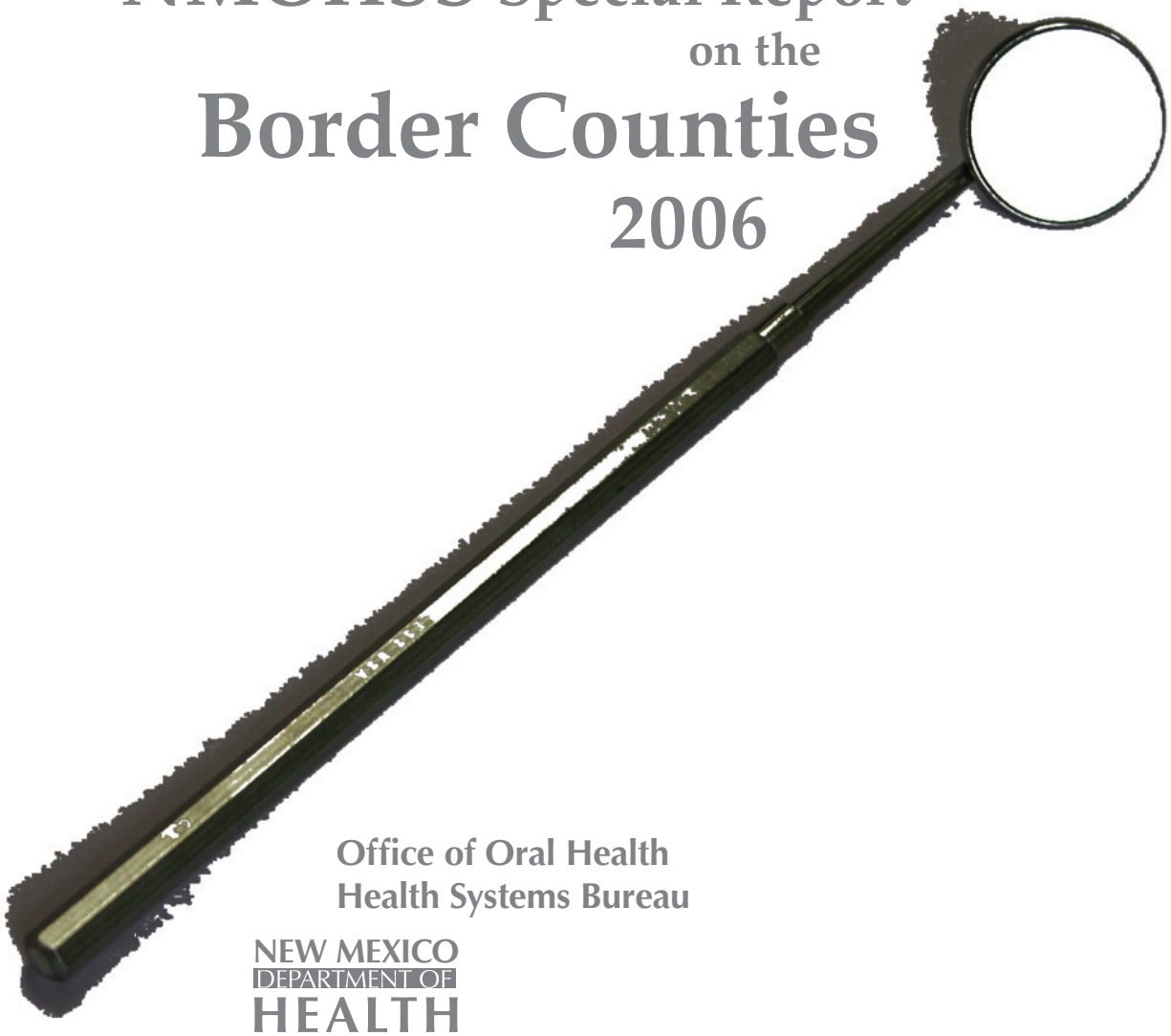
New Mexico Oral Health Surveillance System

# NMOHSS Special Report on the Border Counties 2006



Office of Oral Health
Health Systems Bureau

NEW MEXICO
DEPARTMENT OF
HEALTH

# State of New Mexico

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**Acknowledgements**
This report was prepared with the generous help of Larry Compton of the University of New Mexico Bureau of Business and Economic Research; Robert Pine and Karen Beezhold of the New Mexico Environment Department; Charles Wiggins of the New Mexico Tumor Registry; staff and members of collaborating agencies and NM Oral Health Surveillance Systems Advisory Committee listed at the end of this document; Carol Hanson, Judy Lopez, and Rudy Blea of the Office of Oral Health of the New Mexico Department of Health; in the Health Systems Bureau: Mary Altenberg, Chief; Harvey Licht, Director, Office of Primary Care and Rural Health; and Ken L. Reid, Special Projects Coordinator. Kathleen Kimler Altobelli gathered data and drafted this report under contract number 06/665.0200.0038 with the New Mexico Department of Health, State of New Mexico. Ssu Weng revised the draft and did the layout. Funding was provided by State Oral Health Collaborative Systems Grant, # H47MCO1945, Health Resources Services Administration, US Department of Health and Human Services.

**Suggested citation**
Health Systems Bureau and Office of Oral Health. New Mexico Oral Health Surveillance System Special Report on the Border Counties, 2006. Santa Fe, NM: Health Systems Bureau, Public Health Division, NM Department of Health, 2006.

## NM Oral Health Surveillance System (NMOHSS)
## Special Report on the Border Counties

# Contents

## 1. Introduction

**This report highlights data available from the NMOHSS data bank for the six border counties: Doña Ana, Grant, Hidalgo, Luna, Otero, and Sierra. It focuses on demographics, the provision of sealants, oropharyngeal cancer, and fluoride levels in the public water supply. This and additional information, available from the NMOHSS, may help current public health initiatives in the six-county Border Health Region.**

During the development of this report, it became obvious that better data are needed to guide public health programs in the Border Region. No open-mouth survey data is available to assess the state of children's oral health. This report presents information on sealants among seven- to nine-year olds from two different sources.

The number of cases of cancer of the oral cavity and pharynx has increased in the three ten-year periods since 1973, although the yearly figures are erratic due to the relatively small number of cases. However, the incidence rates for males have declined, although they remain more than double the rate for females. The percentage of cases detected at the earliest stage was lower during 1993-2002 than during 1973-1982.

Currently available data indicate that the public water supply systems of the region are providing more than 74% of the population with a level of fluoride that is either too low to prevent caries or high enough to risk fluorosis. Some of the public water supply systems have naturally occurring fluoride levels that exceed allowable levels.

### Interpreting text and tables

In the text, terms such as "significant, "associated with," "less than," or "more than" refer to statistically significant differences. Terms such as "similar" or "no difference" mean that differences were not statistically significant. Expressions such as "apparent" or "seemed" mean that we need more statistical tests to draw conclusions about whether differences were statistically significant. In general, lack of significance is due to small sample size (there may be a true difference, but the survey did not include enough respondents to show this).

#### Confidence intervals

For surveys, special calculations are done to account for the survey design. These calculations usually include weights, allowing each respondent to "speak" for several others. The resulting estimates refer to the entire population of interest (not just the respondents). These estimates must be reported with a margin of error, the 95% confidence interval (95% CI). In this document, if the 95% CIs do not overlap, differences are significant. However, sometimes, differences are significant even if the 95% CIs overlap.

## 2. Demographics

Table 1 shows population estimates for the six counties from both the Bureau of Business and Economic Research (BBER) of the University of New Mexico[1] and the U.S. Census Bureau.[2] The six border counties are home to approximately 17% of the NM population. Within these counties, the majority (57%) of the population resides in Doña Ana County.

The US Census Bureau estimated that approximately 7% of the population of the six border counties was under the age of 5 years, 23% were 5 to 19 years old, 56% were 20 to 64 years, and 14% were age 65 or older. In the 2003-2004 school year, the 132 schools of the twelve public school districts of the region enrolled 59,804 students: these children accounted for 19% of all enrolled children, 25% of the Hispanics, 23% of the students eligible for the free lunch program, and 52% of the migrant students enrolled in New Mexico's public schools.[3] More than two-thirds of the region's public school students (68%) were eligible for free or reduced lunch programs.

Approximately 25% of the population was enrolled in Medicaid as of July 31, 2005; 65% of these Medicaid enrollees were under the age of twenty-one. Sixteen percent of the border county population was enrolled in Medicare.[4]

According to information provided by NM Health Resources, there were 2,658 persons per dentist in Doña Ana County and 2,925 persons per dentist in the six border counties: 112 dentists in the six border counties (70 in Doña Ana, eighteen in Grant, two in Hidalgo, five in Luna, twelve in Otero and five in Sierra County).

**TABLE 1.**
Population estimates for the six Border Counties by the Bureau of Business and Economic Research (BBER) of the University of New Mexico and the U.S. Census Bureau, as of 7/1/2004

| | UNM BBER 7/1/2004 | | | US Census Bureau 7/1/2004 | Difference in estimates |
|---|---|---|---|---|---|
| County | Population estimate | % of the Border population | % of NM population | Population estimate | BBER minus Census |
| **Doña Ana** | 185,872 | 1 | 0 | 186,095 | -223 |
| **Grant** | 31,337 | 0 | 0 | 29,443 | 1,894 |
| **Hidalgo** | 5,918 | 0 | <1% | 5,186 | 732 |
| **Luna** | 26,350 | 0 | 0 | 26,129 | 221 |
| **Otero** | 63,190 | 0 | 0 | 63,282 | -92 |
| **Sierra** | 13,647 | 0 | 0 | 12,961 | 686 |
| **The six Border Counties** | 326,313 | 1 | 0 | 323,096 | 3,217 |

## 3. Sealants

Healthy People 2010 Objective 21-8 is to increase the proportion of children who have received dental sealants on their molar teeth.[5] For children aged 8 years, the 2010 target is 50%. Pit and fissure sealants protect newly erupted permanent molar teeth from developing caries. Sealants are also recommended for a second group of molars that erupts during adolescence. In the Border Region, children can receive sealants outside of school at a private dental clinic or at one of the four Rural Primary Health Care Act (RPHCA) clinics; or at school from a private vendor who treats Medicaid enrollees or from the Office of Oral Health (ODH) of the NM DOH sealant program. The ODH two-year program is available only to schools with 50% or more of enrolled children eligible for the free or reduced lunch programs. Recruitment targets all second grade students at a participating school. Parental permission is required for participation in the program.

During the 2004-2005 school year, the ODH sealant program visited twenty-nine schools in the six-county Border Region, placing sealants on one or more teeth of 1,316 (40%) of the 3,279 students enrolled in second or third grade during the 2004-2005 school year. The 1,316 students receiving sealants were 59% of the 2,228 with parental permission to participate, and 95% of the 1,388 students for whom sealants were recommended (Table 2).

Barriers to application of sealants included absence on the day(s) services were provided, existing caries in the tooth to be sealed, inability to comply with the program requirements (strong gag reflex or other behavioral issue), incomplete eruption of teeth, or sealants already in place. The four molar teeth targeted in this program cannot be sealed or recommended for sealing until their eruption has reached a certain stage of completion; the timing of this eruption varies among

children and can be later than third grade. Students may receive sealants in this program either as second or third graders or as both, depending on the status of their teeth. During the 2003-2004 school year, 775 second graders received sealants (data not in table), but it is unknown how many of these children did not receive sealants as third graders in 2004-2005, or how many non-participants received sealants. Thus, the ODH services provided during one school year provide a lower bound for this population: *at least* 40% of the enrolled second and third graders had received at least one sealant by the end of the school year 2004-2005.

**TABLE 2**
Office of Oral Health Sealant Program, six -county border region: numbers and percentages of students with various levels of participation, 2004-2005 school year:

| | No. of 2nd graders | No. of 3rd graders | No. of 2nd & 3rd graders | % of the eligible 2nd & 3rd graders |
|---|---|---|---|---|
| **Students...** | | | | |
| **Who were enrolled (eligible)** | 1684 | 1595 | 3279 | 100.0 |
| **Who participated (parents gave permission)** | 1249 | 979 | 2228 | 67.9 |
| **Who were screened** | 1190 | 956 | 2146 | 65.4 |
| **For whom the dentist recommended sealants** | 990 | 398 | 1388 | 42.3 |
| **Who received one or more sealants** | 942 | 374 | 1316 | 40.1 |

Dental providers in the six-county Border Region filed sealant claims through Delta Dental for 192 children between the ages of seven and nine during the calendar year 2005. Of these children, 125 (65%) received four sealants. While the Border Region dental providers also filed claims, it is impossible to determine the number of dental patients of a given age who have at least one sealant, but at least 24% of children between the ages of seven and nine who were seen by these providers in 2005 did have at least one sealant. Topical fluoride treatments were given to 89% of the children of this age group, and 35% received one or more restorations.

Providers working through Delta Dental treated a total of 1,236 children aged five to nine, or approximately 5% of the estimated 22,790 children of this age in the region. NMOHSS does not currently have information on the number of children in the Border Region who received sealant services provided via other dental plans, self-pay, RPHCA dental clinics, or Medicaid. An open-mouth survey such as the Basic Screening Survey is essential to estimate the percentage of the population of eight-year olds who have received sealants.

## 4. Oral and pharyngeal cancer

### Public health importance

Oral and pharyngeal (oropharyngeal) cancer comprises a diversity of malignant tumors that affect the oral cavity and pharynx (mouth and throat). The Healthy People 2010 Objective 21-6 is to increase the percentage of oral and pharyngeal cancers detected at the earliest stage, with a national target of 50%, from a baseline of 35% at Stage 1 (localized) detected in 1990-1995. Visual examination during regular preventive dental visits can detect lesions of oral cancer. This provides another incentive for promoting annual dental visits.

Increasing early detection of lesions improves the five-year survival rate and helps to reduce illness and death. National survival rates for oral cancer have not improved substantially over the past 25 years. The national five-year relative survival rate for persons with oral cancer diagnosed at a localized stage is 81 percent. In contrast, the five-year survival rate is only 51 percent if the cancer has spread to regional lymph nodes at the time of diagnosis, and is only 29 percent for persons with distant metastases.[6]

Known risk factors include use of tobacco products and alcohol. The risk of oral cancer is increased six to 28 times in current smokers. Alcohol consumption is an independent risk factor and, when combined with the use of tobacco products, accounts for most cases of oral cancer in the United States and elsewhere.[7] People should also avoid other potential carcinogens, such as unprotected sun exposure (a risk factor for lip cancer), and should use lip sunscreen and hats.

## Oral and pharyngeal cancer in New Mexico[8]

From 1973-2002, there were 4,057 cases of these cancers reported in New Mexico, with 636 (15.7%) occurring in residents of the six border counties. National, New Mexico and regional incidence rates are higher for males than for females, and also vary by race and ethnicity. For 1993-2002, the state-wide age-adjusted rates were 18.1 for non-Hispanic white males, 7.1 for non-Hispanic white females, 11.1 for Hispanic males, and 3.4 for Hispanic females. For females, both New Mexico as a whole and the six counties of the Border Region exceeded the 50% early detection target for 1998-2002 (the last 5-year period for which data are available. For males, 49% of the cases in males were detected at the earliest stage in the Border Region and 51% in New Mexico statewide.

Table 3 shows age-adjusted incidence rates, number of cases, and the percentage of the diagnosed cases that were diagnosed at the earliest stage (Stage 1 or localized). Males had a higher incidence rate than females in every race/ethnicity group. Figure 2 illustrates the dramatically higher incidence rates for males compared to females and the increasing number of cases over the last 30 years.

**TABLE 3.**
Cancer of the oral cavity and pharynx for the six-county Border Region and the state of New Mexico: incidence rates, number of cases, and percentage diagnosed at the earliest stage. Rates are per 100,000 and age-adjusted to the 2000 US standard population standard (19 age groups - Census P25-1130).

| | | *Six border counties* | | | *New Mexico* | | |
|---|---|---|---|---|---|---|---|
| **Gender** | **Year of diagnosis** | **Rate** | **Cases** | **% diagnosed in earliest stage** | **Rate** | **Cases** | **% diagnosed in earliest stage** |
| Female | 1973-1982 | 5.2 | 38 | 53% | 5.9 | 292 | 49% |
| Female | 1983-1992 | 4.8 | 52 | 56% | 5.7 | 385 | 52% |
| Female | 1993-2002 | 5.3 | 80 | 51% | 5.7 | 500 | 51% |
| **Female** | **1973-2002** | **5.1** | **170** | **53%** | **5.8** | **1177** | **51%** |
| Male | 1973-1982 | 21.5 | 139 | 58% | 18.8 | 785 | 62% |
| Male | 1983-1992 | 15.3 | 143 | 40% | 17.7 | 967 | 45% |
| Male | 1993-2002 | 13.9 | 184 | 49% | 15.1 | 1128 | 48% |
| **Male** | **1973-2002** | **16.0** | **466** | **49%** | **16.8** | **2880** | **51%** |
| Male and Female | 1973-1982 | 12.8 | 177 | 56% | 11.8 | 1077 | 58% |
| Male and Female | 1983-1992 | 9.6 | 195 | 44% | 11.0 | 1352 | 47% |
| Male and Female | 1993-2002 | 9.2 | 264 | 50% | 10.0 | 1628 | 49% |
| **Male and Female** | **1973-2002** | **10.1** | **636** | **50%** | **10.7** | **4057** | **51%** |

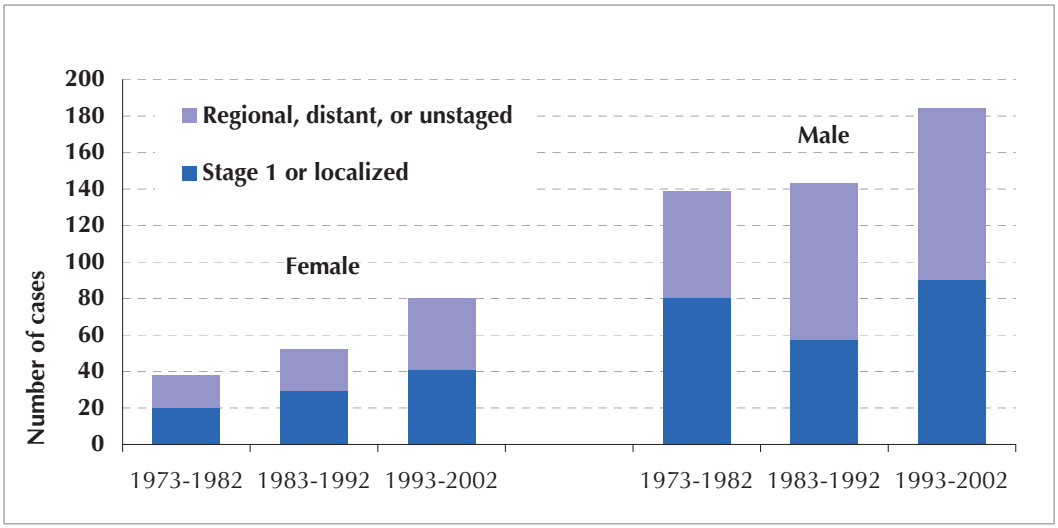



**FIGURE 3.**
Stage of diagnosis for cancer of the oral cavity and pharynx for the six-county Border Region: number of cases, by gender and 10-year period. Stages categorized as Stage 1, localized (earlier) or regional/ distant/unstaged (later).

## 5. Water fluoridation

### Optimally fluoridated water saves money

Healthy People 2010 Objective 21-9 is for 75% of the U.S. population served by community water systems to have optimally fluoridated water. Public water systems are required to monitor their fluoride levels and correct excessive levels, but there is no required minimum level. Since 1962, the federal Public Health Service has recommended that public water supplies contain fluoride at concentrations between 0.7 and 1.2 mg/L in order to prevent dental caries. The EPA-established Maximum Contaminant Level Goal (MCLG) for fluoride is currently 4 mg/L; higher levels increase the risk of severe enamel fluorosis (discoloration, enamel loss, and pitting of the teeth during tooth development in children). If a system exceeds the MCLG, it is required to take corrective action and notify its users. The EPA's secondary maximum contaminant level (SMCL) is 2 mg/L, which is a guideline for reducing the occurrence and severity of (cosmetic) enamel fluorosis. The existing recommendation for optimal fluoride concentration depends on climate and consumption, and is based on the assumption that an adult drinks two liters of water per day.

Recently, the National Research Council of the National Academies recommended lowering the MCLG for fluoride and more study to determine the optimal MCLG.[9] Recent studies show that levels higher than 2 mg/L are linked to severe enamel fluorosis. The NRC also recommended more study of the relationship of fluoride levels to bone fractures and skeletal fluorosis.

Community water fluoridation not only prevents dental caries, but also saves significant costs.[10] Every $1 invested in community water fluoridation is estimated to save $38 in averted costs. The cost of these programs decreases with increasing population size.

### Fluoridation in the border counties

Because there is more than one water source for 77 of the 147 water systems tested, Table 4 shows minimum and maximum fluoride level for each system and the estimated population served. For the 70 systems with only one source, the minimum and maximum values are the same. Since the relative contributions of sources to the water supply are unknown, a single number for a multi-source system cannot be calculated.

***Fluoride levels are categorized by levels relevant to caries prevention:***

Too Low: all results less than 0.5 mg/L
Adequate:
all results between 0.5 mg/L and 2.0 mg/L
Too high: all results over 2.0 mg/L
Low + adequate: all results below 2.0 mg/L, witat least one below and one above 0.5 mg/L
Low + high:
at least one result below 0.5 mg/L
and one above 2.0 mg/L
Adequate + high:
all results above 0.5 mg/L with
at least one above 2.0 mg/L.

"Too low" values are lower than recommended for caries prevention. The "Adequate for dental caries prevention" category is wider than the optimal range of 0.7 to 1.2 mg/L. "Too high" indicates fluoride values that exceed the current SMCL and are also higher than needed for caries prevention; the two largest values recorded in the data are 10.17 and 6.22 mg/L.

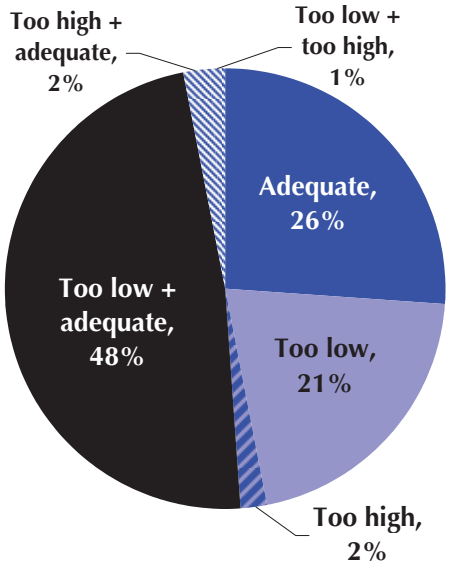
The fluoride level of any single source will vary over time; Table 4 is based on a single test of each source, not an average reading over time. In the column for minimum results, Table 4 shows that some of the water of systems serving 209,521 people had too low a fluoride level. Using just the maximum result, we find that all the system water served to 62,035 people always had levels that were too low. Using both the minimum and maximum results, we see that 2,000 people were served by systems with at least one source testing too low and at least one source testing too high. The largest system in the border counties, the Las Cruces Municipal Water System, serves an estimated 81,025 people and had sixteen wells that tested below 0.7 mg/L (seven of which were below 0.5 mg/L) and eight wells that tested between 0.7 and 1.19 mg/L.

Figure 3 displays the data of Table 4 as a pie chart, highlighting that only 26% of the population served by public water supplies receives water from systems where all sources provided adequate levels of fluoride for caries prevention.

| | *Maximum Test Result* | | | |
|---|---|---|---|---|
| ***Minimum Test Result*** | **Too Low** | **Adequate** | **Too High** | **Total** |
| **Too Low For Caries Prevention** | 62,035 | 145,486 | 2,000 | **209,521** |
| **Adequate For Caries Prevention** | | 78,561 | 5,592 | **84,153** |
| **Too High For Caries Prevention** | | | 6,926 | **6,926** |
| **Total** | **62,035** | **224,047** | **14,518** | **300,600** |

**TABLE 4.**
Population served by caries prevention levels of fluoride, in 147 public water supply systems in the six-county Border Region. Most recent year of data, 2002-2005. The text above explains how fluoride levels are defined.

**FIGURE 3.**
The population served by systems categorized using all test results, grouped by caries-prevention criteria described in text.




## 6. Other information

The NMOHSS can provide more detailed information on the data files used for this report. Additionally, the NMOHSS maintains a data bank on various oral health topics that have not been included in this report and can provide analysis for special requests. The NMOHSS annual report contains additional information. The NMOHSS also maintains a library of publications related to oral health, including both print and electronic publications of federal agencies, national organizations and other states. The NMOHSS encourages entities with oral health care or data needs to join in the collaborative effort of building and maintaining an oral health data bank.

## 7. Public health initiatives

The following public health initiatives are being conducted in the border region.

- The Healthy Gente/Healthy Border is a long-range planning tool through the year 2010 for the four U.S. Border States.

- The Healthy Gente program will develop preventive goals, objectives and strategies focused on 25 national health objectives defined in Healthy People 2010. One Healthy Gente objective is to increase the percentage of people using the oral health care system annually to 75%. The corresponding Healthy People 2010 objective 21-10 is, "Increase the proportion of children and adults who use the oral health care system each year," with the national target set at 56 percent.

- The Healthy Border program draws on the 20 indicators comparable to the Mexican Indicadores Nacionales de Salud.

- The Doña Ana County Commission has taken the lead in forming a comprehensive health program for the county, creating the Doña Ana County Health and Human Services Alliance, which has recently held four community forums on health care. The last forum, held in January 2006 and attended by about 35 providers, consumers and elected officials, focused on oral health. A report is currently being prepared and will include analysis of the community forums and relevant data, recommendations of goals, objectives and strategies to be established by the commission, and recommendations for actions to be taken.

- The Border Health Office (BHO), part of District III of the Public Health Division of the New Mexico Department of Health, began operations in 1993 and is located in Las Cruces, New Mexico.

## 8. Methods

### Oral Health Survey (Basic Screening Survey) of Third Graders

The NMDOH Office of Oral Health (ODH) conducted a survey, "Make Your Smile Count," based on a protocol from the Association of State and Territorial Dental Directors (ASTDD) called *Basic Screening Surveys: an Approach to Monitoring Community Oral Health*.[11] ODH staff (dentists, dental hygienists, and assistants) incorporated the survey activities into their duties. Based on their examinations of children and other activities, they completed the survey, which provided oral health status data and information on access to care.

The sampling frame for the 1999-2000 survey consisted of a list of all public elementary schools provided by the State Department of Education. Enrollment figures were used to define two strata: counties with 3,000 or more elementary school students and counties with fewer than 3,000 students. In counties with 3,000 or more elementary school students, a one in ten random sample of schools was drawn. In counties with fewer than 3,000 students, two schools per county were randomly selected. All third grade students within a school were eligible to participate if they returned a positive consent form. A total of 2,181 questionnaires were returned, and 2,136 third grade children completed the direct observation of oral health examination. The statewide response rate for this survey was 47 percent. The data were weighted to account for the survey design. Estimates were not adjusted for non-response.

### Measurement of water fluoridation

In September 2005 the Drinking Water Bureau (DWB) of the New Mexico Environment Department provided test results for fluoride concentrations in the public water supply systems, based on water samples collected at least every three years. The DWB data file contains information on 147 public water supply systems in the six border counties, serving a population of 300,600 people, based on samples taken from 2002 through August 2005.

A population estimate is given for each system, but is not attributed to individual water sources. The population estimate is based on the number of residential connections to the water system and is a very rough estimate of the

number of people served by the system. The population estimates for the 147 systems equal 96% of the 2000 Census population for the six counties and 92% of the BBER 2004 population estimates. The Drinking Water Bureau does not maintain information on private wells or systems serving populations smaller than the EPA requirements for monitoring.

Seventy-seven of these 147 systems tested have more than one water source, resulting in fluoride concentrations for a total of 286 sources. All these systems except three systems serving 35,030 people in Otero County have ground water as their primary source. There are thirteen non-transient non-community water systems serving 7,773 people (eight systems serve schools and five serve industrial settings). The four transient non-community water systems serve only 386 people. There are 130 community water systems serving 292,441 people. The water systems do additional testing that is not included in the DWB data file and also make adjustments to distribution parameters and fluoride additions in response to this monitoring. The DWB file does not indicate whether the fluoride levels are solely the result of naturally occurring fluoride or include supplemental fluoride. Naturally occurring fluoride levels vary over time.

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