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DISPARITIES IN SERIOUS MORBIDITY OF AMERICAN INDIANS AND ALASKA NATIVES WHO USE TRIBAL HEALTH PROGRAMS: CAUSES OF HOSPITALIZATIONS

Karen Garcia, MPH
Chi Kao, Ph.D.
Carol C. Korenbrot, Ph.D.

of the

California Rural Indian Health Board, Inc.

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SUMMARY

The health status of American Indians and Alaska Natives (AIAN) in state data is not accurately known since 60% of AIAN in California hospitalization data are incorrectly classified as other racial groups. The purpose of this report is to use state health hospitalization data that has been corrected for misclassification of AIAN in order to determine the extent of disparities in health status for certain chronic disease, behavior and injury-caused morbidity serious enough to warrant a hospital admission.

For this reason hospitalization rates for AIAN in California who rely on Tribal Health Programs (THP) are determined for a select set of hospitalization causes and compared to those of non-Hispanic Whites living in the same rural counties, and whenever possible to All Races in the US.

The causes of hospitalizations investigated in this study were selected because they are based on the same causes of death used to determine the Federal Disparity Index which is used by the Indian Health Service (IHS) to determine funding needs of IHS-funded service units in the US, including the THP of California. The causes of death were reported in the first Technical Report in this series. The causes of hospitalization investigated in this report are:

Chronic diseases: diabetes, asthma, cerebrovascular disease, heart disease, cancers

Behavior-related conditions: alcohol and tobacco-related causes, alcohol and drug

Injuries and poisonings

The AIAN described in this report obtained some or all of their ambulatory health care at THP in rural California between 1998 and 2002. The AIAN are entitled to IHS-funded health care because they are either enrolled members of federally recognized tribes, or California Indians who are descendants of a roll taken of American Indians in the state during 1852.

Findings

Disparities between AIAN and non-Hispanic Whites in California

There are major disparities in age-adjusted hospitalizations rates for AIAN compared to Whites for all the chronic diseases, except for cancer, all the behavior-related conditions, and the injuries and poisonings investigated in this study.

The largest disparities in hospitalizations rates for AIAN compared to Whites found were for diabetes, asthma, and injuries and poisonings.

Chronic Disease hospitalization rates of AIAN are higher than those of Whites

- Diabetes hospitalization rates are 3.23 times higher
- Asthma hospitalization rates are 1.85 times higher

- Cerebrovascular disease (stroke) hospitalization rates are 1.19 times higher
- Heart Disease hospitalization rates are 1.15 times higher
- Colon Cancer hospitalization rates are 1.24 times higher, though this is not a statistically significant disparity and for hospitalizations listed with colon cancer as the primary diagnosis.

Behavior-Related hospitalization rates when alcohol, drugs or tobacco are listed as a cause of the hospitalization are higher for AIAN than Whites:

- Alcohol-Related hospitalization rates are 1.36 times higher
- Tobacco-Related hospitalization rates are 1.28 times higher
- Alcohol and Drug-Related hospitalization rates are 1.68 times higher

Injury hospitalization rates of AIAN are higher than those of Whites:

- Injuries and Poisonings hospitalization rates are 1.46 times higher
- Poisonings hospitalization rates are 1.71 times higher
- Fractures hospitalization rates are 1.27 times higher

Disparities between AIAN in California and All Races in the United States

AIAN in California have higher hospitalization rates than All Races in the US for select chronic diseases, behavior-related conditions, and injuries based on the national comparison data that was available.

Chronic Disease hospitalization rates of AIAN in California are higher than those of All Races in the US

- Diabetes hospitalization rates are 1.91 times higher
- Colon Cancer hospitalization rates are 1.14 times higher

Behavioral-Related hospitalization rates of AIAN in California are higher than those of All Races in the US

- Alcohol and Drug hospitalization rates are 1.10 times higher

Injury Disparities for AIAN in California compared to All Races in the US

- Injuries and Poisonings hospitalization rates are 1.51 times higher
- Fractures hospitalization rates are 1.31 times higher

Conclusions

High priority health issues for AIAN in rural California are diabetes, asthma, cerebrovascular disease, heart disease, colon cancer, alcohol, alcohol and drug, and tobacco-related, and injuries and poisonings. The findings in this report demonstrate that largest disparities between AIAN and Whites exist for diabetes, asthma, and injuries and poisonings.

The evidence of unmet health needs of AIAN revealed can be used to advocate for improved policies and health initiatives to improve health prevention and treatment efforts with more resources, including IHS funding, to improve access and quality of care provided in Tribal Health Programs that are operated or overseen by California tribes. The findings in this report may reveal that greater emphasis needs to be focused on particular health issues that are not typically given enough attention.

INTRODUCTION

The health status of American Indians and Alaska Natives (AIAN) in California has widely been unknown until recently due to either a lack of reporting or an underestimation of illnesses due to incomplete reporting methods. Health information for AIAN in California is usually not reported at all due to AIAN representing a small percentage of the state's population in relation to other racial groups despite the fact that California has the largest AIAN population than any other state in the country. When health information for AIAN in California is reported their true health status is typically underestimated, particularly by the Indian Health Service (IHS), since methods that are used to determine rates do not account for the high levels (60%) of racial misclassification that occur when AIAN in California go to public hospitals that are not operated by Indian Health Service.

This report unravels the health status of AIAN in rural California for chronic and behavior-related conditions and diseases as well as injuries. The hospitalization causes are used as indicators of severe morbidity and rates of hospitalization for each cause are assessed for disparities in health status between AIAN users of Tribal Health Programs (THP), and Whites living in nearby rural areas of California. This report contrasts with the previous one in the American Indian Health in California report series because it involves a detailed look at the various hospitalization defined diseases and conditions rather than all hospitalizations combined, therefore the results are based on the same corrective methods used in the previous report, i.e. corrections for racial misclassification of AIAN and missing Social Security Numbers in hospital records.

Rates of hospitalization for select causes are used as indicators of severe morbidity in order to determine the existence of disparities between AIAN and Whites in rural California. The specific causes in this report represent those used for Federal IHS funding of tribal health programs, and those identified as pressing concerns for particular THP. The Indian

Health Care Improvement Fund (IHCIF) uses similar cause-specific indicators, but for mortality, to determine the level of funding given to THP throughout the US therefore diabetes, alcohol, cardiovascular disease, tobacco, cancer, asthma, and injury causes were used in this report. Furthermore, asthma and tobacco-related causes were identified due to concerns by Tribal Health Program directors and tribal communities.

It is important to note that specific causes of hospitalizations have the potential to be defined according to different diagnostic criteria and thus determine major causes of morbidity. Federal definitions are thus used to prevent this issue and to standardize the way in which data is reported for California. Furthermore, although seven causes are reported some are not mutually exclusive from each other, e.g. the definition of tobacco-related conditions includes neoplasms that are also included in the cancer definition (Appendices A, B).

The specific hospitalization causes are reported according to different diagnostic criteria to ensure that comparisons can be made to federal data, and that large enough numbers are provided to make conclusions about the findings. Health information was obtained for patients who were discharged from a hospital for a primary reason or those who were discharged and had multiple (that is co-morbid) conditions thus reflecting a First-listed diagnosis or Any-listed diagnosis (at least a primary or any other four possible diagnoses), respectively. Every effort was made to allow comparisons to be made to National data, therefore the hospitalization causes were defined as either First-listed or Any-listed diagnosis based on this standard. However for some causes the incidence rates tended to be too low to report, therefore hospitalization rates were obtained based on Any-listed diagnosis as much as possible. In fact, Any-listed diagnosis hospitalization rates reflect the prevalence of the condition in the population, as well as the incidence.

¹ We use the term 'American Indians and Alaska Natives' to describe descendants of native indigenous peoples in this report because it describes the major racial group used to group native people in state health data, and it describes the more limited group of native people eligible for the Indian Health Service registry.

METHODS

Populations

AIAN Population. The AIAN population is that of defined Active Users of tribally owned and operated THP in California (California Area IHS, 2007). The uniform definition of Active Users is that of the federal IHS National Patient Information Registry System. Active Users are AIAN who are enrolled members of federally recognized tribes living on or near tribal lands who used an IHS funded service in a THP at least once in either the year the data was reported, or in the 2 years prior to the reporting year. In California the IHS also includes California Indians who are descendants of American Indians documented in a roll completed by federal agents in California on June 1, 1852. (See American Indian Health in California, Report Series Volume 1, Report 2 for more information.)

White Population. The comparison population is that of White non-Hispanics who reside in the IHS Contract Health Service Delivery Area counties of California. White non-Hispanics may be referred to as ‘Whites’ hereafter. The data source for White population by county for 1998 and 1999 was obtained from the U.S. Census. For year 2000 and beyond Bridged Race Estimates were developed from Census data by the National Center for Health Statistics to account for people of mixed race (NCHS 2004). (See American Indian Health in California, Report Series Volume 1, Report 2 for more information.)

Hospitalizations

The data source for hospitalizations is the Patient Discharge Data obtained from the Office of State-wide Health Planning and Development of the California Department of Health Services, 1998 to 2002. Patient Discharge Data contains all records of hospitalizations of people discharged alive from short-stay, non-federal California health facilities.

AIAN Hospitalizations. Hospitalizations of AIAN Active Users were obtained from the California Patient Discharge Data that was linked to that of IHS Active Users of California THP in the IHS National Patient Information Registry System. California Department of Health Services, Center for Health Statistics used the verified Social Security Numbers in the Active User data files from 1998 to 2002 to link to state Patient Discharge Data files annually from 1998 to 2002. All Active Users had verified Social Security Numbers, but there were few Active Users under one year of age because of this requirement for Active User status. Thus hospitalizations for newborns and infants less than 1 year of age are excluded. (See American Indian Health in California, Report Series Volume 1, Report 2 for more information.)

White Hospitalizations. The hospital data for Whites was a random sample of Patient Discharge Data for White non-Hispanics who resided in counties of the IHS Contract Health Service Delivery Area. Prior to the selection, Active User linked-hospitalizations with ‘White’ in the racial field and ‘non-Hispanic’ in the ethnicity field were excluded. Hospitalizations for newborns and infants less than 1 year of age were excluded from the White hospitalizations because they had to be excluded from the AIAN hospitalizations (See American Indian Health in California, Report Series Volume 1, Report 2 for more information.)

Causes of Hospitalizations

The causes of hospitalizations are defined by diagnostic codes, included in the Patient Discharge data, as either the primary (first-listed) diagnoses or as Any-listed diagnosis. Any diagnosis is based on the primary (first-listed) or any one of the four secondary codes (Any-listed) (Appendices A, B). The diagnostic codes are from the International Classification of Diseases, Clinically Modifiable, Version 9 (ICD-9-CM). The definitions of age groups var-

ied either because the particular cause was related to certain ages, or since they were based on the same age groups used in pre-existing national comparison data (Appendices C, D).

Chronic Disease

Diabetes. The diagnostic code for Diabetes is ICD-9 code 250 (CDC 2002; Appendix A). The age groups for diabetes hospitalizations, as any diagnoses, were restricted to ages 1 to 44, 45 to 64, and 65 and over in order to make comparisons to national data (CDC 2002; Appendix C).

Asthma. The diagnostic code for Asthma is ICD-9 code 493 (NCHS 2005). The age group for Asthma hospitalizations, as the primary diagnosis, was restricted to ages 1 to 19 in order to make national comparisons. However national data was available for the 1 to 17 age group and the rate reported is crude since multiple age groups were not available to make age-adjustments (NCHS 2005, Appendix D). The asthma hospitalizations based on any diagnosis were available for ages 1 to 44, 45 to 64, and 65 and over (Appendix C).

Cardiovascular Disease. The Cardiovascular Disease groups analyzed were Heart Disease and Cerebrovascular Disease. The hospitalizations for both disease groups were based on the primary and any diagnosis codes. However the primary diagnosis was used to compare California hospitalization rates to those at the national level (NCHS, 2005).

Diagnostic codes included for Heart Disease were ICD-9 codes 391-392.0, 393-398, 402, 404, 410-416, 420-429. The age groups for Heart Disease were restricted to ages 20 to 44, 45 to 64 and 65 and over in order to make national comparisons. However national data was available for the 18-44, 45 to 64 and 65 and over groups.

Diagnostic codes for Cerebrovascular Disease included ICD-9 codes 430-438 (NCHS, 2005; Appendices A, B). The age groups for Cerebrovascular

Disease were restricted to ages 45 to 64, and 65 and over in order to make national comparisons.

Cancer. Cancer (malignant neoplasm) diagnostic codes were grouped together as All Cancers (ICD-9 codes 140-208), and treated separately as the Respiratory system (Trachea, bronchus, and lung ICD-9 codes 162, 197.0, 197.3), Cancers of the Colon (ICD-9 codes 153-154, 197.5), Breast (ICD-9 codes 174-175, 198.81); and Prostate (ICD-9 code 185) (NCHS, 2005; Appendices A, B). The age groups for the cancer categories as any-diagnoses were restricted to ages 1 to 44, 45 to 64 and 65 and over (NCHS 2005; Appendix C). To make comparisons to national rates, the age groups for cancer categories as primary diagnoses were restricted to age groups 45 to 64 and 65 or older for All Cancers, and Respiratory Cancers separately, and the 65 or over age group was used for Colon Cancer (Appendix D).

Behavior-Related Conditions and Diseases

Alcohol. Hospitalizations for Alcohol Chronic Conditions were obtained as any diagnosis. Those conditions that were considered totally attributable to alcohol included ICD-9 codes 291, 303.0, 303.9, 305.0, 357.5, 425.5, 535.3, 571.0-571.3, 655.4, 760.71; Chronic conditions with high alcohol causation included ICD-9 codes 530.7, 571.5-571.9, 572.3, 577.0, 577.1; Chronic conditions with medium alcohol causation included ICD-9 codes 141,143-146, 148, 149, 150, 155, 161, 427.0, 427.2, 427.3, 456.0-456.2; Alcohol Acute Conditions that were considered completely attributable to alcohol included ICD-9 codes 980.0, 980.1, E860.0, E860.1, E860.2, E860.9, 790.3 (CDC and NCCDPH 2006; Appendix A). The age groups used for Alcohol Hospitalizations are 1 to 19, 20 to 44, 45 to 64, and 65 and over (CDC and NCCDPH 2006, Appendix C).

Alcohol and Drug. Alcohol and drug hospitalizations as first-listed diagnosis were based on ICD-9 codes 291-292, 303-305 (NCHS 2005). The age groups for Alcohol and Drug Hospitalizations were restricted to ages 20 to 44 and 45 to 64 years of age

to make comparisons to national data. However the national data was available for the 18 to 44 and 45 to 64 age groups (NCHS 2005, Appendix D).

Tobacco-related. Tobacco-related diagnostic codes included tobacco-related neoplasms (ICD-9 codes 140-149, 150, 157, 161, 162, 180, 188, 189), tobacco-related cardiovascular disease (ICD-9 codes 390-398, 401-404, 410-414, 415-417, 420-429, 430-438, 440, 441, 442-448) and Respiratory disease (ICD-9 codes 010-012, 480-487, 490, 491-492, 493, 496). (CDC April 2002, Appendix A). The age groups for rates of tobacco-related diseases as any diagnosis were restricted to ages 35 to 44, 45 to 54, 55 to 64 and 65 and over for (CDC April 2002, Appendix C). Rates were not determined for tobacco-related hospitalizations as the primary diagnosis due to small numbers.

Injuries

Injuries. Diagnoses for all Injuries and Poisonings contained ICD-9 codes 800-999, which included Fractures at all sites (ICD-9 codes 800-829), Hip Fractures (ICD-9 code 820) (NCHS 2005), and Poisonings (ICD-9 codes 960-989) (NHDS 2000) (Appendices A, B). To make comparisons to national data the age groups for the injury groups were restricted to ages 1 to 19, 20 to 44, 45 to 64, and 65 or over for hospitalizations as the primary diagnoses. However national data was based on the 1 to 17 and the 18 to 44 age groups (NCHS 2005, Appendices C, D).

Hospitalization Rates

Age-specific hospitalization rates. The hospitalization rate for a specified age group and cause is defined as the number of linkage-adjusted hospitalizations divided by the corresponding population for that age group. Rates are expressed as hospitalizations per 10,000 people in the age group. (See American Indian Health in California, Report Series Volume 1, Report 2 for more information.)

Age-adjusted hospitalization rates. The effects on the hospitalization rates due to differences in the age distributions of the AIAN and White populations are

controlled by age-adjustment to a single standard US population. The age-adjusted hospitalization rates were obtained by multiplying the age-specific hospitalization rate during 2000 for each age group by the proportion of the US 2000 Standard Million Population in that age group (Klein and Schoenborn, 2001). Diagnosis codes for each cause are presented in Appendices A and B, and age groups for each cause are presented in Appendices C and D. (See American Indian Health in California, Report Series Volume 1, Report 2 for more information.)

Rate Ratios. The rate ratio is a measure of the disparity that exists between the hospitalization rates for AIAN compared to another group. The rate ratio for California is obtained by dividing the age-adjusted AIAN hospitalization rate by the age-adjusted White hospitalization rate during 1998 to 2002. The rate ratio for AIAN in California compared to the US-All Races is obtained by dividing the age-adjusted AIAN hospitalization rate, for 1998 to 2002, by the age-stratified rate for US-All Races during 2000 (See American Indian Health in California, Report Series Volume 1, Report 2 for more information.)

Significant Differences. A determination of significance is based on analyzing confidence intervals (CI), with a 95% level of confidence, for the AIAN and White hospitalization rates and their corresponding rate ratio. Our criterion for a significant difference between two rates is that the 95% confidence intervals of two rates do not overlap. In this case a comparable statistical test of the significance would indicate that the difference between the estimates was statistically significant (Washington DOH, 2002). This criterion is conservative since in some cases where the 95% confidence intervals of two rates do overlap a comparable statistical test would indicate that the difference between the estimates was statistically significant. An additional criterion to determine that rates are significantly different is based on verification that the CI for the rate ratio does not contain the value of 1.0.

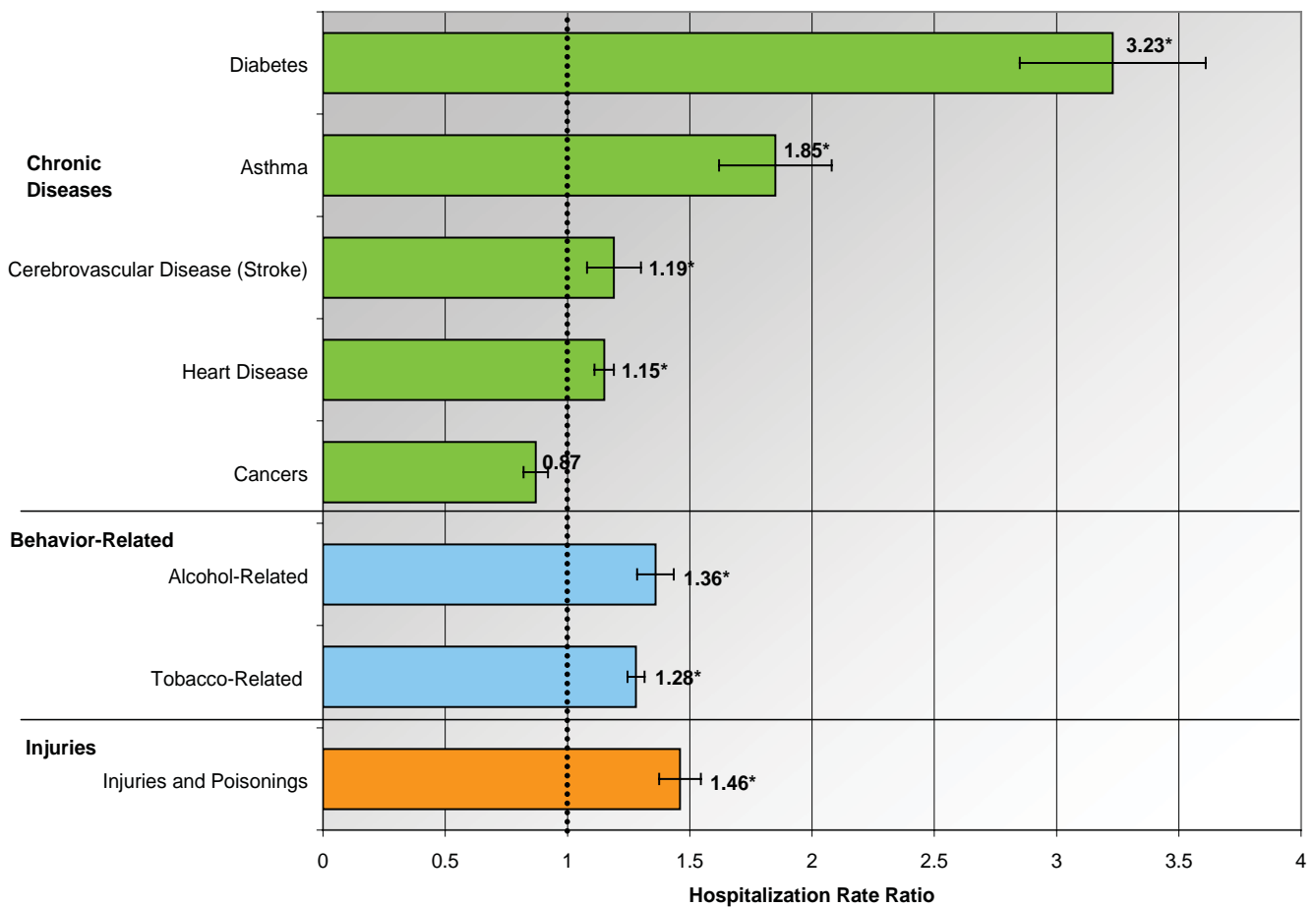
Significant differences were not determined for AIAN to US-All Race rate ratios since CI were not available for the US Rates.

RESULTS

Disparities in Hospitalization Rates. AIAN in rural California are clearly hospitalized more than Whites for a number of diseases and conditions described in this report based on age-adjusted rates. Higher rates of hospitalization also exist for AIAN compared to US-All Races but for age-specific rates.

AIAN have significantly higher age-adjusted hospitalization rates than Whites in the same counties of California for all chronic diseases, with the exception of cancer, and all behavioral-related conditions and diseases, and all injuries described in this study. For hospitalization rates that are comparable, disparities exist for AIAN compared to Whites primarily for diabetes, followed by asthma, and then injuries and poisonings (Figure 1).

Figure 1. Rate Ratios for Select Hospitalization Causes^ as Any-listed Diagnoses: AIAN to Whites in California.



^The rates were age-adjusted based on unique age groups for each respective cause: diabetes (1-44, 45-64, 65+); asthma (1-44, 45-64, 65+); cerebrovascular disease (45-64, 65+); heart disease (20-44, 45-64, 65+); all cancers (1-44, 45-64, 65+); alcohol-related (1-19, 20-44, 45-64, 65+); tobacco-related (35-44, 45-54, 55-64, 65+); injuries and poisonings (1-19, 20-44, 45-64, 65+).

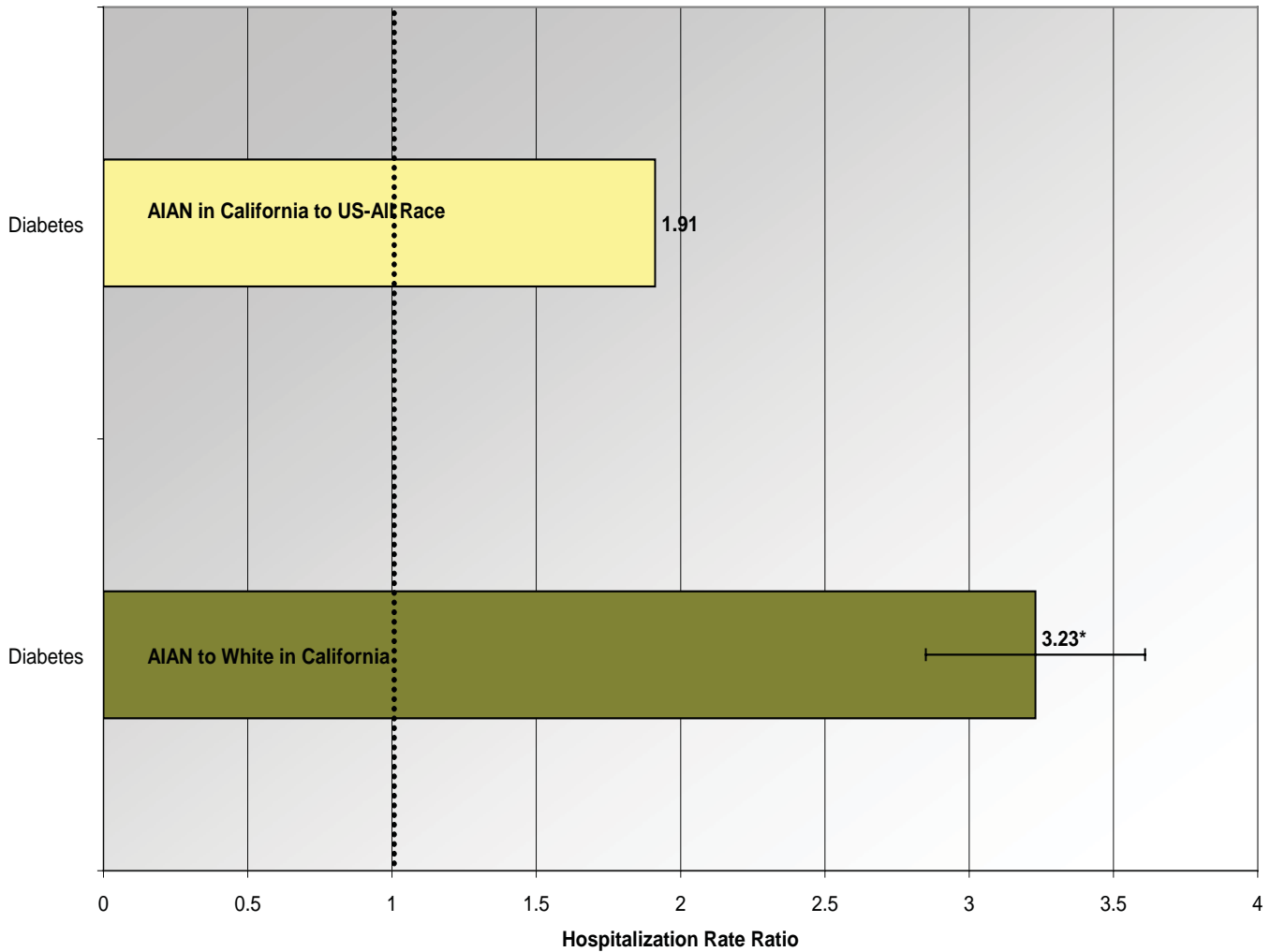
*Significant differences at the 95% level.

Chronic Diseases. AIAN are hospitalized at disproportionately higher rates than Whites for all the chronic diseases analyzed in this study as any-listed diagnoses, except for cancers. In fact, AIAN are hospitalized significantly more than Whites in California for diabetes, asthma, cerebrovascular disease and heart disease causes listed as any diagnoses.

The rate for diabetes is 3.23 times higher (95% CI of 2.87 to 3.63), and 1.85 times higher for asthma for AIAN compared to Whites who are 1 year of age or older (95% CI of 1.63 to 2.09). The rate for cerebrovascular disease (stroke) is 1.19 times higher for AIAN who are 45 years of age or older (95% CI of 1.09 to 1.31). Also, the rate for heart disease is 1.15 times higher for AIAN who are 20 years of age or older (95% CI of 1.11 to 1.19). AIAN are hospitalized less for cancers than Whites, for person 1 year of age or older (Rate Ratio of 0.87 with a 95% CI of 0.82 to 0.92) (Figure 1).

Diabetes. Since the diabetes rate is significantly higher for AIAN compared to Whites in California it is no surprise that the AIAN diabetes rate in California is also higher than the US rate for All Races. The diabetes hospitalization rate is 1.91 times higher for AIAN in California compared to the US-All Race rate for persons 1 year of age or older (Figure 2).

Figure 2. Hospitalizations for AIAN and Whites in California, 1998 to 2002.

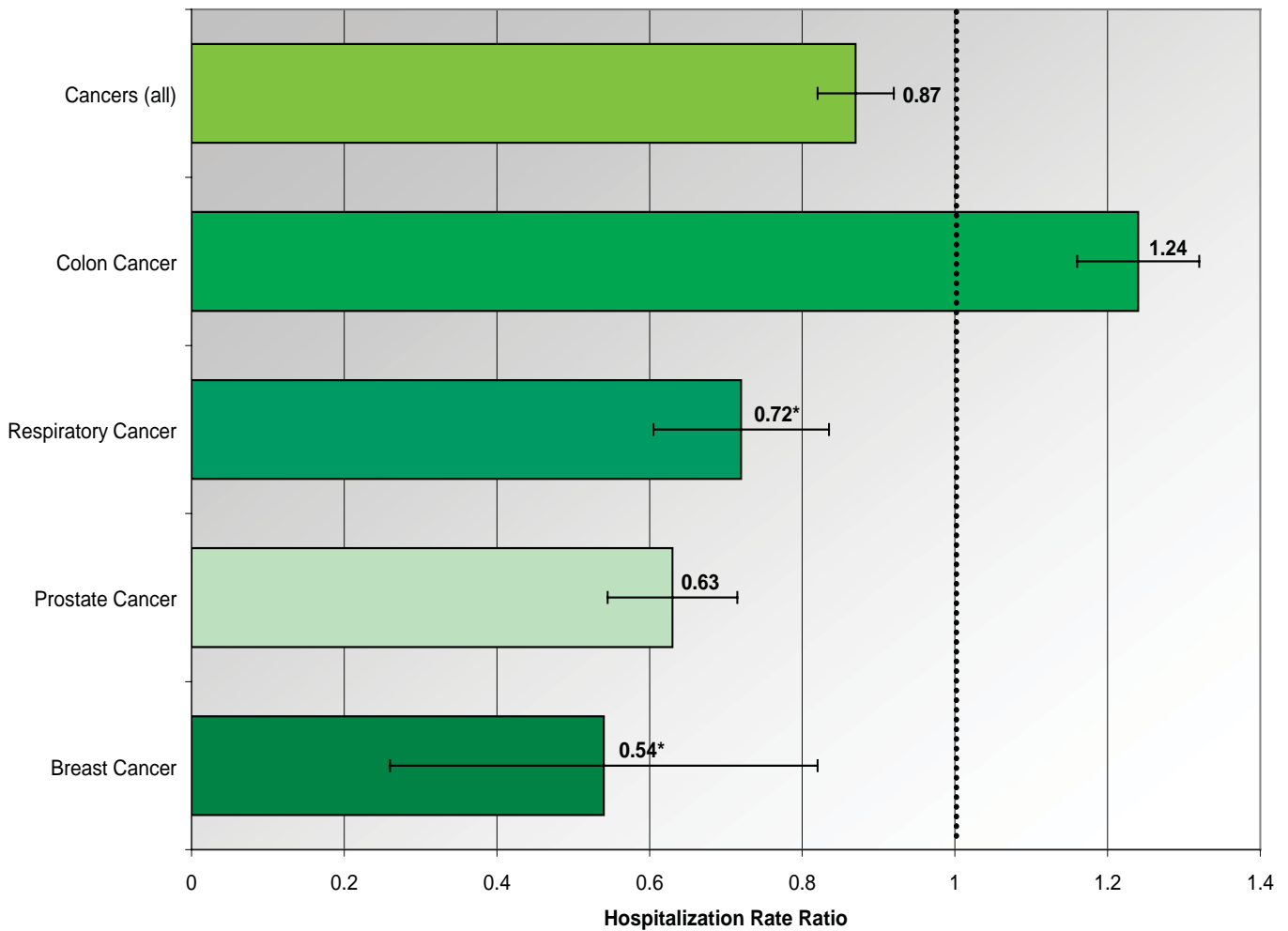


[^]The California rates for diabetes were age-adjusted based on the 1-44, 45-64, and 65+ age groups. The US diabetes hospitalization rate was age-adjusted based on the 0-44, 45-64, 65-74, and 75+ age groups.

*Significant differences at the 95% level.

Colon Cancer. Although the cancer (all malignant neoplasms combined) hospitalization rate is lower for AIAN than Whites in California, the colon cancer hospitalization rate appears to be nearly the same or higher for AIAN compared to Whites. Based on hospitalizations with cancers listed as any diagnoses, colon cancer rates are 1.24 times higher for AIAN than Whites for persons 1 year of age or older (Rate Ratio of 1.24 with a 95% CI of 0.99 to 1.55) (Figure 3). The colon cancer rate is also 1.22 times higher for AIAN than Whites who are 65 years of age or older, based on age-stratified rates for colon cancer hospitalizations as the first-listed diagnoses (Rate Ratio 1.22 with a 95% CI of 0.86 to 1.73). Furthermore, AIAN in California have a 1.14 times higher age-specific rate of colon cancer compared to the US rate for All Races (Figure 4).

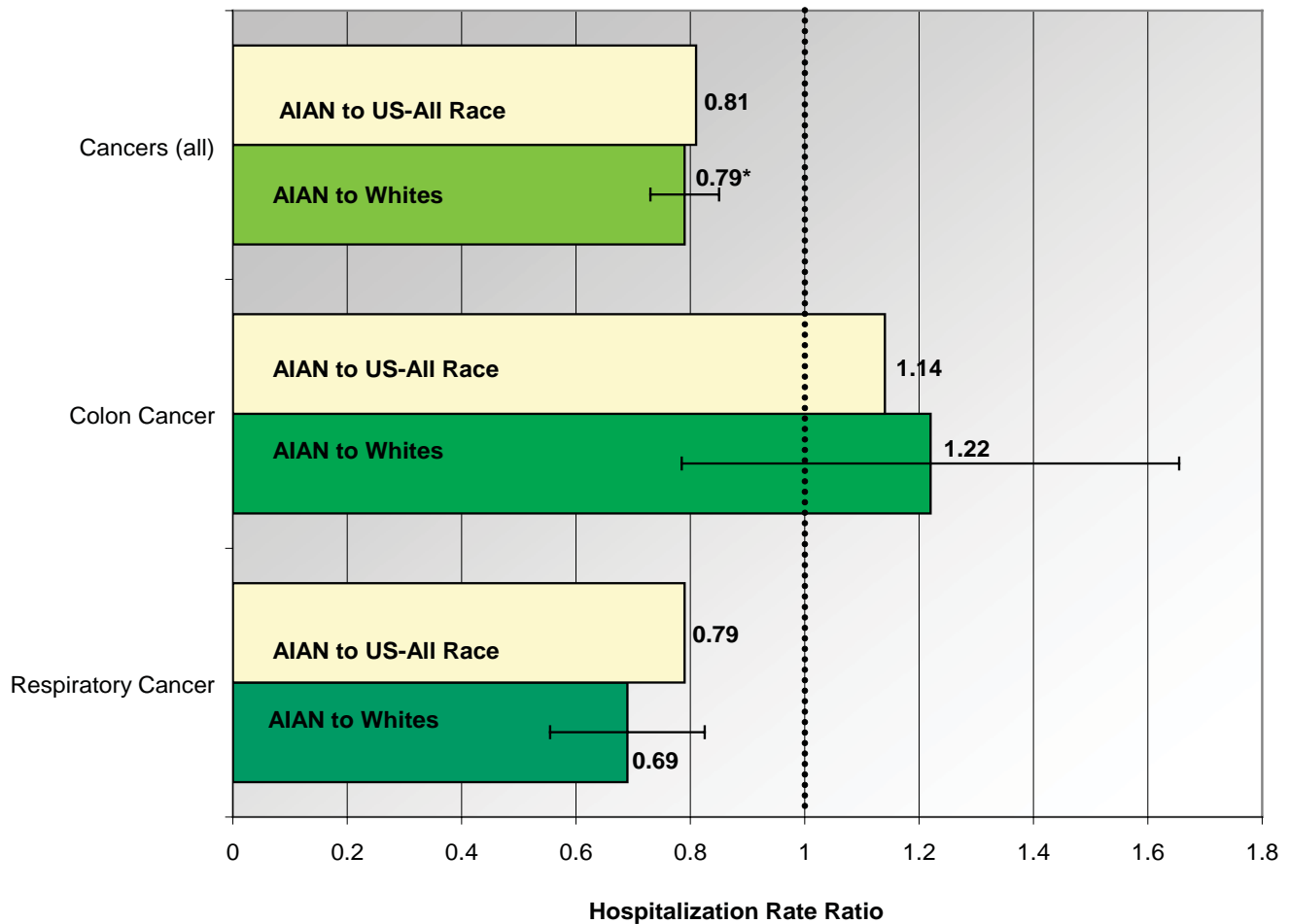
Figure 3. Rate Ratios for Hospitalizations with Cancers as Any-listed Diagnosis: AIAN in California to US-All Races, and Whites in California.



^The rates for cancer (all malignant neoplasms) and each type of cancer were age-adjusted based on the following age groups: 1-44, 45-64, and 65+.

*Significant differences at the 95% level.

Figure 4. Rate Ratios for Hospitalizations with Cancers as First-listed Diagnoses: AIAN in California to US-All Races, and to Whites in California.



^The California and US-All Race rates for cancers (all malignant neoplasms) and respiratory cancer were age-adjusted based on the 45-64 and 65+ age groups. The California and US-All Race rates for colon cancer were not age-adjusted and apply to people 65 years of age or older.

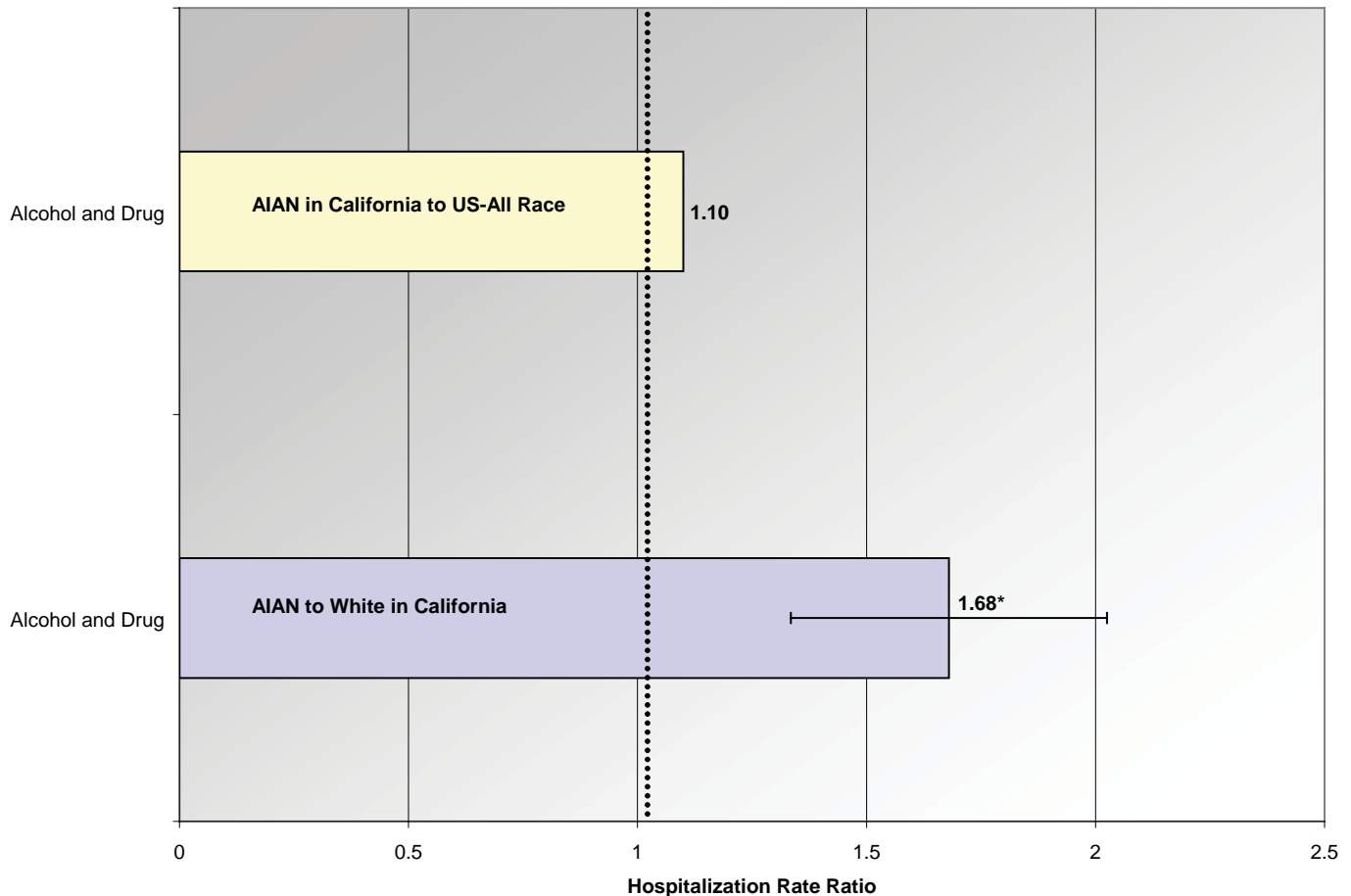
*Significant differences at the 95% level.

Behavior-Related Conditions and Diseases. AIAN are hospitalized significantly more than Whites for alcohol- and tobacco-related conditions in this study with hospitalizations as any-listed diagnoses. AIAN are also hospitalized more than their White counterparts for alcohol and drug-related hospitalizations as the first-listed diagnoses.

Alcohol-Related. AIAN have a 1.36 times higher alcohol-related hospitalization rate than Whites in California, for persons 1 year of age or older (95% CI of 1.29 to 1.44) (Figure 1).

Alcohol and Drug-Related. AIAN have a 1.68 times higher rate of alcohol and drug-related hospitalizations than Whites in California, for persons 20 to 64 years of age (95% CI of 1.37 to 2.06). Also, the alcohol and drug-related hospitalization rates appear to be 1.10 times higher for AIAN in California compared to the US rate for All Races for persons 18 to 64 years of age (Figure 5).

Figure 5. Rate Ratios for Hospitalizations with Alcohol and Drug as First-listed Diagnoses: AIAN in California to US-All Races, and to Whites in California.

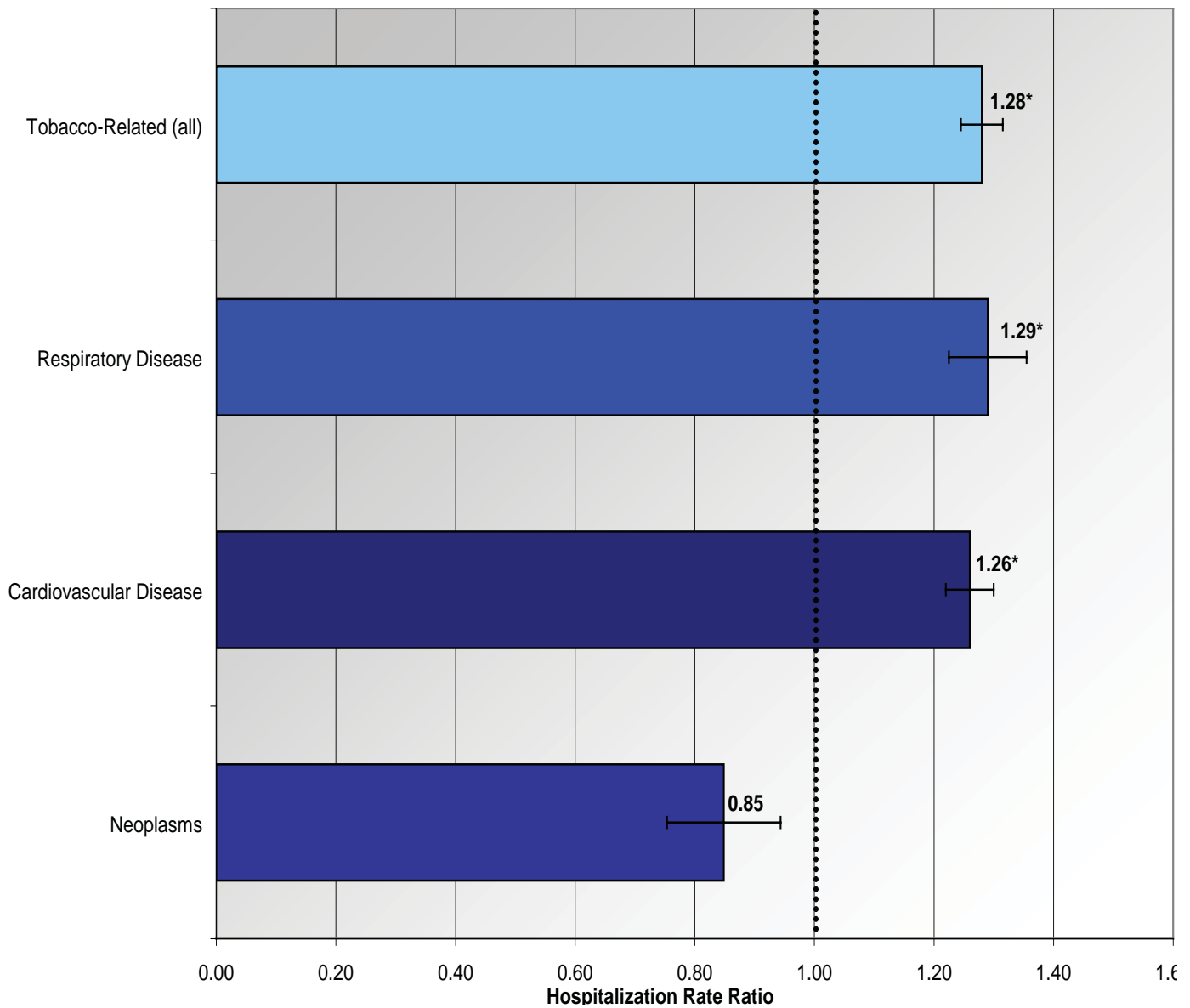


^The California rate for Alcohol and Drug was age-adjusted based on the 20-44 and 45-64 age groups. The US-All Race rate for Alcohol and Drug was age-adjusted based on the 18-44 and 45-64 age groups.

*Significant differences at the 95% level.

Tobacco-Related. AIAN have a 1.28 times higher tobacco-related hospitalization rate than Whites in California, for persons 35 years of age or older (95% CI of 1.25 to 1.32). All tobacco-related hospitalizations include specific respiratory and cardiovascular diseases and neoplasms. Among these three different types of tobacco-related hospitalization rates, the rate for respiratory diseases is highest for AIAN compared to Whites (Rate Ratio 1.29 with a 95% CI of 1.23 to 1.36), and the rate for cardiovascular diseases is the second highest (Rate Ratio 1.26 with a 95% CI of 1.22 to 1.30) (Figures 1, 6).

Figure 6. Rate Ratios for Hospitalizations with Tobacco-Related conditions as Any-listed Diagnoses: AIAN to Whites in California.

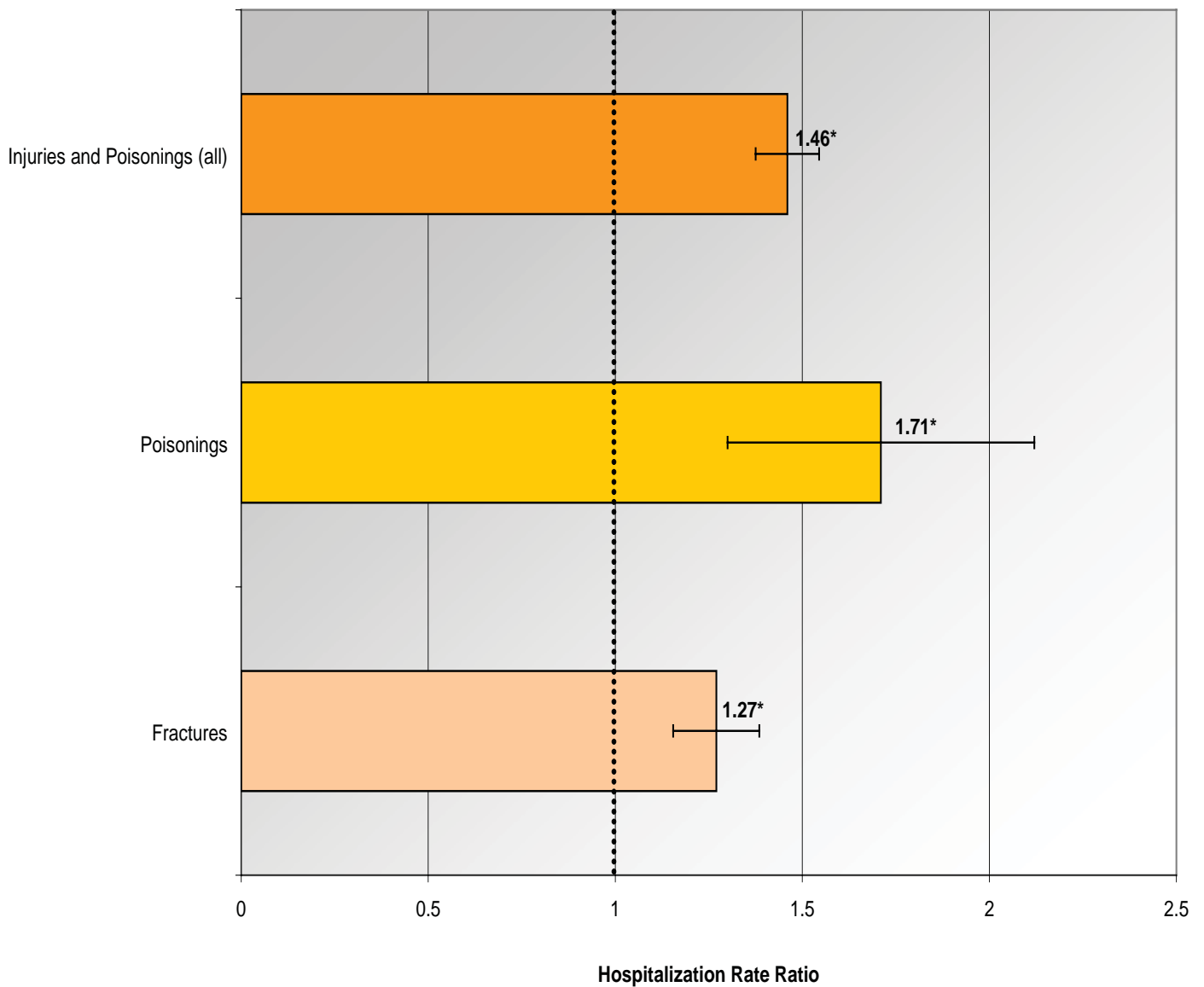


^The California rates for Tobacco-Related Diseases were age-adjusted based on the 35-44, 45-54, 55-64, and 65+ age groups.
 *Significant differences at the 95% level.

Injuries. The rates of hospitalization for injuries and poisonings combined, poisonings alone, and fractures alone are significantly higher for AIAN compared to Whites in California, for persons 1 year of age or older.

The injury and poisoning (all) hospitalization rate as any-listed diagnoses is 1.46 times higher for AIAN than Whites (95% CI of 1.38 to 1.55) (Figure 1). Hospitalization rates for poisonings alone are 1.71 times higher for AIAN than Whites (95% CI of 1.35 to 2.17). Rates of hospitalization for fractures alone are 1.27 times higher for AIAN than Whites (95% CI of 1.16 to 1.39) (Figure 7).

Figure 7. Rate Ratios for Hospitalizations with Injuries or Poisonings as Any-Listed Diagnoses: AIAN to Whites in California.



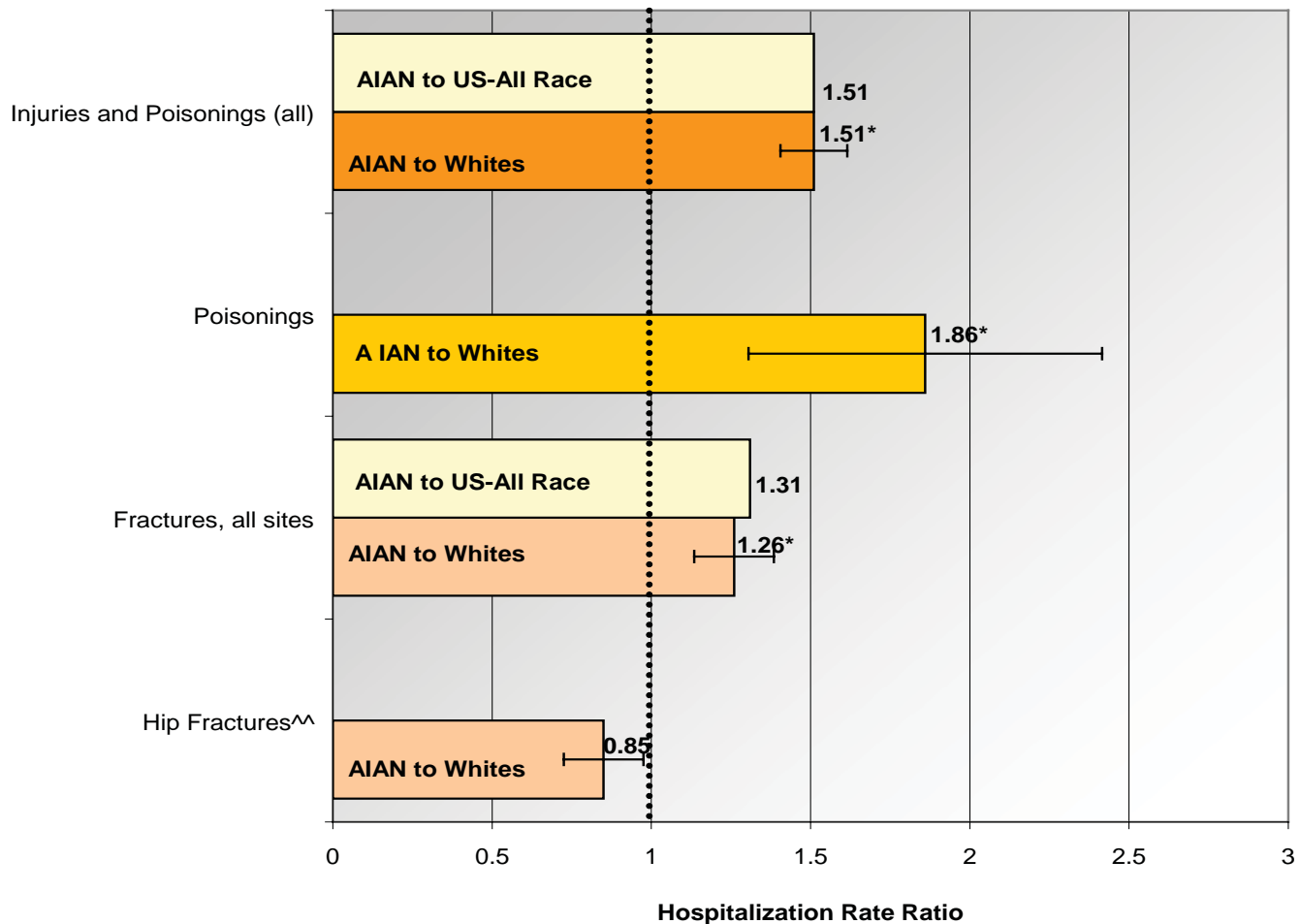
^The rates for Injuries or Poisonings were age-adjusted based on the 1-19, 20-44, 45-64, and 65+ age groups.

*Significant differences at the 95% level.

When observing the different type of injuries and poisonings for hospitalizations as the first-listed diagnoses, AIAN have disparities in hospitalization rates for injuries and poisonings compared to Whites (Rate Ratio 1.51 with 95% CI of 1.40 to 1.61). Also, the rate for injury and poisoning hospitalizations is 1.51 times higher for AIAN in California than for All Races in the US (Figure 8).

Among the different type of injury and poisoning hospitalizations as first-listed diagnoses the disparities in hospitalization rates among AIAN compared to Whites in California are due mainly to poisonings (Rate Ratio 1.86 with a 95% CI of 1.39 to 2.50), and the second most to fractures (Rate Ratio 1.26 with a 95% CI of 1.14 to 1.39). The highest disparities in fractures are related to all sites of the body except for hip fractures (Rate Ratio 0.85 with a 95% CI of 0.74 to 0.99). Compared to US-All Races, the hospitalization rate for fractures at all sites is 1.31 times higher for AIAN in California (Figure 8).

Figure 8. Rate Ratios for Hospitalizations with Injuries or Poisonings as First-Listed Diagnoses: AIAN in California to US-All Races, and to Whites in California.



^The California rates for Injuries or Poisonings (all), poisonings, fractures (including hip fractures) were age-adjusted based on the 1-19, 20-44, 45-64, and 65+ age groups. The US-All race rates for Injuries or Poisonings (all), and fractures were age-adjusted based on the 1-17, 18-44, 45-64, and 65+ age groups.

^^Hip Fractures are included in the fractures category.

*Significant differences at the 95% level.

DISCUSSION & CONCLUSIONS

The findings demonstrate that AIAN who use rural Tribal Health Programs in California are experiencing overwhelming disparities in health status compared to Whites in similar geographic areas, and worst health status than All Races in the US. The indicators of severe morbidity used in this report reveal that AIAN are hospitalized at rates significantly more than Whites for diabetes, asthma, cerebrovascular disease, heart disease, alcohol-and tobacco-related conditions, alcohol and drug, and injuries and poisonings. Rates for AIAN in California are also higher than for All Races in the US for diabetes, and alcohol and drug-related hospitalizations.

A closer look at the types of cancer or injuries effecting AIAN reveal additional information about where health prevention efforts could be focused. Although AIAN have lower rates of cancer hospitalizations than Whites in California, they have higher rates for colon cancer. AIAN also appear to have higher rates of colon cancer than All Races in the US. In regard to injuries and poisonings, AIAN suffer more than Whites in California from poisonings alone, and secondly from fractures at all sites, excluding hip fractures. Furthermore, AIAN in California also have higher age-specific rates of hospitalization than US-All Races for injuries and poisonings and fractures.

The report findings are intended to provide valuable health information to rural Tribal communities in California in order to create health prevention initiatives, policy strategies, and to focus particular health prevention efforts. The findings may identify a community's need to channel more educational and funding resources to support the prevention of specific diseases or conditions that are now being revealed as disparities since they are being reported for the first time in California.

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APPENDIX A.

DIAGNOSTIC CODES USED IN ANALYSES OF ANY-LISTED DIAGNOSES

Diagnostic Category^	ICD-9 Code Numbers
Diabetes mellitus*	250
Asthma^	493
Cardiovascular Disease:	
Heart disease^	391-392.0, 393-398, 402, 404, 410-416, 420-429
Cerebrovascular disease^	430-438
Malignant Neoplasms^ (Cancers)	140-208
Large intestine and rectum (Colon)	153-154, 197.5
Trachea, bronchus, and lung (Respiratory)	162, 197.0, 197.3
Breast	174-175, 198.81
Prostate	185
Alcohol**	Chronic conditions 100% attributable to alcohol: 291, 303.0, 303.9, 305.0, 357.5, 425.5, 535.3, 571.0-571.3, 655.4, 760.71; Chronic conditions with high causation: 530.7, 571.5-571.9, 572.3, 577.0, 577.1, 572.3; Chronic conditions with medium causation: 141,143-146, 148, 149, 150, 155, 161, 427.0, 427.2, 427.3, 456.0-456.2; Acute conditions that are 100% attributable to alcohol: 980.0, 980.1, E860.0, E860.1, E860.2, E860.9, 790.3.
Tobacco-related***	Neoplasms: 140-149, 150, 157, 161, 162, 180, 188, 189; Cardiovascular disease: 390-398, 401-404, 410-414, 415-417, 420-429, 430-438, 440, 441, 442-448; Respiratory disease: 010-012, 480-487, 490, 491-492, 493, 496.
Injuries and poisoning^	800-999
Fractures, all sites	800-829
Hip Fractures (neck of femur)	820
Poisonings^^	960-989

~Codes are based on the International Classification of Diseases that are Clinically Modifiable version 9 (ICD-9-CM).

^National Center for Health Statistics. Health, United States, 2005. With Chartbook on Trends in the Health of Americans. Hyattsville, Maryland: 2005.

^^National Hospital Discharge Survey. National Center for Health Statistics, 2002.

*Center for Disease Control, Diabetes Surveillance System, 2002 Surveillance Report. <http://www.cdc.gov/diabetes/statistics/index.htm#hospitalization>. Referenced March 2006. Diagnoses for the US rate were based on 1 primary of any of 6 secondary diagnoses.

**Center for Disease Control (CDC) and the National Center for Chronic Disease Prevention and Health Promotion (NCCDPH) Alcohol and Public Health. <http://apps.nccd.cdc.gov/ardi/AboutARDICrosswalk.htm>. Referenced on March 8, 2006.

*** Annual Smoking-Attributable Mortality, Years of Potential Life Lost, and Economic Costs-United States, 1995-1999. Centers for Disease Control and Prevention. Table 1. MMR. April 12, 2002/51 (14);300-3. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5114a2>. Accessed May 2, 2006.

APPENDIX B.

DIAGNOSTIC CODES USED IN ANALYSES OF FIRST-LISTED DIAGNOSES

Diagnostic Category [^]	ICD-9 Code Numbers
Asthma.....	493
Cardiovascular Disease:	
Heart Disease.....	391-392.0, 393-398, 402, 404, 410-416, 420-429
Cerebrovascular Disease.....	430-438
Malignant Neoplasms (Cancers).....	140-208
Large intestine and rectum (Colon).....	153-154, 197.5
Trachea, bronchus, and lung (Respiratory).....	162, 197.0, 197.3
Breast.....	174-175, 198.81
Alcohol and Drug.....	291-292, 303-305
Injuries and Poisoning.....	800-999
Fractures, all sites.....	800-829
Hip Fractures (neck of femur).....	820
Poisonings ^{^^}	960-989

~Codes are based on the International Classification of Diseases that are Clinically Modifiable version 9 (ICD-9-CM).

[^]National Center for Health Statistics. Health, United States, 2005. With Chartbook on Trends in the Health of Americans. Hyattsville, Maryland: 2005.

^{^^} National Hospital Discharge Survey. National Center for Health Statistics, 2002.

APPENDIX C.

AGE GROUPS FOR ADJUSTMENT OF HOSPITALIZATION RATES WITH DIAGNOSIS LISTED AS ANY* DIAGNOSIS

DIAGNOSIS LISTED AS ANY DIAGNOSIS

Diabetes	Asthma	Heart Disease	Cerebrovascular Disease	Malignant Neoplasms (Cancers) ⁻	Injury & Poisonings [^]	Alcohol	Tobacco
1-44	1-44	20-44 [^]	45-64	1-44	1-19	1-19	35-44
45-64	45-64	45-64	65+	45-64	20-44	20-44	45-54
65+	65+	65+		65+	45-64	45-64	55-64
					65+	65+	65+

^{*}Hospitalization causes based on Any diagnosis were identified as a primary diagnosis or any 1 other of the four secondary diagnoses.

⁻The age groups are the same for colon, respiratory, breast, and prostate cancers as Any diagnosis.

[^]The age groups are the same for fractures (all sites), hip fractures, and poisonings.

APPENDIX D.

AGE GROUPS FOR ADJUSTMENT OF HOSPITALIZATION RATES WITH DIAGNOSIS LISTED AS FIRST DIAGNOSIS

DIAGNOSIS LISTED FIRST

Asthma ^{^^}	Heart Disease ^{^^^}	Cerebrovascular Disease	Malignant Neoplasms (Cancers)	Respiratory Cancer	Colon [~]	Injury & Poisoning [*]	Fractures, all sites [*]	Alcohol and Drug [^]
1-19	20-44	45-64	45-64	45-64	65+	1-19	1-19	20-44
	45-64	65+	65+	65+		20-44	20-44	45-64
	65+					45-64	45-64	
						65+	65+	

[^]The US-All Race hospitalization rate for Alcohol and Drug was age-adjusted based on the following age groups: 18-44, 45-64.

^{^^}The US-All Race hospitalization rate for Asthma was based on the following age group: 1-17.

^{^^^}The US-All Race hospitalization rate for Heart Disease was age-adjusted based on the following age groups: 18-44, 45-64, 65+.

[~]The rate for colon cancer as a First-listed diagnosis was not age-adjusted.

^{*}The age groups are the same for hip fractures, and poisonings. The US-All Race hospitalization rates for Injury & Poisonings and Fractures (all sites) were age-adjusted based on the following age groups: 1-17, 18-44, 45-64, 65+.

CALIFORNIA TRIBAL EPIDEMIOLOGY CENTER
4400 AUBURN BLVD.
2ND FLOOR
SACRAMENTO, CALIFORNIA
95841
916-929-9761 PHONE
916-929-7246 FAX