

The Health of the California Region Bordering Mexico

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Healthy Border (HB) 2010 is the health promotion and disease prevention agenda through the year 2010 of the United States–Mexico Border Health Commission (BHC). On the United States side, it draws from the Healthy People (HP) 2010 objectives, identifying those most important and relevant for the border. The BHC has harmonized the list of objectives from both countries into a set of 19 that will be monitored and addressed in a collaborative manner. HB provides a framework for describing the border region's health and comparing with others. For this report, available data were collected for the HB indicators for San Diego and Imperial counties, and for California. Data on Latino populations were considered a proxy for Mexican-Americans and people of Mexican origin in California, because more specific data are not available. Results are presented on the 14 indicators for which the data were most complete. Those of most concern include access to health care and tuberculosis in both counties, plus motor vehicle crash injury deaths and asthma hospitalizations in Imperial. These issues should be given priority attention. Conversely, the region's and Latinos' experience with breast cancer mortality and infant mortality is favorable. Recommendations include binational collaborations in assessing and improving the health of our border communities.

KEY WORDS: public health; binational; United States–Mexico border; Latinos; Mexican-Americans.

INTRODUCTION

The California border region includes the 140-mile section of the 1,952-mile international border between the United States and Mexico that separates the states of California on the United States side and Baja California on the Mexico side. The two countries have defined the United States–Mexico border region as the area within 62 miles (100 km) of either side of the border.⁵ The California border region is home to

about 40% of the United States–Mexico border-wide population (1).

This region includes the counties of San Diego and Imperial, which share the international boundary with the municipalities of Tijuana, Tecate, and Mexicali in Baja California. The populations of both California border counties have been increasing steadily since 1990, about 20 and 30% for San Diego and Imperial, respectively. Both counties, like the State, are ethnically diverse and experiencing rapid growth among groups that were historically considered racial/ethnic minorities. According to the 2000 Census, 11 million of the State's total population (34 million) are Latino and 8.5 million (77%) are of Mexican origin (2). Imperial County has the highest percentage of Hispanic/Latino residents in the State (70%) compared to other California counties, while San Diego County has had the second largest increase in Latino residents in the State (3).⁶

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⁵Agreement signed by the United States of America and the United Mexican States on cooperation for the protection and improvement of the environment in the border area. Signed at La Paz on August 14, 1983 and entered into force February 16, 1984.

⁶The terms Hispanic and Latino are used interchangeably in this article. While Hispanic generally refers to those with Spanish

Intermigration and border crossings have a large impact on the demographics of the two counties. Forty-four percent of the Mexican immigrants in the United States are in California (3.8 million) (2). In the year 2000, San Diego had a population of 2,862,819 which, when combined with the Tijuana sister-community population, makes it the largest binational metropolitan area in the entire United States–Mexico border area (approximately 4 million people) (1). The region houses some of the busiest ports-of-entry in the world, with over 90 million incoming crossings of people between Baja California and California in 2001 (4). In Imperial County there were almost 30 million incoming crossings in 2001, which makes a significant impact on the county's resident population of 142,361 (4). Imperial County is the only rural county throughout the United States–Mexico border whose Mexico neighbor, Mexicali (population of over 800,000 residents), is a metropolitan region (5).

The California–Baja California border region experiences interdependence and interpenetration, being an area of tremendous human contact where two cultures meet, flow back and forth across political borders, share common experiences, economic and environmental conditions, as well as health and disease. Indeed, disease knows no boundaries, and because it is a porous border, the region is considered by many to be one epidemiological area for proper disease control and prevention, and health promotion.

Healthy Border

In 2001, the bi-national United States–Mexico Border Health Commission (BHC) adopted the Healthy Border 2010 (HB) program that outlines a health promotion and disease prevention agenda through the year 2010 for both United States and Mexico border communities (6). For the United States side, HB draws on the national health objectives defined in Healthy People 2010 (HP), initially identifying 25 of the most important objectives for the distinct needs and concerns of the border (7). For the Mexico side, HB establishes similar objectives from their list of 40 national public health indicators. The

BHC has harmonized both lists into 19 HB objectives and community health indicators to monitor over time (Table I). HB aims to develop and support strategies that can be used by the border states and local communities to improve health status.

The HB objectives provide an excellent framework for assessing and monitoring California's border region's community health status and comparing it with others. For this report, our aim was to consider the data available for the California border region for the HB objectives, determine which issues may require priority, identify data gaps, and make recommendations to improve border community health. The intended focus was bi-national (Mexican-American and Mexican origin) populations on the California border, of which immigrants, or migrants, form a significant part.⁷

METHODS

In order to describe the health status of the region, available data were sought for each of the HB indicators for San Diego and Imperial counties to compare with those of California State and with HP Objectives. When available, data on Latino populations were considered as a proxy for Mexican-Americans and people of Mexican origin in California. Data on immigrants were scarce.

Because all indicator data were pre-2000, the HP 2000 (not 2010) objectives are used here. Age-adjusted death rates were calculated using the 1940 United States Standard Million Population. Rate estimates on the basis of less than 20 events (e.g., cases or death) should be interpreted with caution because they are statistically unstable. The statistical significance of the differences in rates over time, by racial/ethnic group, and in comparison to the HP objectives was evaluated using their 95% confidence intervals.

Communicable disease data for the border population, and especially for Latinos, also need to be interpreted with caution. It has been reported that some of the border population may access health care in the neighbor country (8). Most of those cases may never

heritage or a Spanish surname in addition to those of Latin American descent, it is the term currently used to report ethnicity in most government statistics. Latino generally refers to populations within the United States with Latin American or Spanish speaking Caribbean heritage.

⁷For this report we use the following definitions. **Border:** communities in the area of California and Mexico within 100 kms of the boundary (PL 103-400). **Binational:** communities outside the 100 kms that are also affected by border and bi-national conditions and activities.

Table I. Healthy Border 2010 Objectives

A.	<i>Access to care</i> 1. Reduce by 25% the proportion of persons lacking access to a primary care provider in underserved areas.
B.	<i>Cancer</i> 2. Reduce the breast cancer death rate for women by 20%. 3. Reduce the cervical cancer death rate for women by 30%.
C.	<i>Diabetes</i> 4a. Reduce the diabetes death rate by 10%; 4b. Reduce diabetes hospitalizations by 25%.
D.	<i>Environmental</i> 5. Reduce to zero proportion of households not connected to either compliant public sewage system or septic tanks. 6. Reduce by 50% the number of persons hospitalized for acute pesticide poisoning.
E.	<i>HIV</i> 7. Reduce the incidence of diagnosed HIV infections among adolescents and adults by 50%.
F.	<i>Infectious diseases and immunizations</i> 8a. Reduce the incidence of hepatitis A by 50%; 8b. Reduce the incidence of hepatitis B by 50%. 9. Reduce the incidence of tuberculosis by 50%. 10. Achieve and maintain an immunization coverage rate of 90% for children 19–35 months-old.
G.	<i>Injury and violence prevention</i> 11. Reduce the motor-vehicle crash death rate by 25%. 12. Reduce the childhood (under age 5-years) death rate due to unintentional injuries by 30%.
H.	<i>Maternal, infant, and child health</i> 13. Reduce the infant mortality rate due to all causes by 25%. 14. Reduce the infant mortality rate from birth defects by 30%. 15. Increase the proportion of women beginning prenatal care in the first trimester to 85%. 16. Reduce the pregnancy rate among 15–17 year-olds by 33%.
I.	<i>Mental health</i> 17. Reduce the suicide death rate by 15%.
J.	<i>Oral health</i> 18. Increase to at least 75% the proportion of children and adults who use the oral health care system each year.
K.	<i>Respiratory disease</i> 19. Reduce the asthma hospitalization rate by 40%.

be reported to health agencies in the county of residence and, therefore, are not counted in the official statistics.

RESULTS

Results are presented mostly on the 14 indicators for which reports of data were available and most complete. In some cases there were only limited data available for a given indicator or county, because of small numbers. The Summary (Table II) shows the figures for those 14 indicators. In addition, we did find some data that could inform on most of the remaining indicators, and these are presented in briefer fashion.

Breast Cancer Mortality

Breast cancer is the most common cancer among females in California among all racial/ethnic groups (9). Both Imperial and San Diego Counties' age-

adjusted rates of breast cancer mortality were below the HP objectives. In San Diego County, Latinas had a lower age-adjusted death rate (13.6) than White women (22.0) in 1998 (10). Latina women in California had lower mortality rates than other racial/ethnic groups (10). As to morbidity, women who develop breast cancer are much more likely to survive when they are diagnosed early. During 1997, San Diego Latina females had a low proportion of breast cancer diagnosed at an early stage (61%). Statewide, about 70% of all female breast cancers were diagnosed early (9). Latinas, along with Asians, are less likely to develop breast cancer than women of other racial/ethnic groups (9).

Cervical Cancer Mortality

In 1998, the age-adjusted cervical cancer death rates for Imperial, San Diego, and California were relatively similar but higher than the HP objective. In San Diego County, the yearly death rates did not

Table II. California Border Health Status, 2000, Summary

Indicator	Healthy People 2000	California	San Diego	Imperial
Breast cancer age-adjusted death rate per 100,000 females (1996–1998)	20.6	18.3 ^a	19.8 ^a	16.3 ^a
Cervical cancer age-adjusted death rate per 100,000 females (1998)	1.3	2.2 ^a	2.7 ^a	2.1 ^a
Diabetes death rate per 100,000 people (1998)	34.0	11.6 ^a	8.3 ^b	7.9 ^a
Hepatitis A incidence rate per 100,000 people (1999)	23.0	10.1 ^a	9.6 ^a	21.9 ^b
Hepatitis B incidence rate per 100,000 people (1999)	40.0	3.6 ^a	1.3 ^b	8.0 ^a
Tuberculosis incidence rate per 100,000 people (1999)	3.5	10.6 ^a	10.3 ^a	26.1 ^b
Motor-vehicle crash age-adjusted death rate per 100,000 people (1996–1998)	14.2	11.4 ^a	9.2 ^a	24.3 ^b
Unintentional injury death rate for <5 yrs-old per 100,000 children <5 yrs-old (1996–1998)	^b	10.2 ^a	6.9 ^b	1.3 ^a
Birth cohort infant death rate (per 1,000 live births) (1994–1996)	7.0	6.4 ^a	5.8 ^a	5.2 ^a
Infant mortality rate from birth defects (per 1,000 live births) (1998)	1.6	1.5 ^a	1.3 ^a	2.0 ^a
Proportion of women with prenatal care in 1st trimester (1998)	90.0	81.1 ^a	78.8 ^a	73.6 ^b
Pregnancy rate in 15–19 yrs-old per 1,000 females 15–19 yrs-old (1998)	^c	32.6 ^a	29.0 ^a	50.7 ^b
Suicide age-adjusted death rate per 100,000 people (1996–1998)	10.5	9.4 ^a	11.1 ^b	5.6 ^a
Asthma hospitalization age-adjusted rate per 100,000 people (1995–1997)	160	120 ^a	94 ^b	207 ^c

Note. ^{a,b,c}For each indicator, statistically significant differences (nonoverlapping 95% confidence intervals) in rates among regions are indicated by different superscripts.

^aRate not statistically reliable because it is based on less than 20 events.

^bHealthy People 2000 did not have a specific objective for <5-years-old, but for all ages combined.

^cData on teen pregnancies are not regularly collected. As a proxy, data on births among teenagers are included.

change significantly during the period 1993–1998, and remained above the HP objective (10). In San Diego, there were no significant differences among the racial/ethnic groups in death rates due to cervical cancer (10). Latinas in California had the highest risk of developing cervical cancer among all racial/ethnic groups (9). Deaths from cervical cancer can be greatly reduced by routine screening. In San Diego, only 51% of Latina females with invasive cervical cancer were diagnosed at an early stage, compared to 65% of White females, during 1997. In California, there were no significant differences among racial/ethnic groups in the proportion of early diagnosis of cervical cancer (9).

Diabetes Mortality

Diabetes is underreported in death certificates because people with diabetes are more likely to die of complications, which are, in turn, listed as the cause of death. Because of this, reported rates may be a significant undercount (11). In San Diego, diabetes age-adjusted mortality rates did not change significantly from 1994 to 1998. Latinas had death rates (13.2) double that for Whites (6.6). Diabetes death rates for Latina females (14.4) were threefold higher than for White females (4.8) (10).

Hepatitis A and B Incidence

Similar to the rates for the entire State, between 1996 and 1999, the incidence of hepatitis A decreased in San Diego County by 57% and in Imperial County by 52% (12). In 1999, the San Diego rate (9.6) and the Imperial County rate (21.9) were below the HP objective (23.0). In San Diego County, the age-group with the highest incidence of hepatitis A reported during 1999 was the 5- to 14-years-old, with 26 cases per 100,000 population. Approximately 67% of the cases in that age group were Latinos (3). Rates of hepatitis A were higher among Latinos in Imperial County and California, although below the Healthy People 2000 objective. Rates for Latinos and Whites were similar in San Diego County.

From 1994 through 1996, the incidence rate of hepatitis B declined by almost 37% in San Diego (from 2.1 to 1.3 per 100,000 people). During the same period, hepatitis B rates in California decreased by more than 46% (3, 12). Although hepatitis B rates for Imperial County (8 in 1999) tended to be higher than for San Diego County (1.3) or California (3.6), they were unstable because of the small number of cases involved and, therefore, should be interpreted with caution. Hepatitis B rates for all three (San Diego, Imperial, and California) were below the HP objective (40.0) (3,12).

Tuberculosis (TB) Incidence

The number of TB cases in California declined from 1991 to 1998 (13). However, the percentage of cases in foreign-born persons increased significantly from 1994 to 1998. In 1999, almost 70% of TB cases in California were foreign-born. According to the San Diego County TB program, in 1999, 44% of their 200 foreign-born TB cases were from Mexico. In both border counties, a high percentage of foreign-born TB cases occurred in those living in the United States for 11 years or more (43% in San Diego and 78% in Imperial) (13).

For more than a decade (1985–1999), San Diego and Imperial Counties had higher TB incidence rates than the national averages. Both counties' incidence rates were far from reaching the 2000 HP objective of 3.5/100,000. Rates in Imperial County have been among the two highest in the state for most of the 1990's (13). Forty percent of the TB cases reported in 1993–1998 in Imperial County were among migrant farm workers (14). San Diego and Imperial Counties' TB programs continue to struggle with issues of binational transmission and case management, including drug resistant cases. In 1999, drug resistance to at least one of the four major first-line drugs was found in 27% of the specimens tested in San Diego, compared to 15.5% of specimens tested statewide (13).

Motor Vehicle Injury Mortality

Motor vehicle crashes and unintentional injuries were among the leading causes of death in Imperial County. Imperial County had an age-adjusted motor vehicle crash death rate (24.3) for 1996–1998 that was more than twice the rate of San Diego (9.2) and California (11.4) and was also higher than the HP 2000 objective of 14.2 deaths per 100,000 population (15). In both, Imperial County and California, there were no significant differences between Latinos and Whites in the age-adjusted rates for motor vehicle crash deaths. In San Diego, Latinos had higher death rates than Whites (12.4 versus 8.0, respectively) (10). Motor vehicle crashes were the leading cause of injury deaths in San Diego County. Twelve percent of all injury crashes were due to driving while under the influence of alcohol or drugs (3).

Childhood Unintentional Injuries

There were no significant changes between the 1993–1995 and 1996–1998 three-year average number of childhood deaths due to unintentional injuries in San Diego or Imperial Counties. Although mortality rates for Imperial (1.3) and San Diego (6.9) are based on small numbers, they were lower than the State rate (10.2) (10).

Infant Mortality

There were no significant differences between the three-year (1994–1996) average birth-cohort infant mortality rates for Imperial, San Diego, and California (15).⁸ All rates met the HP 2000 objective of 7 infant deaths per 1,000 live births. The confidence intervals around the rates also showed no significant differences between the three geographic regions.

Infant Mortality From Birth Defects

In general, there are not large differences in birth defects rates among racial/ethnic groups in California. However, for neural tube defects, babies of Mexican-born mothers have a 1.7 times greater risk of that defect than U.S.-born mothers of all races (16). In 1998 in San Diego, the infant death rate from birth defects was fairly similar in Latinos (1.4/1,000 live births) and Whites (1.2) (10).

Prenatal Care

In 1998, 73.6% of births in Imperial County were to mothers who initiated prenatal care in the first trimester. This was significantly lower than the percentages of first trimester prenatal care in San Diego (78.8%) and California (81.1%) (17). The HP 2000 objective was to increase the proportion of women who receive prenatal care in the first trimester of pregnancy to at least 90%. In 1998, in Imperial and San Diego Counties, Latina women composed the group with the highest proportion of mothers who had initiated prenatal care in the third trimester or not at

⁸Birth cohort infant death data are based upon births during a calendar year (a cohort) tracked individually for 365 days to determine whether or not death occurred.

all (6.7 and 8.5%, respectively) among all race/ethnic groups (17).

Teen Birth Rates

Although the HB objective refers to teen (15–17 years-old) pregnancies, that information is not regularly collected. As a proxy, information on births among teenagers (15–19 years-old) is included (17). In 1998, the teen birth rate in Imperial County (50.7) was significantly higher than the rates in California (32.6) and San Diego (29.0) (17). Latino teen birth rates in both San Diego and Imperial Counties (70.6 and 48.3, respectively) were significantly higher than for other groups (17).

Suicide Mortality

The age-adjusted suicide death rates for all three regions, for 1996–1998, met the HP 2000 objective. In 1998, in both San Diego and California, male suicide rates (15.6 and 14.0, respectively) were significantly higher (more than three-fold) than for females (5.0 and 3.8, respectively) (18). The age-adjusted death rates for Latino males were half that of White males (8.9 versus 18.7) in San Diego (10).

Asthma Hospitalization

Asthma is an ongoing issue of concern in California's border region, especially in Imperial County. For 1995–1997, Imperial County had the highest rates of asthma hospitalizations in the state for all ages combined and for children 1–14 years of age (19). Table II illustrates the differences between the two counties and how they compare to statewide rates. Only the rate for Imperial, at 207, is above the HP objective of 160.

HB Indicators With Less Adequate Data

Access to Primary Health Care Provider

Data on one best or unique indicator of access to primary care providers are not available. Approximately 25% of all San Diegans lack health insurance, compared to 22% of all Californians. Between 1995 and 1999, Latino adults (42%) and children (29%) were more likely to be uninsured than other racial/ethnic groups (20). The 1998 Imperial County

Health Risk Survey, a countywide random digit-dial telephone survey, reported that 29% of adult respondents did not have health insurance and 41% did not have a usual source of care. Imperial County has 23.2 primary care providers per 100,000 people, compared to 65.7 for the United States (21).

Households With Sewage System

Almost all households in Imperial and San Diego Counties are connected to public sewage systems or septic tanks (over 95%). This is a more important health concern in other areas of the United States–Mexico border.

HIV Incidence

HIV has not been a reportable condition in California until mid-2002. However, a study has shown that HIV infection is increasing among young Latinos in San Diego (22). Data on AIDS are available. As of December 1999, a cumulative total of 10,224 San Diego County residents had been diagnosed with AIDS. The county ranks sixth in the incidence rate of AIDS in California (23). The estimated prevalence of HIV or AIDS in San Diego is 0.34–0.47% (24). In San Diego, the AIDS epidemic has disproportionately affected minority groups. Among cases diagnosed in 1998 and 1999, 30% were Latino. Among Imperial County residents, the cumulative total of AIDS cases was 108 (25). The estimated prevalence of HIV or AIDS in Imperial is 0.07–0.15% (24). In San Diego, there has been an apparent shift in the AIDS epidemic, with Latinos 20–29 years old being increasingly affected (23).

Access to Dental Health Care

There are no comprehensive data on access to dental care in border communities. A 1992 study by the San Diego County Community Access to Child Health Committee of the American Academy of Pediatrics found that 46% of low-income persons did not have a dentist for their child (26). There are significant shortages of dentists in border communities: in 1996, in Imperial County, there was one dentist for every 3,498 persons. In San Diego, this number per dentist was 1,353, and in California, it was 1,383 (27).

DISCUSSION

The health status of the California border region in general, and of bi-national border Latinos in particular, is complex. There are strengths that are important to maintain and protect, as well as health disparities that need to be addressed.

From the list of HB indicators, breast cancer mortality and infant mortality are favorable in the border region and Latinos. Breast cancer mortality rates for both Imperial and San Diego counties were below the HP 2000 objectives, with Latina women showing lower rates than other racial/ethnic groups. Despite relatively poor access to prenatal care in both Imperial and San Diego counties, their infant mortality rates were better than the State's overall rate and below the HP objective for 2000.

Our analysis has shown that, in comparison with both California and HP, the areas of significant concern include access to health care and TB in both counties, as well as motor vehicle crash injury deaths and asthma hospitalization in Imperial. These should be given priority attention.

Latino populations in the California border region suffer not only from a lack of health insurance and a shortage of health care professionals, but also experience many other barriers, e.g., language, cultural, economic, transportation, access to primary and preventive health care.

San Diego and Imperial Counties' TB control programs continue to struggle with issues of bi-national transmission and case management, as well as with treating drug resistant cases.

Motor vehicle crash injuries are among the leading causes of death in Imperial County. Border communities face the added challenges of how to coordinate bi-national emergency response and policy development and education in order to decrease deaths due to injuries.

Asthma is an ongoing health concern in California's border region, especially in agricultural Imperial County, and is one that has multiple preventable causes. For example, the role of air pollution (vehicular, agricultural, and other) in increasing asthma incidence in this region requires further study, along with efforts to reduce air pollution from bi-national sources. Another aspect to be studied, perhaps in a bi-national fashion, and explained is the relatively low asthma hospitalization rate in Latinos on the border. For example, what might be the likelihood of accessing asthma care in Mexico and how would this affect the data in California?

In the time since our analysis of HB indicators, bioterrorism response preparedness has emerged as a critical health and security concern to both the United States and Mexico. Related issues around this include all those of required infrastructure for proper public health disease surveillance, control, and prevention, the resources for which are quite disparate between our two countries. For example, public health laboratory capability for pathogen identification, capability for timely reporting and analysis, and capability for bi-national communication and coordination.

An important limitation of this analysis and report is the lack of data on all HB indicators as selected by the United States–Mexico BHC. This is particularly true for data on Mexican-born and Mexican-Americans in California. This will not be addressed until health authorities collect data on ethnicity and country of origin, as well as recency of travel, and related information that can help with disease control and prevention.

Finally, we have learned from our experience that bi-national collaboration in assessing and monitoring the health of border communities in California and Mexico, including sharing information from surveillance, disease control, immunization records, public health surveys, and other health data is needed to help improve the health of our shared migrant and bi-national communities. The California Department of Health Services, through its Office of Binational Border Health, is actively engaged with Mexican counterparts, including the BHC, and other partners, to address these issues. It has published a report to the State legislature on California's border health (28).

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