



# HIDDEN DANGER

## *Environmental Health Threats in the Latino Community*

### *Principal Authors*

Adrianna Quintero-Somaini  
Mayra Quirindongo

### *Contributing Authors*

Evelyn Arévalo  
Daniel Lashof  
Erik Olson  
Gina Solomon, M.D., M.P.H.



## HIDDEN DANGER

*Environmental  
Health Threats  
in the Latino  
Community*

October 2004

---

### ABOUT NRDC

The Natural Resources Defense Council is a national, nonprofit environmental organization with more than 1 million members and online activists. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. NRDC has offices in New York City, Washington, D.C., Los Angeles, and San Francisco. Visit us on the World Wide Web at [www.nrdc.org](http://www.nrdc.org) or contact us at 40 West 20th Street, New York, NY 10011, 212-727-2700.

*NRDC Reports Manager*

Alexandra Kenneough

*Editor*

Matthew Freeman

*Production*

Bonnie Greenfield

*NRDC President*

John Adams

*NRDC Executive Director*

Frances Beinecke

*NRDC Director of Communications*

Alan Metrick

Copyright 2004 by the Natural Resources Defense Council.

For additional copies of this report, send \$7.50 plus \$3.95 shipping and handling to NRDC Reports Department, 40 West 20th Street, New York, NY 10011. California residents must add 7.5% sales tax. Please make checks payable to NRDC in U.S. dollars.

This report is printed on paper that is 80 percent recycled, 60 percent post-consumer waste, and processed chlorine free.

# CONTENTS

<b>Foreword</b>	<b>iv</b>
<b>Acknowledgments</b>	<b>v</b>
<b>Executive Summary</b>	<b>vi</b>
<b>Chapter 1: Introduction</b>	<b>1</b>
Where Latinos Live and Work in the United States	1
Environmental Health Risks to Latinos	3
Factors Compounding Environmental Health Risks in Latino Communities	5
Identifying Key Threats	8
<b>Chapter 2: Air Quality</b>	<b>9</b>
Power Plant Pollution	10
Vehicle Pollution	13
Industrial Pollution	17
Recommendations	21
<b>Chapter 3: Water Quality</b>	<b>23</b>
Drinking Water Supply in Latino Communities	23
Latino Perception of Bottled, Vended, and Tap Water	24
Siting of Superfund Sites	26
Waterborne Diseases in Drinking Water	27
Drinking Water Contaminants	31
Recommendations	36
<b>Chapter 4: Pesticides</b>	<b>38</b>
Children of Farmworkers at Risk	39
Agricultural Pesticide Drift	40
Inadequate Protections Against Farmworker Poisonings	41
Use of Pesticides in the Home	44
Pesticides in Public Housing	46
Recommendations	47
<b>Chapter 5: Lead</b>	<b>50</b>
Dangers of Lead Poisoning for Latinos	51
Recommendations	53
<b>Chapter 6: Mercury</b>	<b>54</b>
Mercury Levels in the Blood and Hair of Latinos	55
Mercury-Contaminated Fish	55
Folk Remedies and Cosmetics	57
Religious Ceremonies	58
Recommendations	60
<b>Endnotes</b>	<b>61</b>



## HIDDEN DANGER

*Environmental  
Health Threats  
in the Latino  
Community*

October 2004



## HIDDEN DANGER

*Environmental  
Health Threats  
in the Latino  
Community*

October 2004

## FOREWORD

As Latinos, the environment is part of our heritage. Our ancestors taught us to love, protect and cherish the environment. Activists like César Chávez and Dolores Huerta fought hard in the 1960s and 1970s so our families today can benefit from a stronger environment and better health. They spearheaded the ban of harmful pesticides and paved the way for a broad recognition of the importance of environmental justice in the Latino community.

But despite their efforts and efforts of those who continue to fight, Latino families today continue to bear the burden of poor environmental conditions. Our children disproportionately suffer from asthma as a result of air pollution, and pregnant women and the elderly suffer from lead and other contaminants in our drinking water. The reality is that our health continues to be inextricably linked to the quality of the environment.

Unfortunately, there is a lack of information available on the extent of the impact of environmental conditions on public health of the Latino community, and often, the information that is available is not easily accessible. This lack of access and lack of information makes it difficult to educate our communities, hard for us to fight for ourselves, and even more difficult to legislate policies that will make a real difference for our community.

Natural Resources Defense Council's new report, *Hidden Danger: Environmental Health Threats in the Latino Community*, is a good step toward getting the information we need to continue to fight for our health and our community. Together, with leaders from the Latino community and other public health and environmental groups, I hope that we can use this information to work toward a cleaner and healthier future.

Together, we can.

*Hilda L Solis*

*Hilda L. Solis, Member of Congress*

*Ranking Democratic Member, Environmental and Hazardous  
Materials Subcommittee, House Energy and Commerce Committee  
Chair, Congressional Hispanic Caucus Health Task Force*

## ACKNOWLEDGMENTS

The Natural Resources Defense Council gratefully acknowledges The California Wellness Foundation, the Richard & Rhoda Goldman Fund, and The Quixote Foundation for their generous support. The authors would also like to thank the following experts from NRDC for their editorial review and comments: Diane Bailey, Ann Bordetsky, Aaron Colangelo, Gail de Rita, Jon Devine, Linda Greer, Jessica Landman, David McIntosh, Lisa Novins, Beth Owen, Mercedes Rubio, Heather Taylor, Bella Tonkonogy, Faith Weiss, and Greg Wetstone.

The authors would also like to thank their external reviewers: Francisco Apodaca of Conservation Voters New Mexico, Shelley Davis of the Farmworker Justice Fund, Judith Espinosa of the Alliance for Transportation Research Institute at the University of New Mexico, Moises Gonzales of the Mexicano Land Education and Conservation Trust, Gabriella Lemus of the League of United Latin American Citizens (LULAC), Richard Moore of the Southwest Organizing Project, Gloria and Alfredo Quintero, Paola Ramos of Latino Issues Forum, Marcela Urrutia, of the National Council of La Raza (NCLR), and Linda Young, for their invaluable comments and support; Sergio Bendixen, Sergio Carlos, and Joe Velasquez for their guidance.

A very special thanks to Congresswoman Hilda Solis and Congressman Raul Grijalva for their unwavering support of the environment and continued encouragement.



## HIDDEN DANGER

*Environmental  
Health Threats  
in the Latino  
Community*

October 2004



## HIDDEN DANGER

### *Environmental Health Threats in the Latino Community*

October 2004

## EXECUTIVE SUMMARY

Pollution in the United States poses health risks for everyone, regardless of race, ethnicity, language, or country of origin. A large percentage of U.S. Latinos, however, live and work in urban and agricultural areas where they face heightened danger of exposure to air pollution, unsafe drinking water, pesticides, and lead and mercury contamination. These hazards can cause serious health problems, including an increased risk of asthma and cancer; waterborne diseases such as giardiasis, hepatitis, and cholera; and neurological and developmental problems.

Specific examples of pollution threatening U.S. Latino communities include the following:

- ▶ Some 91 percent of Hispanics in the United States live in metropolitan areas, where polluted air may increase the risk of illnesses including asthma and cancer.
- ▶ One and a half million U.S. Latinos live in *colonias* (unincorporated communities with substandard housing) along the U.S.-Mexico border, where a lack of potable water and sewage treatment contributes to waterborne diseases such as giardiasis, hepatitis, and cholera.
- ▶ More than one-third of U.S. Latinos live in Western states, where arsenic, industrial chemicals, and fertilizer residues often contaminate local drinking water supplies.
- ▶ The great majority—88 percent—of farmworkers are Latinos; they and their families face regular pesticide exposure, which can lead to increased risks of lymphoma, prostate cancer, and childhood cancers.
- ▶ Twice as many Hispanic children as non-Hispanic white children are likely to have lead in their blood at levels higher than the action level established by the Centers for Disease Control and Prevention (CDC) for risk of lead poisoning.

Despite the serious risks, government officials and some in the scientific community have largely overlooked the impact of pollution on the health of Latinos. Federal and state agencies fail to collect relevant data; few studies assess environmental health threats in Latino communities; and many government authorities, industry, farm operators, and landlords fail to provide warnings in Spanish about environmental health threats. This leaves many Hispanics without the information they need to evaluate the risks to their health from environmental contaminants at their jobs and in their neighborhoods, and even those connected to their cultural traditions.

This report helps bridge the information gap by analyzing existing data and documenting five categories of pollution exposure and the resulting health consequences that exact a heavy toll on Latinos: air quality, water quality, pesticides, mercury, and lead. These categories do not tell the whole story of pollutants threatening Latinos' health in the United States, nor does this report provide a complete picture of the environmental hazards Latinos may encounter in each category it explores. The findings presented in this report, however, underscore the urgent need for government action to identify the effects of environmental health threats on Latino communities, to inform Latinos about the health hazards they face, and to place stronger restrictions on everyday—but hazardous—pollutants that endanger the health and safety of millions of Americans of all ethnicities.

---

### **AIR POLLUTION IN HEAVILY HISPANIC AREAS**

Approximately 66 percent of U.S. Latinos—25.6 million people—live in areas that do not meet the federal government’s air quality standards. These include the U.S.-Mexico border region, the Central Valley of California, and the cities of Chicago, New York, Phoenix, and Houston.

Air pollutants that stream out of power plants, vehicles, heavy machinery, and factories can lead to an increased risk of asthma, lung cancer, allergies, and chronic bronchitis and can even contribute to premature death. Air pollution takes a particular toll on pregnant women and young children, increasing the risk of complications during pregnancy and the risk of premature birth, low birth weight, and cardiac defects in babies.

The following are examples of hazardous areas that have large Latino populations:

- ▶ Chicago and the surrounding area, where 800,000 Hispanics live within ten miles of two power plants estimated to contribute to 2,800 asthma attacks and 41 premature deaths every year.
- ▶ The New York City metropolitan area, where traffic congestion is the second worst in the country, where Latinos suffer the highest adult asthma rate of all ethnic groups, and where children are hospitalized for asthma at twice the national rate.
- ▶ The neighborhood of South Phoenix, where 60 percent of the population is Hispanic and where the asthma rate is higher than anywhere else in surrounding Maricopa County.
- ▶ San Diego’s Barrio Logan neighborhood, where 85 percent of residents are Latino and where asthma rates are 28 percent—four times the national average.
- ▶ California’s Central Valley, where Latinos account for 30 percent of the population and where air pollution has been linked with an increase in emergency room visits and hospitalizations for respiratory conditions.

*Air pollution takes a particular toll on pregnant women and young children, increasing the risk of complications during pregnancy and the risk of premature birth, low birth weight, and cardiac defects in babies.*

---

### **DRINKING WATER CONTAMINATION IN LATINO COMMUNITIES**

Thousands of U.S. residents become ill each year from drinking water contaminated with human and animal waste, pesticides, and heavy metals such as arsenic and lead. This problem is especially prevalent along the U.S.-Mexico border, where some communities lack access to sanitary sewers, and in southern and western states, where drinking water sources are polluted with arsenic and nitrates. Nor are Latinos living in urban areas with large-scale drinking water distribution systems free from worry about water quality. Although some cities have excellent tap water, several with large Latino populations—such as Albuquerque, Fresno, and San Francisco—have water that is sufficiently contaminated to pose health risks to vulnerable people.

Bacteria or parasites in drinking water pose health risks of waterborne diseases, which some studies estimate to affect 7 million or more people each year, 560,000 of them severe cases. Nationwide, it is not known what percentage of those affected by waterborne diseases are Latinos, but data for Los Angeles County in 2000 and New York County in 2001 demonstrate that Hispanics have higher rates for giardiasis and

cryptosporidiosis, respectively, than other ethnic groups. The health effects for many waterborne diseases include diarrhea, abdominal pain, nausea, and vomiting—and some waterborne diseases such as cholera and those caused by *E. coli*, for example, can be fatal to humans.

Bacteria and parasites are not the only contaminants in drinking water that cause illness. Arsenic, which occurs naturally in some rocks that dissolve into water supplies, is known to cause cancer of the bladder, lung, and skin and is suspected to cause cancers of the liver and kidney. Perchlorate, a component of rocket fuels and explosives, seeps into the drinking water supply, where it then exposes people to risks of diminished levels of thyroid hormone—a hormone essential for normal brain development in infants and fetuses. And nitrates found in fertilizers and human and animal feces wash into drinking water sources, where they can interfere with the blood's ability to carry oxygen to the brain and vital organs.

Water quality problems that endanger Latino communities include the following:

- ▶ *Colonias* along the U.S.-Mexico border lack potable water and adequate wastewater treatment, putting residents at risk of contracting waterborne diseases such as giardiasis, hepatitis, and cholera.
- ▶ Arizona's Maricopa County and much of Southern California, both heavily Hispanic areas, take drinking water from the Colorado River, which has been contaminated with perchlorate, a chemical that harms the thyroid and may cause cancer.
- ▶ Officials in California have closed approximately 800 wells because of high levels of nitrates (nitrogen products from fertilizers, human feces, and animal manure), which interfere with the blood's ability to carry oxygen to the brain and vital organs and can cause disease and death among infants.

*Hispanics employed as farmworkers in California were found to have a 59 to 69 percent greater risk of stomach, cervical, and uterine cancer, and of some leukemias, compared with other Hispanics in the state.*

---

#### **PESTICIDE EXPOSURE AT WORK AND AT HOME**

Most U.S. farmworkers (88 percent) are Latino. Many of these men and women are routinely exposed to toxic pesticides. Not only are they exposed to pesticides at work, but also they and their families are exposed off the job when pesticides drift through the air, settle in their drinking water, and cling to their clothes and food.

The effects of exposure to some pesticides include skin rashes, burning eyes, cough, nausea, vomiting, diarrhea, and difficulty breathing. Pesticide exposure may also increase the risk of certain cancers as well as miscarriages and birth defects. Children are particularly susceptible to these harmful chemicals. Many children of farmworkers are exposed to pesticides daily.

Evidence of the vulnerability of farmworkers and their families to pesticide exposures abounds. Here are examples:

- ▶ Hispanics employed as farmworkers in California were found to have a 59 to 69 percent greater risk of stomach, cervical, and uterine cancer, and of some leukemias, compared with other Hispanics in the state.

► Scientists at the University of Washington in Seattle tested children of farmworkers who live in Douglas and Chelan counties in Washington state and found that more than half were exposed during the spraying season to pesticide levels that exceeded federal safety levels, even though the children did not work in the fields.

► Twenty-four farmworkers in Bakersfield, California, were taken to hospitals in May 2004 after pesticides sprayed on a nearby potato farm drifted through the air.

Despite the great potential for pesticide exposure, workers who apply pesticides in the field often do not have or use proper safety equipment. Even when safety equipment is available, many workers do not receive training in its use. Another contributing factor in workers' exposure to pesticides is the lack of water for washing off pesticide residues. According to a U.S. Department of Labor survey, water for washing is unavailable in 16 percent of all fields, lengthening the time that workers spend in contact with pesticide residues and thus increasing the danger of pesticide-related illnesses.

Pesticide exposure is not limited to farmworkers. Americans are exposed to pesticides on a daily basis, and some studies have found a high rate of pesticide use in Latino households. According to a study of pesticide exposure among pregnant women in New York City, Latinas were more likely than non-Hispanic white women to report that they or a member of their household had used pesticides at home during their pregnancy. Latinos living in public housing may be especially exposed. In New York City, for example, almost 190,000 Latinos living in public housing may be exposed to pesticides through routine exterminations.

---

#### **LEAD POISONING IN LATINO CHILDREN**

Although blood lead levels have decreased steadily among the U.S. population as a whole since lead was banned in gasoline and paint in the 1970s, Hispanic children in general are twice as likely as non-Hispanic white children to have blood lead levels above the threshold established by the CDC for risk of lead poisoning.

Other studies conducted in U.S. cities with large Hispanic populations have suggested that Latino children are at significant risk from lead poisoning. In Arizona in 2002, 77 percent of children diagnosed with lead poisoning were Latinos, whereas the total percentage of Latinos in the state is only 25.3 percent. And in San Bernardino County, California, 65 percent of lead-poisoned children were Hispanic, whereas the total Hispanic population in the county is 39.2 percent.

In children, lead is known to cause neurological problems even at tiny doses. Most notably, lead has been associated with a decline in IQ and with learning disabilities, hyperactive behavior, violence, and an increase in antisocial behavior. In adults, lead has been linked to neurological problems, high blood pressure, and kidney problems.

The principal source of lead exposure for children is lead-contaminated dust (from lead-based paint), but other sources may have particular implications for Latinos. One such source is lead-glazed pottery, which some tourists and immigrants continue to bring in from Mexico and other countries. Some Latino children may also be eating lead in candy, as reported in an April 2004 *Orange County Register* investigative story.

*Hispanic children in general are twice as likely as non-Hispanic white children to have blood lead levels above the threshold established by the CDC for risk of lead poisoning.*

The article explained how lead-contaminated candies manufactured in Mexico make their way into the U.S. market.

Another factor for increased risk of childhood lead poisoning among Latino immigrants, particularly those of Mexican origin, is the use of certain folk remedies. Such traditional remedies as *greta* and *azarcón*, which may contain nearly 100 percent lead and are often used to treat stomachaches, may expose children to dangerously high lead concentrations.

---

### **MERCURY EXPOSURE**

The harmful effects of mercury pose another health threat to Latinos. The major ways in which Latinos are exposed to mercury are by eating mercury-contaminated fish and by using mercury in religious ceremonies, cosmetics, and folk remedies. The problem of exposure is aggravated by a lack of Spanish-language educational materials about mercury's hazards and by many states' failure to provide warnings in Spanish about mercury levels in fish caught in local waterbodies.

Mercury accumulates in the body, where it remains for many months. Although mercury exposure can cause health problems for men and women of any age, women of reproductive age and children face the greatest risk. Mercury in a pregnant woman's body can affect the developing brain of the fetus. Children, whose brains continue developing until approximately the age of seven, can develop neurological and behavioral problems and learning disabilities from exposure to mercury. A nationwide study found that on average, Latino children have higher mercury levels in their bodies compared with non-Hispanic children.

Mercury is released into the air by power plants and chemical companies, falls into water, and accumulates in fish, including the canned tuna commonly bought in stores. Tests by the Food and Drug Administration and independent organizations have shown that the mercury levels in canned white (albacore) tuna are high enough that women of reproductive age should not eat more than one can every 10 days. Yet many mothers, particularly those who receive assistance from the Women, Infants, and Children (WIC) program, unknowingly put their children at risk by choosing tuna as an inexpensive, low-fat source of protein, because tuna (but not other types of fish or meat) is a WIC-eligible food. In 2002, for the first time, Hispanics made up the largest group of WIC participants; and according to a study in New York City, canned tuna is the most popular fish among Latinos.

Mercury-contaminated fish—which cannot be distinguished by taste, touch, sight, or smell—is not only purchased but also caught by recreational and subsistence anglers. Although government agencies test fish in many parts of the country, they rarely warn the Spanish-speaking community of the risks of eating contaminated fish. In New York, a study showed that Latino anglers ate more fish from contaminated waters and were less likely to be aware of health advisories than non-Latinos. A study of anglers in Santa Monica Bay found that only 58 percent of Latinos, versus 88 percent of non-Hispanics, had heard about fish advisories in their area.

*Latino children have higher mercury levels in their bodies compared with non-Hispanic children.*

Certain religious and cultural practices provide another route of exposure to mercury, which is sprinkled indoors by practitioners of *Espiritismo* and *Santería* (religious traditions found most commonly among people of Puerto Rican and Cuban origin, respectively), and in the *Voodoo* and *Palo* traditions. Surveys in Massachusetts, New York, and Chicago found that between 19 and 44 percent of Hispanic respondents reported sometimes using mercury for magic or religious purposes. Researchers estimate that 47,000 capsules of mercury are sold per year in *botánicas* (stores that sell remedies and religious items) in New York City, and these capsules are likely to cause long-term contamination of more than 13,000 homes or apartment buildings each year. Use of mercury in an apartment building has been shown to cause elevated levels of mercury vapor in the hallways and entryway, and probably also in other apartments where mercury was not used. Toxic vapors can linger for months or even years, leading to neurological and respiratory symptoms in apartment residents.

---

### **RECOMMENDATIONS TO IMPROVE ENVIRONMENTAL HEALTH IN THE LATINO COMMUNITY**

Pollution-related health problems affecting U.S. Latino communities can be reversed, but only with a concerted effort from government and industry that includes government funding for adequate data gathering and research as well as outreach to the Latino community. Following are selected recommendations aimed at improving environmental health in the Latino community; the following chapters outline other recommendations for reducing pollution and improving Latino health.

#### **To begin addressing the problem of air pollution in Latino communities,**

- ▶ The U.S. government should make funding available through the CDC for the study of asthma rates and other health effects in Latino and other minority communities affected by air pollution.
- ▶ The Environmental Protection Agency (EPA) should enforce regulations that require power plants to install modern pollution controls when they make upgrades that would increase pollutant emissions. The EPA should withdraw its recent changes to these regulations.
- ▶ State health departments and environmental agencies should inform the Latino community about the general health effects of air pollution, the specific hazards posed by conditions in their community, and ways to reduce their health risks. These agencies should use Spanish media outlets to reach Latino populations.

#### **To begin addressing the problem of poor drinking water quality in Latino communities,**

- ▶ Congress should increase funding for the Border Environmental Infrastructure Fund from \$50 million to \$100 million to build and improve drinking water systems in the U.S.-Mexico border region.
- ▶ Congress should increase funding for the CDC and the EPA to track waterborne diseases in the U.S.-Mexico border region and to carry out outreach campaigns to

*Pollution-related health problems affecting U.S. Latino communities can be reversed, but only with a concerted effort from government and industry that includes government funding for adequate data gathering and research as well as outreach to the Latino community.*

educate residents on how to reduce exposure to microbial and chemical contaminants in the water.

- ▶ The EPA should require public water systems serving an area where at least 10 percent of the population speaks Spanish as a primary language to translate consumer confidence (“right-to-know”) reports into Spanish.

**To begin addressing the problem of pesticide exposure in Latino communities,**

- ▶ The EPA should ban the most hazardous pesticides, and the EPA and various state regulatory agencies should prohibit drift-prone application methods, including the use of airplanes, to reduce acute and chronic poisonings.
- ▶ The EPA should require farm owners to establish larger buffer zones during pesticide applications and to improve posting and worker-notification practices to reduce pesticide drift and pesticide residue exposures.
- ▶ The EPA and various state agencies should designate farm children as a vulnerable population that must be considered and protected in all pesticide registration and tolerance decisions under federal and state law.

**To begin addressing the problem of lead poisoning in Latino communities,**

- ▶ Congress should allocate funding to the Department of Housing and Urban Development (HUD) for expansion of the program that provides financial assistance for lead abatement and control projects in privately owned housing. Congress should also allocate funds through the Department of Health for a lead-screening program in urban, low-income housing.
- ▶ The CDC should require every state to report the results of blood lead testing, including the race or ethnicity of every child tested, to make it possible to track the progress of lead poisoning prevention programs and to identify areas where additional interventions may be needed.

**To begin addressing the problem of mercury in Latino communities,**

- ▶ The EPA should require power plants to install the best available technology to achieve maximum control of mercury emissions and should require prompt reduction of as much as 90 percent in mercury emissions from power plants.
- ▶ The Food and Drug Administration (FDA) should require the posting of fish consumption advisories in grocery stores in both English and Spanish; state departments of health should provide fish consumption advisories in English and Spanish to public clinics.
- ▶ State health departments and departments of environmental protection should post warnings in English and Spanish about fish contamination in local waterbodies.

# INTRODUCTION

Pollution in the United States poses health risks for everyone, regardless of race, ethnicity, language, or country of origin. A large percentage of U.S. Latinos, however, live and work in urban and agricultural areas where they face heightened danger of exposure to air pollution, unsafe drinking water, pesticides, and lead and mercury contamination. These hazards can cause serious health problems, including an increased risk of asthma and cancer; waterborne diseases such as giardiasis, hepatitis, and cholera; and neurological and developmental problems. The problems are compounded by several factors, including the following:

- ▶ Lack of data about environmental health risks to Latinos
- ▶ Lack of accessible, Spanish-language information on environmental issues and ways to protect against health risks
- ▶ Lack of access to adequate medical care
- ▶ Lack of government action to protect low-income and minority communities from environmental hazards

Exposure to pollution, combined with weak or nonexistent efforts to inform Latinos about and protect them from associated health hazards, contributes to a serious and growing health problem for Hispanic communities from coast to coast.

---

## WHERE LATINOS LIVE AND WORK IN THE UNITED STATES

Latinos are the largest minority group in the United States. Nearly 40 million Latinos lived in the United States in 2002, making up 13.4 percent of the total U.S. population.<sup>1</sup> Latinos share common bonds of language, culture, religion, and history, and yet there is considerable variation in terms of self-defined ethnic identity. Some Latinos refer to themselves according to their country of origin—for example, as Mexican-Americans (or Chicanos). Others refer to themselves as Latinos or Hispanics, and still others simply as Americans.<sup>2</sup> The 2002 census defines a Hispanic or Latino person as “a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race.”<sup>3</sup> In this report, the terms *Latino* and *Hispanic* are used interchangeably.

About two-thirds (66 percent) of U.S. Latinos are of Mexican origin, with people of Central and South American extraction accounting for another 14 percent. Slightly less than half (44 percent) of U.S. Latinos live in the West, 35 percent in the South, 13 percent in the Northeast, and 8 percent in the Midwest. Most Hispanics (91 percent)



## HIDDEN DANGER

### *Environmental Health Threats in the Latino Community*

October 2004

live in metropolitan areas, nearly half of them in cities. In fact, Hispanics are twice as likely as non-Hispanic whites to live in cities.<sup>4</sup>

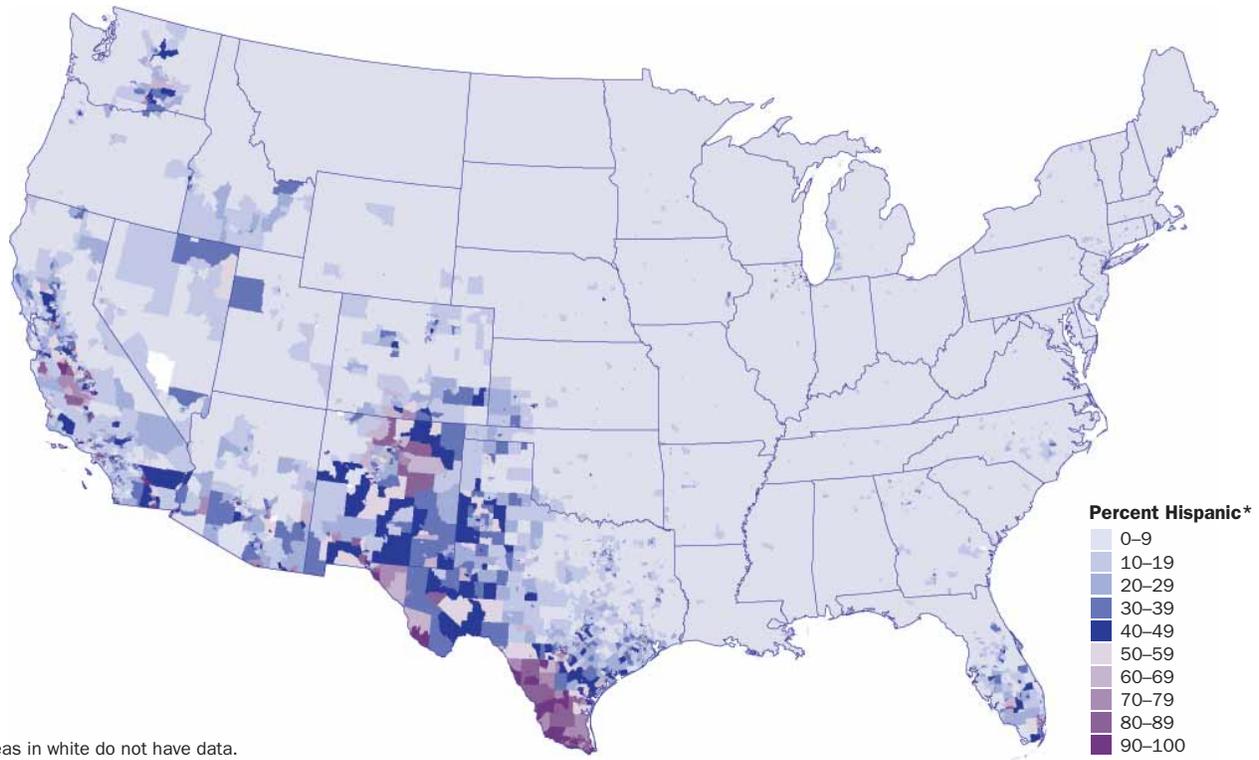
Particular states have large Hispanic communities, including California, Arizona, New Mexico, Florida, Colorado, Texas, New York, New Jersey, and Illinois, each of which has a Hispanic population numbering 500,000 or more. Along the U.S.-Mexico border and in parts of California and in South Florida, it is common for Hispanics to be in the majority in a given local area (see Figure 1-1)

Most Hispanics (63 percent) more than 16 years of age are employed—the same rate as for non-Hispanic whites.<sup>5</sup> Hispanics made up half of all new workers in the past decade, a trend that, according to *BusinessWeek*, will lift Hispanics from roughly 12 percent of the workforce today to nearly 25 percent two generations from now.<sup>6</sup> According to the Census Bureau, Latinos are twice as likely as non-Hispanic whites to be employed in service jobs, and twice as likely to be employed as laborers. They also are the majority of the agricultural workforce. According to the Bureau of Labor Statistics, 88 percent of U.S. farmworkers are Hispanic.<sup>7</sup>

**Latino Attitudes Toward Environmental Protection**

Surveys have repeatedly found that Latinos strongly believe environmental preservation and health protection are important. Preserving the environment

**FIGURE 1-1**  
**Hispanic Population in the United States**



\*Areas in white do not have data.

Source: U.S. Census Bureau 2000 tract-level data

### **CÉSAR E. CHÁVEZ: A PREEMINENT LATINO ENVIRONMENTAL ACTIVIST**

In possibly one of the most important public marriages of civil and environmental rights, César E. Chávez led the fight of California and Southwestern farmworkers against injustices brought on by abusive employment practices and the dangers of pesticides. The son of a migrant farmworker, Chávez experienced the hardships of life in the fields at a time when workers had fewer rights than they have today. With his wife, he began teaching English to other farmworkers so that they could become American citizens. Then he organized voter registration drives and unionized farmworkers to fight for their rights, ultimately helping to form the National Farmworkers Union (now the United Farmworkers of America).

Chávez and other union members faced violence and jail sentences in their struggle for better pay and working conditions. Their sacrifices paid off in 1966, when growers and farmworkers reached an unprecedented collective bargaining agreement, which required growers to provide clean drinking water and protection against pesticides. Under Chávez's leadership, farmworkers also obtained higher salaries and worker's compensation benefits.

César Chávez continued working for farmworkers' rights until his death in 1993. His legacy lives on in the work of those who continue to fight to improve the lives of America's farmworkers.

Source: César E. Chávez Institute, San Francisco State University. Available online at [http://www.sfsu.edu/~cecipp/cesar\\_chavez/chavezhome.htm](http://www.sfsu.edu/~cecipp/cesar_chavez/chavezhome.htm).

was the third most important issue to registered Latino voters in California, after improving public education and reducing crime, according to a survey by the Latino Issues Forum in 1998.<sup>8</sup> Another survey of Latinos in California found that 85 percent are in favor of permanently protecting wilderness areas and wild rivers that are being threatened by development.<sup>9</sup> In 2000, a nationwide survey of registered voters found that 55 percent of Hispanics (versus 44 percent of the general population) said that reducing illnesses caused by environmental problems should be a top priority of the federal government. In addition, 62 percent of Hispanics said this issue should be a priority of their state and local governments.<sup>10</sup>

Latinos have also demonstrated their concern about environmental issues at the polls and elsewhere (see "César E. Chávez"). For example, in 2002 California's Proposition 40, the largest bond proposal for parks and open space in U.S. history, passed with the approval of 74 percent of Latino voters.<sup>11</sup>

Despite demonstrated interest among Latinos to preserve the environment and prevent harm from environmental health threats, policymakers and businesses are not addressing the serious environmental health hazards many Latinos encounter in their daily lives.

---

### **ENVIRONMENTAL HEALTH RISKS TO LATINOS**

Although the Latino population is growing and becoming increasingly influential in public policy debates, many Hispanics live and work in places where environmental health hazards are most likely to be in evidence. Occupational and home exposures

include power plants and industrial facilities in or very close to Hispanic neighborhoods, pesticides in the fields where many Latinos work, and contaminated drinking water in heavily Latino areas of the country.

### **Agricultural Areas**

Nearly 90 percent of U.S. farmworkers are Hispanic. In California, 91 percent of all hired farmworkers were born in Mexico.<sup>12</sup> Many of these men and women live and work in areas where exposure to pesticides is almost constant. They take in toxic pesticides at work when they spray fields and when they harvest crops in recently sprayed fields. Farmworkers and their families are also exposed to pesticides off the job because of pesticides drifting through the air; pesticide residues brought into the home on their skin, clothes, and shoes; and pesticide residues on the food they eat and in the water they use to drink and bathe.

### **Major Urban Areas**

Heavily Hispanic neighborhoods are often located in industrial areas where pollutants are constantly poured into the air by factories and heavy traffic. Major highways on which polluting diesel trucks travel day and night often surround their neighborhoods. Exposure to this polluted air can cause lung cancer, asthma attacks, and premature death. One study estimates that a Hispanic child's chances of developing asthma are two and a half times as high as those of a non-Hispanic white child.<sup>13</sup>

Not only do factories pollute the air, but also many leave behind toxic waste that continues to expose nearby communities—often minority or low-income people—to dangerous chemicals long after the factories have shut down. The most polluted abandoned hazardous waste sites around the country are designated by the Environmental Protection Agency (EPA) for cleanup through the Superfund program. Cleanup of these sites is funded by a tax paid by chemical and oil companies. But in 1995, Congress allowed the tax to expire, and, as a result, the cleanup of as many as 522 Superfund sites could be scaled back or postponed, leaving many poor and minority communities exposed to serious health hazards. In areas with large Latino communities, underfunding jeopardizes the cleanup of many contaminated sites: 2 in Arizona, 37 in California, 24 in Florida, 17 in Illinois, 5 in New Mexico, 49 in New York, and 25 in Texas.<sup>14</sup>

### **U.S.-Mexico Border and Southwestern States**

Water pollution also affects Latino communities across the country, particularly in impoverished areas along the U.S.-Mexico border, where contaminated drinking water is a serious problem. Pollutants in drinking water in southern and western states can cause sudden, even deadly, illnesses such as cryptosporidiosis and those caused by *E. coli*, or serious long-term effects, including cancer, hepatitis A, and developmental problems. Even where water contamination does not pose a health risk, lack of information in Spanish reinforces the trend among Latinos to purchase bottled drinking water. Some families then spend a high portion of their income on bottled water.

*Hispanic children “rank at or near the top of several unhappy lists”: exposure to environmental toxins, poverty, lack of health insurance, low levels of education, and cultural and language barriers that affect their performance in school and limit their ability to achieve better living conditions as they grow into adulthood.*

### **The Particular Risk to Children**

The combined effect of these environmental hazards is particularly serious for children. All children breathe more air, drink more water, and consume more food pound for pound than adults. The air intake of a resting infant is twice that of an adult under the same conditions; infants and children drink more than two and half times as much water daily as adults do as a percentage of body weight; children ages one through five eat three to four times more per unit of body weight than the average adult American; and the total area of skin that could be exposed to a chemical (by swimming or bathing in polluted water or rolling in dirt) is two and a half times as great per unit of body weight in the infant as in the adult.

A study published in the *Journal of the American Medical Association*, for example, found that Hispanic children “rank at or near the top of several unhappy lists”: exposure to environmental toxins, poverty, lack of health insurance, low levels of education, and cultural and language barriers that affect their performance in school and limit their ability to achieve better living conditions as they grow into adulthood.<sup>15</sup> The study’s lead author is Glenn Flores, M.D., chairperson of the Latino Consortium of the American Academy of Pediatrics Center for Child Health Research. Dr. Flores points out that with one of every six children in the United States Latino, “[i]f the disparities continue, it has the potential to affect the health and productivity and well-being of our entire nation.”

---

### **FACTORS COMPOUNDING ENVIRONMENTAL HEALTH RISKS IN LATINO COMMUNITIES**

Many Latinos face increased exposure to environmental health risks because of the polluted areas in which they live and work. In addition, these risks are compounded by a series of problems that affects their ability to combat environmental health hazards.

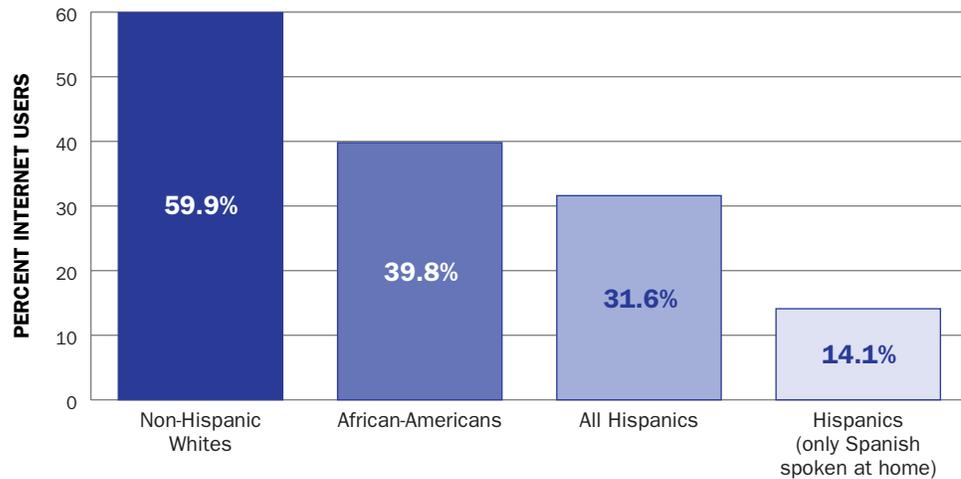
#### **Lack of Data About Environmental Health Threats to Latinos**

What we know about Hispanic exposure to pollution is disturbing. Equally distressing is what we know we do not know. Important questions remain unanswered, or at least inadequately answered, because no government body has collected the necessary data. For example, government data collectors do not generally include enough Latinos in their surveys to allow for any useful conclusions, and they often fail to analyze data on environmental exposures based on ethnicity.

Failure to collect data specific to minorities leaves us in the dark on important aspects of the environmental health effects of government and corporate actions on predominantly Latino neighborhoods and regions, and in turn it increases the environmental health risks for Latinos. The lack of data also makes it harder to determine whether the health care needs of Latinos who face increased environmental health risks are being met. Improved tracking of pollution, pollution-related diseases, and consequential health care needs would be an important step toward reducing the risks confronting the Latino community.

*Government data collectors do not generally include enough Latinos in their surveys to allow for any useful conclusions, and they often fail to analyze data on environmental exposures based on ethnicity.*

**FIGURE 1-2**  
**Internet Use by Population Group, 2001**



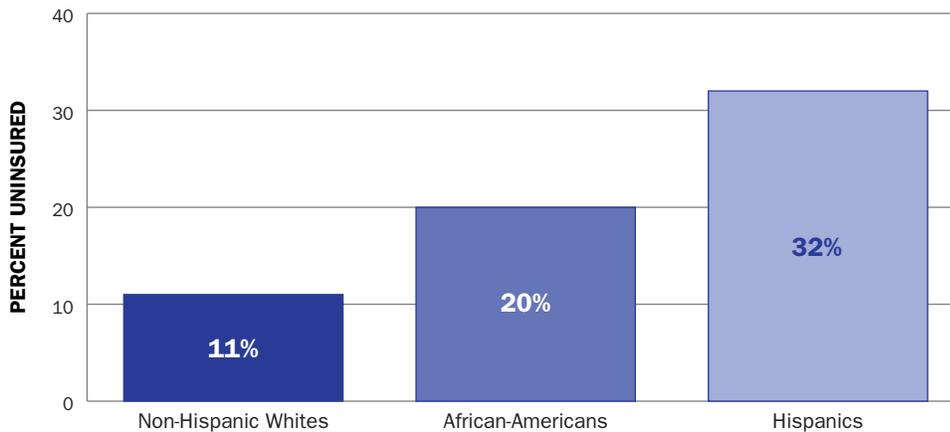
To close this data gap, Congress should enact legislation that will require data collection and make progress toward improving the health of Hispanic children. Such laws include the Legal Immigrant Children's Health Improvement Act (H.R. 1689), the Health Care Equality and Accountability Act (S. 1833), and the Hispanic Health Improvement Act (S. 1159), all of which were introduced in Congress in 2003. And the U.S. Department of Health should require that the programs it operates or funds must collect race, ethnicity, and language data to detect disparities in ethnic and racial health care. In addition, the U.S. Department of Health, the EPA, and other federal and state agencies that conduct scientific studies involving health information should gather data on the race and ethnicity of their study populations. In this way, the data can be used to detect any special health patterns in different ethnic groups.

#### ***Lack of Accessible Information in Spanish***

Despite the well-documented interest of the Latino community in the quality of our environment, most environmental information from federal, state, and local government and private nongovernmental groups is written only in English and is distributed through limited channels, leaving it beyond the reach of those with limited English skills. As government agencies increasingly distribute information over the Internet, a new barrier is created because only 31.6 percent of Latinos are Internet users (see Figure 1-2). Among Hispanics living in homes where Spanish is the only language spoken, the percentage is even lower: only 14.1 percent.<sup>16</sup>

Because environmental issues generally receive little coverage in most of the Spanish-language media, Hispanics are often left in the dark about environmental problems. Several grassroots organizations have been providing information to fill this gap for years, and other larger groups, including NRDC, are beginning to address this need. But there is still a large information gap that government and

**FIGURE 1-3**  
**Lack of Health Insurance by Population Group, 2002**



public interest groups could fill by providing in-depth information aimed at the Hispanic population, including radio, television, and print media.

***Lack of Access to Medical Care***

Despite high employment rates, a significant percentage of the Hispanic population lacks access to proper medical care. About one-third (34 percent) of adult Latinos are uninsured year-round, and an additional 16 percent are uninsured at least part of the year (see Figure 1-3). Contrary to popular belief, their lack of insurance is not necessarily related to employment status. In fact, 79 percent of nonelderly adult Latinos who are uninsured have part- or full-time jobs, but many of those jobs may not offer health benefits. This may explain why Latinos with health problems are twice as likely as the insured in the general population to report not seeing a doctor during the past year.<sup>17</sup>

People without insurance are less likely to visit a doctor regularly and are more likely to suffer lasting health effects after being sickened by pollutant exposures—including Latino children, 24.9 percent of whom have no health insurance and lack access to regular health care.<sup>18</sup> Even unborn babies and their mothers are affected by inequalities in access to health care. One-quarter of pregnant Latinas do not receive early prenatal care; this is twice the rate of non-Hispanic white women.<sup>19</sup> For the approximately 12 million uninsured Latinos, delays in diagnosis and treatment may worsen the consequences of illnesses caused or aggravated by environmental contamination.

To reduce the lack of access to adequate medical care among Latinos, Congress should allow states to provide medical assistance under Medicaid and the State Children’s Health Insurance (SCHIP) to legal immigrants and their children. States should also provide better linguistic and cultural training for health care providers serving people who have limited English skills, and they should establish grant programs to help schools for health professions recruit Hispanics to the sector.

*These findings underscore the need for government action to identify the effects of environmental health threats, to inform Latinos about the health hazards they face, and to place stronger restrictions on everyday—but hazardous—pollutants that endanger the health and safety of millions of Americans of all ethnicities.*

### **Lack of Government Action**

Despite years of local victories won by environmental justice groups, the disparate effect of pollution on many Latino communities continues. In the ten years since a presidential order directed the EPA to integrate environmental justice into its programs and activities, the agency has done little to protect low-income and minority communities from serious environmental risks.<sup>20</sup> In fact, the EPA's own Office of the Inspector General reports that the agency has failed to fully implement the order and has even tried to undermine this mandate.

Specifically, the EPA has failed to identify low-income and minority populations experiencing disproportionately high environmental risks, to develop standards for how to apply environmental justice criteria in decision making, to set environmental justice goals, or to establish a system to measure progress in meeting the order's requirements. Moreover, in 2001, the EPA reinterpreted the executive order to reduce its emphasis on low-income and minority populations. In 2002, the agency went even further, telling its staff that the environmental justice mandate of the executive order was not meant to address specifically the concerns of low-income and minority communities.<sup>21</sup> Not only is this contrary to the executive order, but also it calls into question the EPA's commitment to protect the health of communities at high risk.

---

### **IDENTIFYING KEY THREATS**

The following chapters describe five general categories of environmental health threats that are particularly relevant to the Latino community: air pollution, water pollution, and exposure to pesticides, lead, and mercury. Although these five categories do not cover the full range of pollution that imperils Latinos' health in the United States, each chapter provides a snapshot of the environmental hazards Latinos encounter in that category.

The information in this report helps to fill a small part of the large data gap discussed earlier. This report documents exposure levels, avenues of exposure, and health consequences of that exposure, and it clearly demonstrates that pollution in the United States exacts a heavy toll on Latinos. These findings underscore the need for government action to identify the effects of environmental health threats, to inform Latinos about the health hazards they face, and to place stronger restrictions on everyday—but hazardous—pollutants that endanger the health and safety of millions of Americans of all ethnicities.

# AIR QUALITY



## HIDDEN DANGER

### *Environmental Health Threats in the Latino Community*

October 2004

Air pollution threatens the health of many Americans and is a significant health risk for the majority of Latinos. Approximately 66.1 percent of U.S. Latinos (25.6 million) live in areas that do not meet the federal government's air quality standards.<sup>1</sup> These areas include the U.S.-Mexico border region, the Central Valley of California, Southern California, and the cities of Chicago, New York, Phoenix, and Houston.

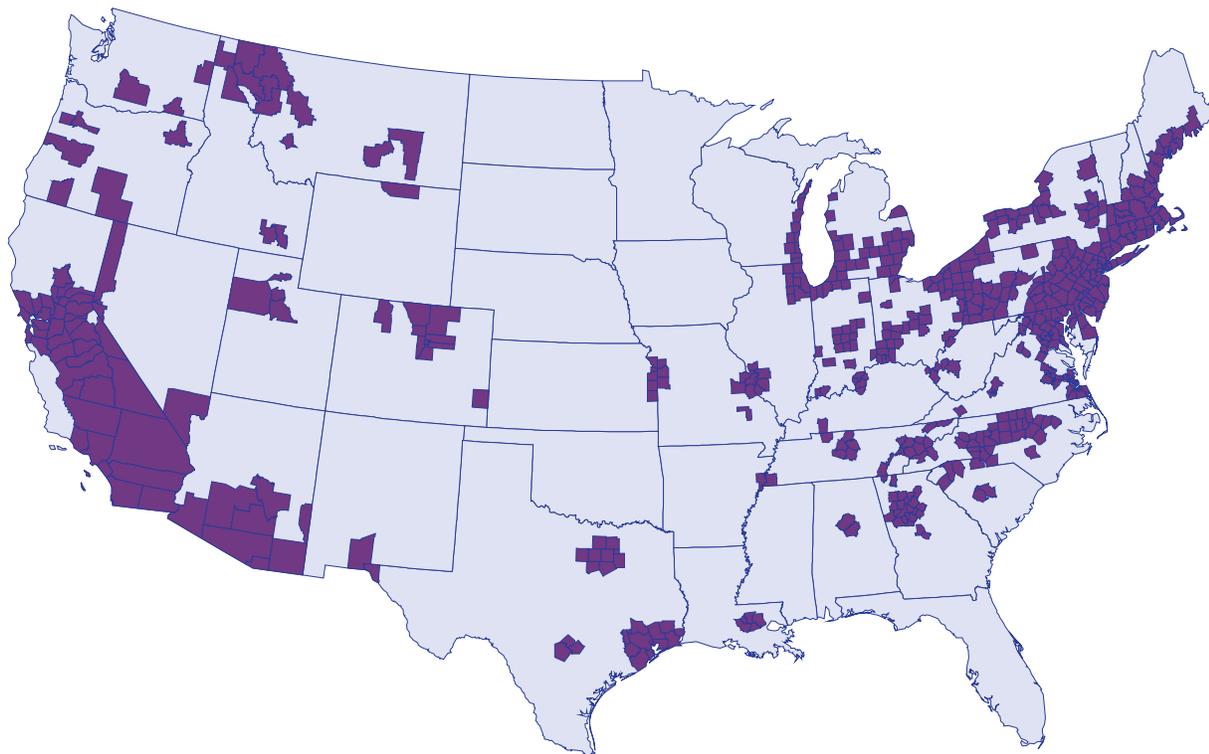
Polluted air harms human health in a number of ways. Lung tissue is fragile and can be easily damaged by the pollutants that stream out of cars, buses, heavy machinery, factories, and power plants. These pollutants can lead to an increased risk of such respiratory diseases as asthma, lung cancer, allergies, and chronic bronchitis and can contribute to premature death. Air pollution takes a particular toll on pregnant women and young children, increasing the risk of complications during pregnancy as well as premature birth, low birth weight, and cardiac defects in babies. Although air pollution is most commonly associated with respiratory illnesses, its effects go much further; it can travel long distances, settle onto vegetation, contaminate bodies of water, and get into the food chain.

Of the hundreds of air pollutants to which humans are exposed daily, the Environmental Protection Agency (EPA) has established health-based national standards for six common air contaminants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide. The levels of these contaminants are used to determine whether the air in specific cities and regions of the country is safe to breathe.<sup>2</sup> The EPA also regulates 188 other toxic air contaminants that can cause a variety of health problems, including cancer and respiratory illnesses.<sup>3</sup> Many of these substances reach unhealthy concentrations in industrialized areas and in urban areas with high traffic.

In the U.S.-Mexico border region alone, more than 3.2 million Latinos live in areas that do not meet the EPA's standards for carbon monoxide, ozone, sulfur dioxide, or particulate matter (see Figure 2-1). Similarly, the San Joaquin Valley and the Sacramento Valley air basins in California's Central Valley are home to more than 1.6 million Latinos. Both areas continually fail to meet national ozone and particulate matter standards, making Bakersfield, Fresno, and the Visalia-Tulare-Portersville area in the Central Valley second only to Los Angeles in ozone pollution.<sup>4</sup>

Four U.S. cities that violate federal air quality standards for ozone and other air quality measures—New York City, Los Angeles, Chicago, and Houston—are home to more than 5.3 million Latinos. The EPA classifies the ozone levels in New York City, Chicago, and Houston as "severe," and Los Angeles stands with the San Joaquin

**FIGURE 2-1**  
**Counties That Do Not Meet National Standards for Key Air Pollutants**



Based on U.S. EPA data as of April 15, 2004.

Valley in the worst classification: “extreme.” Rising temperatures due to global warming will continue to promote ozone formation and make it even more difficult to reduce ozone to healthy levels.

Major air pollution sources can be divided into three general categories:

- ▶ Power plants (particularly coal-fired power plants)
- ▶ Gasoline- and diesel-powered vehicles
- ▶ Industrial sources, such as factories, materials-processing facilities, refineries and other petrochemical operations, mining works, and shipping terminals

This chapter discusses all these major sources as they pose particular threats to Latino communities in the United States.

---

### **POWER PLANT POLLUTION**

Of the three major sources of air pollution, coal-fired power plants are the biggest polluters. In addition to emitting large amounts of particulate matter, nitrogen oxides, sulfur dioxide, and carbon dioxide, power plants spew 50 tons of mercury into the atmosphere every year (see Chapter 6).

## LATINOS AND ASTHMA

Nationwide, more than 2 million Latinos currently suffer from asthma symptoms. Researchers repeatedly link asthma and other respiratory diseases to air pollution, observing that when particulate matter—dust, soot, and smoke—increases, the number of asthmatic children admitted to emergency rooms increases. A recent survey of asthmatic Latino children in East Los Angeles, a neighborhood surrounded by freeways and trucking routes, showed that air pollutants were associated with the onset of the children's asthma symptoms. Heightened rates of asthma also affect children's health in other ways. For example, asthmatic children are more likely to develop bronchitis when exposed to air pollution at levels common in Southern California.

Although Latinos have lower asthma rates than whites or African-Americans on a national basis, studies conducted at regional and local levels reveal hot spots where Latinos have a higher prevalence of asthma and where they are at a much greater risk of being hospitalized or dying from asthma attacks. Whereas the average rate of asthma for all races nationwide is 7.1 percent, a study in the South Bronx area of New York City showed that 17.9 percent of Latino children had asthma compared with 8.2 percent of non-Hispanic white children and 11.6 percent of African-American children. A study in one area of Boston found asthma rates of 39.6 percent for adult Latinos, 39.1 percent for African-Americans, and 24.4 percent for non-Hispanic whites.

Nationally, Puerto Ricans have the highest asthma mortality rate of all ethnic groups, at 47.8 per million, compared with 14.7 per million for non-Latino whites and 38.1 per million for African-Americans. The difference in mortality rates between Latinos and other groups is most striking in the northeastern United States, where the annual asthma mortality rate for Latinos was 33.8 per million from 1990 to 1995, or 2.8 times the rate for non-Latino whites (12.1 per million) during the same period.

Worse still, these rates are increasing for Latinos. The annual asthma mortality rate among Latinos in Chicago increased from 14.3 per million in the 1990–1993 period to 25.7 per million in the 1994–1997 period. Whereas asthma hospitalizations of non-Hispanic white children in California decreased 32 percent between 1983 and 1996, asthma hospitalizations of Latino children *increased* 37 percent during that time, to a rate of 161 per 100,000. These hospitalization rates translate into costs of about \$34.6 million per year.

Sources: H. Desqueyroux et al., "Short-term effects of low-level air pollution on respiratory health of adults suffering from moderate to severe asthma," *Environmental Research* 89(1)(2002): 29–37; G D'Amato et al., "Respiratory allergic diseases induced by outdoor air pollution in urban areas," *Monaldi Archives of Chest Disease* 57(3-4)(2002): 161–163; G. Norris et al., "An association between fine particles and asthma emergency department visits in children in Seattle," *Environmental Health Perspectives* 107(6): 489–493; R. Delfino et al., "Asthma symptoms in Latino children and daily ambient exposures to toxic and criteria air pollutants," *Environmental Health Perspectives* 111(4): 647–656; K. McConnell et al., "Air pollution and bronchitic symptoms in Southern California children with asthma," *Environmental Health Perspectives* 107(9): 757–760; American Lung Association, "Asthma trends 2003"; F.P. Perera et al., "The challenge of preventing environmentally related disease in young children: Community-based research in New York City," *Environmental Health Perspectives* 110(2): 197–204; A.A. Litonjua et al., "Race, socio-economic factors, and area of residence are associated with asthma prevalence," *Pediatric Pulmonology* 28(6): 394–401; D.M. Homa et al., "Asthma mortality in U.S. Latinos of Mexican, Puerto Rican, and Cuban heritage, 1990-1995," *American Journal of Respiratory and Critical Care Medicine* 161(2 Pt1): 504–509; S.D. Thomas and S. Whitman, "Asthma hospitalization and mortality in Chicago: An epidemiologic overview," *Chest* 116(4 Suppl 1): 135S–141S; and R. Donoso and C. Reyes, "Taking Action: Confronting the Health, Social, and Environmental Factors Associated with Asthma in the Latino Community," *Latino Issues Forum*, p. 58. 2003.

*Approximately 15 percent of all Latinos in the United States live within 10 miles of a coal-fired power plant—well within the distance affected by the contaminants in the smoke plume.*

Power plant pollution is significant to the health of Latino communities because census data has shown that approximately 15 percent of all Latinos in the United States live within 10 miles of a coal-fired power plant—well within the distance affected by the contaminants in the smoke plume. These 5.5 million Latinos have an elevated risk of developing asthma and other respiratory conditions from continuous exposure to the pollutants released by these facilities (see “Latinos and Asthma”).

Older, dirtier coal-fired power plants are especially troublesome because they are exempt from some pollution control requirements. Generally, old power plants in the United States release twice the sulfur dioxide and 25 percent more nitrogen oxides per unit of electricity generated than the newer plants with modern pollution control devices.<sup>5</sup> As these plants age and electricity demand rises, evidence suggests that the amount of pollution they release into the air will increase. For example, releases of sulfur dioxide in old Florida power plants increased by 36 percent between 1995 and 2000.<sup>6</sup>

Chicago and the surrounding area, where nearly 800,000 Hispanics live within 10 miles of the Crawford and Fisk power plants, offers another example.<sup>7</sup> This area, which is home to the second largest Mexican-American community in the United States, also has the highest asthma rate in the city.<sup>8</sup> Sulfur dioxide emissions from the Crawford and Fisk power plants increased by 48.1 percent and 45.1 percent, respectively, between 1995 and 2000.<sup>9</sup> Estimates are that pollutant emissions from the two plants contribute to about 2,800 asthma attacks and 40 premature deaths every year.<sup>10</sup>

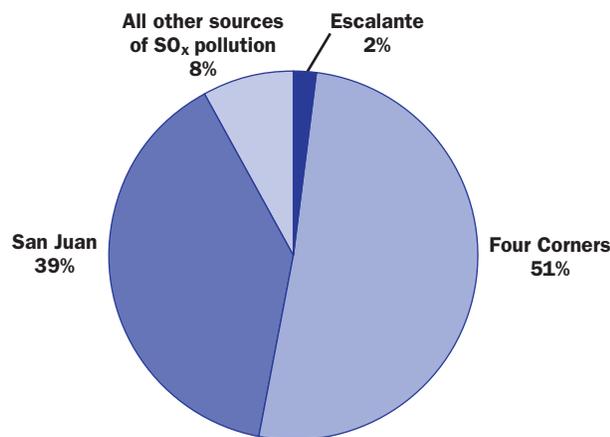
#### **Power Plants in New Mexico**

With the largest percentage of Hispanic residents of any state in the nation—42.1 percent—New Mexico provides another example of the health threat from power plants. Despite its vast reserves of natural gas and its enormous potential to develop solar and wind energy, New Mexico still relies on coal for 88 percent of its electricity needs.<sup>11</sup>

In 2000, New Mexico’s three major coal-fired power plants—Escalante, Four Corners, and San Juan—together released 82,000 tons of nitrogen oxides and 68,500 tons of sulfur dioxide into the air (see Figure 2-2).<sup>12</sup> All three plants are located in the San Juan Basin and account for 66 percent of the state’s industrial emissions of nitrogen dioxide and 92 percent of its industrial sulfur dioxide. The pollution has pushed ozone levels in the area close to the maximum national standard for healthy levels of ozone. Pollution from these plants is also transported out of the area by wind currents and contributes to haze formation in other areas of the state.<sup>13</sup>

This is bad news for the approximately 122,000 people in New Mexico—6.8 percent of the population—suffering from asthma, and for those suffering from other respiratory illnesses.<sup>14</sup> Moreover, as in many parts of the United States, New Mexico has not collected sufficient information, so it is not clear what percentage of asthmatics are Hispanics. A study of long-term New Mexican welfare recipients, however, found a 9 percent rate of self-reported asthma or emphysema among adult Hispanics.<sup>15</sup>

**FIGURE 2-2**  
**Emissions of Sulfur Dioxide (SO<sub>2</sub>) from the Escalante, Four Corners, and San Juan Coal-Fired Power Plants, New Mexico, 2000**



Sources: U.S. EPA, Emissions & Generation Resource Integrated Database, Version 2.01, 2003; and New Mexico Bureau of Geology and Mineral Resources, "New Mexico's Energy, Present and Future: Policy, Production, Economics, and the Environment, Decision-Makers Field Guide 2002, San Juan Basin," 2002.

Elevating the environmental health threat in this region is the forecast that the number of power plants in the U.S.-Mexico border region will grow by more than 400 percent from 2001 to 2011. Polluted areas in Tamaulipas and Texas, as well as California and Baja California, will experience the greatest increase in the number of power plants. Moreover, cities and regions such as El Paso-Ciudad Juárez, the Imperial Valley-Mexicali region, and the Lower Rio Grande Valley will see an increase in pollutants from additional emissions from the new power plants.

Despite the threat to public health from power plant pollution, current administration policies would effectively allow power plants to increase harmful emissions (weakening requirements that power companies install modern pollution control devices when they upgrade older, heavily polluting plants). A plan being developed by the EPA would also allow power plants to (1) trade credits for pollutant emissions, which potentially can create pollution hot spots and (2) release nearly seven times as much mercury pollution for 12 years longer than the current regulatory system, which would require the installation of maximum achievable control technology for mercury by 2007.<sup>16</sup>

## VEHICLE POLLUTION

Engine exhaust from cars, trucks, and other vehicles is the leading source of pollution in most U.S. cities, including those where the vast majority of Latinos live and work. In all, 91.2 percent of Latinos live in urban areas, where the air is more likely to contain health-endangering pollutants.<sup>17</sup> The harm, however, is not limited to urban areas. Large numbers of Latinos living along or near the U.S.-Mexico border also face serious health risks from the stream of cars and trucks flowing through their communities (see "Health Risks from Global Warming in the Latino Community").

### **Heavy Traffic Along the U.S.-Mexico Border**

Gasoline and diesel engines emit many harmful substances, including nitrogen oxides, sulfur oxides, carbon monoxide, and volatile organic compounds (VOCs). The effects of traffic-related air pollution on Latino children are especially apparent in the border area between Ciudad Juárez, Mexico, and El Paso, Texas. A study by the Commission for Environmental Cooperation found that from 1997 to 2001, some 44,700 children suffering from asthma, bronchitis, and a variety of other respiratory

#### **HEALTH RISKS FROM GLOBAL WARMING IN THE LATINO COMMUNITY**

Global warming is caused by carbon dioxide from power plants, vehicles, and other sources. These emissions cause a build-up of carbon dioxide in the atmosphere, which keeps the sun's heat from escaping. This thickening blanket of heat-trapping pollution is raising temperatures all over the world.

The effects of global warming range from melting the Arctic ice cap to increasing the severity of droughts in the Southwest. Health risks of particular concern to the Latino community include the following:

► **More frequent violations of federal air quality standards for ozone.** A recent NRDC report documents how much smog levels could rise over the eastern United States because of global warming. Researchers predict that people living in 15 cities in the eastern United States could see the number of unhealthy "red alert" air quality days double because rising temperatures promote ozone formation. For example, in Chicago the number of summer days with healthy air quality could drop by 17 percent, from 75 to 62 days each year. Chicago saw asthma mortality rates among Latinos nearly double during the 1990s, and if ozone pollution is not brought under control, mortality rates will continue this upward trend.

► **More heat-related deaths.** Heat waves cause more deaths in the United States than all other weather events combined, including lightning, rainstorms or floods, hurricanes, and tornadoes. The EPA reports that a 1 degree Fahrenheit warming would more than double heat-related deaths in New York City, from 300 to 700 per year, and that a 3 degree Fahrenheit warming could almost double heat-related deaths in Los Angeles, from about 70 to 125 per year. The elderly and poor will be at highest risk. Because poverty rates are higher among Latinos and other minorities, they are likely to be at higher risk.

► **More allergies and asthma attacks.** The elevated carbon dioxide levels responsible for global warming also stimulate increased pollen production in allergenic plants, such as common ragweed. In fact, a doubling of the atmospheric CO<sub>2</sub> concentration stimulated ragweed-pollen production by 61 percent. In addition, higher allergenic content was found in samples collected from sites with higher daily mean temperature. This should be of special concern in areas such as the northeastern region of the United States, where Latinos have higher asthma mortality rates compared with other population groups.

Sources: Centers for Disease Control and Prevention, "About Extreme Heat," 2004; U.S. EPA, "Climate Change and New York," 1997; NRDC, *Heat Advisory: How Global Warming Causes More Bad Air Days*, 2004; D.M. Homa et al., "Asthma mortality in U.S. Hispanics of Mexican, Puerto Rican, and Cuban heritage, 1990-1995," *American Journal of Respiratory and Critical Care Medicine* 161(2 Pt1)(2000): 504-509; S.D. Thomas and S. Whitman, "Asthma hospitalization and mortality in Chicago: An epidemiologic overview," *Chest* 116(4 Suppl 1)(1999): 135S-141S.

problems were taken to the emergency rooms of two hospitals in Ciudad Juárez. When maximum ozone levels rose by 20 parts per billion (ppb), the risk of emergency room visits for asthma increased by 17 to 37 percent, depending on how long the ozone concentration remained elevated. The study has identified an association between high ozone levels and asthma and respiratory infections, and particulate matter levels appeared to be associated with mortality from respiratory problems among infants from the poorest families.

Approximately 84 percent of the 662,000 tons of air pollutants released in the area in 1997 came from cars and trucks, millions of which travel through Ciudad Juárez to enter and leave the United States each year.<sup>18</sup> The commission's research raises the possibility that similar effects may be felt on the U.S. side of the border, especially given the increase in truck traffic since the North American Free Trade Agreement (NAFTA) went into effect in 1994. El Paso, Texas, was the port of entry for 47 million trucks and passenger cars entering the United States from Mexico in 1999, and that traffic has contributed to a serious pollution problem in the area: El Paso County fails to meet air quality standards for carbon monoxide, ozone, and particulate matter (see Table 2-1).<sup>19</sup>

One reason the problem is so severe is that Mexican trucks coming into the United States, which are generally older and more polluting, are not required to comply with the increasingly stringent emissions standards applied to U.S. trucks. Compounding this situation is an increase in the number of power plants and industrial polluters in the area, leading to serious air quality issues along the border.

**TABLE 2-1**  
**Latino Population in Counties Along U.S.-Mexico Border Failing to Meet National Air Quality Standards for Selected Air Pollutants**

State/County	Latino Population (Number and Percent)	Carbon Monoxide	OZONE		Sulfur Dioxide	Particulate Matter
			(1-Hour Standard)	(8-Hour Standard)		
<b>Arizona</b>						
Cochise	36,134 (30.7)				●	●
Maricopa	763,341 (24.8)	●	●	●		●
Pima	247,578 (29.3)					●
Pinal	53,671 (29.9)			●	●	●
Santa Cruz	31,005 (80.8)					●
Yuma	80,772 (50.5)					●
<b>California</b>						
Imperial	102,817 (72.2)		●	●		●
Riverside	559,575 (36.2)	●	●	●		●
San Diego	750,965 (26.7)			●		
<b>New Mexico</b>						
Doña Ana	110,665 (63.4)		●			●
<b>Texas</b>						
El Paso	531,654 (78.2)	●	●			●
<b>Total</b>	<b>3,268,177</b>					

Sources: U.S. Environmental Protection Agency, *Green Book*, 2004. Available online at [www.epa.gov/oar/oaqps/greenbk/](http://www.epa.gov/oar/oaqps/greenbk/), as updated in the Federal Register current as of May 5, 2004. U.S. Census Bureau, Census 2000, [www.census.gov](http://www.census.gov).

### **Traffic in New York City and Its Boroughs**

Traffic-related pollution is a serious concern for Latinos in large urban areas. In New York City, all five boroughs fail to meet national standards for ozone, perhaps not surprising given the 1.8 million cars registered in the city and the significant commuter traffic.<sup>20</sup> Traffic from outside the city adds to the problem. Approximately 100,000 cars and trucks travel from New Jersey through Manhattan each day on their way to destinations in New York City and beyond.<sup>21</sup> The resulting volumes of traffic contribute to the New York City–Northeastern New Jersey metropolitan area’s ranking as the second worst area for traffic congestion in the United States.<sup>22</sup>

Exposure to ozone and other asthma triggers released by motor vehicles could seriously affect the health of Latino residents. Latinos in New York City have the highest adult asthma rate of all ethnic groups, at 6.4 percent, compared with rates of 3.5 and 4.6 percent for whites and African-Americans, respectively.<sup>23</sup>

Transportation accounts for most urban air pollution, and that pollution causes serious health problems, as the residents of Hunts Point, New York, can attest. Heavy traffic is a major source of air pollution in this South Bronx community, which is home to a large commercial produce market. More than 20,000 trucks traverse the area each day, and this traffic is expected to increase with the relocation of a major fish market to Hunts Point.<sup>24</sup> Research has associated the community’s unusually high concentrations of airborne particulate matter and elemental carbon (soot) with traffic, particularly truck traffic. Concentrations of these pollutants are 1.6 to 3 times as high in Hunts Point as in areas with lower traffic.<sup>25</sup> The pollution poses a serious health threat for residents, two-thirds of whom are Hispanic. The community’s asthma rate has been as high as 12 times the national average.<sup>26</sup> Efforts by community groups to educate the public and obtain greater government involvement in asthma and pollution control have contributed to a decrease in asthma incidence and hospitalization rates, but this illness is still a significant problem. The adult asthma hospitalization rate is 7.3 times the national rate and hospitalizations among children are three times the national rate.<sup>27</sup>

*Latinos in New York City have the highest adult asthma rate of all ethnic groups, at 6.4 percent, compared with rates of 3.5 and 4.6 percent for whites and African-Americans, respectively.*

### **Traffic in Arizona’s Maricopa County**

Maricopa County, Arizona, offers another example of the health threats from traffic-related pollution. Phoenix, located in Maricopa County, is 34 percent Hispanic and is ranked sixth in Latino population among the nation’s cities. The city’s roads are among the most congested in the United States, ranking eleventh in person-hours lost to traffic congestion annually.<sup>28</sup> Phoenix residents are familiar with the “brown cloud,” a mass of polluted air that hangs over the city when air quality deteriorates. Not surprisingly, Maricopa County is in violation of air quality standards for carbon dioxide, ozone, and particulate matter. This pollution is thought to be a significant contributor to the county’s recent surge in asthma rates.

The county’s low-income South Phoenix neighborhood, 60 percent Hispanic, vividly illustrates the health consequences of air pollution for children.<sup>29</sup> Bordered

by two highways, the community has the highest asthma rates in the county, so high that asthma has become a part of daily life for many area children, who must be rushed to emergency rooms when the air quality is bad. The superintendent of the community's Roosevelt Elementary School District estimates that 25 percent of the district's students are asthmatic.<sup>30</sup>

---

## INDUSTRIAL POLLUTION

Thousands of old and inefficient industrial facilities around the country do more than cloud the sky with a gray haze. The carcinogens and other chemicals they pump into the air endanger the health of millions of people, particularly Latinos, other minorities, and those in disadvantaged communities. At the national level, the American Lung Association has reported that even though only 12 percent of urban counties

### BETTER BREATHING IN ASTHMA TOWN

The residents of "Asthma Town," a section of the Huntington Park neighborhood in Southeast Los Angeles, know more about the impacts of highly polluting industrial facilities on nearby communities than almost anyone else. This community, which is 95 percent Hispanic, sits next door to factories that constantly spew large amounts of toxic chemicals into the air. Decades of environmental irresponsibility have left the land and water highly polluted with dangerous chemicals. In the midst of the contamination are homes, schools, and playgrounds where children and adults are constantly exposed to a variety of chemicals. In fact, the situation is so bad that in 1986 at Park Avenue Elementary School, a black, tarlike substance began oozing out of the ground and can still be seen occasionally.

There is a good reason that this area received the nickname Asthma Town. Stories abound here about young children developing asthma and about residents feeling sick from breathing the toxic clouds coming from the industrial plants that surround them. The relationship between the children's asthma and local pollution was supported by a 2000 scientific study, which found that asthma symptoms in Huntington Park children increased with higher concentrations of air pollutants. Even years before, there had been little doubt among residents whose ills were related to the chemicals in the air. Yet despite all the evidence of the harm people were suffering, the area received little attention from government agencies until residents organized to petition authorities to control the polluters. With the help of Communities for a Better

Environment (CBE), an environmental justice group based in Huntington Park, residents advocated before the South Coast Air Quality Management District (AQMD), the City Council, and other local officials to put a stop to this toxic attack.

Thanks to the organized efforts of community residents and CBE, residents of Asthma Town achieved several important goals. They obtained action from the City Council to withdraw a permit for a concrete recycling facility that had been operating in violation of local zoning codes, and they convinced the city to convene a task force that produced a plan to reduce air pollution. They also persuaded the South Coast AQMD to investigate options to reduce the impact of industrial operations and conduct air monitoring, and they got the City Council to start considering potential local impacts before giving permit approvals to companies with AQMD permits.

Residents continue to work to improve environmental conditions in their community. Although pollution is still a problem for Asthma Town and the entire Huntington Park neighborhood, residents have achieved changes that have improved air quality and given them more control over their health and future.

Sources: Communities for a Better Environment, "Toxic Tour," 2002. Available online at <http://www.cbecal.org/>. Delfino et al., "Asthma symptoms in Hispanic children and daily ambient exposures to toxic and criteria air pollutants," *Environmental Health Perspectives* 111(4)(2003): 647-656. B. Ehrenreich, "Goo and Gunk: A Toxic Tour," *LA Weekly* (Supplements), October 19-25, 2001. National Academy of Public Administration, *Addressing Community Concerns: How Environmental Justice Relates to Land Use Planning and Zoning*, 2003. Available online at <http://www.napawash.org/publications.html>.

contain populations that are more than 31 percent minority, these 12 percent contained 21 percent of the facilities considered major sources of air pollutants.<sup>31</sup> At the local level, many predominantly Hispanic communities have grown in the shadows of smokestacks and surrounded by toxic waste dumps.

Latinos and other minorities have an elevated risk of suffering health problems caused by pollution because they tend to live and work in areas significantly affected by industrial emissions. In Los Angeles County, California, 60 percent of the people living within a half mile of the top 100 emitters of toxic pollutants are Latino, even though Latinos make up only 44 percent of the county's population.<sup>32</sup> Research in Southern California has connected minorities, including Latinos, to high lifetime cancer risks associated with toxics in their air and notes that companies commonly choose to locate their polluting facilities in low-income, minority areas (see "Better Breathing in Asthma Town").<sup>33</sup>

### ***Port Pollution in the Bandini Community of Commerce, California***

A prime example of polluting industries affecting low-income, minority communities is the Bandini neighborhood of Commerce, California—a neighborhood, 95 percent

#### **HOUSTON LATINOS WANT CLEANER AIR**

Nearly three-quarters of a million Latinos account for 37.4 percent of the population of Houston, a city renowned for its industrial development—and now for its poor implementation of air quality regulations. In 1999, the city's ozone levels put it at the top of the list of smog-polluted areas in the United States, temporarily edging Los Angeles out of the dubious distinction.

The chief culprits were industrial pollution and vehicles, which filled the air with such pollutants as nitrogen oxides and volatile organic compounds, which combined to form toxic smog. Despite the severity of the problem, Texas has been lax in enforcing its environmental laws. Not surprisingly, Latinos in Houston strongly support cleaner air.

A 2000 survey of Houston residents found that support for stricter environmental regulations is often stronger among Latinos than any other group. According to the survey, 61 percent of Houston Latinos (versus 56 percent of the general population) were very concerned about the health effects of air pollution. Also, 72 percent wanted stronger vehicle emission tests requirements (versus 65 percent of non-Hispanic whites and 69 percent of African-Americans), and 69 percent favored lowering the speed limit to save fuel and reduce pollution (support among non-Hispanic whites and African-Americans was 47 percent and 53 percent, respectively).

More surprisingly, 57 percent of Latinos favored implementing an obligatory no-drive day once a week, compared with 27 percent of non-Hispanic whites and 37 percent of African-Americans. Given the political strength of the Latino community in Houston, a concerted effort among Latinos could be the key to transforming Houston into a cleaner, healthier place to live.

Sources: Galveston-Houston Association for Smog Prevention, "How Bad is Houston's Smog? Houston Leads the Nation in Exposures to Ozone Smog"; J. Baird, "Como se dice 'environment'?" *CEC Environmental Exchange Newsletter*; and a survey by Dr. Stephen Klineberg of Rice University.

Latino, in which 20 percent of residents live below the poverty line. The community is surrounded by a container train yard that serves the busy ports of Los Angeles and Long Beach. Diesel trucks shuttle between the two ports, spewing pollution into the air. In addition, the community's air is polluted by traffic along Interstate 710, various chemical plants, and an electricity-generating garbage incinerator.<sup>34</sup>

**“Refinery Row” of Corpus Christi, Texas, Near Public Housing**

The Refinery Row area of Corpus Christi, Texas, also exhibits some of these inequities. In the days of racial segregation, public housing was commonly constructed near industrial areas, without regard for the health of residents. These dwellings are in use to this day, occupied mostly by African-Americans and Hispanics, and are located in areas where refineries and chemical plants continue to release large amounts of toxics (see Figure 2-3). Even worse, industrial accidents have exposed residents to dangerous concentrations of chemicals on several occasions.<sup>35</sup> The areas closest to the plants range from 40 to 89 percent Latino, and the cancer rate here is 17 percent higher than in the rest of the city.<sup>36</sup>

The risks to children of air pollution from industrial sources are especially worrisome. A recent study of Texas counties with large numbers of refineries and chemical plants has found that minority children were the most likely to be affected by toxic emissions from these facilities (see “Houston Latinos Want Cleaner Air”). An astounding 40 million pounds (or 63 percent) of these emissions were released within two miles of a school. Although only 40 percent of Texas schoolchildren are Latino, a disproportionate percentage—54 percent—of them are affected by the emissions.<sup>37</sup> The pollutants these children are exposed to include carcinogens and developmental toxins.

**FIGURE 2-3**  
**Aerial View of a Section of “Refinery Row” in Corpus Christi, Texas**

The communities surrounding the area are over 50 percent Latino.



### **Pollution in San Diego's Barrio Logan**

Some Hispanic communities have fought prolonged battles to protect themselves from industrial polluters. Barrio Logan, a neighborhood in San Diego, California, with 85 percent Latinos, is one example. Like many communities affected by highly polluting facilities, Barrio Logan is economically disadvantaged, with a poverty rate of 40 percent, nearly four times that of San Diego County (see "California's Central Valley Can't Catch a Breath"). Its asthma rate of 28 percent is four times the national average.<sup>38</sup>

Residents endured the pollution created by chemical suppliers, a metal-plating plant accused of repeated hazardous waste violations, a sewage pumping station receiving illegally dumped industrial wastewater, and frequent pesticide use at a nearby shipping yard. Concerned about the health effects of this contamination, the residents united to form the Environmental Health Coalition and conducted a

### **CALIFORNIA'S CENTRAL VALLEY CAN'T CATCH A BREATH**

Latinos account for 30 percent of the population in California's booming Central Valley region, known for its expansive farmland, and are the largest and fastest-growing minority group in the region. Although it has long attracted immigrants who come looking for a better life, the valley has now gained notoriety for serious air pollution problems that threaten its residents' health.

Agricultural equipment and dust from unpaved roads are responsible for half of the lung-clogging particulate matter in the air. Cars and trucks also release carbon monoxide, nitrogen oxides, and chemicals that form ozone pollution. A recent study found that increases in particulate matter, nitrogen dioxide, and carbon monoxide were associated with an increase in the number of emergency room visits and hospitalizations for respiratory conditions in the valley.

By 2001, the air pollution problem had become so severe that public interest groups threatened to sue the Environmental Protection Agency to do two things: elevate its classification of the ozone pollution problem in the San Joaquin Valley area of the Central Valley from "serious" to "severe," and promulgate rules to tackle particulate matter and ozone pollution. In anticipation of the lawsuit, the EPA changed the designation to "severe" but lagged in taking appropriate measures to reduce pollution. In 2003, local authorities even requested that the EPA reclassify the San Joaquin Valley's ozone pollution problem as "extreme," a designation so far earned by no other community in the nation except Los Angeles.

Meanwhile, residents of San Joaquin and other Central Valley areas continue to suffer. Six of the 25 most polluted counties in the nation are in the valley, and together they are home to 1.1 million Latinos. Fresno County has the third highest asthma rate in the nation, after Chicago and New York, and a much higher asthma hospitalization rate for Latino children than non-Hispanic white children (127 per 100,000 compared with 95 per 100,000), and the Central Valley as a whole is seeing its economy threatened by pollution so severe that new businesses may be unwelcome.

Sources: Van Den Eeden, C.P. Quesenberry Jr., J. Shan, and F. Lurmann, "Particulate Air Pollution and Morbidity in the California Central Valley: A High Particulate Pollution Region"; American Lung Association, "State of the Air," 2003; California Department of Health Services, *California County Asthma Hospitalization Chart Book*, 2000.

campaign to end the toxic assault. Years of lawsuits and advocacy were required before the government moved to curb the pollution.

The community's hard work paid off in several important victories: Port authorities stopped the use of the dangerous pesticide methyl bromide in the shipping yard in response to public pressure, and the State of California and the federal government provided funding to study the incidence of asthma and monitor air pollutants. Most importantly, the EPA awarded a grant to the City of San Diego to relocate some polluting industries away from the neighborhood.<sup>39</sup> The work continues, as Barrio Logan, like many other minority communities around the country, jump-starts its economy through new development and better urban planning strategies.<sup>40</sup>

---

## **RECOMMENDATIONS**

With 25.6 million Latinos living in areas that do not meet the federal government's air quality standards—areas that include the U.S.-Mexico border region, the Central Valley of California, Southern California, and the cities of Chicago, New York, Phoenix, and Houston—NRDC recommends the following measures to begin to reduce the health threat to Hispanic communities from air pollution:

- ▶ The EPA should enforce existing regulations, known as new source review, that require power plants to install modern pollution controls when they make upgrades that would increase pollutant emissions; the EPA should withdraw its recent changes to these regulations, which would allow the plants to make those upgrades without better pollution controls, in violation of the Clean Air Act.
- ▶ Congress should provide more funds to local transit agencies through the Department of Transportation's Federal Transit Administration to allow local agencies to purchase cleaner new buses and to retrofit old buses.
- ▶ The U.S. government should collaborate with the Mexican government to improve air quality along the border by aiding Mexican truck companies in meeting improved U.S. vehicle emissions standards; by promoting cleaner industry practices for manufacturing and power plants; and by encouraging implementation through incentive programs.
- ▶ Congress should initiate a low-interest loan program to help small truck companies and other small businesses to retrofit their old, highly polluting diesel trucks and equipment with cleaner technology.
- ▶ The U.S. government should make grants available through the Centers for Disease Control and Prevention for the study of asthma rates and other health effects in Latino and other minority communities affected by air pollution.
- ▶ State health departments and environmental agencies should inform the Latino community about the general health effects of air pollution, the specific

*Like many communities affected by highly polluting facilities, Barrio Logan is economically disadvantaged, with a poverty rate of 40 percent, nearly four times that of San Diego County. Its asthma rate of 28 percent is four times the national average.*

hazards posed by conditions in their community, and ways to reduce their health risks, and these agencies should issue press releases in Spanish in areas with significant Latino populations.

► State and local governments should require air-polluting industries located in or around residential neighborhoods to assess, disclose, and act to minimize their environmental impacts; decisions regarding new sitings should facilitate the involvement of non-English-speaking community members.

# WATER QUALITY



## HIDDEN DANGER

### *Environmental Health Threats in the Latino Community*

October 2004

Access to clean water is something that most people in the United States take for granted. Nevertheless, thousands of U.S. residents become ill from water contamination each year.<sup>1</sup> According to the National Water Quality Inventory (2000), 31 percent of surveyed stream miles, nearly 48 percent of surveyed lakes, and 21 percent of surveyed estuaries were polluted. Moreover, federal data between 1997 and 2001 showed that 19 percent of community water systems, serving more than 3 million people, violated health standards.

Drinking water can contain microbes from human and animal waste, chemical pollutants including pesticides and volatile organic compounds, heavy metals such as arsenic and lead, and even chemical byproducts created by processes for disinfecting drinking water. This wide range of contaminants can cause an equally broad spectrum of adverse health effects, ranging from simple gastrointestinal illness to serious long-term effects, including cancer and developmental problems. Those most likely to suffer from diseases caused by contaminated water are people who do not have access to sanitary sewers; who live near chemical factories, landfills, hazardous waste sites, or large farms; and whose water supply depends on shallow wells or surface water sources that drain highly polluted areas. Many Latino communities in the United States fall into these categories, including Florida, the U.S.-Mexico border area, and western and southwestern states.

---

### **DRINKING WATER SUPPLY IN LATINO COMMUNITIES**

Latinos living in urban areas with large-scale drinking water distribution systems are not free from worry about water quality. In a recent study of 19 U.S. cities, NRDC found that overall tap water quality varies widely from city to city. Some cities have excellent tap water, but in others, including some with large Latino populations—Albuquerque, Fresno, and San Francisco—water is sufficiently contaminated to pose health risks to vulnerable people.<sup>2</sup>

In 2000, the most recent year for which the Environmental Protection Agency (EPA) reported data, 31 drinking water supplies in Arizona were contaminated with more chemicals than the EPA health standards allow; moreover, 73 supplies were contaminated with bacteria in excess of the EPA standards, and 11 violated treatment standards for public health. In addition, more than 370 water suppliers in the state were in “significant violation” of federal laws requiring them to test for water contaminants.<sup>3</sup>

EPA officials have declared that 94 percent of Americans drink water that complies with all health-based standards, but the EPA assistant inspector general reported in

2004 that data quality is so poor that 35 percent of all health-based violations do not appear in the EPA database. The report concluded that the EPA estimates were based on incomplete information, and, contrary to the agency's claims, the EPA had failed to meet its drinking water goals.

As troubling as the fact that the EPA estimates were based on incomplete data is the fact that these risks may be underestimated. Methods used by the EPA to calculate exposure to chemicals in drinking water are likely to underestimate actual exposures, both for the general population and for Hispanics. In recent rules, the agency has used an average individual daily water intake of 1.2 liters to decide the maximum contaminant levels allowed in the water supplied by public water systems, but research suggests that this method is not protective enough. That's because many people drink (and are told to drink) closer to 2 liters of water per day, and that intake would double the amount of contaminants people are exposed to and thus requires more protective levels be set. A survey of residents of Tucson, Arizona, a city with a hot, dry climate, indicates that Hispanics drink 1.83 liters of water (tap or bottled) per day on average.<sup>4</sup> The EPA's own data indicates that 20.5 percent of Hispanics drink more tap water than the 1.2 liters the EPA assumes.<sup>5</sup> These figures raise the concern that current water quality standards leave a significant number of people underprotected.

*According to a Census Bureau survey for 2001, 2.3 million (23.6 percent) of the 9.8 million Hispanic householders in the United States believe that their primary water source is not safe to drink.*

---

#### **LATINO PERCEPTION OF BOTTLED, VENDED, AND TAP WATER**

Nationwide, the data reveal that many Latinos are concerned about the quality of their drinking water. According to a Census Bureau survey for 2001, 2.3 million (23.6 percent) of the 9.8 million Hispanic householders in the United States believe that their primary water source is not safe to drink. In the general population, only 8.8 percent believe that their primary water source is not safe to drink.<sup>6</sup> In some parts of the country, water actually may not be safe to drink, but this perception among Latinos is thought to stem from both a general concern about environmental problems and the fact that in many Latin American countries (such as Mexico, El Salvador, and Colombia) many people are accustomed to getting all their potable water from bottled water sources.

In some Latino communities, safe water is not the first issue; any basic water service is an issue. For example, a study in California by the Latino Issues Forum estimated that in 2000, more than 85,000 households in the state did not have complete plumbing facilities, including a connection to sewage or other wastewater systems or to a protected drinking water source. Of these, approximately 42 percent were Latino households.<sup>7</sup> In Texas, more than 1,400 *colonias*—unincorporated communities with substandard housing—are located near the border with Mexico and are home to 340,000 people, mostly Latinos. Nearly one-fourth (24 percent) of homes in these communities use untreated water for cooking and drinking. Almost half (44 percent) of them have outhouses or cesspools, something that increases the risk of water contamination.<sup>8</sup>

Having full access to piped water from a municipal supply, however, does not erase all concerns. Faced with the possibility of contamination in municipal water

sources, Latinos are less likely to drink tap water and more likely to consume large amounts of bottled or vended water. Even Hispanics in areas without contamination problems often turn to bottled water products, believing, as many others do, that bottled water must be cleaner and safer than their tap water. The irony is that bottled water is subject to weaker regulations than tap water and in many cases may be nothing more than bottled tap water.

### ***Expense of Bottled and Vended Water Popular Among Latinos***

The low trust many Latinos place on their tap water has a significant economic impact. A California-wide study by the Public Policy Institute of California found that 55 percent of Latinos drink bottled water, compared with 39 percent of all adults. In Southern California, which has the highest rate of bottled water consumption in the country, 82 percent of Hispanics buy bottled water, as compared with 68 percent of non-Hispanic whites.<sup>9</sup> In a similar study in Tucson, Arizona, Hispanics were nearly five times as likely to drink bottled water as non-Hispanics.<sup>10</sup> At an average price of \$1.13 per gallon, the cost to consumers who may already be on limited incomes can be significant.<sup>11</sup>

Even vended water, which is popular in many Latino communities, is an expensive and ineffective alternative. Water from vending machines, or “waterias,” costs 30 to 40 cents per gallon and sometimes more, and it often comes from the same local municipal water utilities that serve purchasers’ homes. Even when vended water is advertised as “filtered,” there is no guarantee of quality. A study conducted in California in 2002 found that one-third of the machines owned by the state’s largest vended water company dispensed water that did not meet state health standards.<sup>12</sup> However, because there are no state or federal requirements to provide consumers with information on bottled or vended water, consumers are not aware of the quality of the water.

### ***Inadequate Information in Spanish About Tap Water***

The lack of information extends beyond bottled and vended water to tap water—at least as far as the Spanish-speaking community is concerned. Water utilities are required by law to prepare and distribute “right-to-know” reports to their customers.<sup>13</sup> The law is premised on the principle that consumers have a right to know what is in their drinking water and where it comes from, so that they will be better able to make health decisions for themselves and their families.<sup>14</sup> Some utilities produce useful reports, but others produce reports that bury, obscure, or omit negative information about water quality; provide misleading statements; and in a variety of ways violate federal requirements, leaving consumers unaware of problems with their water.<sup>15</sup>

The law also requires that systems serving “a large proportion of non-English speaking residents”—defined in California as 10 percent, or 1,000 people—provide information on the importance of the report in the relevant language(s), or provide a phone number or address where residents can get a translated version of the report.<sup>16</sup> However, water utilities in many largely Spanish-speaking communities—including Los Angeles, where 42 percent of the population speaks Spanish at home—have failed to translate these reports into Spanish.<sup>17</sup> So even though some water utilities,

*In Southern California, which has the highest rate of bottled water consumption in the country, 82 percent of Hispanics buy bottled water, as compared with 68 percent of non-Hispanic whites. At an average price of \$1.13 per gallon, the cost to consumers who may already be on limited incomes can be significant.*

such as the Los Angeles Metropolitan Water District, have begun to reach out to Spanish-speaking consumers with information about their tap water, much remains to be done to truly protect and empower Latinos to protect their health and the health of their families.

In a recent example of how municipalities and utilities do not always respect the public right to know, the *Washington Post* in early 2004 reported high levels of lead in the drinking water in Washington, D.C. The newspaper also reported that the city had failed to translate documents and alerts about the drinking water quality in a timely manner, and that it had failed to alert the Spanish media to free testing sites where children could go to have their blood lead levels tested (see Chapter 5).<sup>18</sup>

---

### SITING OF SUPERFUND SITES

Nationally, three out of five African-Americans and Latinos live in communities that are also home to Superfund sites.<sup>19</sup> Superfund sites are uncontrolled or abandoned hazardous waste sites. In 1980, citizen concern about toxic sites led Congress to establish the Superfund program to locate, investigate, and clean up the worst hazardous waste sites nationwide, although thousands of sites remain.<sup>20</sup> Most of the remaining Superfund sites are in or near low-income and working-class communities and communities of color.<sup>21</sup> By definition, a toxic waste dump poses a serious risk when emissions are released into the air and groundwater, threatening the economic vitality and health of residents in nearby neighborhoods.

California's Santa Clara County is home to the nation's largest number of Superfund sites—23. A recent study by Professor Andy Szasz of the University of California, Santa Cruz, maps out Superfund sites in the Silicon Valley with the highest toxic emission releases and areas of high Latino populations and people of color, as well as low-income neighborhoods. Both maps overlap consistently

In New Jersey's Newark Bay, urban blacks, Hispanics, and Portuguese are witnessing what many see as the worst case of waterborne dioxin contamination in the United States. The EPA has done little to address the problem and has acted to preempt a lawsuit filed by NRDC and community groups against the polluter responsible for the contamination.

In the Albuquerque valley, there are 52 known areas of groundwater contamination, primarily because of industrial dumping.<sup>22</sup> And Albuquerque's San José community, where the population of 2,100 is 86 percent Latino, is New Mexico's highest Superfund cleanup priority.<sup>23</sup> Prominent groups, including the SouthWest Organizing Project (SWOP), which was founded in 1981 by a group of Latino, Native American, and African-American activists, assists communities in tackling environmental justice issues. In fact, pressure from another community group, the San José Community Awareness Council, was successful in getting polluting companies to pay for the cleanup of the groundwater polluted with hazardous chemicals such as benzene and trichlorethylene (TCE) as well as pesticides such as DDT.

In Tucson, Arizona, years of dumping cancer-causing TCE in unlined pits by a large defense contractor resulted in widespread contamination of groundwater and

*Nationally, three out of five African-Americans and Latinos live in communities that are also home to Superfund sites.*

municipal wells. The TCE spread at least one mile wide and four miles long across southern Tucson, eventually resulting in a 24-square-mile Superfund site. An estimated 47,000 people living in the areas have consumed water contaminated with TCE. Initially, the predominantly Latino residents of Tucson’s Southside area were not informed about the extent of contamination of their drinking water and the possibility of health effects. Then, in 1985, reporter Jane Kay, then with the *Arizona Daily Star*, conducted her own health survey of 500 south Tucson residents and suggested a link between TCE and the high incidence of cancer and lupus in Tucson’s Southside. In response to this information, residents formed Tucsonians for a Clean Environment, enabling them to become informed and involved in the Superfund process.

Stories such as those discussed earlier of low-income communities that energize their residents to protect themselves from the dangers of toxic waste pollution, only to meet government resistance, are becoming fewer. Numerous environmental justice groups are uniting individuals into a powerful voice.

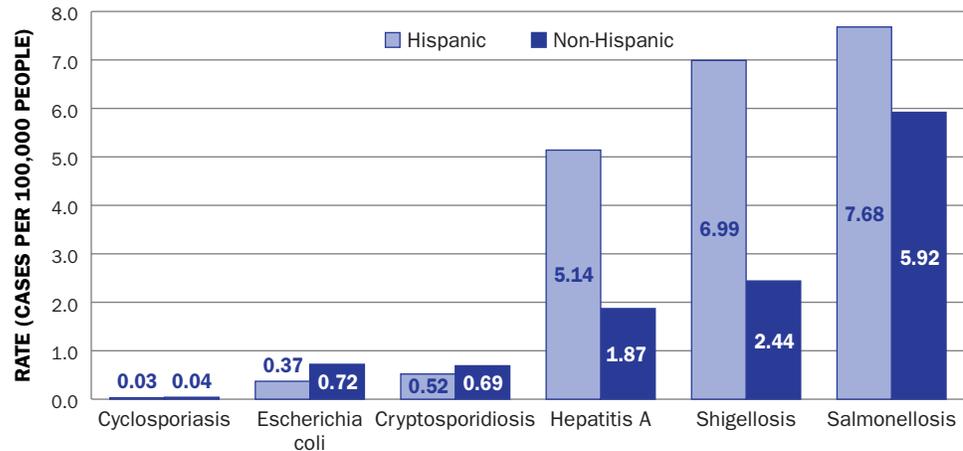
---

### WATERBORNE DISEASES IN DRINKING WATER

Infectious diseases caused by bacteria or parasites in drinking water are a significant public health risk to many people (see “Causes and symptoms of some waterborne diseases”). Experts with the Centers for Disease Control and Prevention (CDC) published an estimate in the mid-1980s concluding that waterborne disease causes 940,000 illnesses and 900 deaths per year in the United States.<sup>24</sup> Other published studies have estimated the number of illnesses caused by waterborne contaminants

CAUSES AND SYMPTOMS OF SOME WATERBORNE DISEASES		
Amebiasis (amoebiasis, dysentery)	Parasite	Diarrhea, abdominal cramps, fatigue, weight loss, fever, vomiting. May spread to the liver.
Campylobacteriosis	Bacteria	Abdominal pain, diarrhea, fever. Complications in people with weakened immune systems.
Cholera	Bacteria	Diarrhea, dehydration, abdominal cramps, nausea, vomiting. May be fatal.
Cryptosporidiosis	Parasite	Diarrhea, abdominal cramps, nausea, swelling of the liver or pancreas. Complications in people with weakened immune systems.
Cyclosporiasis	Parasite	Diarrhea, loss of appetite, bloating, stomach cramps, nausea, vomiting, fatigue, fever.
<i>E. coli</i> infection	Bacteria	Diarrhea, stomach cramps, vomiting, abdominal pain, fever. May be fatal.
Giardiasis	Parasite	Diarrhea, abdominal pain and swelling, fever, nausea, vomiting, headache, dehydration.
Hepatitis A	Virus	Jaundice (yellow color of the skin), fatigue, nausea, vomiting, fever. Complications in people with chronic liver disease.
Salmonellosis	Bacteria	Abdominal pain, diarrhea, vomiting, nausea, fever, chills, muscle pain. Life-threatening infections in babies.
Shigellosis	Bacteria	Abdominal pain, diarrhea, vomiting, nausea, fever. Complications in children who are malnourished or have weakened immune systems.

**FIGURE 3-1**  
**Incidence of Waterborne Diseases in the United States, 2001**



Source: Centers for Disease Control and Prevention, "Summary of Notifiable Diseases—United States, 2001," MMWR 50(53)(2003). Available online at <http://www.cdc.gov/mmwr/PDF/wk/mm5053.pdf>.

at 7 million or more per year, including 560,000 severe cases.<sup>25</sup> Two microscopic parasites—*Giardia* and *Cryptosporidium*—are among the most common causes of waterborne disease in the United States.<sup>26</sup> The largest outbreak in the United States of disease from these contaminants was in 1993 in Milwaukee, Wisconsin, when *Cryptosporidium* sickened 400,000 people and killed more than 100.

Nationwide, it is not known what percentage of those affected yearly by the microbial contamination of drinking water are Latinos, but data for Los Angeles County in 2001 demonstrated higher rates for giardiasis among Hispanics than among Asians and African-Americans.<sup>27</sup> In New York City, in 2001, Hispanics also had the highest rates of cryptosporidiosis, and ranked second, after white non-Hispanics, for *Giardia* infection.<sup>28</sup>

Figure 3-1 compares the rates of some waterborne illnesses in the United States. Rates of hepatitis A, salmonellosis, and shigellosis are higher for Hispanics than for other sectors of the population. The disparity in hepatitis A rates is particularly noteworthy: It is 2.7 times as high for Hispanics as non-Hispanics. Spread by drinking polluted water and eating food contaminated with feces, hepatitis A is an indicator of poor sanitation, a frequent consequence of the absence of piped water.

### **Waterborne Diseases Along the Border**

Along the U.S.-Mexico border, the lack of reliable access to clean drinking water is a serious problem. Some 12 percent of the border population lacks access to potable water, and 30 percent lacks access to wastewater treatment.<sup>29</sup> Many of these communities are *colonias*, which are home to more than 1.5 million people on the U.S. side alone in New Mexico, Arizona, Texas, and California.

The lack of safe water in many *colonia* homes forces residents to get their water from sources such as canals and dug wells that do not meet minimum safety standards.<sup>30</sup>

These sources may be polluted by pesticide-laden agricultural runoff, industrial pollution, and biological contaminants from septic tanks and household waste. Because of the lack of safe drinking water as well as inadequate wastewater collection and treatment, *colonia* residents are at high risk of contracting diseases such as giardiasis, hepatitis, and cholera. On the Mexican side of the border, gastrointestinal disease linked to water contaminated with sewage is the leading cause of infant death.<sup>31</sup> By contrast, in the United States as a whole, waterborne disease does not even rank among the top 15 causes of infant mortality, constituting less than 1 percent of infant deaths in 2001.<sup>32</sup>

Complicating the problem is a growing stream of pollution from American-owned factories on the Mexican side of the border. According to the International Trade Data System, some 4,760 of these facilities, known as *maquiladoras*, are situated near the border in Mexico.<sup>33</sup> The largest concentrations of *maquiladoras* are found in Tijuana, where 605 factories employ 140,000 workers, and Ciudad Juárez, where 302 plants employ 190,000 workers.<sup>34</sup> These manufacturing facilities, which produce goods for export using imported materials and Mexican labor, receive special tax incentives from the Mexican government. Many of these plants are responsible for the discharge of large quantities of waste into surface waters each year.

Another major challenge facing governments along the border is the illegal dumping of household and industrial wastes. For example, El Paso County in Texas has 1,542 illegal dumping sites, and pollution from these sites poses a threat to water quality and human health in this largely poor area.<sup>35</sup> Illegal waste dumps are common in other border areas, but no reliable estimates of their number, or what they may contain, are available.

Along the U.S.-Mexico border, sanitation problems caused by the lack of safe drinking water and waste treatment and disposal facilities, as well as by a scarcity of affordable health services on both sides of the border, are responsible for high rates of infectious diseases. These include hepatitis A and a variety of food-borne and waterborne diseases.<sup>36</sup> Rates of the gastrointestinal diseases amoebiasis, shigellosis, and campylobacteriosis were as much as three times as high in the border area as in the rest of the country, and the hepatitis A rate was twice the national rate. Data for the Texas border region shows a similar disparity in hepatitis A rates between border counties and the rest of the state in 1999.<sup>37</sup>

Since 1994, Mexico and the United States have invested approximately \$3.1 billion to improve living conditions along the border. Still, the U.S. Congress's General Accounting Office (now called the Government Accountability Office) estimates that an additional \$3.2 billion is needed to meet existing needs for potable water, wastewater treatment, and solid waste disposal.<sup>38</sup> Recent experience has shown that clean water can be brought to these communities cost-effectively. The Clean Water in Homes program, which the Mexican government began implementing nationwide in 1991, helped reduce the nationwide incidence of cholera in Mexico from 16,430 cases in 1995 to only 9 cases in 1999.

Encouraged by this success, the United States and Mexico designed another initiative—the Clean Water in Homes in Border Municipalities program—to bring potable water to communities on the Mexican side of the border. The program began

*Along the U.S.-Mexico border, sanitation problems caused by the lack of safe drinking water and waste treatment and disposal facilities, as well as by a scarcity of affordable health services on both sides of the border, are responsible for high rates of infectious diseases.*

in 1998 in several communities in the state of Chihuahua, and it helped reduce the incidence of gastrointestinal diseases from 21 percent to 6 percent in those areas. The program focused on educating residents about basic sanitation practices, providing them with household water disinfectants, analyzing water quality and waste disposal needs, and initiating small infrastructure projects to allow for safer waste and wastewater disposal. What's more, the EPA reported that program goals were achieved at a relatively low cost.<sup>39</sup> Similar community-focused approaches could be implemented in the United States to improve water quality and health in those communities suffering from a high incidence of waterborne illnesses.

### **Waterborne Diseases and Farmworkers**

One group of Latinos suffering from poor water quality and an overall lack of availability are farmworkers. In the absence of field sanitation, farmworkers suffer from third world levels of parasitic infection and hepatitis A, as well as high rates of urinary tract infection, heatstroke, and pesticide poisoning. Unfortunately, however, because of restrictions on the jurisdiction of the Occupational Safety and Health Administration (OSHA), the agency's field sanitation regulations cover only about 36 percent of farms. This is because Congress prohibited OSHA from regulating occupational safety in farms having fewer than 11 employees. Unless Congress allows OSHA to extend its regulations to smaller farms, or the 26 states that regulate occupational health and safety follow the lead of California and require the full complement of field sanitation protections (toilets, drinking water, and hand-washing water) on farms that employ even one worker, thousands will continue to labor in deplorable conditions, lacking even the most basic services.

*In the absence of field sanitation, farmworkers suffer from third world levels of parasitic infection and hepatitis A, as well as high rates of urinary tract infection, heatstroke, and pesticide poisoning.*

### **Drinking Water Disinfection Byproducts**

The use of chlorine to disinfect drinking water supplies substantially reduces the incidence of many waterborne diseases. This inexpensive process, however, has solved one problem but left another. Disinfection byproducts (DBPs) are formed when chlorine or similar disinfectants are used to purify water that has not been filtered to remove organic matter (such as leaves, twigs, and other decaying plant material) before disinfection. DBPs have been shown to cause cancers, birth defects, and miscarriages. An analysis in the *American Journal of Public Health* of more than 10 large studies found that DBPs may be responsible for 10,700, or more, rectal and bladder cancers per year.<sup>40</sup> Human studies have well documented the reproductive risk posed by DBPs. Studies in the 1980s and 1990s found a link between these chemicals and reproductive defects, ranging from miscarriages in the first trimester to stillbirths, low birth weights, intrauterine growth retardation, neural tube defects (serious birth defects that affect the spine, spinal cord and brain, causing physical and mental disabilities), and central nervous system defects.<sup>41</sup>

Disinfection byproducts evaporate when water is heated, so people may absorb these chemicals into their bodies not only from drinking the water but also when they inhale steam in the shower. These chemicals exist at significant levels in the drinking water of 80 million to 100 million Americans.<sup>42</sup> In warm-weather places, such as

California and Florida, concentrations of disinfection byproducts are often higher than in other areas. Waters in southern Florida, in particular, have high levels of organic matter that react with the chlorine used for disinfection to produce these toxic byproducts.<sup>43</sup> This is sometimes referred to as the “Florida effect.”

Some of the major studies on the link between these chemicals, birth defects, and miscarriage have been conducted in Santa Clara County, California, a heavily Latino community.<sup>44</sup> These studies have found a significant link between miscarriages and exposure to drinking water with high levels of DBPs in the first trimester of pregnancy. Other recent studies have indicated that high peak levels of trihalomethanes and other disinfection byproducts may be associated with low birth weight, preterm delivery, spontaneous abortions, stillbirths, and birth defects—in particular, central nervous system defects, major cardiac defects, oral cleft, and respiratory and neural tube defects.<sup>45</sup> California’s Central Valley, which already faces a myriad of health threats, also has high levels of disinfection byproducts in the water supply.

The CDC has recognized that quality medical care for pregnant women and newborns is critical to identify and reduce the effects of premature births or birth defects.<sup>46</sup> Unfortunately, 25.6 percent of pregnant Latinas do not receive early prenatal care, compared with 11.5 percent of non-Hispanics.<sup>47</sup> Therefore, when Latinos are exposed to chemicals, such as disinfection byproducts, that appear to cause low birth weight or trigger other reproductive problems, they may be harder hit than members of non-Hispanic white communities with similar exposures.

The EPA has established maximum contaminant levels for some disinfection byproducts. Public water systems that use surface water, or groundwater under the direct influence of surface water, must comply with limits of 80 parts per billion (ppb) annual average for trihalomethanes, and 60 ppb annual average for haloacetic acids.

By improving water treatment through methods such as using activated carbon filtration and switching to ultraviolet light as a primary disinfectant, water systems can control disinfection byproducts while reducing microbiological risks. It is also necessary to protect source water from excessive contamination with organic matter by preventing agricultural runoff laden with soil, fertilizer, or animal waste from reaching lakes and streams, and by preventing sewage overflows.

*An analysis in the American Journal of Public Health of more than 10 large studies found that DBPs may be responsible for 10,700, or more, rectal and bladder cancers per year.*

---

## **DRINKING WATER CONTAMINANTS**

The heavily Hispanic areas of the West and Southwest are also plagued with significant drinking water problems: high levels of arsenic, increasing spread of perchlorate contamination, and nitrates from fertilizer residue and animal waste.

### **Arsenic**

Arsenic is one of the world’s best-known poisons, made popular as a murder weapon in mystery novels and films. But arsenic also occurs naturally in certain types of rocks, from which it can dissolve into water supplies in some parts of the country. Long-term exposure to arsenic is known to cause cancer of the bladder, lung, and

skin and is suspected to cause cancers of the liver and kidney. Arsenic also causes other illnesses, including damage to nerves and the brain, heart and blood vessel problems, and interference with hormones that regulate blood sugar.<sup>48</sup>

Most drinking water in the United States contains either no arsenic or very low levels of it.

But in the southwestern states—where many Hispanics live and work—many drinking water systems exceed the EPA’s legal standard for arsenic, the result of naturally occurring arsenic deposits in the rocks (see Table 3-1). The region dominates the list of large (by population served) water systems with arsenic levels exceeding 5 ppb—a level below the recently adopted the EPA standard of 10 ppb (effective in 2006) but at a level that would be expected to produce 1 cancer death per 1,000 people consuming the water. Of the 46 largest water systems in the United States with arsenic levels exceeding 5 ppb, all but 7 serve cities with populations that are more than 15 percent Hispanic.<sup>49</sup>

In Arizona, the EPA’s new 10 ppb standard will require 1,100 of the state’s public water systems to reduce the concentration of arsenic in their drinking water.<sup>50</sup> In the Arizona community of Ajo, where nearly 30 percent of the population is Hispanic, treated municipal water in 2002 carried 22 ppb of arsenic—more than twice the new EPA standard.<sup>51</sup> Moreover, testing completed by a resident of Ajo found levels as high as 48 ppb in treated tap water.<sup>52</sup>

In many parts of New Mexico, where 42 percent of the population is Hispanic, arsenic levels exceed the EPA standard. In Albuquerque, where 40 percent of residents are Hispanic, some tests showed arsenic levels up to 60 ppb in 1998. In 2001,

**TABLE 3-1**  
**Ten largest water systems with average arsenic levels greater than 5 ppb (ranked by largest population)**

Rank	Water System	State	County	Population	Low Estimate of Average Arsenic Level (ppb)	Best Estimate of Average Arsenic Level (ppb)	Number of Samples with Detectable Arsenic	Maximum Level Found (ppb)	Date of Most Recent Sample in EPA Database
1	Los Angeles-City, Dept. of Water & Power	CA	Los Angeles	3,600,000	4.2	6.9	92 (24.1%)	73.3	3/4/1997
2	Phoenix Municipal Water System	AZ	Maricopa	1,000,000	4.6	5	312 (75.7%)	0.7	3/5/1998
3	El Paso Water Utilities-Public Service B	TX	El Paso	620,000	6.6	6.8	42 (80.8%)	16.6	10/24/1996
4	Southern Nevada Water System	NV	Clark	500,000	5	5	1 (100%)	5	4/17/1996
5	Albuquerque Water System	NM	Bernalillo	417,279	14.1	14.2	188 (92.6%)	60	1/6/1998
6	Mesa, Municipal Water Dept.	AZ	Maricopa	350,000	7	9.5	94 (42.5%)	50	5/21/1997
7	Corpus Christi, City of	TX	Nueces	270,000	6.5	6.5	5 (100.0%)	8.1	2/14/1996
8	Stockton East Water District	CA	San Joaquin	250,000	2.2	6.1	4 (22.2%)	13	6/13/1994
9	City of Riverside	CA	Riverside	245,000	2.3	5.4	49 (17.3%)	100	5/15/1997
10	Scottsdale, Municipal Water	AZ	Maricopa	174,170	10	11.1	149 (73.0%)	50	2/25/1998

Source: Natural Resources Defense Council, *Arsenic and Old Laws: A Scientific and Public Health Analysis of Arsenic Occurrence in Drinking Water, Its Health Effects, and EPA’s Outdated Arsenic Tap Water Standard*, 2000. Available online at <http://www.nrdc.org/water/drinking/arsenic/aolinx.asp>. Based on EPA’s 25-State Arsenic Database of Samples Taken and Reported to States from 1980–1998.

the maximum concentration was 48 ppb, according to calculations by the National Academy of Sciences, a level four times the new EPA standard, presenting a cancer risk of 40 excess cancers per 10,000 people drinking the water. Albuquerque's average arsenic level is one of the highest of any city in the United States, at 14 ppb. In some parts of Albuquerque, the lifetime chance of developing lung or bladder cancer from arsenic in the water is as high as 1 in 100. California communities such as Hanford (43.6 percent Hispanic) and the city of Chino Hills (39.2 percent Hispanic) also rank high on the list of places affected by arsenic.<sup>53</sup>

### **Perchlorate**

Perchlorate, a component of rocket fuel and explosives, has seeped into the water supply from many military and aerospace installations, as well as from the factories of defense contractors. As many as 20 million Americans are drinking water contaminated with perchlorate. Perchlorate interferes with the normal ability of the thyroid gland to absorb iodine, which is a necessary nutrient. People exposed to perchlorate are at greater risk of diminished levels of thyroid hormone (hypothyroidism). Thyroid hormone is essential for normal brain development in the fetus and infant. Babies that do not have enough thyroid hormone are more likely to have learning disabilities, lower intelligence, and problems in school.<sup>54</sup> Contamination has been found in nearly 400 drinking water sources in 31 states.

Some 15 million people in Nevada, Arizona, and California are exposed to drinking water from the Colorado River that is contaminated with perchlorate. The contamination originated at a Kerr-McGee factory located outside Las Vegas and ran down a desert stream known as the Las Vegas Wash and into Lake Mead, and from there into the Colorado River.<sup>55</sup> Although perchlorate is no longer produced at the factory, contaminated groundwater remains. Because a number of water utilities take water from the Colorado River, the contamination reaches several largely Hispanic communities across the Southwest. The Environmental Working Group, a public interest organization, has estimated that more than 2.6 million people in Arizona alone drink perchlorate-contaminated water from the Colorado River.<sup>56</sup> Of the 2.6 million people, more than 2.4 million are in Maricopa County, where one-quarter of the population is Latino.

Indeed, Arizona was the site of a study on the effects of perchlorate exposure; the study was completed in 1999 by Dr. Ross Brechner, chief of the Arizona Department of Health Services.<sup>57</sup> Researchers compared the thyroid hormone levels of infants in Yuma, Arizona, where the water supply comes entirely from perchlorate-contaminated Colorado River water, with those of Flagstaff, Arizona, where no perchlorate is detectable in the water.<sup>58</sup> Babies born in Yuma had significantly higher levels of a thyroid-stimulating hormone. This increase is thought to lead to some potentially harmful effects on the brain of the developing fetus and in newborns.

In California, according to the Department of Health Services, as of March 2004, perchlorate had been detected in 89 public water systems and 354 drinking water sources serving approximately 29 million people, more than 80 percent of the state's population.<sup>59</sup> The chemical has been found in East Sacramento, Placer, Santa Clara,

*Some 15 million people in Nevada, Arizona, and California are exposed to drinking water from the Colorado River that is contaminated with perchlorate.*

San Benito, Los Angeles, San Bernardino, and Riverside counties and in the lower Colorado River. In Los Angeles County alone, an estimated 8.9 million residents may be receiving perchlorate-contaminated water. In the summer of 2003, water officials in Fontana, Bloomington, Colton, and Rialto were forced to shut down 20 perchlorate-contaminated wells; in fact, in Rialto, more than one-third of the city's wells are polluted. All four of these cities are more than 50 percent Latino.

In January 2002, the EPA issued an extensive report on perchlorate in water and recommended that the level of this contaminant in water be restricted to a very low level of 1 ppb. For comparison, levels in the Colorado River are about 5 to 8 ppb, and wells in many other communities have levels of more than 100 parts per billion. The Department of Defense and the companies responsible for perchlorate pollution have succeeded in delaying federal action while the National Academy of Sciences reviews the EPA conclusions. The EPA now says it has no plans to regulate the levels of perchlorate in water in the foreseeable future. Several states are beginning to take action on this problem by shutting down contaminated wells. California also passed a law in 2003 to force polluters to pay to supply consumers with cleaner drinking water.

*A report produced by a joint initiative between U.S. and Mexican agencies found that 14 wells tested in Nogales, Mexico, and in Sonora and Nogales, Arizona, contained high concentrations of nitrates and other carcinogenic chemicals.*

### **Nitrates**

Another serious water pollution problem of particular concern to the Hispanic community is nitrates (and nitrites)—nitrogen products from fertilizers, human feces, and animal manure that wash off land into surface water sources and enter some groundwater sources.<sup>60</sup> Nitrates interfere with the blood's ability to carry oxygen to the brain and vital organs. Infants who drink water that contains excessive nitrates for even a short time can develop blue baby syndrome (methemoglobinemia), in which nitrate poisoning prevents their blood from holding oxygen. Pregnant women are also particularly vulnerable to high nitrate levels in drinking water, again because it can affect the ability of their blood to carry oxygen. Studies have revealed indications of a potential link between high nitrates in drinking water and gastrointestinal cancer, miscarriages, and an increased risk of neural tube defects.<sup>61</sup>

A report produced by a joint initiative between U.S. and Mexican agencies found that 14 wells tested in Nogales, Mexico, and in Sonora and Nogales, Arizona, contained high concentrations of nitrates and other carcinogenic chemicals.<sup>62</sup> Contamination of groundwater in California by nitrates is widespread and has forced the closure of more public wells than any other contaminant.<sup>63</sup> Officials have closed approximately 800 wells in Southern California because of nitrate levels. In 1999, California's Department of Health Services found that 22 public water systems in the state were in violation of state and federal nitrate standards. Infants and pregnant women should not drink water, or formula prepared with water, that contains nitrate levels near or above the 10 parts per million permitted by the EPA. Some heavily Latino areas, however, get their drinking water from wells with nitrate concentrations as high as 40 milligrams per liter (40 parts per million).

In 2003, a total of 58,840,020 gallons of sewage spilled into Florida's waters (see "Florida Beach Paradise Lost to Polluters"). Florida is among the top 10 states that allowed the most sewage permit violations between January 1999 and December

## FLORIDA BEACH PARADISE LOST TO POLLUTERS

In Florida—where Hispanics are the largest minority group, numbering 2.7 million—industrial and municipal facilities are being permitted to discharge large amounts of toxic chemicals and other pollutants into streams, rivers, beaches, and even underground aquifers. A study by Florida's Public Interest Research Group found that between 2002 and 2003, 53 percent of facilities with permits to pollute violated their legal limits. These actions degrade the places where Floridians fish and swim, contaminate drinking water sources, and threaten public health.

Lakes and rivers are under fish advisories due to mercury pollution, and Floridians have been advised to limit their consumption of fish caught in Florida waters. Because of poor warning systems, many people in Florida are not aware of the risk from eating their catch. Florida's economic lifeblood—its beaches—is also under attack from increased pollution and lax enforcement. The state of Florida did not require any monitoring of ocean and bay coastal waters until the passage of Senate Bill S1412 in June 2000 gave the Florida Department of Health the authority to initiate a statewide beach monitoring program and close beaches or issue advisories if standards are exceeded.

NRDC's August 2003 report *Testing the Waters: A Guide to Water Quality at Vacation Beaches* found that in 2002, Florida had 1,745 beach closings and advisories, more than double the number in 2001 (686). NRDC's report determined that 92 percent (1,600) of closings or advisories in 2002 reflected monitoring that revealed elevated bacteria levels. Of these (excluding 103 from Wakulla County that gave no source information), 66 percent (986) were from unknown sources of contamination, 29 percent (433) were from stormwater, 18 percent (262) were from other sources (including wildlife), and 5 percent (72) were from sewage leaks or spills. Pasco County beaches were closed a total of 383 days, with Escambia County coming in next at 289 days. The state has nevertheless failed to include 38 beaches (34 in Brevard County, 1 in Gulf County, and 3 in Okaloosa County) in its analysis, leaving swimmers there to decide for themselves whether to venture into those waters.

The water people drink to cool off in the Florida sun is also at risk because of Florida's reliance on underground injection for disposal of wastewater. In South Florida, 120 municipal Class 1 underground injection control wells discharge more than 400 million gallons of partially treated sewage every day. Underground injection is a widely used waste-disposal method in which waste is injected underground into aquifers supposedly beneath and separated from drinking water supply aquifers. The process assumes that the waste will not reach drinking water supplies, never posing a threat to human health. The reality is that when the waste migrates upward through fractures in the rock or seeps through formations that are not impermeable enough to contain the waste, a toxic mix of fecal coliform and chemicals will flow into drinking water supplies. At least 18 wells in the counties of Pinellas, Dade, Palm Beach, and Brevard are known or suspected to be causing wastewater movement into other aquifers. Nine may be releasing wastewater into underground drinking water supplies in violation of the Safe Drinking Water Act. The health threat is real, because 94 percent of the drinking water in South Florida comes from underground sources.

Sources: Florida PIRG, "Troubled Waters: An Analysis of Clean Water Act Compliance, January 2002–June 2003," 2004; NRDC, *Testing the Waters: A Guide to Water Quality at Vacation Beaches*, 2002; Sierra Club, "What are we doing to our drinking water?"; and U.S. Environmental Protection Agency, "Relative Risk Assessment of Management Options for Treated Wastewater in South Florida," EPA 816-R-03-010, 2003.

2001. Of the 1,745 beach closings in 2002, 92 percent were caused by elevated bacteria levels from sewage.

---

## **RECOMMENDATIONS**

Thousands of U.S. residents become ill each year by drinking water contaminated with human and animal waste, pesticides, and heavy metals such as arsenic and lead—especially along the U.S.-Mexico border, where some communities lack access to sanitary sewers, and in southern and western states, where drinking water sources are polluted with arsenic and nitrates. NRDC recommends the following measures to begin to reduce the health threat to Hispanic communities from water pollution:

- ▶ Congress should establish a clean water trust fund with a dedicated source of funding, not subject to any congressional appropriations fight, to help finance water infrastructure projects.
- ▶ Congress should increase funding for wastewater infrastructure through the Clean Water State Revolving Fund, which provides low-interest loans to localities for clean water projects.
- ▶ Congress should enact legislation to hold bottled and vended water products to the same regulatory, reporting, and right-to-know standards to which tap water is held. The labels of bottled water should contain information about the presence of contaminants in the water, particularly those that exceed the EPA's maximum contaminant level goals or health advisories.
- ▶ The EPA should enforce current Clean Water Act requirements on sewage treatment plants and sewer operators, particularly those that prohibit sanitary sewer overflows, which are not being strictly enforced; should abandon its proposal to allow sewage to bypass certain treatment processes; and should make it mandatory for sewer operators to report sewage overflows to the agency and to notify the public of their occurrence.
- ▶ The EPA should commit to setting an enforceable drinking water standard that will protect pregnant women and babies from perchlorate contamination in their drinking water.
- ▶ City governments should earmark investments to install new pipes and upgrade drinking water treatments to any of four state-of-the-art advanced treatment techniques that are often used in Europe and elsewhere in the world but are rarely used alone in this country and virtually never together: ozone, granulated activated carbon, ultraviolet (UV) light treatment, and membrane treatment (such as reverse osmosis or nanofiltration).
- ▶ Congress should increase funding for the U.S. Department of Health to track waterborne diseases in the U.S.-Mexico border region, and to conduct outreach campaigns to educate residents on how to reduce exposure to microbial and chemical contaminants in the water.

- ▶ Congress should increase funding for the Border Environmental Infrastructure Fund (BEIF) in the EPA budget from the current \$50 million to \$100 million, as requested by the advisory committee that oversees this fund. This would increase the BEIF's capacity to build and improve drinking water systems in the U.S.-Mexico border region.
- ▶ The EPA should require public water systems serving an area where at least 10 percent of the population speaks Spanish as a primary language to translate their consumer confidence ("right-to-know") reports into Spanish; and the EPA should broadcast announcements on Spanish radio to inform people about the release and importance of the reports and how to obtain more information.
- ▶ State and local governments should require water-polluting industries located in or around residential neighborhoods to assess, disclose, and act to minimize their environmental impacts; and decisions regarding new sitings should facilitate the involvement of non-English-speaking community members.



# PESTICIDES

## HIDDEN DANGER

*Environmental  
Health Threats  
in the Latino  
Community*

October 2004

Americans are exposed to pesticides on a daily basis, from the food we eat, the water we drink, and the air we breathe. However, farmworkers and their families are at greatly increased risk for pesticide-related health problems, for the simple reason that they are much more likely to be exposed to pesticides, and at much higher levels.

Because 88 percent of farmworkers are Latino, this problem is of particular concern to Latino communities. In addition, people living in agricultural areas are at higher risk for pesticide exposures—including millions of Latinos living in Arizona's and California's farming communities.

Pesticides are a diverse group of chemicals used to kill insects, molds, and other undesirable organisms on crops and lawns or inside buildings. Although some pesticides are more toxic than others, the purpose of these chemicals is to kill pests, so even low levels of exposure can be toxic to humans.

The effects caused by exposure to pesticides range from skin rashes, burning eyes, and cough to acute illness with nausea, vomiting, diarrhea, sweating, twitching, and difficulty breathing. Pesticide exposure can also increase a person's risk of certain types of cancer, such as lymphoma, prostate cancer, and childhood cancers. Women who work with pesticides may be at higher risk of experiencing a miscarriage or having a child with a birth defect.

An estimated 2.5 million migrants and seasonal laborers work on farms in the United States each year. The Centers for Disease Control and Prevention (CDC) has identified this subgroup of the U.S. population as a group at risk for a number of serious health problems, including infectious diseases, diabetes, high blood pressure, work-related injuries, and diseases related to pesticides.<sup>1</sup> Poor nutrition and limited access to adequate health care can aggravate these problems.

In California, 91 percent of all hired agricultural workers were born in Mexico.<sup>2</sup> Many of these men and women live and work in areas where exposure to environmental contaminants is almost constant. They are exposed to toxic pesticides at work, either when they spray fields or when they cultivate and harvest crops in recently sprayed fields.

They—and their families—are exposed to pesticides off the job from pesticides drifting through the air and from pesticide residues on their clothes and on the food they eat and in the well or irrigation water they use to drink and bathe. Moreover, although data on particular incidents is limited, there are many stories about crop-dusting planes accidentally spraying migrants with pesticides.

---

## CHILDREN OF FARMWORKERS AT RISK

Even though children themselves do not work in the fields, many children of farmworkers are exposed daily to harmful pesticides. Children can be exposed at school and on playgrounds located near farms, which become contaminated with pesticides drifting from the fields; and at home through contact with their parents' clothes, from dust tracked into the house, from contaminated soil in play areas, from food brought directly from the fields to the table, and from contaminated well water. Indeed, children of farmworkers are likely to be the most pesticide-exposed subgroup in the United States.<sup>3</sup> For example, surveys of farmworkers' children have shown that they are likely to swim or play in irrigation ditches and play in soil near farm fields.<sup>4</sup> Scientists at the University of Washington in Seattle tested children of farmworkers in Douglas and Chelan counties in Washington state and found that more than half were exposed during the spraying season to dangerous dimethyl organophosphate pesticides, even though the children themselves did not work in the fields.<sup>5</sup>

Small children are at highest risk of exposure to take-home pesticide residues. Even fetuses are at risk—from pesticides in their mothers' blood that cross the placenta. In addition, infants can be exposed through breast-feeding.<sup>6</sup> Most of these children are Hispanic, and their parents often lack access to adequate information on how to protect themselves and their families from pesticides.

It is well known that the toxic chemicals in pesticides pose a serious risk to children's health, but few studies have examined the neurological impact of pesticides on Latino children. One recent study examined the neurological function of children living in a heavily agricultural area of Mexico. Researchers compared children living in two communities: a heavily agricultural community where children were regularly exposed to pesticides, and a community where nonchemical pest control methods were used in agriculture. The differences between the two groups were startling.

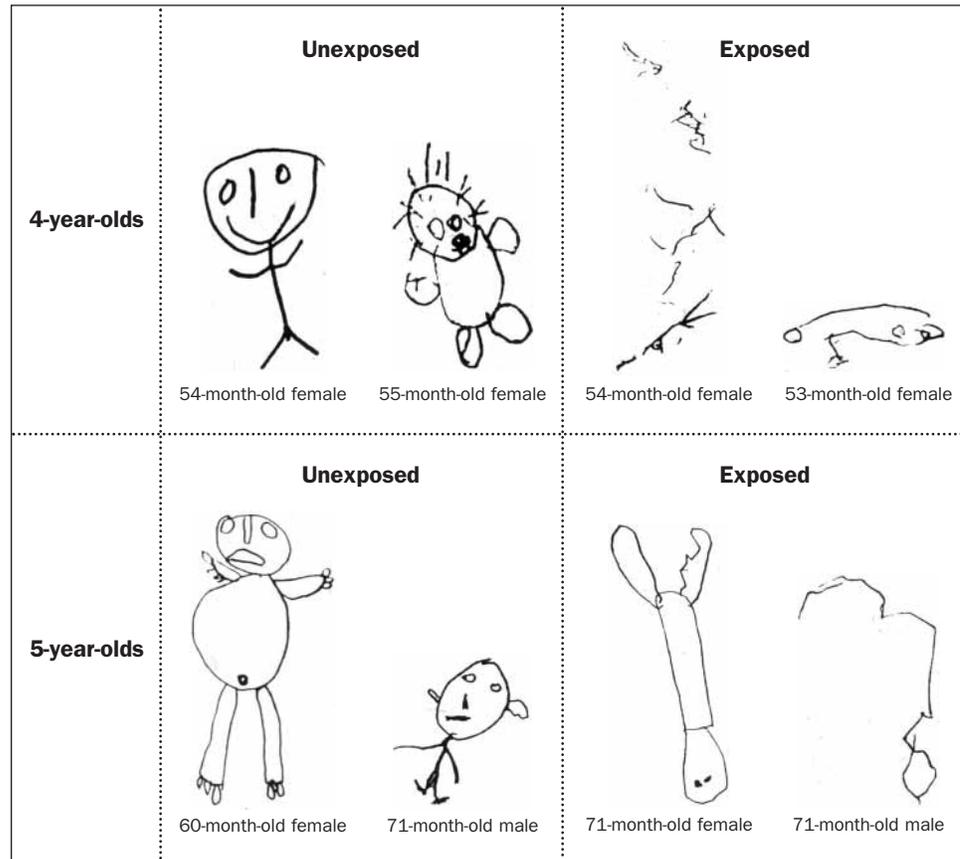
In the community where pesticides were heavily used, researchers detected a variety of highly toxic organochlorine pesticides in the umbilical cord blood and breast milk of women. Children in the exposed community showed significantly diminished stamina and coordination when performing a number of tasks (catching a ball, jumping in place, dropping raisins into a bottle cap). The children also showed memory impairment in that they were less able to recall what they had been promised as a reward before starting. Most remarkably, however, were the differences between the ability of children in the exposed community to draw recognizable representations of people and objects (see Figure 4-1).<sup>7</sup>

There is also evidence of associations between parental or infant exposures to pesticides and childhood brain tumors, leukemia, non-Hodgkin's lymphoma, sarcoma, and Wilm's tumor. One California study found that children with leukemia were three to nine times as likely to have a parent who reported using pesticides in the home or garden during pregnancy or lactation. Maternal occupational exposure to pesticides has also been associated with birth defects, including abnormalities of the lungs, heart, musculoskeletal system, and urogenital system and an increased risk of stillbirth.<sup>8</sup>

Studies such as those described earlier are conclusive that children and farmworkers are particularly vulnerable to pesticides, but many pesticides are still not adequately

*Children in the exposed community showed significantly diminished stamina and coordination when performing a number of tasks (catching a ball, jumping in place, dropping raisins into a bottle cap). The children also showed memory impairment in that they were less able to recall what they had been promised as a reward before starting.*

**FIGURE 4-1**  
**A Comparison of Drawings By Children Exposed to Pesticides and Unexposed Children**



Source: The Oregon Child Development Coalition

evaluated for safety despite the mandate of the Food Quality Protection Act of 1996, which requires the EPA to evaluate the health threats posed by these pesticides. In 2001, NRDC, the United Farm Workers, the Breast Cancer Fund, and others won a settlement forcing the EPA to fulfill these duties and better protect farmworkers and their families.

**AGRICULTURAL PESTICIDE DRIFT**

Neighborhoods, migrant worker camps, and whole towns in agricultural regions can be exposed to airborne pesticides following aerial crop spraying, or via air currents containing pesticide-laden dust from farm fields. This phenomenon, called pesticide drift, is a serious matter. More than half of all farmworker poisonings from 1998 to 2000 occurred because of pesticide drift. The greatest number of worker poisonings were reported in Tulare, Fresno, Monterey, and Kern counties, which are 38 to 51 percent Latino and have a total Latino population of 980,000.<sup>9</sup> Kern County does not require pesticide applicators to notify people living near application sites and requires only a quarter-mile buffer zone between aerial applications of restricted pesticides and schools or residential areas. Many more pesticide poisonings go unreported each year. The

**TABLE 4-1**  
**Concentrations of Pesticide Compounds in the Urine of the Most Exposed Individuals**

Class	Compound	CONCENTRATION IN URINE (PARTS PER BILLION)		
		Mexican-Americans	Non-Hispanic Whites	Difference
Organophosphates	DMP	15.0	10.0	1.5 times
	DMTP	13.0	45.0	2.9 times
	DEDTP	1.10	0.870	1.3 times
	p-nitrophenol	21.0	4.20	5.0 times
Carbamates	carbofuranphenol	1.90	0.740	2.5 times
Organochlorines	DDE	4,940	1,160	4.2 times

Source: Centers for Disease Control and Prevention, "Second National Report on Human Exposure to Environmental Chemicals," 2003.

victims and their families may be unable to recognize the symptoms of pesticide-related illness, and they may not have access to health facilities. Moreover, many health care providers fail to correctly identify cases of pesticide poisoning.<sup>10</sup>

Surface water and groundwater near agricultural fields can also contain high concentrations of pesticides, and these polluted waters frequently serve as sources of drinking water for local residents and farmworkers. A U.S. Geological Survey study of rural drinking water wells between 1992 and 1999 found that 38 percent were contaminated with at least one of a group of 83 pesticides.<sup>11</sup>

In January 2003, the CDC published its second national report on human exposure to environmental chemicals. In this study, the government took blood and urine samples from more than 1,000 people of all ages and ethnicities in the United States to test for patterns of exposure to hazardous pollutants such as pesticides. The report found the most exposed Mexican-Americans had between 1.3 and 2 times as much of some neurotoxic pesticides, known as organophosphates, in their urine samples compared with the most exposed non-Hispanic whites. The most exposed Mexican-Americans had 5 times the exposure to a pesticide called parathion, and 2.5 times the exposure to other pesticides called carbamates, compared with non-Hispanic whites. Parathion and carbamates are known to be toxic to the brain and nervous system. Mexican-Americans in the study also had 4 times the levels of DDE, a chemical that persists in our bodies for many years and that is related to the banned pesticide DDT. Finally, the study found that Hispanics had nearly twice as much of a weed killer linked to non-Hodgkin's lymphoma (2,4-D) in their urine samples compared with non-Hispanic whites (see Table 4-1).<sup>12</sup>

### **INADEQUATE PROTECTIONS AGAINST FARMWORKER POISONINGS**

More than four in five migrant farmworkers in the United States are Latino, and they are thought to have the worst health status in the nation.<sup>13</sup> Lack of field sanitation facilities and exposure to pesticides are some of the most important contributing causes. According to a survey of farmworkers by the U.S. Department of Labor, water for washing is unavailable in 16 percent of the fields in the United States.<sup>14</sup> A recent study in El Paso, Texas, found that nearly one-third of farmworkers were not given water

### PESTICIDE DRIFTS IN CALIFORNIA POISON FARMWORKERS

In September 1996, 22 farmworkers harvesting grapes near Bakersfield, California—including three pregnant women—were hospitalized after being poisoned by a mixture of toxic pesticides. The pesticides drifted from a nearby cotton field that was being treated. Some 225 additional farmworkers who were in the fields were also exposed.

In November 1999, 150 people (mostly farmworkers) in the California town of Earlimart had to evacuate their homes after a sprinkler application of the soil fumigant metam sodium exposed them to toxic fumes. At least 24 were taken to the hospital with nausea, vomiting, headaches, burning eyes, and shortness of breath.

On May 2, 2004, 13 farmworkers in Bakersfield, California, had to be taken to hospitals after being exposed to the pesticides Monitor 4 and Penncozeb 75 DM. These chemicals drifted from a potato field that was being sprayed by a crop duster to the peach orchard where the workers were laboring.

Sources: Pesticide Action Network North America, [www.panna.org](http://www.panna.org); United Farm Workers, [www.ufw.org](http://www.ufw.org).

for washing in the field.<sup>15</sup> This condition lengthens the time that workers spend in contact with pesticide residues, thus increasing the danger of pesticide-related illnesses.

Workers who apply pesticides in the field often do not have or use safety equipment such as respirators, gloves, boots, and coveralls. According to a recent study, approximately 23 percent of farmworkers reported not using any safety equipment while mixing or applying chemicals in their most recent farm job.<sup>16</sup> Even when some safety equipment is available, many workers do not receive training in its proper use. Language and educational barriers contribute to the problem: Approximately 53 percent of all farmworkers in this country cannot read English at all, and 58 percent read Spanish at or below a seventh-grade level and would have trouble understanding technical language.<sup>17</sup> Even if written instructions were issued in Spanish—and they often are not—many workers would have difficulty understanding them.

Another study found that the amount of exposed skin was directly related to the concentration of pesticides found in the blood. For example, workers who reported wearing short-sleeved shirts had blood concentrations of pesticides that were about 3.3 times as high as those who wore long-sleeved shirts. Workers who reported wearing the same pair of pants day after day had blood concentrations that were more than twice as high as workers with two pairs of work pants, and workers who wore sneakers or shoes had levels 2.5 times as high as those who wore boots. Finally, workers who reported wearing gloves and hats had one-third the concentrations compared with those who wore only hats.<sup>18</sup>

The study's findings also underscore the need to make clean water available for washing at the worksite. Researchers found that workers who reported never or seldom washing their hands before using the bathroom had blood concentrations of pesticides that were 2.4 times as high as those who did so most or all of the time. Workers who reported eating food from the fields without washing it first had blood pesticide levels that were 1.6 times as high as those who said they always washed food from the fields before eating it.<sup>19</sup>

In some parts of the country, information is even more difficult to obtain for non-English-speaking farmworkers, as evidenced by a study that surveyed about 300 Latino farmworkers in North Carolina in both 1998 and 1999. The study found that between one-third and more than half of field facilities and pesticide training practices were inadequate for basic pesticide safety. Between one-third and more than half of the interviewed workers did not have access to separate sources of water for washing and drinking at the worksite, did not have access to adequate laundry facilities, and did not have pesticide safety training. Less than half of the interviewed workers reported that pesticide application information or warning signs were posted in central areas, and only 11 percent of the workers were able to name the pesticides used in their fields. The latter finding is important because knowing which pesticides are used is critical to the proper treatment of pesticide illnesses. Furthermore, only about 20 percent of workers reported being told by employers to dress and work safely.<sup>20</sup> Employers act with a degree of immunity because farmworkers do not have the ability to challenge pesticide violations in court and are vulnerable to employer retaliation.

Based on reported data about pesticide-related illnesses in California, the Environmental Protection Agency (EPA) estimates that agricultural workers in the United States as a whole suffer 10,000 to 20,000 acute pesticide-related illnesses each year (see “Pesticide Drifts in California Poison Farmworkers”). However, most cases likely go unreported. Chronic pesticide exposures that do not cause immediate illness, which may account for the majority of pesticide-related health problems, are almost never recorded.<sup>21</sup>

The situation is further complicated by lack of access to preventive health services and other medical care. Only 5 percent of farmworkers have some form of employer-provided health insurance, and only 13 percent are enrolled in the Medicaid program.<sup>22</sup> Another 15 percent of U.S. farmworkers obtain medical care through federally funded migrant health centers.<sup>23</sup> This means that most of the U.S. farmworker population must rely on some limited state programs or clinics run by nonprofit groups. The limited availability of such programs leaves most farmworkers, who can rarely afford to pay a doctor, without regular access to health care. The problem is so serious that a 2000 study of farmworkers in California found that 32 percent of male farmworkers had never seen a doctor in their lives.<sup>24</sup> Gaining access to health care may be especially challenging for the tens of thousands of illegal immigrants, who may not qualify for government programs and who may be afraid of seeking any assistance out of concern that they will be deported.

Although high cancer rates are a serious problem for the general farmworker population, few government agencies have studied the problem in detail. One such study, by the Cancer Registry of Central California, found that Hispanics employed as farmworkers had a 59 to 69 percent greater risk of stomach, cervical, and uterine cancer, and of some leukemias, than other Hispanics in California.<sup>25</sup>

### ***Limiting Exposure to Agricultural Pesticides***

Recent research has suggested useful ways to limit the pesticide exposure of farmworkers and their families. Exposure conditions are often far worse for homeless

*The situation is further complicated by lack of access to preventive health services and other medical care. Only 5 percent of farmworkers have some form of employer-provided health insurance, and only 13 percent are enrolled in the Medicaid program.*

*According to a study of pesticide exposure among pregnant women in New York City, Latinas were more likely than non-Hispanic white women to report that they or a member of their household had used pesticides at home during their pregnancy (50.5 percent compared with 30.8 percent).*

workers who are not provided with temporary housing or washing facilities at the workplace. Between 1991 and 1992, the County of San Diego, California, conducted an observation project aimed at (1) determining the number of homeless migrant farmworkers living in 42 temporary encampments without adequate sanitation facilities and (2) defining the health risks faced by these workers.<sup>26</sup> The research found that 19 of 29 surveyed water sources drew water from farm irrigation systems. These systems often contained toxic levels of pesticides and fertilizers during the growing season. Even if the camps had tapped in to the irrigation systems at points upstream from the introduction of pesticides and fertilizers, it would have been necessary to add valves to prevent backflow of contaminated water. Although these are inexpensive devices, employers were unlikely to have provided them to workers living in temporary encampments.

Because of this finding, a pilot project was begun in San Diego to provide these camps with clean municipal water sources. The expenses incurred by this project were remarkably low, averaging between \$438 and \$920 per system for piping, gravel, spigots, backflow devices, and other hardware, depending on how far the encampments were from the nearest municipal water supply point.<sup>27</sup> This project serves as an excellent example of the simplicity and low cost of many of the most fundamental practices necessary to protect farmworkers' health and safety.

---

#### **USE OF PESTICIDES IN THE HOME**

Agricultural pesticides are not the only pesticides that put Latino communities at risk for pesticide poisoning (see "Deadly Poisons"). Hundreds of pesticides, used for everything from preventing weeds to killing rats and mice, are easily purchased. However, behind the seeming convenience of these products lie dangers ranging from skin irritation and respiratory problems to nervous system damage and cancer.

Some studies suggest a high rate of pesticide use in Latino households. According to a study of pesticide exposure among pregnant women in New York City, Latinas were more likely than non-Hispanic white women to report that they or a member of their household had used pesticides at home during their pregnancy (50.5 percent compared with 30.8 percent).<sup>28</sup> Another study of pregnant Dominican-American and African-American women in New York City found that 85 percent of them reported that pesticides were applied at home during their pregnancy. Of those who had their homes treated by an exterminator, 45 percent used pesticides at home more than once per month. Half of the women who reported having seen no pests at home still reported that pesticides were applied.<sup>29</sup> Unknowingly, these women put their unborn children at risk of developmental and neurological problems, unaware that such repeated use exposed them to unsafe doses of these chemicals.

A recent study of children of Dominican and African-American women in New York City found evidence that pesticide exposure during pregnancy has measurable effects on fetal development. High concentrations of the pesticide chlorpyrifos in babies' umbilical cords—the result of the mothers being exposed to the pesticide during pregnancy—were associated with decreased birth weight. The effect on birth

### DEADLY POISONS: ILLEGAL PESTICIDES USED IN THE HOME

Latino communities have seen a constant flow of illegally imported pesticides marketed as the ultimate solution to such household pests as mice and roaches. The products include Tempo, *Tres Pasitos*, Miraculous Chalk, *polvo de avión*, and others. They are often sold in small neighborhood *mercados* or *bodegas* in predominately Hispanic communities, or even on the street, and are often much more toxic than legal pesticides. Although EPA approval is no guarantee that a pesticide is safe, illegal pesticides are much more dangerous. These products generally contain pesticides that the agency has tested and found to be too dangerous to approve for home use.

*Tres Pasitos* is sold in predominately Hispanic communities in New York, including the South Bronx and Washington Heights. Imported from Mexico and the Dominican Republic, it contains the pesticide aldicarb. Exposure to high amounts of aldicarb can be deadly, paralyzing the respiratory system.

Miraculous Chalk is typically sold in Asian communities throughout New York. Generally imported from China, it contains the pesticide deltamethrin, one of the most toxic pesticides of its kind.

Tempo, also sold in predominately Hispanic communities in New York, including the South Bronx and Washington Heights, is a registered pesticide with both the state and federal governments, meaning that it is approved for some uses. In New York state, however, use of Tempo is restricted because it is considered too hazardous to humans and other forms of life to permit unrestricted sale, purchase, use, or possession. The pesticide in Tempo, cyfluthrin, can be lethal, and as sold on the street, Tempo can contain 200 to 400 times the recommended dose.

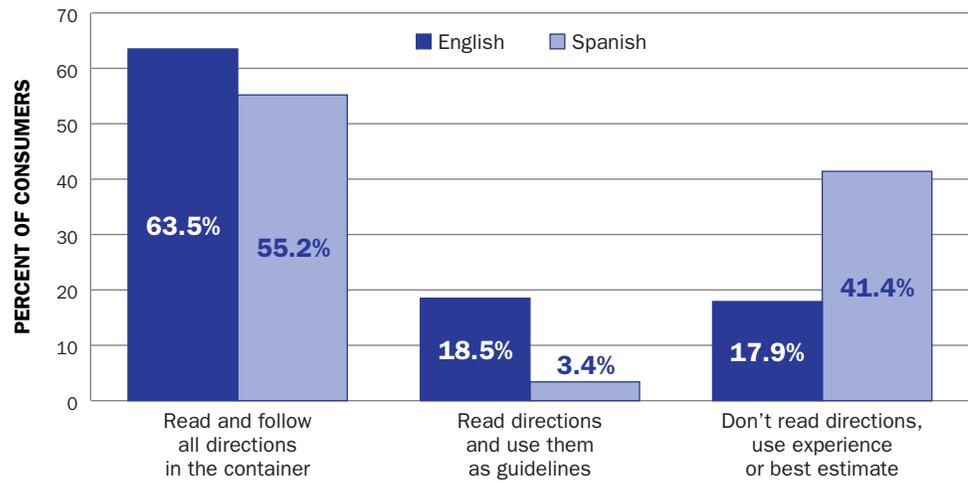
*Polvo de avión*, which contains the highly toxic pesticide methyl parathion, is sold in areas near the U.S.-Mexico border. Although it is illegal to sell methyl parathion for home use, consumers near some border areas have easy access to the chemical, which is sold by vendors in unmarked bags. Residues of this pesticide remain in homes for years, putting residents, especially children, at risk of brain and nerve damage. With these hazards in mind, the EPA has begun an awareness campaign targeting Latinos in an attempt to inform them of the dangers from these illegal pesticides, and the New York attorney general began a serious crackdown in 2003 with arrests made in Chinatown, Upper Manhattan, and the Bronx.

Sources: EPA, Office of Pesticide Programs, "Illegal Pesticides," 2003, and "Public Service Announcement: Willie Colon on Illegal Pesticides," 2003; Office of New York Attorney General Eliot Spitzer, "What you need to know about black market pesticides," fact sheet, Dec. 16, 2003, and "Spitzer Warns New Yorkers About Dangers of Illegal Pesticides" press release, Dec. 16, 2003.

weight was as great as if the mothers had smoked while pregnant. Low birth weight is associated with respiratory and other complications in newborns. More importantly, birth weights increased soon after chlorpyrifos products sold for home use were removed from the market in 2001, indicating a positive health effect from reduced exposures.<sup>30</sup>

The limited data available on home pesticide use suggests that Latinos need information about the risks of these chemicals and about safer and more effective pest management methods. A study in San Diego, California, found that Latinos living in homes where the primary language was Spanish were less likely than the general population to read pesticide labels to find out what pests they were meant

**FIGURE 4-2**  
**How Consumers Decide How Much of Pesticide to Apply (by Primary Language Spoken at Home, San Diego Study)**



Source: C.A. Wilen, "Survey of Residential Pesticide Use and Sales in the San Diego Creek Watershed of Orange County, California," 2001. Available online at <http://www.cdpr.ca.gov/docs/sw/contracts/sdcrk.pdf>.

to control, what ingredients they contained, how much should be applied, when they should be applied, and how they should be disposed of (see Figure 4-1).

Spanish speakers were more than twice as likely to rely on store employees or advertisements as sources of information. This is to be expected, because application instructions are usually available only in English. Reliance on word of mouth, advertisements, and other unofficial sources of information may increase the likelihood that pesticides will be applied incorrectly, thus increasing the health risks of exposure. The same San Diego study also found that although Spanish speakers generally applied pesticides less frequently than the general population, 22.2 percent of them used pesticides in their homes more than 12 times per year.<sup>31</sup>

### PESTICIDES IN PUBLIC HOUSING

Public housing environments often contain densely concentrated populations—contributing to garbage disposal problems—and old, deteriorated buildings, both characteristics that promote pest infestations. Residents may be exposed to pesticides not only when they self-apply to ward off pests but also when housing authorities conduct periodic applications.

In New York City, for example, more than 187,300 Latinos live in public housing, making up 40.4 percent of all public housing residents. Although data is lacking on the number of Latino families affected, 63.7 percent of all householders in the city's public housing report that exterminations are carried out in their buildings routinely and not only in response to existing pest problems.<sup>32</sup>

Despite routine applications, residents sometimes feel the need to follow up by applying pesticides themselves. A survey of two public housing complexes in New

York City revealed that despite pesticide applications in apartments and common areas ordered by the New York City Housing Authority (NYCHA), 93 percent of residents also applied their own pesticides, and 44 percent did so at least once per week. The EPA classifies some of the pesticides used by residents—such as Baygon, Fipronil, and hydramethylnon—as possible, or probable, carcinogens. The pesticides applied by the NYCHA included a possible carcinogen and a restricted-use pesticide.<sup>33</sup> Restricted-use pesticides are more toxic than pesticides intended for homeowner use and can be applied only by certified applicators. Even when they are legally applied, the fact that a more dangerous type of pesticide is being applied in buildings where children live is cause for concern.

Public housing residents may feel powerless to do anything about excessive pesticide exposures or pest problems in their community. Fortunately, the choice is not between living with chemicals or living with pests. Experience has shown that integrated pest management (IPM), an approach based on sanitation and physical controls to prevent and eliminate pest infestations, offers a cost-effective and safe alternative to chemical use. Least-toxic pesticides are applied only when necessary, keeping health risks to a minimum. IPM also improves the community environment through better waste handling and building maintenance.

Some public housing developments that have tried IPM have found it to be far more effective than conventional pest management that relies on toxic chemicals. The NYCHA carried out a pilot project in 1999 in a public housing project in East Harlem that completely eliminated mice problems and reduced cockroach populations in 73 percent of apartments (only 12 percent reported an increase). Mice and cockroach populations stayed the same in a control building that continued using conventional pest management instead of IPM. The Henry Horner public housing project in Chicago implemented a similar program in 1996 and achieved such a significant reduction in cockroach populations that use of the nontoxic cockroach bait employed in the IPM program went down 83 percent during the project. Both the East Harlem and the Chicago programs were largely implemented by residents trained in IPM techniques, giving the residents a stake in the success of the program.<sup>34</sup>

Recognizing the dangers of pesticide use in public housing and the potential for IPM to control pest problems safely and effectively, NRDC and the attorneys general of New York and nine other states petitioned the Department of Housing and Urban Development (HUD) in 2003 to require housing authorities to implement IPM in public housing receiving HUD funds.<sup>35</sup> Surprisingly, HUD denied the request despite an existing legal mandate that federal agencies promote IPM through regulatory policies and other activities.<sup>36</sup> This means that more pressure will be required not only at the federal level but also at the state level to force state housing authorities to adopt safer pest management methods.

*Restricted-use pesticides are more toxic than pesticides intended for homeowner use and can be applied only by certified applicators. Even when they are legally applied, the fact that a more dangerous type of pesticide is being applied in buildings where children live is cause for concern.*

---

## **RECOMMENDATIONS**

Farmworkers, 88 percent of whom are Latino, and their families are routinely exposed to toxic pesticides at work and off the job when pesticides drift through the air, settle

in their drinking water, and cling to their clothes and food. NRDC recommends the following to reduce the health threat to the Hispanic community from pesticides:

- ▶ Federal, state, and local governments should develop educational efforts aimed at migrant workers, farm owners, health clinics, and policymakers. These efforts should include giving farmworkers the right to know what pesticides they are exposed to on the job, including the health effects of exposure and the safety precautions they can take. Federal, state, and local governments also should require growers to provide field posting with dates so that workers know exactly when to stay out of the fields; and to provide workers with crop sheets so that they know the names of the pesticides to which they are exposed and can give these sheets to a health professional in case of suspected exposure.
- ▶ The EPA and various state agencies should designate farm children as a vulnerable population that must be considered and protected in all pesticide registration and tolerance decisions under federal and state law.
- ▶ The EPA and state agencies should include an additional 10-fold safety factor into its assessments of risks to children from pesticides.
- ▶ The EPA should consider nondietary routes of pesticide exposure for farm children in establishing its standards for pesticides in food, including exposure from their parents' clothes and pesticide drift.
- ▶ The Federal Department of Labor and state agencies overseeing the working and health conditions of agricultural workers should improve their data-collection practices so that medical researchers can have the information they need to conduct epidemiological studies and better track the health status of this population.
- ▶ Congress should eliminate the Federal Insecticide, Fungicide and Rodenticide Act's "one free bite" rule, which prohibits enforcement agencies from imposing monetary fines on private pesticide applicators (i.e., growers) for their first violation of a particular regulation. This rule is the reason that no fine is issued in 80 percent of the instances where violations are found.
- ▶ The EPA and other regulatory agencies should tighten their enforcement of pesticide and chemical-use regulations and should impose harsher penalties, including criminal prosecution, on those, including farm owners and pesticide manufacturers, who endanger workers' health.
- ▶ The EPA should ban the most hazardous pesticides, and the EPA and various state regulatory agencies should prohibit the most drift-prone application methods—including pesticide applications from airplanes or helicopters—to reduce acute and chronic pesticide poisonings.
- ▶ The EPA should cancel the registration of any pesticide that cannot be safely applied without protective equipment that farmworkers can realistically use under actual field conditions (such as hot weather and the like).

- ▶ The EPA should require farm owners to establish larger buffer zones during pesticide applications, and to improve their posting and worker-notification practices, in order to reduce pesticide drift and pesticide residue exposures.
- ▶ The EPA should develop and implement a national pesticide incident reporting system and require growers to keep records of all pesticides they apply.
- ▶ State agencies and the EPA should give farmworkers a private right of action to challenge pesticide violations in the workplace.
- ▶ The Department of Housing and Urban Development should establish regulations requiring public housing authorities (PHAs) receiving federal funds to adopt integrated pest management (IPM) in public housing developments; in the absence of a federal mandate, states should require that PHAs adopt IPM as the standard for pest prevention and control.



## CHAPTER 5

# LEAD

## HIDDEN DANGER

### *Environmental Health Threats in the Latino Community*

October 2004

According to the U.S. Agency for Toxic Substances and Disease Registry, “lead can affect almost every organ” in the body, especially the nervous system.<sup>1</sup> Scientists estimate that nearly half a million U.S. children between the ages of one and five have elevated levels of lead in their blood. Although blood lead levels have decreased steadily among the U.S. population as a whole since lead was banned in gasoline and paint in the 1970s, an estimated 4 percent of Mexican-American children have blood lead levels above the action level established by the Centers for Disease Control and Prevention (CDC) for risk of lead poisoning.

Hispanic children in general are twice as likely as non-Hispanic white children to exceed the CDC threshold.<sup>2</sup> In fact, the most recent data showed that in 2001, 5.57 percent of the Hispanic children whose lead test results were reported to the CDC had lead levels above the safety threshold. By comparison, 2.02 percent of non-Hispanic white children exceeded that level.<sup>3</sup> Because reporting criteria vary from state to state, it is not possible to determine the total number of Hispanic children suffering from lead poisoning, but the difference in lead levels between Hispanic and non-Hispanic white children suggests that Hispanics are at greater risk.

In adults, lead has been linked to neurological problems, high blood pressure, and kidney problems. In children, lead is known to cause neurological problems even at tiny doses.<sup>4</sup> Most notably, lead has been correlated with a decline in IQ, with learning disabilities, and with hyperactive behavior, violence, and an increase in antisocial behavior in children (see “Preventing Lead Poisoning”).<sup>5</sup>

Humans are exposed to lead from a number of sources. The principal one is lead-contaminated dust (from lead-based paint) that can be inhaled or ingested by children when the contaminated dust sticks to their hands or toys. Water run through lead pipes or pipes soldered with lead, and the ingestion of soil still contaminated with lead particles from leaded gasoline, are two other sources.

Another risk factor is lead-glazed pottery used in cooking and food storage, which can result in chronic lead poisoning. In 1971, the Food and Drug Administration (FDA) adopted guidelines to remove from U.S. commerce ceramic pottery with high lead levels, but some tourists and immigrants continue to bring it with them from Mexico and other countries.<sup>6</sup> Lead-glazed pottery was responsible for 8 percent of lead poisoning cases in Arizona children in 2002 and was identified as a consistent source of severe lead poisoning.<sup>7</sup> A survey of Texas homes near the border with Mexico revealed that 53 percent of the ceramic food containers in these homes leached lead.<sup>8</sup>

## PREVENTING LEAD POISONING

### ***Risk factors for lead poisoning***

**Paint:** Although the use of lead paint was banned in 1978, it is still found in 25 percent of U.S. homes built before that year, 4 million of which are home to children. Low-income families are more likely to live in older housing or in deteriorated homes, where lead paint chips and fine dust from deteriorating paint peel off the walls and settle on windowsills, floors, and other surfaces and contaminate soil around homes. Children breathe and ingest lead particles when they come into close contact with these areas.

**Plumbing:** Corrosion of lead pipes and other plumbing materials (for example, lead solder) causes lead to leach into drinking water. Use of lead pipes in public water systems and homes was banned in 1986, but 20 percent of public water systems and an unknown number of older homes have lead in their plumbing.

**Pottery glazes:** Lead glazes on pottery used for cooking, serving, and storage can contaminate food and water. Pottery imported from Mexico or Central America often contains lead glaze and is a hazard to anyone who eats or drinks from it.

**Folk remedies:** Folk remedies such as *greta* and *azarcón*, traditionally used by Mexican immigrants, expose children to high amounts of lead.

**Nutritional deficiencies:** When children do not get enough calcium in their diets, their bodies absorb lead more quickly and completely. Children of low-income families are also more likely to have nutritional deficiencies that increase lead absorption.

### ***Protecting your family from lead poisoning***

- ▶ Keep household surfaces free of dust, including floors, windowsills, furniture, and children's toys, to reduce lead paint hazards.
- ▶ Repaint walls and other areas to keep old lead paint from chipping away and releasing lead particles. Test paint for lead before doing any work that might cause dust. Areas that may contain lead paint should never be scraped or sanded.
- ▶ Test your water for lead, and if it is contaminated, use a water filter certified by the National Sanitation Foundation (NSF) to remove lead (or at the very least, allow the water to run for one minute if a tap has not been used in several hours).
- ▶ Avoid putting food or beverages in glazed pottery manufactured outside the United States, or in lead crystal containers.
- ▶ Never use *greta* or *azarcón* as medicines. If unsure about a home remedy, ask a doctor.
- ▶ Eat a healthy diet. Eating the recommended daily allowance of iron and calcium reduces lead absorption in the body.

Sources: Centers for Disease Control and Prevention, "Childhood Lead Poisoning Fact Sheet," 2003; Water Quality Association, "Reducing Lead Levels in Drinking Water," 1991; and U.S. EPA, "Technical Fact Sheet on: Lead," 2002.

## DANGERS OF LEAD POISONING FOR LATINOS

Data from the New York City Lead Poisoning Prevention Program show that in 2000, 33 percent of children with blood lead levels at or above 20 micrograms per deciliter (twice the safety threshold) were Hispanic (42 percent were African-American, and 7 percent were non-Hispanic whites).<sup>9</sup> Such data often reflect the likelihood that some groups are screened for lead more often than others. But in New York City, testing is

mandatory for all children up to two years of age, and further lead screening is targeted at those found to have elevated blood lead levels or specific risk factors. The findings of this study are significant because they imply that Latino children are at significant risk from lead poisoning.

Studies conducted in other U.S. cities with large Hispanic populations have indicated similar findings. In Miami, Florida, 55 percent of homes in one predominantly Hispanic area exceed the EPA's lead standards.<sup>10</sup> In Santa Clara County, California, 20 percent of U.S.-born Latino children seen at public health clinics have high blood lead levels.<sup>11</sup> In San Bernardino County, California, 65 percent of lead-poisoned children are Hispanic. The two primary causes are lead-based paint in homes and lead-glazed pottery.<sup>12</sup> In Arizona, 77 percent of the children diagnosed with lead poisoning in 2002 were Latino.<sup>13</sup>

Another study has showed that 13 percent of Mexican-American children living in housing built before 1946 have elevated lead concentrations in their blood.<sup>14</sup> And the living conditions of many immigrant families along the U.S.-Mexico border put children at high risk of lead poisoning: lead paint in old, dilapidated housing, industrial pollution, hazardous waste sites, and the use of lead-containing products. One study put the childhood lead poisoning rate in the Texas border area at 3 percent; a similar study of the Arizona-Sonora area of the border found a rate of 6 percent.<sup>15</sup>

Although lead paint in homes is the greatest risk to children, the use of certain folk remedies among Latino immigrants, particularly those of Mexican origin, puts some children at particularly high risk for lead poisoning. Such traditional remedies as *greta* and *azarcón*, which may contain nearly 100 percent lead, to treat *empacho*, or stomachaches, may expose children to dangerously high lead concentrations and a risk of permanent brain damage or death.<sup>16</sup> Opportunities to inform families about this danger are lost when health care providers do not know these "remedies" are in use, as is sometimes the case.

Unlike the threat from lead paint, these risks could be eradicated simply through education, but much more work is required in this area. A study conducted in the Texas border area in 1997 found that 27 percent of parents had given their children *greta* or *azarcón*.<sup>17</sup> Also, the state of Arizona reports that 14 percent of moderate to severe cases of lead poisoning in children were caused by the use of home remedies.<sup>18</sup>

Latino children are at risk not only from eating food served in lead-glazed pottery but also from ingesting lead in candy. Over several years, candy manufactured in and imported from Mexico to California has become a new source of lead contamination. The contamination is found both in the candy itself and in the wrapping, which is decorated with lead-based inks. In April 2004, the *Orange County Register* ran an investigative story on lead-contaminated Mexican candies, detailing how lead-contaminated candies manufactured in Mexico make their way into the U.S. market.<sup>19</sup> Federal and state records obtained by the newspaper showed that the state of California has found lead in Mexican candy one out of every four times it tests.<sup>20</sup> Even though 112 brands of candy have tested high for lead over the past decade, the state took action in only 11 of those instances.<sup>21</sup> In fact, health officials rarely pull candy from shelves or alert the public to the danger they may pose. Even when

*Although lead paint in homes is the greatest risk to children, the use of certain folk remedies among Latino immigrants, particularly those of Mexican origin, puts some children at particularly high risk for lead poisoning.*

candies have repeatedly tested high, the state resists ordering recalls or alerting companies about the results.

Meanwhile, Latino children continue to eat lead-contaminated candy. Almost 90 percent of lead-poisoning victims in Orange County, California, are Latino children, and, of these, at least half were believed to have been poisoned by lead-contaminated candy. Because these candies are available nationwide, children in Texas, Florida, New York, and other large Latino communities may also be eating lead-contaminated candy.

There are few protections to ensure that lead-contaminated Mexican candies do not reach the market. In 2003, legislation was defeated that would have increased candy testing, established clear procedures for issuing health advisories, and made lead levels available to parents and health care workers. The reasons included budgetary concerns, heavy lobbying by the U.S. candy industry, and lack of support from state health officials.

---

## **RECOMMENDATIONS**

NRDC recommends the following to reduce the health threat to the Hispanic community from lead poisoning:

- ▶ State health departments should require that doctors and clinics provide fact sheets and brochures in English and Spanish with information on lead in paint and plumbing, the use of lead-containing folk remedies, and the availability of financial assistance (such as loans offered by state and local departments of housing) to help low-income homeowners carry out lead abatement projects, particularly to parents of young children going to the clinic for checkups and vaccinations.
- ▶ Congress should allocate funding to the Department of Housing and Urban Development for expansion of the program that provides financial assistance for lead abatement and control projects in privately owned housing, and should allocate funds through the Department of Health for a lead-screening program in urban, low-income housing.
- ▶ State and local departments of health should mandate testing for lead in the blood of every child under the age of two—and not only for those covered by Medicaid, as currently required by law—and should provide follow-up services to children with high lead levels.
- ▶ The Food and Drug Administration and state health departments should institute testing programs for food and medicinal products that are likely to have high levels of lead.
- ▶ The Centers for Disease Control and Prevention should require every state to report the results of blood level testing, including the race or ethnicity of every child tested; the data would be used to track the progress of lead poisoning eradication efforts and to identify areas where additional interventions may be needed.



# MERCURY

## HIDDEN DANGER

*Environmental  
Health Threats  
in the Latino  
Community*

October 2004

Another substance posing a significant health threat to Latinos is mercury. Once known best as the silvery liquid in thermometers, mercury is better known today as a poison that damages the brain and kidneys. Despite the health risks associated with the chemical, the public largely does not appreciate the seriousness of the threat and the presence of its sources. This is especially true in the Latino community, where public education efforts in Spanish have so far been limited. The most serious ways in which Latinos may be exposed to dangerous amounts of mercury are eating mercury-contaminated fish and using mercury in religious ceremonies, cosmetics, and folk remedies.

Although mercury exposure can cause health problems for men and women of any age, women of reproductive age and children face the greatest risk. Mercury accumulates in the body, where it remains for long periods. When a woman becomes pregnant, mercury in her body can cross the placenta and affect the developing brain of the fetus. Children, whose brains continue developing until approximately the age of seven, can develop neurological and behavioral problems and learning disabilities from exposure to mercury.<sup>1</sup> New scientific evidence indicates that mercury in adults may increase the risk of cardiovascular disease.<sup>2</sup> Higher levels of mercury poisoning can produce headaches, tremors, memory loss, and hearing and vision problems.<sup>3</sup>

Industrial mercury pollution is released into the air primarily by power plants and certain chemical facilities and then settles into oceans and waterways, where it builds up in the fish that we eat. Most of the mercury released in the United States comes from coal-fired power plants or mercury-cell chlor-alkali plants (factories that manufacture chlorine and caustic soda, or lye, using mercury as a catalyst).

Coal is naturally contaminated with mercury, and when it is burned to generate electricity, mercury is released into the air through the smokestacks. The bulk of this mercury pollution could be eliminated with the installation of pollution control devices. Similar devices have proved very successful on municipal incinerators, which were once a significant source of mercury pollution.

Some chlor-alkali plants that use massive quantities of mercury to convert salt to chlorine and caustic soda “lose” as much as 100 tons of mercury each year; power plants emit around 50 tons of mercury pollution annually. This means that huge amounts of mercury are unaccounted for and likely are being released into the environment every year. Facilities that recycle auto scrap are another big source of mercury pollution, pouring 10 to 12 tons of mercury into the air every year. The most common way people are exposed to mercury is through eating fish.

---

### **MERCURY LEVELS IN THE BLOOD AND HAIR OF LATINOS**

Nationwide, more than one in 12 women of reproductive age has mercury in her blood that exceeds the level set as safe by the Environmental Protection Agency (EPA).<sup>4</sup> A large study done by the Centers for Disease Control and Prevention (CDC) tested for mercury in the blood and hair of more than 2,500 women and children around the United States. On average, Mexican-American children had higher levels of mercury in their bodies compared with non-Hispanic white children.<sup>5</sup> In addition, three people tested in that study had mercury levels that were 100 to 1,000 times as high as the average for the other people tested. All of these people were Mexican-Americans, including a 37-year-old woman and two children ages 1 and 3. These people had both methyl mercury and inorganic mercury in their bodies, suggesting that they may have been exposed to this toxic chemical both from eating fish and from direct exposure such as from folk remedies or religious uses.

---

### **MERCURY-CONTAMINATED FISH**

A significant portion of the mercury released into the air can travel large distances before reaching waterbodies, where it is then converted to a more dangerous form, methyl mercury. Because of the distances the substance can travel, it is possible for people to suffer negative health effects from mercury in fish without living near a polluting factory or power plant. Indeed, although most people accept the common wisdom that “fish is good for you,” the reality is that high or frequent consumption of certain fish, such as tuna and swordfish, can expose humans to unhealthy levels of mercury (see “Mercury Concentrations in Some Commercially Caught Seafood Species, and Consumption Recommendations”). People who catch their own fish in contaminated lakes, streams, or bays are also at risk of mercury poisoning. Because mercury has no taste or smell and is invisible in the fish meat, people cannot tell when they eat a fish whether or not it is contaminated.

Mercury does not make people sick right away. The main problem is with delayed neurological problems, and especially with developmental problems in the fetus.<sup>6</sup> Many expectant mothers consume fish—particularly canned tuna—because it is an inexpensive, low-fat source of protein, without knowing that they could be eating enough mercury to put their babies’ health at risk. An astonishing 91 percent of the canned white (albacore) tuna tested by the Mercury Policy Project in 2003 exceeded the EPA’s 0.3 parts per million guideline.<sup>7</sup> On average, mercury levels in canned “white” albacore tuna run three times as high as levels in canned “chunk light” tuna. To stay within the level considered safe by the EPA, women should eat less than two cans of “chunk light” tuna per week and should eat no more than one can of “white” albacore tuna every 10 days.

Mercury-contaminated fish has important implications for Latinos. Studies in New York City have found that canned tuna is the most popular fish among area Latinos.<sup>8</sup> In the absence of significant education about the risk of excessive consumption, many people are at risk. Because data are scarce for other areas of the country, this research raises important questions about mercury exposure among Latinos.

*Mercury does not make people sick right away. The main problem is with delayed neurological problems, and especially with developmental problems in the fetus.*

In addition to the problem of mercury in the fish people buy in stores, there is also the problem of pollution in the fish that people catch themselves. Often these fish are contaminated with mercury, which is hidden in the meat and not detectable by taste, smell, or appearance. The only way people can know whether the fish is contaminated with mercury is for state governments to test the fish and issue warnings. Unfortunately, although there is widespread contamination, warnings are rarely provided in Spanish, and there is often no effort to conduct outreach to the Latino community.

In Florida, a state heavily populated with Latinos, industries released 6,987 pounds of mercury into the environment in 2002. Of these releases, 2,167 pounds of mercury were air emissions that poison the air, then the water, and finally the fish. Florida currently has 66 separate fish consumption advisories, including a statewide coastal advisory, a statewide freshwater advisory, and additional advisories on waterbodies across the state. In Arizona, another state with a large Latino population, fish consumption advisories are in effect due to chemical contamination in 11 lakes. Ten of the advisories are due to mercury contamination.<sup>9</sup>

Yet state governments are failing to publicize the problem to the Latino community—a community that greatly enjoys fishing. Surveys have found that Latinos are less likely than others to know about fish consumption advisories issued by authorities to warn anglers that fish caught in specific bodies of water carry an unacceptable dose

**MERCURY CONCENTRATIONS IN SOME COMMERCIALY CAUGHT SEAFOOD SPECIES, AND CONSUMPTION RECOMMENDATIONS**

<b>Highest Mercury</b> (More than 0.55 parts per million)	<b>Avoid eating</b>	Grouper* Orange roughy* Marlin*	Tilefish* Swordfish*	Shark* Mackerel (king)
<b>High Mercury</b> (From 0.26 to 0.55 parts per million)	<b>Eat no more than three 6-ounce servings per month</b>	Bass (saltwater)* Croaker	Tuna (canned, white albacore) Tuna (fresh bluefin)	Sea trout Bluefish Lobster Halibut*
<b>Lower Mercury</b> (From 0.12 to 0.25 parts per million)	<b>No more than six 6-ounce serving per month</b>	Rockfish* Mahi Mahi Crab (dungeness)	Snapper* Crab (blue)* Crab (snow)	Cod* Tuna (canned, chunk light)
<b>Lowest Mercury</b> (Less than 0.12 parts per million)	<b>No limit</b>	Perch (saltwater) Crab (king)* Pollock Haddock* Herring Catfish	Whitefish Scallops Flounder* Sole Trout (freshwater) Crawfish/crayfish	Salmon Shrimp* Clams Tilapia Oysters Sardines

Source: Mercury concentration data based on information provided by the Food and Drug Administration (FDA). The consumption recommendations show the amount of various types of fish that a woman who is pregnant or planning to become pregnant can safely eat, according to the Environmental Protection Agency.

\*Fish to avoid for reasons other than mercury: Fish and other types of seafood are marked with an asterisk if any of their populations are depleted due to overfishing or if the methods used to catch them are especially damaging to other sea life or ocean habitats.

of mercury. A study of anglers in Santa Monica Bay found that only 59 percent of Latinos—versus 88 percent of non-Hispanic whites and 95 percent of Japanese—had heard about fish advisories in effect in their area. Another study in New Jersey found that knowledge of fish advisories was much lower among Latinos than non-Hispanic whites and African-Americans, but Latinos were just as willing to comply with the advisories after they received the information.<sup>10</sup>

In a follow-up study, a group of women of childbearing age in New Jersey—mostly Latinas—received bilingual information on the effects of eating contaminated fish. Some 74 percent of them said they would change the way they chose or prepared fish in response to what they had learned. Women who heard about the advisories through classroom lessons were more likely to understand the advice than those who read a brochure (96 percent to 72 percent). This suggests that some form of verbal advisory may help improve the understanding of fish consumption advisories among Latinos.<sup>11</sup>

The same lack of awareness of mercury advisories has been documented elsewhere, including among Latinos living around the Great Lakes and in New York and Oregon.<sup>12</sup> A study of anglers in Michigan found that ethnicity was directly related to fish consumption; Latino, African-American, and Native American anglers ate many more meals of fish per week than did non-Hispanic white anglers.<sup>13</sup> In New York state, a study showed that Latino anglers ate more fish from contaminated waters and were significantly less likely to be aware of health advisories than non-Hispanic whites. In many communities, warnings about mercury contamination were not available in Spanish. In some places, Spanish brochures were created as part of a special initiative in the past but were no longer distributed.

In the Greenpoint/Williamsburg neighborhood in Brooklyn, New York, where 42 percent of the population is Latino (mostly Puerto Rican and Dominican), local community residents realized that many people were fishing from the East River, which is known to be contaminated with mercury and other toxic chemicals. Community members interviewed more than 200 anglers and found that almost all of them were Latino or African-American. These men were catching 40–75 fish per week and using the fish to feed their families, including children. When EPA scientists tested the fish, they found that the anglers and their families were facing high risks of cancer and other health problems from eating the contaminated fish. Awareness in the community eventually helped many of the subsistence anglers to find alternative sources of food, such as community gardens.<sup>14</sup>

The research demonstrates that focused education efforts will be necessary to reduce the risk of harm to Latino children from mercury in fish. Of course, the problem is not simply one of notification: Much stricter limits on mercury pollution are needed.

*In New York state, a study showed that Latino anglers ate more fish from contaminated waters and were significantly less likely to be aware of health advisories than non-Hispanic whites.*

---

## FOLK REMEDIES AND COSMETICS

Mercury, known as *azogue* in some Latino communities, is sometimes used as a folk remedy for *empacho* (indigestion or gastroenteritis). This practice is most common among Mexican-Americans, and surveys have found that more than one out of 12 Latinos in New Mexico mention *azogue* as a cure for *empacho*.<sup>15</sup> Doctors have

*Doctors have documented individual cases of children becoming ill, even requiring hospitalization, from the use of mercury for empacho.*

documented individual cases of children becoming ill, even requiring hospitalization, from the use of mercury for *empacho*.<sup>16</sup> Not surprisingly, children are more likely than adults to be harmed by ingesting *azogue*.<sup>17</sup> Diagnosis is complicated by the similarity between the symptoms from consuming *azogue* and the symptoms of the illness it is used to treat. People who use *azogue* for the treatment of illness do not realize that it is harmful, just as most Americans did not realize until recently the potential hazards of mercury-containing disinfectants (such as Merthiolate or Mercurochrome) for treating cuts and scrapes in children.

Some cosmetics that are advertised for their ability to make skin lighter in color may contain large amounts of mercury. This is a problem because mercury can be absorbed through the skin. A beauty cream imported from Mexico caused an outbreak of mercury poisoning among Latinas in Texas, New Mexico, Arizona, and California in 1996.<sup>18</sup> This product was discovered to contain up to 10 percent mercury by weight. Hundreds of people in the Latino community were over-exposed to mercury from this product, and, in many cases, family members who did not use the product also were discovered to have high levels of mercury in their bodies.

Chronic exposure to this type of mercury can cause irritability, nervousness, headaches, tremors, fatigue, personality changes, memory loss, numbness, and tingling.<sup>19</sup> The problem does not seem to be unique to one product. Since 1996, several other creams and soaps sold in New Mexico and near Washington, D.C., have been found to be contaminated with mercury. The contaminated products are generally imported from Mexico or other countries and are often advertised for their skin-lightening properties or as an acne treatment.

---

## RELIGIOUS CEREMONIES

Another source of mercury exposure that goes largely unnoticed is its use in the religious practices of some Latin American and Afro-Caribbean communities. Practitioners of *Espiritismo* and *Santería* (religious traditions most commonly found among people of Puerto Rican and Cuban origin, respectively), *Voodoo*, and *Palo* use mercury. It is sometimes carried in capsules, burned in candles or oil lamps, sprinkled around the home, or added to perfumes. In these religious traditions, *azogue* helps summon spirits for magical spells and serves as an amulet that keeps evil spirits at bay and brings good luck.<sup>20</sup>

Initial studies indicate that the use of *azogue* is relatively common in the Latino and Caribbean community. A 2003 study of 898 Latino respondents in Massachusetts found that 38 percent have used or know someone who has used *azogue* for religious, spiritual, or health purposes.<sup>21</sup> Similarly, a study of 203 adults in New York City revealed that 44 percent of Caribbean respondents and 27 percent of those from Latin America reported using mercury as part of their cultural practices.<sup>22</sup> In a Chicago survey, 19 percent of Hispanics reported using mercury for magic or religious purposes.<sup>23</sup> And in another survey, 12 percent of practitioners reported sprinkling mercury around a child's crib or bed.<sup>24</sup>

Mercury is sold in most *botánicas*, stores that sell remedies and religious items. Studies show that more than 85 percent of *botánicas* around the country sell *azogue* and that in some areas the percentage is even higher.<sup>25</sup> A canvass of 35 *botánicas* in the Bronx found that they collectively sold more than 420 kilograms (924 pounds) of mercury yearly.<sup>26</sup> Based on this survey, researchers estimated that 47,000 capsules of mercury are sold per year in New York City, and these capsules would be likely to cause long-term contamination of more than 13,000 homes or apartment buildings each year.<sup>27</sup>

Even if a family does not use mercury themselves, there can be a danger of exposure because the mercury lingers in cracks in the floor or in the carpets for months or years, slowly giving off mercury vapor that can be inhaled by people living in the building. For example, use of mercury in an apartment building has been shown to cause elevated levels of mercury vapor in the hallways and entryway, and probably in other apartments where mercury was not used. Moving into a house or apartment where mercury was used in the past can expose new occupants to mercury hazards. Children have been reported to become seriously ill from living in a room where a mercury thermometer was broken eight months previously, and the amounts of mercury used in these rituals can be significantly more than the amount in a thermometer.<sup>28</sup> In certain areas of New Jersey with large populations of Caribbean-Americans, indoor mercury levels have often been found to be five times the outdoor level.<sup>29</sup> When mercury is in vapor form it can cause neurological problems and is also associated with respiratory symptoms such as shortness of breath, pneumonia, and lung disease.<sup>30</sup>

In 2001, the New York State Senate adopted a resolution calling upon state and federal agencies to investigate the residential use of mercury in New York. The Senate was especially concerned about the risks to women and children and about the risks to people who move into apartments unaware that the previous tenant scattered mercury that could make them sick.<sup>31</sup> In 1994, the U.S. Environmental Protection Agency warned state and local health officials of a mercury threat to Hispanics related to the use of mercury in many Hispanic communities.<sup>32</sup>

Studies have shown elevated levels of mercury in people's bodies related to inadvertent exposure to mercury used in rituals. A survey of 100 Hispanic and Caribbean children from a Bronx, New York, community with known access to mercury for religious rituals revealed that 5 percent had elevated levels of the toxic metal in their urine.<sup>33</sup> The mercury levels were as high as those shown to cause subtle cognitive defects, abnormalities in motor function, and mood changes in adults. Recently, health officials investigating a mercury spill in a school found that Latinos who used mercury in their homes had higher mercury levels than individuals exposed at the school.<sup>34</sup>

Mercury disposal is also cause for concern. A 1999 study showed that 64 percent of users of *azogue* reported throwing mercury into the garbage, and 27 percent reported flushing it down the toilet.<sup>35</sup> New York's Bureau of Wastewater Treatment has been unable to identify the source of about 68 pounds per year of mercury entering one of its plants from a region that contains the city's largest Latino population.<sup>36</sup> When mercury is disposed of in garbage or wastewater, it eventually is transformed into methyl mercury and contaminates the fish that we eat.

*Mercury disposal is also cause for concern. A 1999 study showed that 64 percent of users of azogue reported throwing mercury into the garbage, and 27 percent reported flushing it down the toilet.*

Conversations with *azogue* users indicate that some realize that touching or eating mercury may be harmful, but they are generally unaware that mercury is highly volatile and that inhalation is a very dangerous route of mercury exposure.<sup>37</sup> A culturally sensitive education campaign that involves *Santeros* ( *Santería* priests), local groups, and local government could address the problem. Significantly, various studies show that *botánica* owners are already wary of outsiders and are trying to conduct sales in an inconspicuous manner. Any action that drives this business further underground will only hinder efforts at education. Therefore, an approach that does not point fingers or stigmatize religious practices and that allows practitioners to make well-informed decisions will help to protect children in these communities.

---

## RECOMMENDATIONS

NRDC recommends the following to reduce the health threat to the Hispanic community from mercury poisoning:

- ▶ The EPA should require power plants to install modern technology to achieve maximum control of mercury emissions, as required under the Clean Air Act; should require a prompt reduction of as much as 90 percent in mercury emissions from power plants; and should require mercury-cell chlor-alkali plants to switch to mercury-free technology.
- ▶ The Food and Drug Administration should expand its fish testing program, should establish targets for the number of fish species and samples to be tested annually, and should make the findings easily available to the public through its website.
- ▶ The Food and Drug Administration should require the posting of fish consumption advisories in grocery stores in both English and Spanish, and state departments of health should provide fish consumption advisories in English and Spanish and ensure that these advisories are posted in popular fishing areas and reported in the news media.
- ▶ State departments of health and state environmental protection agencies should post fish consumption advisories in English and Spanish at all popular fishing sites along contaminated waterbodies and should place warnings in newspapers and conduct community-based education in targeted communities.
- ▶ Local departments of health in cities with significant Latino populations should provide bilingual materials at public health clinics and in schools to inform Latinos about the risks of mercury use in folk remedies, cosmetics, and religious ceremonies.

## ENDNOTES

### Chapter 1

1 U.S. Census Bureau, "Hispanic Population Reaches All-Time High of 38.8 Million, New Census Bureau Estimates Show," press release, 2003. Available online at <http://www.census.gov/Press-Release/www/2003/cb03-100.html>. Last visited March 1, 2004.

2 Sarah Nieves-Squires, "What Does 'Hispanic' Mean? Hispanic Women: Making Their Presence on Campus Less Tenuous," 1993. Available online at [www.asn.csu.edu/em-ncfr/down99/Baptiste1993c.htm](http://www.asn.csu.edu/em-ncfr/down99/Baptiste1993c.htm). Last visited June 3, 2004.

3 U.S. Census Bureau, "Overview of Race and Hispanic Origin," *Census 2000* brief, March 2001.

4 United States Bureau of the Census, "The Hispanic Population in the United States, March 2002," June 2003. Available online at <http://www.census.gov/prod/2003pubs/p20-545.pdf>.

5 Based on Bureau of Labor Statistics Current Population Survey seasonally adjusted data for the first quarter of 2004. Available online at <http://www.bls.gov/cps/home.htm#data>.

6 *BusinessWeek*, "Hispanic Nation," March 15, 2004, p. 60.

7 Bureau of Labor Statistics, "Findings from the National Agricultural Workers Survey (NAWS) 1997-98," 2000. Available online at [http://www.dol.gov/asp/programs/agworker/report\\_8.pdf](http://www.dol.gov/asp/programs/agworker/report_8.pdf). Last visited January 22, 2004.

8 L.M. Arteaga, C. Flegal, and G. Rodríguez, "Latino Vote 1998: The New Margin of Victory," Latino Issues Forum, 1998. Available online at [http://www.lif.org/publications/LIF\\_vote1998.pdf](http://www.lif.org/publications/LIF_vote1998.pdf). Last visited March 3, 2004.

9 California Heritage Campaign, "Why Latinos Care About Saving California's Last Wild Places," 2004. Available online at <http://www.californiawild.org/WhyLatinosCare.html>. Last visited March 3, 2004.

10 The Pew Charitable Trusts, "National Survey of Public Perceptions of Environmental Health Risks," 2000. Available online at <http://healthyamericans.org/reports/files/survey0620.pdf>. Last visited March 3, 2004.

11 P. Rogers, "Latinos take lead on environmental issues," *Mercury News*, March 10, 2002. Available online at <http://www.ejrc.cau.edu/latinoesj.html>. Last visited March 3, 2004.

12 The California Endowment, "Suffering in Silence: Who Are California's Agricultural Workers?" 2001. Derived from the California Institute of Rural Studies.

13 American Lung Association, "Growing Hispanic Populations Face Increased Health Threat—Asthma," 1997. Available online at <http://lungusa2.org/press/association/asnhisp3.html>.

14 U.S. Public Interest Research Group, "Cleanup Slowdown: How Under-Funding the Superfund Program Harms Communities Across America," 2003. Available online at <http://www.uspirg.org/reports/CleanupSlowdown2003.pdf>.

15 G. Flores, E. Fuentes-Afflick, et al., "The Health of Latino Children, Urgent Priorities, Unanswered Questions, and a Research Agenda," *JAMA*, 288(2002): 82-90.

16 National Telecommunications Information Administration, "A Nation Online: How Americans Are Expanding Their Use of the Internet," 2002. Available online at <http://www.ntia.doc.gov/ntiahome/dn/anationonline2.pdf>. Last visited March 1, 2004.

17 M.M. Doty, "Insurance, Access, and Quality of Care Among Hispanic Populations," The Commonwealth Fund. Prepared for the National Alliance for Hispanic Health Meeting, October 15-17, 2003. Available online at [http://www.cmfwf.org/programs/minority/doty\\_hispanicchartpack\\_684.pdf](http://www.cmfwf.org/programs/minority/doty_hispanicchartpack_684.pdf).

18 NCLR, "NCLR Urges Congressional Action For Latino Children on El Dia De Los Niños," press release, April 30, 2004.

19 March of Dimes Perinatal Data Center, "Early Prenatal Care by Hispanic Ethnicity, 2000," 2002. Based on data by National Center for Health Statistics. Available online at <http://www.marchofdimes.com/aboutus/1525.asp>. Last visited March 1, 2004.

20 Executive Order 12898, "Federal Action to Address Environmental Justice in Minority Populations and Low-income Populations," 1994. Available online at

<http://www.epa.gov/fedsite/eo12898.htm>.

21 U.S. Environmental Protection Agency, "EPA Needs to Consistently Implement the Intent of the Executive Order on Environmental Justice," Report No. 2004-P-00007, 2004. Available online at <http://www.epa.gov/oig/reports/2004/20040301-2004-P-00007.pdf>.

### Chapter 2

1 NRDC analysis of Census Bureau population data for counties designated by U.S. EPA as nonattainment areas for criteria air pollutants as of April 15, 2004.

2 U.S. Environmental Protection Agency, "Air Quality Where You Live," 2003. Available online at <http://www.epa.gov/air/urbanair/6poll.html>. Last visited July 22, 2003.

3 U.S. Environmental Protection Agency, "Taking toxics out of the air: Introduction," 2002. Available online at <http://www.epa.gov/oar/oaqps/takingtoxics/p1.html#8>. Last visited July 23, 2003.

4 Earth Justice, "Valley Air: Agricultural Exemptions (Title V)," 2001. Available online at <http://www.earthjustice.org/urgent/display.html?ID=65>. Last visited December 24, 2003.

5 General Accounting Office, "Air Pollution: Emissions from Older Electricity Generating Units" (GAO-02-709), 2002. Available online at <http://www.gao.gov>. Last visited December 29, 2003.

6 Florida Climate Alliance, "Environmentalists say old power plants polluting air." Available online at <http://www.floridacimatealliance.net/news/power.htm>. Last visited December 29, 2003.

7 NRDC analysis of Census 2000 data.

8 Student Environmental Action Coalition, "Youth Power Shift Action Packet," 2003. Available online at <http://www.seac.org/energy/resources/actionpacket.pdf>.

9 Clear the Air, "Darkening Skies: Trends Toward Increasing Power Plant Emissions," 2002. Available online at [http://cta.policy.net/fact/darkening\\_skies/darkening\\_skies.pdf](http://cta.policy.net/fact/darkening_skies/darkening_skies.pdf). Last visited January 24, 2003.

10 J. Levy, J.D. Spengler, D. Hlinka, and D. Sullivan, "Estimated Public Health Impacts of Criteria Air Pollutant Emissions from Nine Fossil-Fueled Power Plants in Illinois," December 2000. Harvard School of Public Health.

11 Physicians for Social Responsibility, "A Breath of Fresh Air: How Smarter Energy Choices Can Protect the Health of New Mexicans," 2003. Available online at [http://www.envirohealthaction.org/upload\\_files/Breath\\_NMe.pdf](http://www.envirohealthaction.org/upload_files/Breath_NMe.pdf). Last visited December 24, 2003.

12 U.S. Environmental Protection Agency, Emissions & Generation Resource Integrated Database, Version 2.01, 2003.

13 New Mexico Bureau of Geology and Mineral Resources, "New Mexico's Energy, Present and Future: Policy, Production, Economics, and the Environment, Decision-Makers Field Guide 2002, San Juan Basin," 2002, B.S. Brister, and L.G. Price, Eds. Available online at [http://geoinfo.nmt.edu/publications/decisionmakers/2002/dmfg2002\\_complete.pdf](http://geoinfo.nmt.edu/publications/decisionmakers/2002/dmfg2002_complete.pdf). Last visited December 29, 2003.

14 Centers for Disease Control and Prevention, "Forecasted State-Specific Estimates of Self-Reported Asthma Prevalence—United States, 1998," *MMWR*, 47 (47) (1998): 1022-1025.

15 P. Richardson, G. Schoenfeld, and S. LaFever. "New Mexico TANF Longitudinal Study: Survey of Long-Term Welfare Recipients for the Barrier and Safety Net Study," 2003. Available online at [http://www.cortidesignhost.com/maximus/cps/New\\_Mexico\\_Barrier\\_and\\_Safety\\_Net\\_Study.pdf](http://www.cortidesignhost.com/maximus/cps/New_Mexico_Barrier_and_Safety_Net_Study.pdf). Last visited December 29, 2003.

16 Natural Resources Defense Council, *EPA's Mercury Proposal: More Toxic Pollution for a Longer Time*, 2003. Available online at <http://www.nrdc.org/media/pressreleases/031205.asp>. Last visited December 21, 2003.

17 American Lung Association, "Minorities and Air Pollution Fact Sheet," 1998. Available online at [http://www2.lungusa.org/air/minority\\_factsheet.html](http://www2.lungusa.org/air/minority_factsheet.html). Last visited May 5, 2003.

18 Commission for Environmental Cooperation, "Health Impacts of Air Pollution on Morbidity and Mortality Among Children of Ciudad Juarez, Chihuahua,

- Mexico," 2003. Available online at [http://www.cec.org/files/PDF/POLLUTANTS/cdjuarez\\_en.pdf](http://www.cec.org/files/PDF/POLLUTANTS/cdjuarez_en.pdf). Last visited December 22, 2003.
- 19 Bureau of Transportation Statistics, TranStats: The Intermodal Transportation Database, 2003. Available online at <http://www.transtats.bts.gov/homepage.asp>. Last visited December 22, 2003.
- 20 Transportation Alternatives, "A calming influence," *Transportation Alternatives Magazine*, January/February 1996. Available online at <http://www.transalt.org/press/magazine/961JanFeb/index.html>. Last visited December 22, 2003.
- 21 New York City Department of Transportation, "Manhattan River Crossings 2001," 2003. Available online at <http://www.nyc.gov/html/dot/pdf/manrivcross01.pdf>. Last visited February 23, 2004.
- 22 D. Schrank and T. Lomax, Texas Transportation Institute, "The 2003 Annual Urban Mobility Report," 2003. Available online at <http://mobility.tamu.edu/ums/>. Last visited February 23, 2003.
- 23 New York City Department of Health and Mental Hygiene, "Asthma can be controlled," *NYC Vital Signs* 2(4), 2003. Available online at <http://www.ci.nyc.ny.us/html/doh/pdf/survey/survey-2003asthma.pdf>. Last visited December 22, 2003.
- 24 New York League of Conservation Voters, "EcoFiles, District 17: Hunts Point, Concourse, Port Morris/Mott Haven, Soundview," 2003. Available online at <http://www.nylcv.org/ecofiles/bronx/html/ccd17.htm>. Last visited December 29, 2003.
- 25 T.S. Lena, V. Ochieng, M. Carter, J. Holguin-Veras, and P.L. Kinney, "Elemental carbon and PM(2.5) levels in an urban community heavily impacted by truck traffic," *Environmental Health Perspectives* 110(10)(2002): 1009-1015.
- 26 New York League of Conservation Voters, "EcoFiles, District 17: Hunts Point, Concourse, Port Morris/Mott Haven, Soundview," 2003. Available online at <http://www.nylcv.org/ecofiles/bronx/html/ccd17.htm>. Last visited December 29, 2003.
- 27 A Karpati, X Lu, F Mostashari, L Thorpe, TR Frieden. "The Health of Hunts Point and Mott Haven." NYC Community Health Profiles 2003;1(19): 1-12; and National Center for Health Statistics "Asthma Prevalence, Health Care Use and Mortality, 2000-2001," 2003. Available online at: <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/asthma/asthma.htm>. Last visited March 29, 2004.
- 28 D. Schrank and T. Lomax, Texas Transportation Institute, "The 2003 Annual Urban Mobility Report," 2003. Available online at <http://mobility.tamu.edu/ums/>. Last visited December 24, 2003.
- 29 Population data from Maricopa County Department of Public Health, "Maternal and Child Health Needs Assessment 2001." Available online at [http://www.maricopa.gov/public\\_health/epi/pdf/MCH\\_Full\\_Document.pdf](http://www.maricopa.gov/public_health/epi/pdf/MCH_Full_Document.pdf). Last visited December 24, 2003.
- 30 M.J. Pitzl, "85040: Valley's asthma hotspot," *The Arizona Republic*, February 26, 2001. Available online at <http://www.azcentral.com/health/asthma/0226zipcode26-ON.html>. Last visited December 24, 2003.
- 31 American Lung Association, "Minorities and Air Pollution Fact Sheet," 1998. Available online at [http://www2.lungusa.org/air/minority\\_factsheet.html](http://www2.lungusa.org/air/minority_factsheet.html). Last visited May 5, 2003.
- 32 A. Carlson and J. Zasloff J, "Environmental Justice," UCLA Institute of the Environment Report Card, 2001. Available online at <http://www.ioe.ucla.edu/publications/report01/EnvironmentalJustice.htm>. Last visited July 15, 2003.
- 33 R. Morello-Frosch, M. Pastor Jr., C. Porras, and J. Sadd, "Environmental justice and regional inequality in Southern California: Implications for future research," *Environmental Health Perspectives* 110(Suppl 2) (2002): 149-154.
- 34 W. Kelly, "Noxious neighborhoods," *California Journal*, May 2003, pp. 20-26.
- 35 E. Timms, "Racial patterns: Economics and segregation left minorities closer to toxic sites," *The Dallas Morning News*, October 3, 2000. Available online at [http://charlotte.utdallas.edu/mgis/news\\_items/TOXIC%20TRAP%20SERIES%20Racial%20Patterns.htm](http://charlotte.utdallas.edu/mgis/news_items/TOXIC%20TRAP%20SERIES%20Racial%20Patterns.htm). Last visited January 23, 2004.
- 36 *Environmental Justice Case Study: Toxic Neighbors of Corpus Christi*. Available online at <http://www.umich.edu/~snre492/mezza.html>. Last visited January 23, 2004.
- Public Employees for Environmental Responsibility, *Corpus Christi's Refinery Row*, 2000. Available online at [http://www.txpeer.org/toxictour/corpus\\_christi.html#5](http://www.txpeer.org/toxictour/corpus_christi.html#5). Last visited January 23, 2003.
- 37 Sustainable Energy and Economic Development (SEED) Coalition, "A is for Air Pollution Part II: The Toxic Threat to Texas Schools. What You Don't Know Could Hurt Your Children," 2003. Available online at <http://www.refineryreform.org/downloads/AisforAir.pdf>. Last visited January 23, 2004.
- 38 U.S. Environmental Protection Agency, "Fact Sheet: Barrio Logan Environmental Justice Project," 2000. Available online at <http://www.epa.gov/region09/features/barriologan/fact.html>.
- 39 "Environmental Justice Case Study: Industrial Pollution in Barrio Logan." Available online at <http://www.umich.edu/~snre492/holtzman.html>. Last visited January 23, 2004. U.S. Environmental Protection Agency, "Interagency Committee Selects Barrio Logan Community As An Environmental Justice Pilot Project," 2000. Available online at <http://www.epa.gov/region09/features/barriologan/>.
- 40 Reconnecting America, "Barrio Logan, Natural-Born Transit Village, San Diego, California." Available online at [http://www.reconnectingamerica.org/pdfs/BARRIO\\_LOGAN.pdf](http://www.reconnectingamerica.org/pdfs/BARRIO_LOGAN.pdf). Last visited January 23, 2004.

## Chapter 3

- 1 S.H. Lee, D.A. Levy, G.F. Craun, M.J. Beach, and R.L. Calderon, CDC, MMWR, "Surveillance for Waterborne-Disease Outbreaks: United States, 1999-2000," *MMWR* 51(SS8)(2002): 1-28. Available online at <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5108a1.htm>.
- 2 NRDC, *What's on Tap? Grading Drinking Water Quality in U.S. Cities*, 2003. Available online at [www.nrdc.org](http://www.nrdc.org).
- 3 NRDC, *Rewriting the Rules*, April 2004. Available online at [www.nrdc.org](http://www.nrdc.org).
- 4 B.L. Williams, Y. Florez, and S. Pettygrove, "Inter- and intra-ethnic variation in water intake, contact, and source estimates among Tucson residents: Implications for exposure analysis," *Journal of Exposure Analysis and Environmental Epidemiology* 11(6)(2001): 510-521.
- 5 U.S. Environmental Protection Agency, "Exposure Factors Handbook" [No. EPA/600/P-95/002Fa], 1997. Available online at <http://www.epa.gov/ncea/pdfs/efh/front.pdf>. Last visited March 1, 2001.
- 6 U.S. Census Bureau, *American Housing Survey for the United States: 2001*. Washington, DC: U.S. Government Printing Office.
- 7 P. Ramos, Latino Issues Forum, "Promoting Quality, Equity and Latino Leadership in California Water Policy: An Introduction to Water Issues Impacting Latino Communities in California," June 2003. Available online at [http://www.lif.org/publications/water\\_report/water\\_report2003.pdf](http://www.lif.org/publications/water_report/water_report2003.pdf).
- 8 Housing Assistance Council, "Taking Stock of Rural People, Poverty, and Housing at the Turn of the 21st Century," 2002. Available online at <http://www.ruralhome.org/pubs/hsganalysis/ts2000/>.
- 9 D. Minkow, "Many Latinos favor bottled water," *La Prensa San Diego*, February 7, 2003.
- 10 M. Tobin, "Sales of bottled water slower this time around," *Arizona Daily Star*, May 2, 2001.
- 11 Beverage Marketing Corporation, 2000.
- 12 R. Sharp and B. Walker, Environmental Working Group, "Is Water From Vending Machines Really 'Chemical-Free'?" 2002. Available online at [http://www.ewg.org/reports/vendedwater/pdf/vendedwater\\_final.pdf](http://www.ewg.org/reports/vendedwater/pdf/vendedwater_final.pdf). Last visited March 1, 2004.
- 13 These are also known as consumer confidence reports or water quality reports. 42 U.S.C. 300g-3(c); SDWA, Section 1414(c)(4)(A).
- 14 *National Primary Drinking Water Regulations: Consumer Confidence Reports, Proposed Rules*, 63 Fed. Reg. 7605-7633, Feb. 1998.
- 15 NRDC, *What's on Tap? Grading Drinking Water in U.S. Cities*, 2003. Available online at [www.nrdc.org](http://www.nrdc.org).
- 16 13 40 CFR §141.153(h)(3).
- 17 NRDC, *What's on Tap? Grading Drinking Water in U.S. Cities*, Early Release California Edition, October 2002, pp. 81-82.

- 18 "For Some, a Trickle of News on Water Woes: D.C. Officials Were Slow To Translate for Immigrants," *The Washington Post*, Mar. 5, 2004.
- 19 Commission for Racial Justice, *Toxic Wastes and Race in the United States*. New York: United Church of Christ, 1987.
- 20 U.S. EPA, "About Superfund," 2003. Available online at <http://www.epa.gov/superfund/about.htm>
- 21 See Robert D. Bullard, Glenn S. Johnson, and Angel O. Torres, *Race, Equity, and Smart Growth: Why People of Color Must Speak for Themselves*. Atlanta, GA: Environmental Justice Resource Center, 2000.
- 22 International City/County Management Association, *Environmental Justice in Latino Communities, The Role of Local Government*, 1996. Available online at <http://www.lgean.org/documents/EJLatino.pdf>.
- 23 Ibid.
- 24 J.V. Bennett, S.D. Holmberg, M.R. Rogers, and S.L. Solomon, "Closing the Gap—The Burden of Unnecessary Illness," *American Journal of Preventive Medicine. Special Supplement*. 55(1997): 102–114.
- 25 R.D. Morris and R. Levin, "Estimating the incidence of waterborne infectious disease related to drinking water in the United States," In E. Reichard and G. Zapponi G, eds., *Assessing and managing health risks from drinking water contamination: approaches and applications*. Proceedings of a symposium held in Rome, September 1994. Wallingford (UK): International Association of Hydrological Sciences, 1995; publ. no. 233.
- 26 CDC, "Giardiasis: Fact Sheet," 2001. Available online at [http://www.cdc.gov/ncidod/dpd/parasites/giardiasis/factsht\\_giardia.htm](http://www.cdc.gov/ncidod/dpd/parasites/giardiasis/factsht_giardia.htm). CDC, "Cryptosporidiosis, Fact Sheet," 2003. Available online at [http://www.cdc.gov/ncidod/dpd/parasites/cryptosporidiosis/factsht\\_cryptosporidiosis.htm](http://www.cdc.gov/ncidod/dpd/parasites/cryptosporidiosis/factsht_cryptosporidiosis.htm).
- 27 County of Los Angeles Department of Health Services, "Acute Communicable Disease Control Annual Morbidity Report and Special Studies Report," 2001. Available online at <http://lapublichealth.org/acd/reports/annual/2001%20ACDC%20Annual.pdf>.
- 28 "NYC 2001 Waterborne Disease Surveillance," Tables 7 and 14, 2001. Available online at <http://www.nyc.gov/html/dep/pdf/wdrap01.pdf>.
- 29 Charles W. Schmidt, "Bordering on Environmental Disaster," *Env. Health Perspectives*, Jul. 2000, A309, citing Government Accounting Office, "U.S.-Mexico Border: Despite Some Progress, Environmental Infrastructure Challenges Remain."
- 30 U.S. Environmental Protection Agency, "Drinking Water Infrastructure Needs Survey: Second Report to Congress" [Report No. EPA 816-R-01-004], 2001. Washington, DC: Office of Water, U.S. Environmental Protection Agency.
- 31 Charles W. Schmidt, "Bordering on Environmental Disaster," *Env. Health Perspectives*, Jul. 2000, A311.
- 32 National Center for Health Statistics, "Infant, Neonatal, and Postneonatal Deaths, Percent of Total Deaths, and Mortality Rates for the 15 Leading Causes of Infant Death by Race and Sex: United States, 1999–2001," 2002. Available online at [http://www.cdc.gov/nchs/data/wh/statab/unpubd/mortabs/lcwk7\\_10.htm](http://www.cdc.gov/nchs/data/wh/statab/unpubd/mortabs/lcwk7_10.htm).
- 33 International Trade Data System, "Maquiladoras," fact sheet, 2002. Available online at <http://www.itds.treas.gov/maquiladora.html>. Last visited November 1, 2002. U.S. Environmental Protection Agency, "Border 2012: U.S.-Mexico Environmental Program" [No. EPA-160-D-02-001], 2002. Available online at [http://www.epa.gov/usmexicoborder/pdf/2012\\_english\\_web.pdf](http://www.epa.gov/usmexicoborder/pdf/2012_english_web.pdf). Last visited November 1, 2002.
- 34 Charles W. Schmidt, "Bordering on Environmental Disaster," *Env. Health Perspectives*, Jul. 2000, 309.
- 35 Texas Natural Resource Conservation Commission, *State of the Rio Grande and the Environment of the Border Region: Strategic Plan Fiscal Years 2003–2007* (Vol. 3) [SFR-035C/02], 2002. Austin, TX: Texas Natural Resource Conservation Commission. Available online at [http://www.tnrcc.state.tx.us/admin/topdoc/sfr/035\\_02/035\\_02\\_vol3.html](http://www.tnrcc.state.tx.us/admin/topdoc/sfr/035_02/035_02_vol3.html). Last visited November 1, 2002.
- 36 Centers for Disease Control and Prevention, "Preventing and controlling tuberculosis along the US-Mexico border: Work group report," 2001. MMWR 2001;50 (No. RR-1). Available online at <http://www.cdc.gov/mmwr/PDF/RR/RR5001.pdf>. Last visited November 1, 2002.
- 37 The University of Texas Houston School of Public Health, "The Health and Health Service Systems of Texans on the Texas-Mexico Border: Public Policy Implications," 2002.
- 38 This estimate was calculated by the Southwest Center for Environmental Research and Policy, a consortium of five U.S. and four Mexican universities. Charles W. Schmidt, "Bordering on Environmental Disaster," *Env. Health Perspectives*, Jul. 2000, A314.
- 39 U.S. Environmental Protection Agency, "U.S.-Mexico Border XXI Program: Progress Report 1996–2000," 2001. Available online at <http://www.epa.gov/usmexicoborder/progress/eng/00cover.pdf>. Last visited May 6, 2003.
- 40 R. Morris et al., "Chlorination, Chlorination By-Products, and Cancer: A Meta-Analysis," *American Journal of Public Health* 82(7)(July 1992): 955–963.
- 41 M. Deane et al., "Adverse pregnancy outcomes in relation to water contamination, Santa Clara County, California, 1980–1981," *Am J Epidemiol* 129(5)(1989): 894–904; M. Deane et al., "Adverse pregnancy outcomes in relation to water consumption: A re-analysis of data from the original Santa Clara County Study, California, 1980–1981," *Epidemiology* 3(2)(1992): 94–97; I. Hertz-Picciotto, S.H. Swan, and R.R. Neutra, "Reporting bias and mode of interview in a study of adverse pregnancy outcomes and water consumption," *Epidemiology* 3(2)(1992): 104–112; G.C. Windham et al., "Tap or bottled water consumption and spontaneous abortion: A 1986 case-control study in California," *Epidemiology* 3(2)(1992): 113–119; M. Wrensch et al., "Spontaneous abortions and birth defects related to tap and bottled water use, San Jose, California, 1980–1985," *Epidemiology* 3(2)(1992): 98–103; L. Fenster et al., "Tap or bottled water consumption and spontaneous abortion in a case-control study of reporting consistency," *Epidemiology* 3(2)(1992): 120–124; S.H. Swan et al., "Is drinking water related to spontaneous abortion? Reviewing the evidence from the California Department of Health Services Studies," *Epidemiology* 3(2)(1992): 83–93; A. Aschengrau, S. Zierler, and A. Cohen, "Quality of community drinking water and the occurrence of spontaneous abortion," *Arch Environ Health* 44(5)(1989): 283–290; A. Aschengrau, S. Zierler, and A. Cohen, "Quality of community drinking water and the occurrence of late adverse pregnancy outcomes," *Arch Environ Health* 48(2)(1993): 105–113; D.A. Savitz, K.W. Andrews, and L.M. Pastore, "Drinking water and pregnancy outcome in central North Carolina: Source, amount, and trihalo-methane levels," *Environ Health Perspect* 103(6)(1995): 592–596; M.D. Kramer et al., "The association of waterborne chloroform with intrauterine growth retardation," *Epidemiology* 3(5)(1992): 407–413; A. Mantovani, "Reproductive risks from contaminants in drinking water," *Ann Ist Super Sanita* 29(2)(1993): 317–326; S.H. Swan et al., "A prospective study of spontaneous abortion: Relation to amount and source of drinking water consumed in early pregnancy," *Epidemiology* 9(2)(1998): 126–133; K. Waller et al., "Trihalo-methanes in drinking water and spontaneous abortion," *Epidemiology* 9(2)(1998): 134–140; M.D. Gallagher et al., "Exposure to trihalo-methanes and adverse pregnancy outcomes," *Epidemiology* 9(5)(1998): 484–489; J.B. Kotz and L.A. Pyrch, *A Case-Control Study of Neural Tube Defects and Drinking Water Contaminants*, 1998. Atlanta: ATSDR.
- 42 The occurrence numbers are based on three surveys: the National Organic Monitoring Survey, the National Organics Reconnaissance Survey, and the American Water Works Association Research Foundation's THM Survey; see "Frequency Distributions of National THM Survey Data," 59 Fed.Reg. 38668, 38726 (Figure VI-9), 1994.
- 43 B.F. McPherson, R.L. Miller, K.H. Haag, and A. Bradner, "Water Quality in Southern Florida, 1996–98," U.S. Geological Survey Circular 1207, 2000. Available online at <http://sofia.usgs.gov/publications/circular/1207/docanddom.html#table2>.
- 44 S.H. Swan et al., "A prospective study of spontaneous abortion: Relation to amount and source of drinking water consumed in early pregnancy," *Epidemiology*

- 9(2)(1998): 126–133; K. Waller et al., “Trihalomethanes in drinking water and spontaneous abortion,” *Epidemiology* 9(2)(1998): 134–140.
- 45 M.J. Nieuwenhuijsen, M.B. Toledano, N.E. Eaton, J. Fawell, and P. Elliott, “Chlorination disinfection byproducts in water and their association with adverse reproductive outcomes: A review,” *Occup Environ Med.* 57(2)(2000): 73–85; see also F. Bove, Y. Shim, and P. Zeitz, “Drinking water contaminants and adverse pregnancy outcomes: A review,” *Environ Health Perspect* 110 Suppl 1(2002): 61–74; M.I. Cedergren, A.J. Selbing, O. Lofman, and B.A. Kallen, “Chlorination byproducts and nitrate in drinking water and risk for congenital cardiac defects,” *Environ Res.* 89(2)(2002): 124–130; W.D. King, L. Dodds, and A.C. Allen, “Relation between stillbirth and specific chlorination by-products in public water supplies,” *Environ Health Perspect.* 108(9)(2000): 883–886; J.S. Reif, M.C. Hatch, M. Bracken, L.B. Holmes, B.A. Schwetz, and P.C. Singer, “Reproductive and developmental effects of disinfection by-products in drinking water,” *Environ Health Perspect.* 104(10)(1996): 1056–1061.
- 46 J.L. Kiely and M.D. Kogan, “Prenatal Care,” in Centers for Disease Control and Prevention (CDC), *From Data to Action: CDC’s Public Health Surveillance for Women, Infants, and Children*, 1994. Available online at <http://www.cdc.gov/reproductivehealth/dataoact/rhow.htm>.
- 47 March of Dimes Perinatal Data Center, “Early Prenatal Care by Latino Ethnicity, 2000,” 2002. Based on data by National Center for Health Statistics. Available online at <http://www.marchofdimes.com/aboutus/1525.asp>. Last visited March 1, 2004.
- 48 E. Olson, *Arsenic and Old Laws*, 2000. Available online at <http://www.nrdc.org/water/drinking/arsenic/chap2.asp>.
- 49 Ibid.
- 50 Arizona Department of Environmental Quality, “Owens Announces ADEQ Plan to Help Water Systems Comply with New Federal Standard for Arsenic in Drinking Water,” news release, Feb. 2003. Available online at <http://www.adeq.state.az.us/comm/pr/2003/feb.html#0210>.
- 51 U.S. Census, “State and County QuickFacts: Pima County, Arizona,” 2000. Available online at <http://quickfacts.census.gov/qfd/states/04/04019.html>.
- 52 Thomas R. Powell, “Ajo Arizona Water Quality,” 2003. Available online at <http://earthonly.com/ajo/water/index.php>.
- 53 U.S. Census Bureau, “State and County QuickFacts for Kings County, CA,” 2000. Available online at <http://quickfacts.census.gov/qfd/states/06/06031.html>.
- 54 U.S. Environmental Protection Agency, “Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization,” National Center for Environmental Assessment, Office of Research and Development, January 16, 2002, External Review Draft.
- 55 C. Hogue, “Rocket Fueled River,” *C&EN*, 81(33)(Aug. 18, 2003): 37–46.
- 56 EWG, “Rocket Fuel in Drinking Water: Perchlorate Pollution Spreading Nationwide,” 2003. Available online at <http://www.ewg.org/reports/rocketwater/table2.php>.
- 57 R.J. Brechner, G.D. Parkhurst, W.O. Humble, M.B. Brown, and W.H. Herman, “Perchlorate Contamination of Drinking Water,” *J Occup Environ Med.* 42(2000): 777–782.
- 58 The population of Yuma is 45.7 percent Latino. Flagstaff is 16.1 percent Latino.
- 59 California Department of Health Services (CADHS), “California’s experience with perchlorate in drinking water,” September 8, 2003. Available online at <http://www.dhs.ca.gov/ps/ddwem/chemicals/perchl/monitoringupdate.htm>. Reflects results from 6,177 drinking water sources.
- 60 EPA, “Nitrates,” fact sheet, 2004. Available online at [www.epa.gov/safewater/dwh/c-ioc/nitrates.html](http://www.epa.gov/safewater/dwh/c-ioc/nitrates.html).
- 61 Texas Birth Defect Monitoring, <http://www.tdh.state.tx.us/tbdmd/risk/risk7-NTDs.PDF>.
- 62 International Boundary and Water Commission, “Binational,” May 1998, A 312.
- 63 Ground Water Protection Council, “Ground Water Report to Congress, Summary of State Ground Water Conditions,” 1999. Available online at <http://www.gwpc.org/gwreport/states.htm>.

## Chapter 4

- 1 Migrant Clinicians Network, 2001. Available online at <http://www.migrantclinician.org>. Last visited November 1, 2002.
- 2 The California Endowment, “Suffering in Silence: Who Are California’s Agricultural Workers?” 2001. Derived from the California Institute of Rural Studies.
- 3 G. Solomon, Natural Resources Defense Council, *Trouble on the Farm: Growing Up with Pesticides in Agricultural Communities*, 1998. Available online at <http://www.nrdc.org/health/kids/farm/chap1.asp>.
- 4 Cooper et al., “Ascertainment of Pesticide Exposures of Migrant and Seasonal Farmworker Children: Findings from Focus Groups,” *American Journal of Industrial Medicine* 40: 531–537.
- 5 C.L., R.A. Fenske, N.J. Simcox, G. Bellamy, and D. Kalman, “Biological Monitoring of Organophosphorus Pesticide Exposure among Children of Agricultural Workers in Central Washington State,” *Environmental Health Perspectives* 105(12)(1997): 1344–1353.
- 6 CA Wilen, “Survey of Residential Pesticide Use and Sales in the San Diego Creek Watershed of Orange County, California,” report prepared for the California Department of Pesticide Regulation, 2001. Available online at <http://www.cdpr.ca.gov/docs/sw/contracts/sdcrk.pdf>. Last visited April 2, 2004.
- 7 E.A. Guillette, M.M. Meza, M.G. Aquilar, A.D. Soto, and I. Enedina, “An anthropological approach to the evaluation of preschool children exposed to pesticides in Mexico,” *Environmental Health Perspectives* 106(1998): 347–353.
- 8 G. Solomon, Natural Resources Defense Council, *Trouble on the Farm: Growing Up with Pesticides in Agricultural Communities*, 1998. Available online at <http://www.nrdc.org/health/kids/farm/chap1.asp>.
- 9 PANNA, “Fields of Poison 2002: California Farmworkers and Pesticides,” 2002. Available online at <http://www.panna.org/>

- campaigns/docsWorkers/CPRreportexsum.pdf.
- 10 M. Reeves and K.S. Schafer, “Greater Risks, Fewer Rights: U.S. Farmworkers and Pesticides,” *International Journal of Occupational and Environmental Health* 9(2003): 30–39.
- 11 P.J. Squillace, et al., “VOCs, Pesticides, Nitrate, and Their Mixtures in Groundwater Used for Drinking Water in the United States,” *U.S. Geological Survey, Environmental Science and Technology* 36(9)(2002): 1923–1930.
- 12 “PSR Fact Sheet, An Exposed Population: Latino Americans and Environmental Health,” 2003. Available online at [http://www.envirohealthaction.org/upload\\_files/Latino%20American%20Fact%20sheet.pdf](http://www.envirohealthaction.org/upload_files/Latino%20American%20Fact%20sheet.pdf). (Describes in part the findings of the Centers for Disease Control and Prevention, *Second National Report on Human Exposure to Environmental Chemicals*, 2003. Available online at <http://www.cdc.gov/exposurereport/default.htm>.)
- 13 T.A. Arcury, S.A. Quandt, A.J. Cravey, R.C. Elmore, and G.B. Russell, “Farmworker Reports of Pesticide Safety and Sanitation in the Work Environment,” *American Journal of Industrial Medicine* 40(2001): 487–498.
- 14 U.S. Department of Labor, *Findings from the National Agricultural Workers Survey (NAWS) 1997–1998: A Demographic and Employment Profile of United States Farmworkers*, 2000. Washington, DC: U.S. Department of Labor. Available online at [http://www.dol.gov/asp/programs/agworker/report\\_8.pdf](http://www.dol.gov/asp/programs/agworker/report_8.pdf). Last visited October 29, 2002.
- 15 M. Robson, D. Schneider, C. Marentes, and E. Villanueva, “Field conditions for agricultural workers in the El Paso, Texas Region,” *New Solutions* 11(2)(2001): 93–111.
- 16 R. Mines, N. Mullenax, and L. Saca, *The Binational Farmworker Health Survey: An In-depth Study of Agricultural Worker Health in Mexico and the United States*. Davis, CA: California Institute for Rural Studies, 2001. Available online at <http://www.cirsinc.org/rickfin2.pdf>. Visited October 29, 2002.
- 17 U.S. Department of Labor, *Findings from the National Agricultural Workers Survey (NAWS) 1997–1998: A Demographic and Employment Profile of United States Farmworkers*.

- Washington, DC: U.S. Department of Labor, 2000. Available online at [http://www.dol.gov/asp/programs/agworker/report\\_8.pdf](http://www.dol.gov/asp/programs/agworker/report_8.pdf). Visited October 29, 2002.
- 18 M.A. Hernandez-Valero, M.L. Bondy, M.R. Spitz, and S.H. Zahm, "Evaluation of Mexican-American Migrant Farmworker Work Practices and Organochlorine Pesticide Metabolites," *American Journal of Industrial Medicine* 40(2001): 554-560.
- 19 Ibid.
- 20 T.A. Arcury, S.A. Quandt, A.J. Cravey, R.C. Elmore, and G.B. Russell, "Farmworker Reports of Pesticide Safety and Sanitation in the Work Environment," *American Journal of Industrial Medicine* 39 (2001): 487-498.
- 21 M. Reeves and K. S. Schafer, "Greater Risks, Fewer Rights: U.S. Farmworkers and Pesticides," *International Journal of Occupational and Environmental Health* 9(2003): 30-39; J. Blondell, "Epidemiology of Pesticide Poisonings in the United States, with Special Reference to Occupational Class," *Occupational Medical State of the Art Reviews* 12(1997): 209-220; California Department of Pesticide Regulation, "California Pesticide Illness Surveillance Program Report," 2000. Available online at <http://www.cdpr.ca.gov/docs/whs/pdf/hs1831.pdf>. Visited August 21, 2003.
- 22 U.S. Department of Labor, "Findings from the National Agricultural Workers Survey (NAWS) 1997-1998: A Demographic and Employment Profile of United States Farmworkers," 2000. Available online at [http://www.dol.gov/asp/programs/agworker/report\\_8.pdf](http://www.dol.gov/asp/programs/agworker/report_8.pdf). Visited October 29, 2002.
- 23 National Association of Community Health Centers, "A Perspective on America's Farmworkers and the Migrant Health Center Program," fact sheet, 2003. Available online at <http://www.nachc.com/advocacy/2003%20Policy%20Papers/Migrant%20perspective%20paper.pdf>.
- 24 D. Villarejo et al., California Institute for Rural Studies and The California Endowment, "Suffering in Silence: A Report on the Health of California's Agricultural Workers," 2000. Available online at <http://www.calendow.org/publications/AgrWorkersSurveyver012301.pdf>.
- 25 P.K. Mills and S. Kwong, "Cancer Incidence in the United Farmworkers of America (UFW), 1987-1997," 2001. Fresno, CA: Cancer Registry of Central California. Available online at <http://www.ufw.org/cancerfw.pdf>. Last visited October 29, 2002.
- 26 Swerdlow, et al., "Health Surveillance in Migrant Camps, San Diego County, July 1991-June 1992," San Diego County Department of Health Services, San Diego, California.
- 27 Ibid.
- 28 G.S. Berkowitz, J. Obel, E. Deych, R. Lapinski, J. Godbold, Z. Liu, P.J. Landrigan, and M.S. Wolff, "Exposure to indoor pesticides during pregnancy in a multiethnic urban cohort," *Environmental Health Perspectives* 111(1)(2003): 79-84.
- 29 R.M. Whyatt, D.E. Camann, P.L. Kinney, A. Reyes, J. Ramirez, J. Dietrich, D. Diaz, D. Holmes, and F.P. Perera, "Residential pesticide use during pregnancy among a cohort of urban minority women," *Environmental Health Perspectives* 110(5)(2002): 507-514.
- 30 R.M. Whyatt, V. Rauh, D.B. Barr, D.E. Camann, H.F. Andrews, R. Garfinkel, L.A. Hoepner, D. Diaz, J. Dietrich, A. Reyes, D. Tang, P.L. Kinney, and F.P. Perera, "Prenatal insecticide exposures, birth weight and length among an urban minority cohort," *Environmental Health Perspectives* in print at time of publication.
- 31 C.A. Wilen, "Survey of Residential Pesticide Use and Sales in the San Diego Creek Watershed of Orange County, California," report prepared for the California Department of Pesticide Regulation, 2001. Available online at <http://www.cdpr.ca.gov/docs/sw/contracts/sdcrk.pdf>. Last visited April 2, 2004.
- 32 U.S. Census Bureau, "2002 New York City Housing and Vacancy Survey," 2003. Available online at <http://www.census.gov/hhes/www/nychvs.html>. Last visited April 2, 2004.
- 33 Attorney General, State of New York, "Pest Control in Public Housing, Schools and Parks: Urban Children At Risk," 2002. Available online at [http://www.oag.state.ny.us/environment/pest\\_control\\_public\\_housing.pdf](http://www.oag.state.ny.us/environment/pest_control_public_housing.pdf). Last visited April 2, 2004.
- 34 Ibid.
- 35 Attorney General, State of New York, "States Call on HUD to Reduce Pesticides in Public Housing," press release, 2003. Available online at [http://www.oag.state.ny.us/press/2003/oct/oct08b\\_03.html](http://www.oag.state.ny.us/press/2003/oct/oct08b_03.html). Last visited April 2, 2004.
- 36 Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. §136r-1: "Federal agencies shall use Integrated Pest Management techniques in carrying out pest management activities and shall promote Integrated Pest Management through procurement and regulatory policies, and other activities."

## Chapter 5

- 1 United States Agency for Toxic Substances and Disease Registry, "ToxFAQs for Lead," 1999. Available online at <http://www.atsdr.cdc.gov/tfacts13.html>. Last visited April 8, 2004.
- 2 J.L. Pirkle, R.B. Kaufmann, D.J. Brody, T. Hickman, E.W. Gunter, and D.C. Paschal, "Exposure of the U.S. population to lead, 1991-1994," *Environmental Health Perspectives* 106(11)(1998): 745-750.
- 3 Centers for Disease Control and Prevention, "Surveillance for Elevated Blood Lead Levels Among Children: United States, 1997-2001," *MMWR* 52 (SS10) (2003): 1-21. Available online at <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5210a1.htm>.
- 4 Centers for Disease Control and Prevention, "Childhood Lead Poisoning Fact Sheet," 2003. Available online at <http://www.cdc.gov/nceh/lead/factsheets/childhoodlead.htm>. Last visited June 6, 2003.
- 5 United States Environmental Protection Agency, "Lead in Paint, Dust, and Soil: Basic Information," 2002. Available online at <http://www.epa.gov/opptintr/lead/leadinfo.htm#facts>. Last visited May 14, 2003.
- 6 D. Blumenthal, "An Unwanted Souvenir: LEAD in Ceramic Ware," *FDA Consumer Magazine*, December 1989/January 1990. Available online at <http://www.fda.gov/bbs/topics/CONSUMER/CON00080.html>. Last visited January 22, 2004. D. Farley, "Dangers of Lead Still Linger," *FDA Consumer Magazine*, January-February 1998. Available online at [http://www.fda.gov/fdac/features/1998/198\\_lead.html](http://www.fda.gov/fdac/features/1998/198_lead.html). Last visited January 22, 2004.
- 7 Arizona Department of Health Services, "Lead Poisoning in Arizona: Annual Report 2002," 2003. Available online at [http://www.hs.state.az.us/phs/oe/invsurv/lead/pdf/iss\\_02\\_final.pdf](http://www.hs.state.az.us/phs/oe/invsurv/lead/pdf/iss_02_final.pdf). Last visited January 22, 2004.
- 8 R.J. Dutton, M. Weldon, J. Shannon, C. Bowcock, M. Tackett-Gibson, C. Blakely, J. Dyer, B. Jayasuriya, W. Worrall, and R. Betru, "Survey of Health and Environmental Conditions in Texas Border Counties and Colonias," 2000. Available online at [http://www.epa.gov/orsearch/pdf/exsumrev\\_hetbcc.pdf](http://www.epa.gov/orsearch/pdf/exsumrev_hetbcc.pdf). Last visited December 24, 2003.
- 9 New York City Department of Health and Mental Hygiene, "Surveillance of Childhood Blood Lead Levels in New York City," 2002. Available online at <http://www.ci.nyc.ny.us/html/doh/html/lead/12002.html>. Last visited December 21, 2003.
- 10 J. Gasana, and A. Chamorro, "Environmental lead contamination in Miami inner-city area," *Journal of Exposure Analysis and Environmental Epidemiology* 12(4)(2002): 265-272.
- 11 D.C. Snyder, J.C. Mohle-Boetani, B. Palla, and M. Fenstersheib, "Development of a population-specific risk assessment to predict elevated blood lead levels in Santa Clara County, California," *Pediatrics* 96(4 Pt 1) (1995): 643-648.
- 12 M. Aguirre and S. Hernandez, "Lead poisoning in Latino children: The great need for prevention education," *Californian Journal of Health Promotion* 1(2)(2003): 52-58.
- 13 Arizona Department of Health Services, "Lead Poisoning in Arizona: Annual Report 2002," 2003. Available online at [http://www.hs.state.az.us/phs/oe/invsurv/lead/pdf/iss\\_02\\_final.pdf](http://www.hs.state.az.us/phs/oe/invsurv/lead/pdf/iss_02_final.pdf). Last visited January 22, 2004.
- 14 J.L. Pirkle, R.B. Kaufmann, D.J. Brody, T. Hickman, E.W. Gunter, and D.C. Paschal, "Exposure of the U.S. population to lead, 1991-1994," *Environmental Health Perspectives* 106(11)(1998): 745-750.
- 15 R.J. Dutton, M. Weldon, J. Shannon, C. Bowcock, M. Tackett-Gibson, C. Blakely, J. Dyer, B. Jayasuriya, W. Worrall, and R. Betru, "Survey of Health and

- Environmental Conditions in Texas Border Counties and Colonias," 2000. Available online at [http://www.epa.gov/orsearch/pdf/exsumrev\\_hetbcc.pdf](http://www.epa.gov/orsearch/pdf/exsumrev_hetbcc.pdf). Last visited December 24, 2003. Arizona Department of Health Services, "Pediatric Lead Assessment On the United States-Mexico Border," 2002. Available online at <http://www.hs.state.az.us/phs/borderhealth/lead1.htm>. Last visited December 24, 2003.
- 16 Santa Clara County Public Health Department, "Lead in Home Remedies." Available online at <http://www.sccphd.org/content/0,4745,child%253D18626%2526ccid%253D115477,00.html>. Last visited December 21, 2003.
- 17 R.J. Dutton, M. Weldon, J. Shannon, C. Bowcock, M. Tackett-Gibson, C. Blakely, J. Dyer, B. Jayasuriya, W. Worrall, and R. Betru, "Survey of Health and Environmental Conditions in Texas Border Counties and Colonias," 2000. Available online at [http://www.epa.gov/orsearch/pdf/exsumrev\\_hetbcc.pdf](http://www.epa.gov/orsearch/pdf/exsumrev_hetbcc.pdf). Last visited December 24, 2003.
- 18 Arizona Department of Health Services, "Lead Poisoning in Arizona: Annual Report 2002," 2003. Available online at [http://www.hs.state.az.us/phs/oei/invsurv/lead/pdf/iss\\_02\\_final.pdf](http://www.hs.state.az.us/phs/oei/invsurv/lead/pdf/iss_02_final.pdf). Last visited January 22, 2004.
- 19 J.B. McKim, K. Sharon, and W. Heisel, "Hidden Threat: Mexican candy—a seemingly harmless indulgence—can contain a poison that is especially dangerous to children," April 25, 2004. Available online at <http://www.oregister.com/investigations/2004/lead/part1.shtml>.
- 20 The OCR supplemented and substantiated information obtained from federal and state records with more than 180 additional tests on candy and wrappers.
- 21 The "level of concern," a term used in the state of California to describe the point at which the amount of lead in candy exceeds accepted standards, is 0.2 parts per million lead, and only candies at least as contaminated were considered high in lead.
- Chapter 6**
- 1 P. Grandjean, R.F. White, P. Weihe, and P.J. Jorgensen, "Neurotoxic risk caused by stable and variable exposure to methylmercury from seafood," *Ambul Pediatr.* 3(1)(2003): 18–23.
- 2 E. Guallar, M.I. Sanz-Gallardo, P. van't Veer, P. Bode, A. Aro, J. Gomez-Aracena, et al., "Mercury, fish oils, and the risk of myocardial infarction," *N Engl J Med.* 347(22)(2002): 1747–1754.
- 3 G.J. Myers and P.W. Davidson, "Prenatal mercury exposure and children: Neurologic, developmental, and behavioral research," *Environ Health Perspect* 106(Suppl 3)(1998): 841–847.
- 4 United States Environmental Protection Agency, "Blood Mercury and Dietary Mercury Intake: National Health and Nutrition Examination Survey, 1999–2000," 2003. Available online at <http://dx.doi.org/>.
- 5 M.A. McDowell, C.F. Dillon, J. Osterloh, P.M. Bolger, E. Pellizzari, R. Fernando, et al., "Hair mercury levels in U.S. children and women of childbearing age: Reference range data from NHANES 1999–2000," *Environmental Health Perspectives* 112(11)(2004):1165–71. Available online at <http://dx.doi.org/doi:10.1289/ehp.7046>. Visited May 27, 2004.
- 6 P. Grandjean, P. Weihe, R.F. White, and F. Debes, "Cognitive performance of children prenatally exposed to 'safe' levels of methylmercury," *Environmental Research* 77 (2)(1998): 165–172; P. Grandjean, P. Weihe, R.F. White, F. Debes, S. Araki, K. Yokoyama, K. Murata, N. Sorensen, R. Dahl, and P.J. Jorgensen, "Cognitive deficit in 7-year-old children with prenatal exposure to methylmercury," *Neurotoxicology and Teratology* 19 (6)(1997): 417–428.
- 7 Mercury Policy Project, "Can the Tuna: FDA's Failure to Protect Children From Exposure to Mercury in Albacore 'White' Canned Tuna," 2003. Available online at <http://www.mercuryproject.org/new/documents/CanTheTuna061903.pdf>.
- 8 S.J. Weinstein, C.A. Bisogni, E.A. Frongillo Jr., and B.A. Knuth, "Factors explaining seafood consumption among Latinos living in New York City," *Journal of Nutrition Education* 31(4)(1999): 212–223; S.J. Weinstein, C.A. Bisogni, M.E. Villalobos, and D. Sanjur, "Bilingual mail survey approach to examine seafood consumption practices among Latinos living in metropolitan New York," *Journal of Nutrition Education* 31(4)(1999): 201–211.
- 9 Arizona Department of Environmental Quality, "ADEQ Director Owens Reminds Arizona Anglers—Fish Consumption Advisories Still In Effect for 11 Arizona Lakes," 2004. Available online at <http://www.adeq.state.az.us/function/news/2004/may.html>
- 10 J. Burger, K.K. Pflugh, L. Lurig, L.A. Von Hagen, and S. Von Hagen, "Fishing in Urban New Jersey: Ethnicity Affects Information Sources, Perception, and Compliance," *Risk Analysis* 19 (2)(1999): 217–229.
- 11 J. Burger, M.H. McDermott, C. Chess, E. Bochenek, M. Perez-Lugo, and K.K. Pflugh, "Evaluating risk communication about fish consumption advisories: Efficacy of a brochure versus a classroom lesson in Spanish and English," *Risk Analysis* 23(4)(2003): 791–803.
- 12 Western Michigan University Environmental Institute, "Environmental Institute Approach to the Kalamazoo River Watershed." Available online at <http://www.wmich.edu/env/kalamazooriver/kalriverwatershed.htm>. Last visited December 29, 2003. J. Tilden, L.P. Hanrahan, H. Anderson, C. Palit, J. Olson, and W.M. Kenzie, "Health advisories for consumers of Great Lakes sport fish: Is the message being received?" *Environmental Health Perspectives* 105(12)(1997): 1360–1365. U.S. Department of Health and Human Services, "Public Health Assessment, Initial Release; Portland Harbor," 2002. Atlanta, GA: Agency for Toxic Substances and Disease Registry.
- 13 G.P. Beehler, B.M. McGuinness, and J.E. Vena, "Characterizing Latino Anglers' Environmental Risk Perceptions, Sport Fish Consumption, and Advisory Awareness," *Medical Anthropology Quarterly* 17(1)(2003): 99–116.
- 14 J. Corburn, "Combining community-based research and local knowledge to confront asthma and subsistence-fishing hazards in Greenpoint/Williamsburg, Brooklyn, New York," *Environmental Health Perspectives* 110(Suppl 2)(2002): 241–248.
- 15 R.T. Trotter, "Greta and Azarcon: A survey of episodic lead poisoning from a folk remedy," *Human Organization* 44(1)(1985): 64–72.
- 16 P.E. McKinney, "Elemental mercury in the appendix: An unusual complication of a Mexican-American folk remedy," *Journal of Clinical Toxicology* 37(1)(1999): 103–107; M.E. Geffner and A. Sandler, "Oral metallic mercury: A folk remedy for gastroenteritis," *Clinical Pediatrics* 19(6)(1980): 435–437.
- 17 New York City Department of Health, "Metallic Mercury Exposure: A Guide for Health-Care Providers." Available online at <http://www.ci.nyc.ny.us/html/doh/pdf/eode/mercury1.pdf>.
- 18 J. Villanacci, R. Beauchamp, D.M. Perrotta, M. Rodriguez, A. Abel, R.J. Dutton, D.M. Simpson, et al., "Update: Mercury poisoning associated with beauty cream—Arizona, California, New Mexico, and Texas, 1996," *MMWR* 45(29)(1996): 633–635.
- 19 M.M. Weldon, M.S. Smolinski, A. Maroufi, B.W. Hasty, D.L. Gilliss, L.L. Boulanger, et al., "Mercury poisoning associated with a Mexican beauty cream," *Western Journal of Medicine* 173 (2000): 15–18.
- 20 D.M. Riley, C.A. Newby, T.O. Leal-Almeraz, and V.M. Thomas, "Assessing elemental mercury vapor exposure from cultural and religious practices," *Environmental Health Perspectives* 109(8)(2001): 779–784.
- 21 JSI Center for Environmental Health Studies, commissioned by Massachusetts Executive Office of Environmental Affairs, Environmental Justice Office, "Ritual Use of Mercury (Azogue) Assessment and Education Project," August 7, 2003, p. 6.
- 22 C. Johnson, "Elemental Mercury Use in Religious and Ethnic Practices in Latin American and Caribbean Communities in New York City," *Population and Environment: A Journal of Interdisciplinary Studies* 20(5)(1999): 443–453.
- 23 A.P. Wendroff and D.A. Jetter, "Mercury exposure from magico-religious use in Hispanic and Caribbean homes," *Environmental Times* December 1999: 1–16.
- 24 JSI Center for Environmental Health Studies, commissioned by Massachusetts Executive Office of Environmental Affairs, Environ-

mental Justice Office, "Ritual Use of Mercury (Azogue) Assessment and Education Project," August 7, 2003, p. 6.

25 L.H. Zayas and P.O. Ozuah, "Mercury use in *Espiritismo*: A survey of botánicas," *American Journal of Public Health* 86(1)(1996): 111–112.

26 Ibid.

27 A. Wendroff, "Reports by Botanica personnel of mercury sale and use for spiritual practices, Bronx, New York City," 1995. Available online at <http://www.mercury poisoningproject.org>. M.J. Greenberg, "Mercury hazard widespread in magico-religious practices in U.S.," *Emergency Medicine News* 21(8)(1999): 24–25.

28 K.E. Muhlendahl, "Intoxication from mercury spilled on carpets," *The Lancet*, December 22/29, 1990: 1578.

29 A.H. Stern, M. Gochfeld, D. Riley, A. Newby, T. Leal, and G. Garetano, "Cultural Uses of Mercury in New Jersey," New Jersey Department of Environmental Protection, May 2003.

30 Agency for Toxic Substances and Disease Registry, "Toxicological Profile for Mercury," 1999. Available online at <http://www.atsdr.cdc.gov/toxprofiles/tp46.pdf>.

31 M. Smith, "Urging the New York State Congressional Delegation to call upon the Department of Health, the United States Consumer Product Safety Commission, the Federal Occupational Safety and Health Administration and/or any other appropriate agency to investigate the unlawful retail sale of elemental mercury to consumers within the City of New York." Senate No. 1468, April 24, 2001.

32 "EPA Warns health officials of mercury threat to Hispanics," *The Nation's Health*, May/June 1994, p. 5.

33 P.O. Ozuah, M.S. Lesser, J.S. Woods, H. Choi, and M. Markowitz, "Mercury exposure in an urban pediatric population," *Ambulatory Pediatrics* 3(1)(2003): 24–26.

34 A. Goldstein, "Tests find 10 with higher mercury," *Washington Post*, October 15, 2003, p. B01.

35 C. Johnson, "Elemental Mercury Use in Religious and Ethnic Practices in Latin American

and Caribbean Communities in New York City," *Population and Environment: A Journal of Interdisciplinary Studies* 20(5)(1999): 443–453.

36 Personal communication, June 10, 2003, with Jorge Villacis and Lily Lee of NYC DEP and Dr. Arnold Wendroff.

37 D. Riley, C.A. Newby, T.O. Leal-Almeraz, and V.M. Thomas, "Assessing Elemental Mercury Vapor Exposure from Cultural and Religious Practices," *Environmental Health Perspectives* 109(8)(2001): 779–784.