

US EPA ARCHIVE DOCUMENT



SURVEY OF HEALTH AND ENVIRONMENTAL CONDITIONS IN TEXAS BORDER COUNTIES AND COLONIAS



EXECUTIVE SUMMARY



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Texas Department of Health

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FOREWORD

Dear Reader:

The US-Mexico border is one of the longest and busiest international boundaries in the world. The two million Texans currently living along the border frequently cross the border to shop, visit friends and family, dine, and seek medical or dental care. The ever increasing flux of people and goods back and forth across the border is a critical component in defining the dynamic nature of the region and its changing economy, culture, and environment. During this period of dramatic growth, a number of public health concerns have been raised about health and environmental conditions.

The *Survey of Health and Environmental Conditions in Texas Border Counties and Colonias*, the results of which are presented in this report, was an essential element of the efforts undertaken by the Office of Border Health (OBH), at the Texas Department of Health (TDH), to identify and collect environmental health data for the Texas-Mexico border. This work represents the culmination of an important collaboration between TDH and the US Environmental Protection Agency (USEPA) and the Centers for Disease Control and Prevention (CDC), and underscores the continuing commitment of TDH and its federal partners to identify and address the unique public health issues and concerns along the border.

This population-based household survey is the first comprehensive description of health and environmental conditions facing Texas families living near the border with Mexico. The results provide a baseline of information for development of targeted interventions by agencies working with border residents to improve the quality of life and health. The baseline can be used to evaluate the success of follow-up interventions and to identify high-risk subgroups.

Copies of the *Survey of Health and Environmental Conditions in Texas Border Counties and Colonias* full technical report may be obtained from:

Texas Department of Health
Office of Border Health
1100 West 49th Street
Austin, Texas 78756-3199

Sincerely,

Original signed by:
William R. Archer, M.D.
Commissioner of Health

Acknowledgements

A study of this magnitude represents the ideas, energy, and perseverance of many people. We wish to acknowledge their contributions and thank them for their willingness to help the study toward successful completion.

We owe much to the patience and support of the program managers at each of the participating Texas Department of Health (TDH) Office of Border Health (OBH) regional offices in El Paso (Blanca Serrano), Uvalde (Kassie Curfman), Laredo (Jacob Rathmell) and Harlingen (Ramiro Gonzales). They contributed to the conceptualization of the project plan and more importantly, the translation of those protocols into action in the field with their staff.

Special recognition is noted for the work of the following OBH staff: Maria Isabel Chavez, Debra Dale, Luis DeLeon, Jorge Elizondo, Robert Garcia, Esteban Gonzales, Manny Hernandez, Sal Hernandez, Mary Lou Orozco, Albert Perez, Elida Torres, and Claudia Vasquez who worked diligently to ensure that activities moved forward and planned and facilitated the process of getting data from the field into the hands of the data coordinators at the Public Policy Research Institute (PPRI).

Members of TDH staff who assisted in developing the survey instrument or provided critical editorial reviews include Dr. Jean Brender, Cynthia Culmo, Debra Dale, Dr. Kate Hendricks, Judy Henry, Julie Rawlings, Dr. Mark Rodriguez, Dr. Lucina Suarez, Dr. Griselda Carrillo-Stevenson, and Amy Weiss. Members of the PPRI staff making significant contributions to the successful completion of this project include Alicia Novoa, Laurie Kirts, Kenneth Brobst, Reade Sitton, and Stephen Thigpen.

Funding for this project was the result of contributions from the Texas Department of Health (TDH), the Centers for Disease Control and Prevention (CDC), and the U.S. Environmental Protection Agency (EPA). A landmark interagency memorandum of understanding (MOU) between the EPA and CDC led to the development of a CDC/TDH cooperative agreement (Grant No. U50-CCU612808-01). In this regard, we are deeply indebted to the efforts of Mr. Glen Provost (Texas Tech University), Dr. Hal Zenick (EPA), Dr. Henry Falk (CDC), and Mr. Larry Posey (CDC -Project Officer). In addition, Dr. Rossanne Philen, Dr. Emilio Esteban, Dr. Kim Blindauer, and Ms. Rebecca Hart at the CDC National Center for Environmental Health provided additional strength to the study design and final report.

The entire study team worked extremely well together as a team. Joint efforts by federal/state agency members and university researchers and staff are often difficult endeavors to undertake. Yet, considerable partnership and collegial interactions came from this project.

The findings generated from this overall effort represent the views of many respondents in the border area. To all of those who took the time from their days to respond to our questionnaires, provide blood samples, or allow us to test various water storage devices in their homes, we owe our deepest gratitude, for it is your input that provides the essence of our findings.

Preface

In response to community health concerns in the Texas-Mexico border region and the need for data about human exposure to environmental contaminants, the U.S. Environmental Protection Agency (EPA) coordinated an intensive monitoring study in Cameron and Hidalgo counties of the Lower Rio Grande Valley (EPA, 1994; Akland et al., 1997; Mukerjee et al., 1997a; 1997b; Crescenti, 1997; Ellenson et al., 1997; Berry et al., 1997a, 1997b; Buckley et al., 1997; Mejia-Velazquez and Rodriguez-Gallegos, 1997). This work was conducted in the spring and summer of 1993 through an Interagency Coordinating Committee (ICC), a partnership of federal and state agencies, which included laboratory support from the Food and Drug Administration (FDA) and the Centers for Disease Control and Prevention (CDC).

The objective of the EPA monitoring study was to assess if contaminants from different environmental sources (e.g., air, food, water, house dust) contribute to human exposure for nine participating households in this border area. The study documented the presence and levels of the measured chemicals that together with the gathered pathway information showed how exposure could occur. Several areas for further investigation were identified including exposure to selected environmental contaminants, microbiological contamination of drinking water storage containers, and use of well water. The *Survey of Health and Environmental Conditions in Texas Border Counties and Colonias* was proposed as a population-based follow-up activity to address some of the issues identified in the EPA monitoring project.

The TDH Office of Border Health (OBH) was responsible for overseeing and coordinating the border survey. The OBH is comprised of a multi-disciplinary group of approximately 25 public health professionals who have expertise in sanitation, epidemiology, toxicology, health promotion, and policy development. The mission of the OBH is to improve public health along the Texas-Mexico border by coordinating public health activities with public and private entities on both sides of the border, by sponsoring public health interventions, and through studies such as this.

Technical assistance for the survey was provided by the Public Policy Research Institute (PPRI) at Texas A&M University. Specific responsibilities of OBH and PPRI were as follows:

- C OBH developed the initial survey protocol and questionnaire. Staff from OBH regional offices in Harlingen, Laredo, Uvalde (Del Rio/Eagle Pass), and El Paso conducted the household interviews. OBH contracted with local phlebotomists to draw blood samples, and blood samples were tested at the TDH laboratory in Austin. OBH directed the preparation of the final report.
- C PPRI provided statistical consultation and guidance in addressing methodological issues of the study design. PPRI translated the questionnaire into Spanish, trained interviewers, pilot-tested the survey, monitored fieldwork (including telephone verification of completed interviews), coded and entered data, prepared data files, conducted data analysis and assisted with the writing and preparation of the final report.

The following report presents the background of the study, its methodology, and principal research findings.

Executive Summary

Survey of Health and Environmental Conditions in Texas Border Counties and *Colonias*

Over the past decade, both sides of the Texas-Mexico border have experienced greater than a 25% increase in population. This dramatic population increase has given rise to a number of concerns regarding health conditions, including exposure to pesticides, poor water quality, potential trans-boundary pollution, food and drug safety, contamination of fish, rabies, consumer product safety, birth defects and cancer. Special populations in *colonias* may be at particular risk for health problems. *Colonias* are rural, unincorporated communities characterized by a lack of certain basic public services such as drinking water, sewage disposal, garbage pickup, and paved roads.

The *Survey of Health and Environmental Conditions in Texas Border Counties and Colonias* was conducted to provide the first population-based data on health concerns on the border. The goal of this survey was to provide individual and household level data on specific variables that reflect the health status and living environment of persons residing in *colonias* or non-*colonias* areas of the Texas-Mexico border.

The specific aims of this survey were to:

- Describe the demographics, links to Mexico, health care and source of health information, health risks and health conditions, child health and well-being, living environment, and neighborhood problems for about 2,100 households in Texas border counties and *colonias*;
- Determine the prevalence of elevated blood lead levels in children one to twelve years old;
- Determine the prevalence of past hepatitis A infection in children one to twelve years old;
- Screen for lead in ceramic pottery used for cooking and storing food; and
- Test stored drinking water for residual chlorine.

Sample Selection:

A standard multistage cluster sampling procedure was used to select a total of 2,194 households (**All Sites**) from six of the most populous Texas border counties. This sampling procedure allowed for survey results to be generalizable to the entire Texas border region. Sampling occurred throughout the 1997 calendar year.

Non-colonias: Non-*colonias* households were sampled from six border counties (El Paso, Webb, Maverick and Val Verde, Cameron and Hidalgo) representing four geographic areas (upper Rio Grande, upper-middle Rio Grande, lower-middle Rio Grande, lower Rio Grande). Census defined block groups were randomly selected from all the non-*colonia* block groups in these six counties. First blocks and then households were randomly sampled from the selected block groups. Seventy-seven percent of the selected non-*colonia* households participated in the survey (1,816 out of 2,346).

Colonias: *Colonias* households were sampled from 96 *colonias* located within the six selected counties (El Paso, Webb, Maverick and Val Verde, Cameron and Hidalgo). A simple random sample of households was selected from each *colonia*. Ninety-two percent of selected *colonias* households participated in the survey (378 out of 413).

Data Collection:

Survey data was collected through face-to-face interviews at the participant's homes. All interviewers were trained and followed a standardized protocol for identifying households, obtaining consent, administering the questionnaire and record keeping. The interviews were conducted in both Spanish and English.

The questionnaire included 159 items, 15 of which were based on interviewer observation or tests of collected samples. The remaining items were self reported and solicited information about all adults and children in the household. The questionnaire collected data regarding demographic characteristics, links to Mexico, health care and health information, health risks and health conditions, child health and well being, living conditions, and neighborhood problems and solutions. In a subset of households, ceramic cooking and storage containers were tested for lead, stored water was tested for residual chlorine, and a child was tested for blood lead level and antibodies to the hepatitis A virus.

Response Rate:

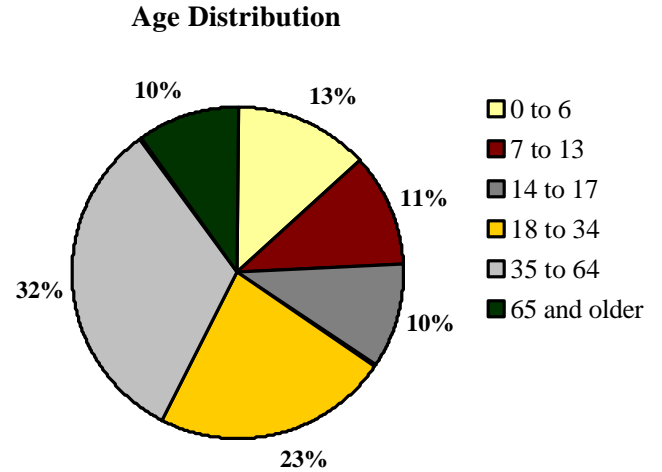
A total of 2,759 households were asked to participate in the study. Persons in 2,194 of the households (80%) agreed to participate. The response rate was higher in *colonias* (92%) than *non-colonias* (77%), with the lowest participation rates in the Maverick/ Val Verde *non-colonias* (73%) and El Paso *non-colonias* (76%).

Key Survey Findings

Study Population Demographics:

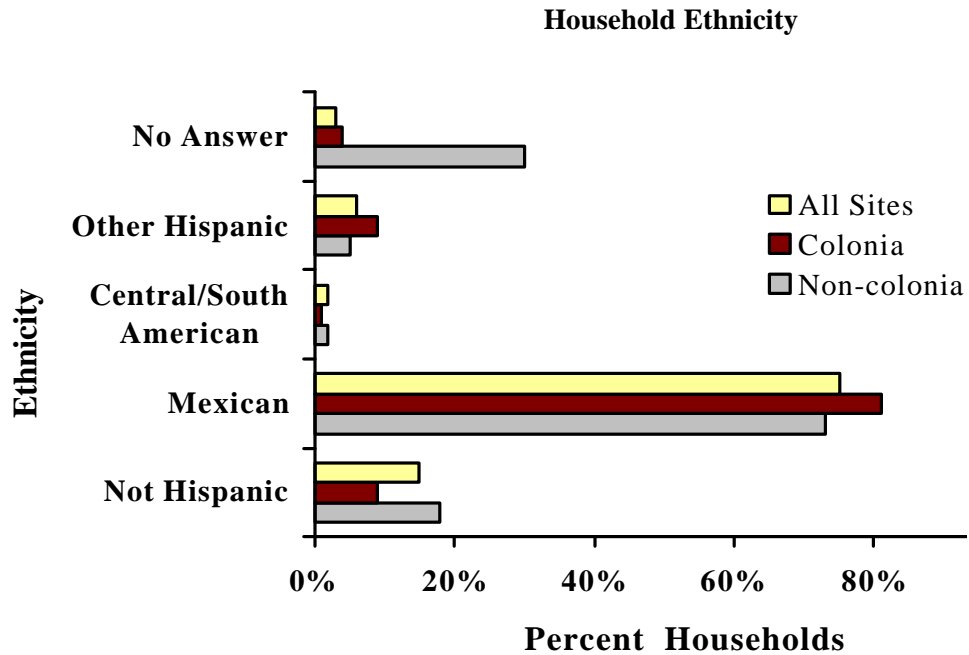
➤ **Young**

- ❖ 34% of survey participants were under the age of 18 compared to 29% in Texas non-border counties.



➤ **Hispanic**

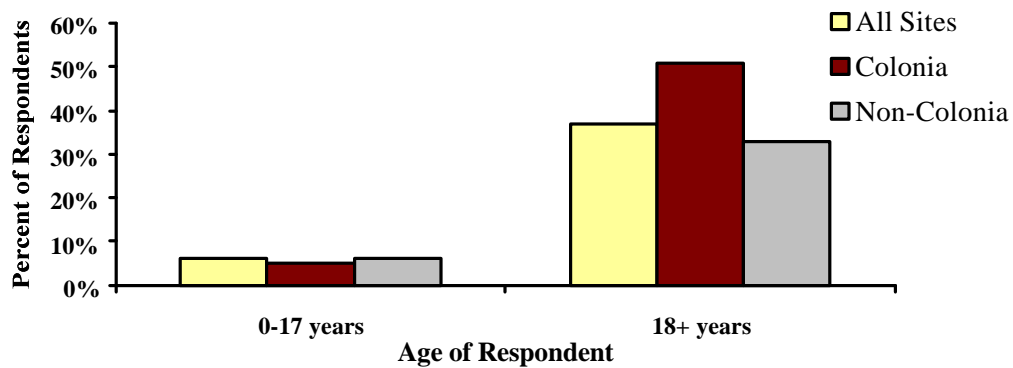
- ❖ Eighty-three percent of survey participants considered themselves to be white and of Hispanic ethnicity. The largest proportion of non-whites was in El Paso non-colonias (3% African American).



➤ **Recent Migrants**

- ❖ About forty percent of adults and 8% of children in all household sites were born outside the U.S., indicating that at least the remaining respondents were U.S. citizens by birth. The actual percentage of U.S. residents may be higher though due to the fact that residents may have acquired citizenship through naturalization.

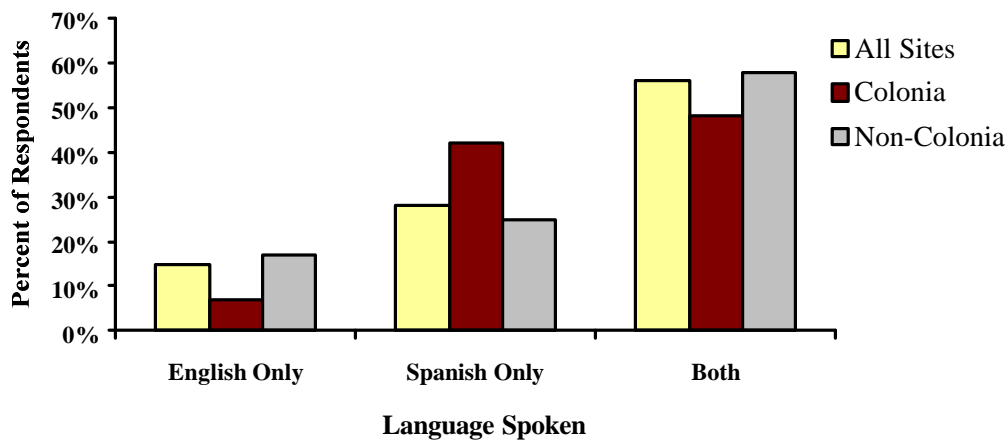
Percent of Respondents Born Outside the U.S.



➤ **Bilingual**

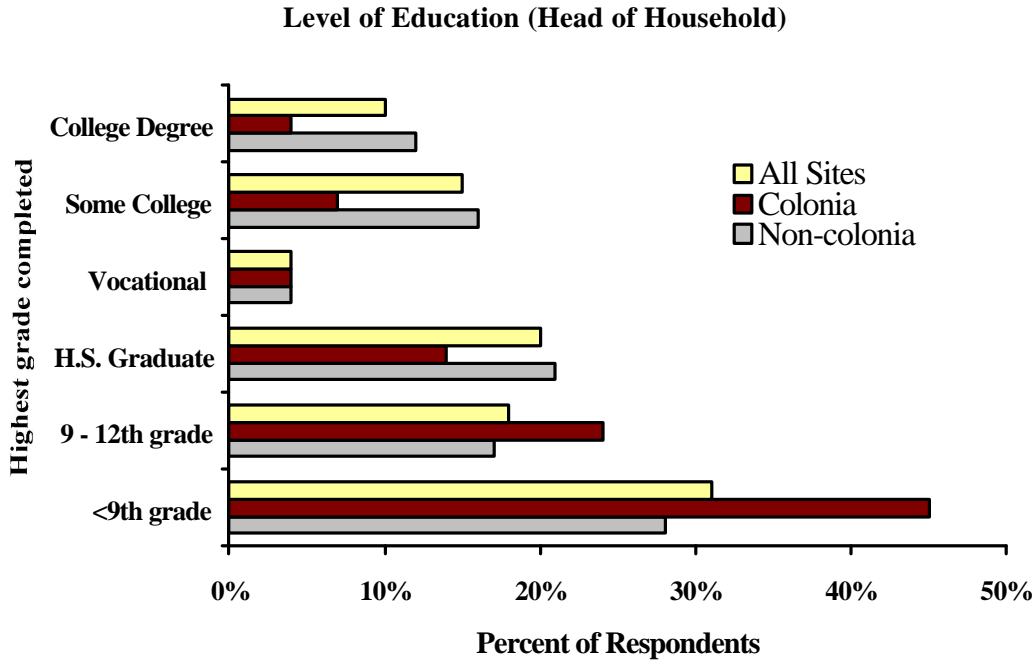
- ❖ Approximately half of all respondents were bilingual (48% of *colonia* residents, 58% of non-*colonia* residents). Overall, in 77% of households at least one person (head of household or spouse) spoke English.

Language of Survey Respondents



Low Educational Attainment

- ❖ Nearly half of all respondents reported not having completed high school (49%).



- ❖ Respondents from *colonias* reported fewer years of formal education beyond the high school diploma (31% of *colonia* respondents had at least a high school diploma vs. 55% of non-*colonia* residents).

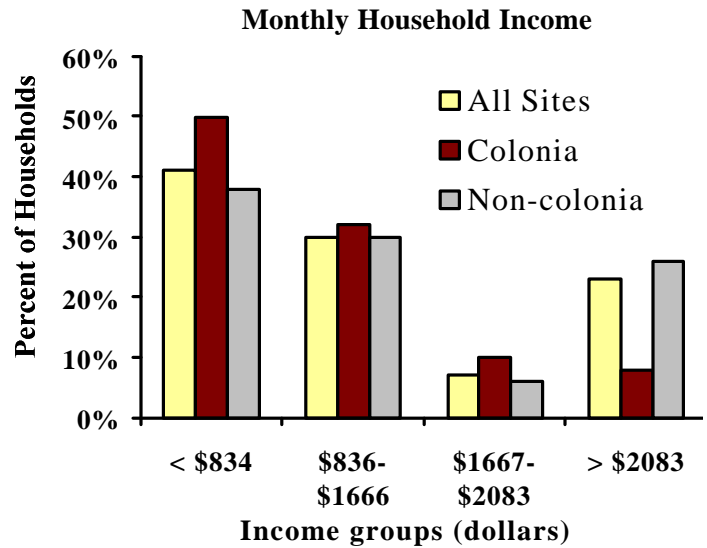
Employment

- ❖ *Colonia* residents reported a higher rate of unemployment (18% *colonia* vs. 11% non-*colonia*). El Paso *colonia* residents reported the highest unemployment rate (24%).

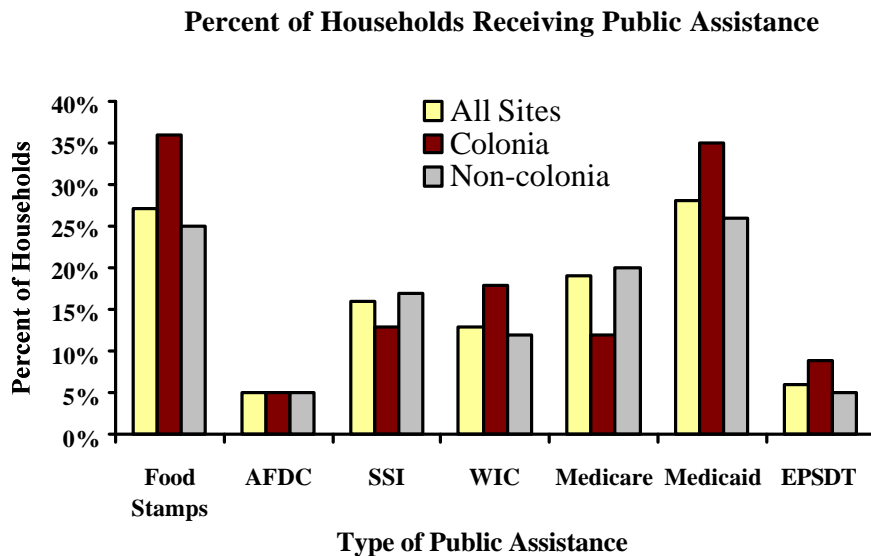
Household Income and Public Assistance:

➤ **Low Socio-economic Status**

❖ Of households willing to report (1,515 of 2,194), 41% reported a total household income of less than \$834 per month. 40% of households with four members fell below the U.S. poverty threshold of \$1,368, as compared to 17% of households falling below the poverty threshold statewide.



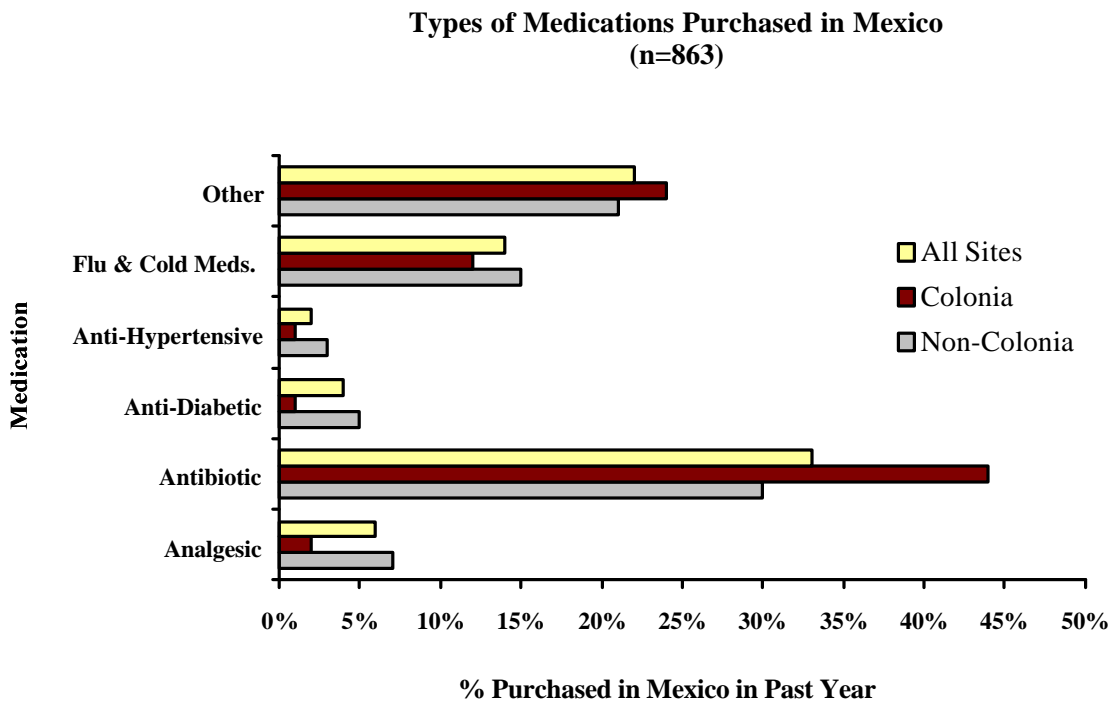
❖ 50% of households reported receiving at least one form of public assistance. Highest utilization of public assistance was in both *colonia* and *non-colonia* households in Cameron and Hidalgo counties.



Links to Mexico

➤ **Medications Frequently Purchased in Mexico**

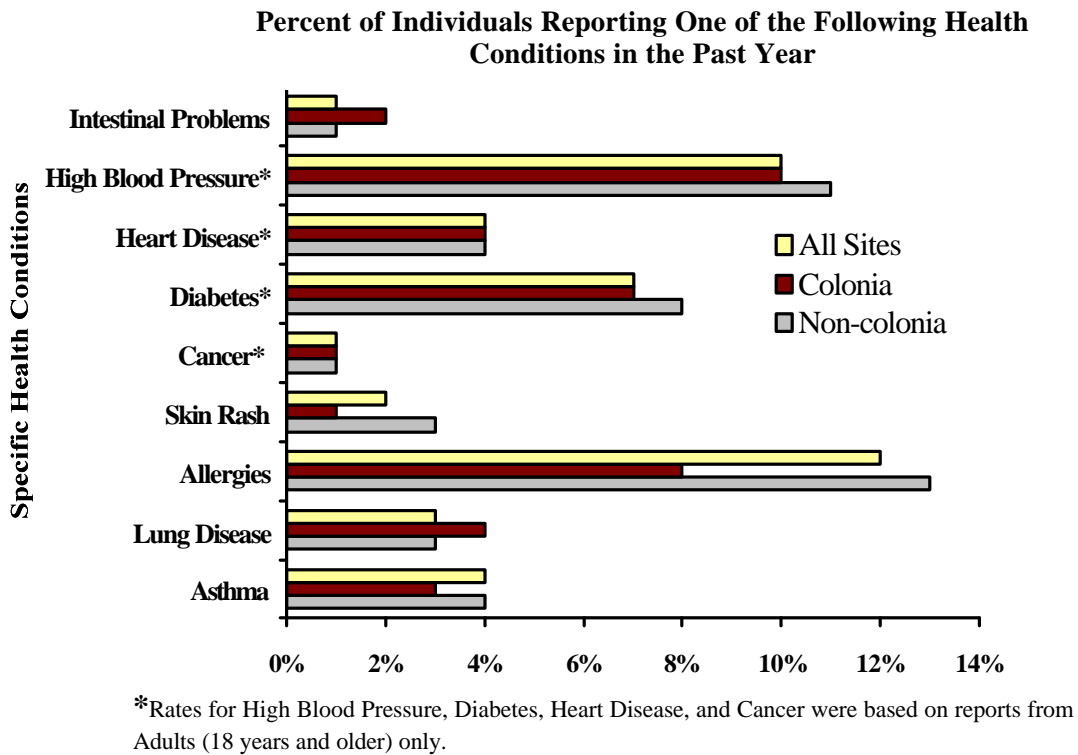
- ❖ Nearly 40% (863/2194) of survey respondents reported that someone in their household bought medications in Mexico in the past year. Each of those made purchases an average of six times in the past year.
- ❖ Of those that bought medications in Mexico, antibiotics were the most frequently purchased medication (33%).
- ❖ Based upon the total number of medications, *colonia* residents were more likely to purchase medications in Mexico than non-*colonia* residents.



Self Reported Health Conditions

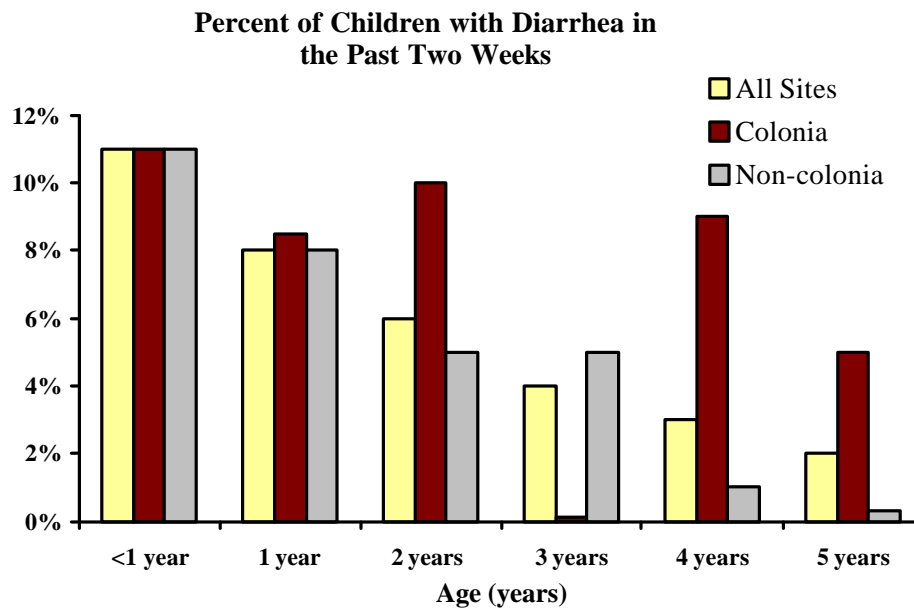
➤ **One-third of Participants Reported at Least One Adverse Health Condition**

- ❖ Older respondents (over 65 years) reported higher rates of diabetes (20%), high blood pressure (30%) and heart disease (15%).
- ❖ Allergies were most prevalent adverse health condition reported.
- ❖ Eight percent of adult (over 18 years) respondents reported having diabetes as compared to a statewide prevalence of 5.7%.



➤ **Prevalence of Diarrhea in Children Ages 1-5**

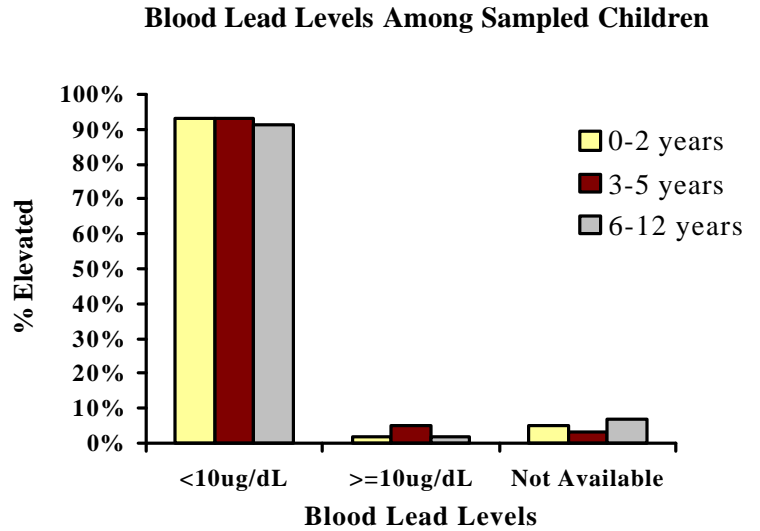
- ❖ *Colonia* children 1 year to five years old were much more likely than non-*colonia* children to have had diarrhea in the past two weeks.
- ❖ 11% of both *colonia* and non-*colonia* children under 1 year of age were reported to have had diarrhea in the past two weeks.
- ❖ By comparison, in a preliminary survey of five El Paso *colonias* without drinking water or wastewater services (i.e., worst-case scenario) we found a 2-week diarrhea prevalence of 20% in children under 1 year of age.



Biological Test Results

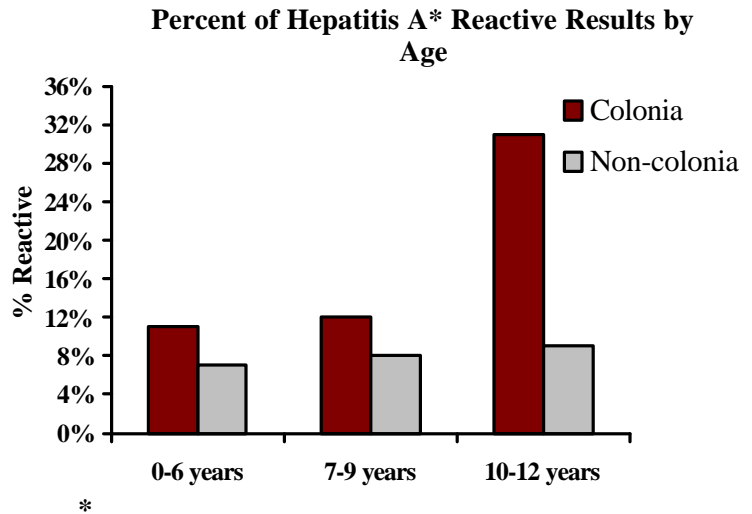
➤ Low Prevalence of Elevated Blood Lead Levels

- ❖ Of children tested for elevated lead levels (n=423), only 3% were found to be elevated (10µg/dL). Statewide ~4% of children tested have elevated lead levels.



➤ High Prevalence of Antibodies to Hepatitis A

- ❖ Prevalence of antibodies to Hepatitis A ranged from 10% overall to 48% of 1-12 year olds residing in Maverick/ Val Verde/ Webb counties.

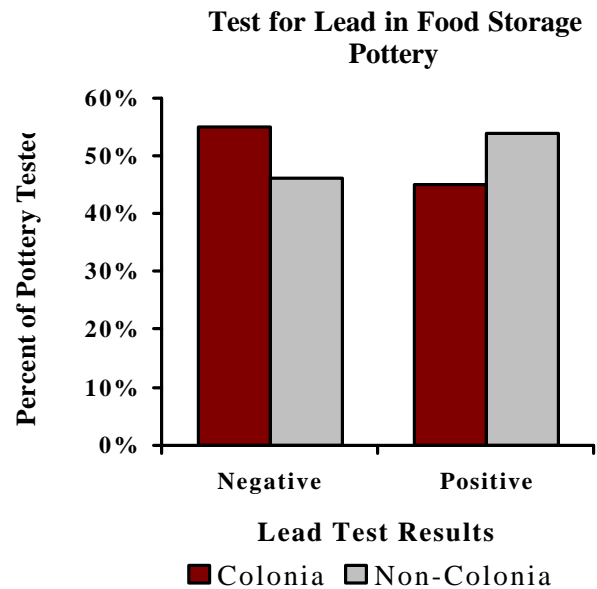


% of children tested minus those immunized against Hepatitis A

Environmental Exposures

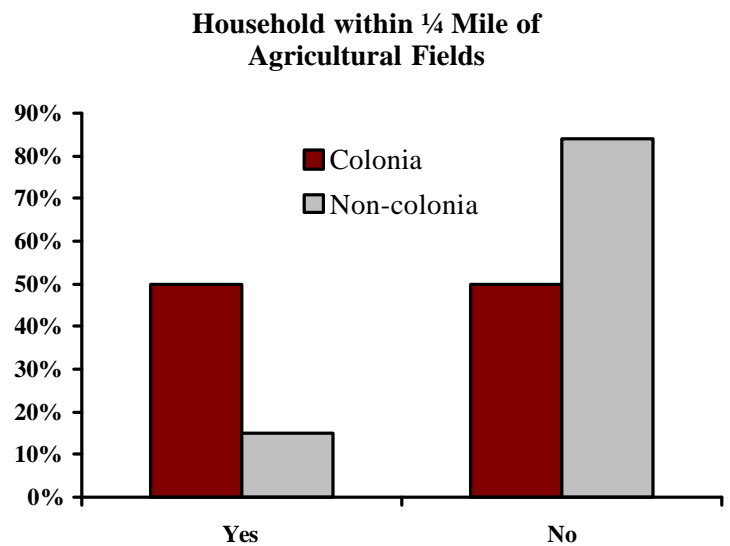
➤ High Environmental Lead Exposure

- ❖ 53% of the ceramic food storage containers tested leached lead.
- ❖ Over a quarter (27%) of respondents indicated that they had given their child a lead containing medicine (e.g. Greta or Azarcon).



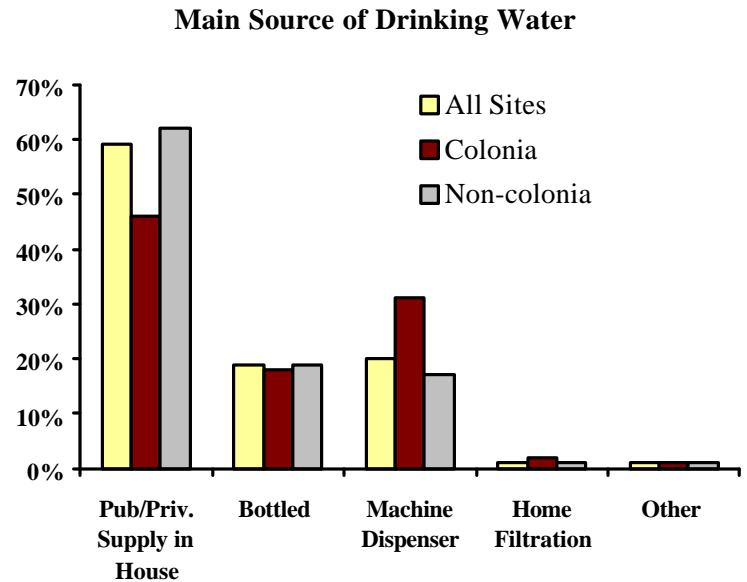
➤ High Potential for Exposure to Pesticides

- ❖ Exposure to pesticides is a potential problem, with 50% of *colonia* households being located within ¼ of a mile from an agricultural field.
- ❖ 66% of these households reported that pesticides were used on these fields and 75% said the pesticides were applied using aerial application.



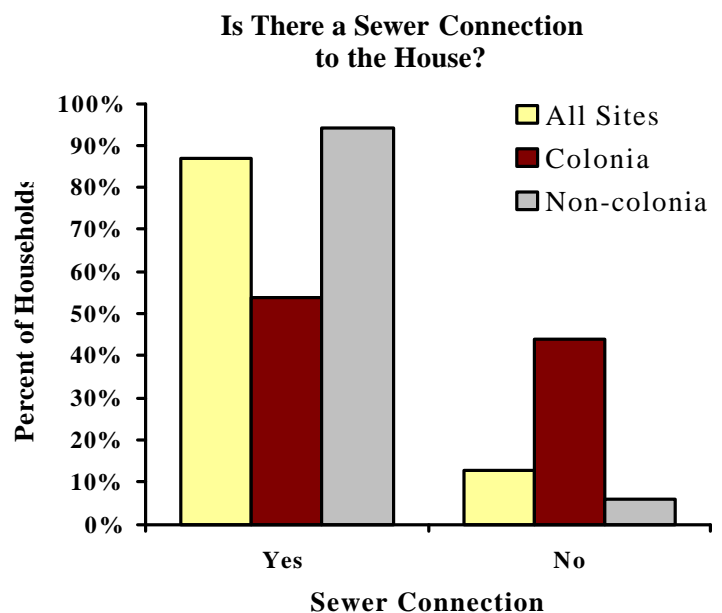
➤ **Water Available But Not Used For Drinking**

- ❖ 98% of all households had a water connection.
- ❖ 41% of respondents did not drink water from the tap, but obtained drinking water from other sources, such as tanker truck, water machines or home filtration.
- ❖ 64 households stored drinking water in containers and provided water samples. The chlorine residual was adequate in only 10% of the samples tested.



➤ **Availability of Public Services**

- ❖ With the exception of sewer service, public services are largely received by both *colonia* and non-*colonia* residents (including telephone, electricity, and waste removal).
- ❖ Public sewer service- available to only 54% of the *colonia* residents.



Conclusions and Recommendations

Conclusion:

The results of the *Survey of Health and Environmental Conditions in Texas Border Counties and Colonias*, presented in this report, are the most current and comprehensive description of health and environmental conditions facing Texas families living near the border with Mexico. This chapter highlights the key findings of the study and suggests topics for action.

The survey was specifically designed to: (1) provide baseline estimates of health and environmental conditions along the Texas-Mexico border, (2) represent conditions across the entire Texas Border region, and (3) determine the prevalence of elevated blood lead levels and past hepatitis A infection in children. The survey focused on demographic characteristics, links to Mexico, health care and health information sources, health risks and conditions, children's health and well-being, living environment, and specific neighborhood problems.

Six of the fourteen Texas counties along the Texas-Mexico border were selected for the study. Each county was included in the Texas Water Development Board's Economically Distressed Areas Program (EDAP). The counties surveyed provided data that allowed for comparisons of different geographic areas along the border. Similarly, *colonias* from the six counties were specifically targeted for inclusion in the study. Not only do residents of *colonias* represent a substantial proportion of the total border population (approximately 20%), but also due to a history of poor infrastructure and public services they were potentially at greater risk of disease and exposure to environmental contaminants. Many of the analyses focused on differences and similarities between *colonia* and *non-colonia* neighborhoods.

Recommendations:

Based on the lessons learned from conducting this borderwide survey the following general topics are suggested for follow-up activities and action.

Binational Coordination

1. Health care providers and policy makers must appreciate the potential for cross-border health care utilization, referrals, and care delivery. Culturally appropriate health services and lower costs for major medical and dental services point to the reasons why many border residents fill in the gaps by seeking care from Mexican physicians, dentists, and pharmacists.
2. Health and environmental problems transcend the border. The data reported here on the links to Mexico strongly suggest that we should strive to reduce barriers to working with Mexico and enhance binational coordination. Important topics for action include health and environmental surveillance, technology transfer, and the development of communication infrastructure (internet, telemedicine, etc.).

Environmental Exposures

3. There is a need to assess the potential for pesticide exposures, especially in children living in *colonias* of the Lower Rio Grande Valley and El Paso areas.
4. There is a need to assess the extent of use of folk remedies (i.e., *greta*, *azarcon*) containing lead for the treatment of stomach ailments in young children.

Water and Wastewater

5. Community sanitation projects in *colonias* are having an impact and need to continue to grow to reach all *colonia* residents. Exemplary state efforts to date

- include coordination of *colonias* activities by the Secretary of State's Office, including programs of the Texas Water Development Board, the Texas Department of Housing and Community Affairs, the Texas Natural Resource and Conservation Commission, the Texas Department of Health and community self-help STEP (Small Town Environment Program) projects.
6. Drinking water needs should be assessed more broadly. Large amounts of time and money have been dedicated to assessing and increasing availability of drinking water. However, there are still a large percent of families, particularly in the Lower Rio Grande Valley, that report they do not drink the tap water. Reasons for not drinking available tap water need to be assessed (e.g., taste and odor) and necessary steps need to be taken to increase the desirability of safe tap water.
 7. Residual chlorine levels are inadequate in selected *colonia* households that must store drinking water in containers. Until approved water sources are made available in those households, sanitation education should be provided on the potential hazards of storing large volumes of water without continuing chlorination.
 8. There is a need to assess the use of water from wells to ascertain potential health risks.

Community Health Promotion/ Disease Prevention

9. There is a need to expand service beyond water and wastewater infrastructure improvements in the *colonias* to include other community needs (solid waste, roads, access to health care, education, and social services). One approach is to integrate services through the development of community centers in *colonias* and the promotion of lay community health workers (“promotoras”).

10. Health education and intervention programs are needed to address health risks associated with lead leaching into food and beverages stored in certain Mexican pottery and the use of folk remedies containing lead to treat children with stomach ailments.
11. Infectious diseases, such as hepatitis A, emerge as priority border health issues supported by the findings of this survey. New Texas Department of Health (TDH) hepatitis A immunization requirements for children enrolling in schools or child-care facilities (effective August 1, 2000) is a critical prevention strategy. Those requirements will apply to children in the 32 counties along the Texas-Mexico border.
12. Community health and prevention strategies are needed for certain chronic diseases. Residents over 65 years old reported having diabetes (20%), high blood pressure (30%) and heart disease (15%). Non-*colonia* households reported health problems at marginally higher percentages than those in *colonias*.
13. Allergies and asthma were frequently reported health problems among all survey respondents (12% and 4%, respectively). There is a need to adequately monitor incidence of those health conditions in adults and children, particularly in El Paso (non-*colonias*) where those problems were most commonly reported.

Targeted Activities

14. Farmworkers (migrant and seasonal) are a special population that was not adequately assessed in this study and follow-up activities targeting their health needs are recommended.
15. The development of community health and prevention strategies should be specific to the needs of the community and built on the strengths and cultural values of the Hispanic community (e.g., family structure, loyalty, and solidarity).