

# Injury and disability among Native Hawai'ians

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## Abstract

Injury remains one of the most pressing health problems facing the world for all ethnic groups. The literature shows that overall injury rates for Native Hawai'ians are not significantly higher than other groups and, in some cases lower. However, Native Hawai'ians have more risk factors, suggesting rates may be higher within particular groups. This article is based on data from collaborative research that reviewed death certificates and medical records from 1990 with diagnoses related to injury. Ethnicity was classified into two groups (Native Hawai'ian and non-Hawai'ian) and rates were compared. Injury rates were significantly higher for younger Native Hawai'ians, particularly suicides, assaults and traffic incidents. Similarly, the disability proportion was higher among younger Native Hawai'ians, primarily due to traffic incidents. In response to community-specific issues, a number of cultural approaches to injury prevention have been used in Hawai'i. The effectiveness of these approaches

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for reducing injury risk among Native Hawai'ians warrants further investigation.

## Introduction

Morbidity and mortality for most health conditions among the Native Hawai'ian population are disproportionately high compared to other groups in Hawai'i<sup>1-4</sup>. However, the proportion of deaths for the three large injury categories (unintentional, homicide and suicide) are equivalent between Native Hawai'ians and the state overall<sup>4</sup>. The authors and colleagues reported similar findings for Native Hawai'ians/Part Hawai'ians<sup>5</sup>. The injury death rate for Native Hawai'ians/Part Hawai'ians of 43.4 per 100,000 approximated Hawai'i's overall estimated annual injury death rate of 42.3 per 100,000 residents. However, the estimated injury hospitalization rate

for Native Hawai'ians/Part Hawai'ians of 230.4 per 100,000 was substantially lower than the overall hospitalization rate of 580.9 per 100,000 residents. These rates meet health status objectives for injury established in Healthy People 2000<sup>6</sup>. While it appears injury and disability are not major prob-

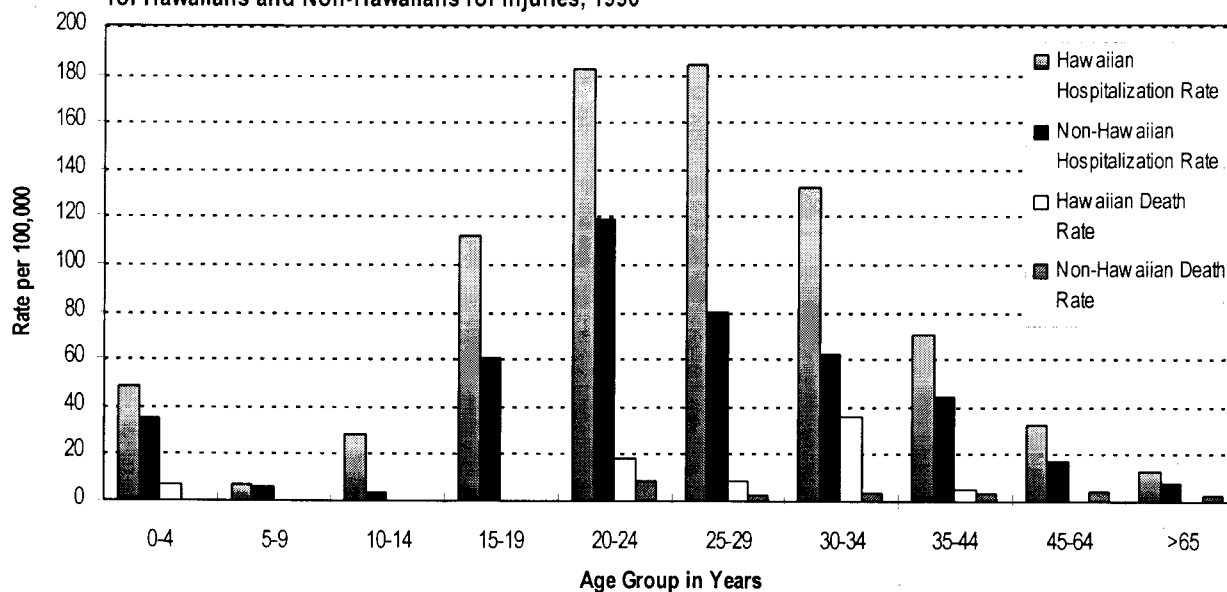
lems for Native Hawai'ians overall, other related factors suggest that some subgroups may be at increased risk.

Haddon's pioneering contribution of a series of matrices changed the way injury is conceptualized<sup>7</sup>. Injury and disability result from complex interactions among the individual, the vector, the physical environment, and the socio-economic environment that occur over time. Thus, these rates are influenced by demographic, geographic and behavior factors. For example, Healthy Start programs provide early intervention for child abuse by identifying families at high-risk<sup>4</sup>. Factors contributing to high-risk include insufficient income, family separation, social isolation, lack of tolerance to child's disobedience, family violence, alcohol or drug dependence, and many others. Native Hawai'ians comprise over 44% of referrals to this program, far higher than other ethnic groups. While these programs are extremely successful, not every child at risk is identified.

Alcohol and other substance abuse impacts virtually all causes of injury areas, particularly motor vehicle incidents,

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**Figure 1. Age-specific assault death and hospitalization rates for Hawaiians and Non-Hawaiians for injuries, 1990**



drownings, assaults, and suicide<sup>8</sup>. Contrary to popular perception, alcohol and other drugs can increase the risk of permanent paralysis and other serious injury. In fact, the more serious the event, the more likely alcohol played a role. Native Americans and Pacificans are at increased risk for alcohol and other drug abuse<sup>9-11</sup>. These groups have also been reported to start using substances earlier and more heavily. Over the last six years for which self-reported information is available, Native Hawaiians consistently have a higher prevalence of acute drinking in comparison to other ethnic groups<sup>4</sup>. Additionally, Native Hawaiians have the highest reported percent of drinking and driving.

These factors suggest that children and young adults are likely to be at increased risk for particular types of injury and disability. Overall rates may have obscured subgroup risks. This article takes a more in-depth look at injury and disability among Native Hawaiians.

## Methods

Injury death, disability and hospitalization was examined through collaborative research conducted by the Pacific Basin Rehabilitation Research & Training Center, the Hawaii State Department of Health, Injury Prevention and Control Program and all hospitals in Hawai'i. The collaborative study used death certificates and medical records as the primary sources of data. Medical record review was completed for all patients admitted to any of Hawai'i's acute care hospitals in 1990, with International Classification of Disease, 9th revision (ICD-9) codes related to injury<sup>12</sup>. The study included injuries caused by traffic incidents, falls, drowning, burns and other unintentional injuries as well as intentional injuries such as suicides and suicide gestures, homicides, domestic abuse, assault and battery. The study excluded injuries resulting

from medical or surgical complications. Data from medical records and death certificates include information on injury type, etiology or cause, severity, outcomes, risk factors such as non-use of safety equipment and substance use, ethnicity, sex, age and residence status.

The database contains approximately 96% of all injury hospital admissions. Record abstraction was completed at all of the 20 hospitals. It was not possible to obtain every record at every hospital. Although information was collected in a standardized manner, the reader should also be aware that injury definitions and completeness of recorded information varies from hospital to hospital. This is not expected to have a major effect on the results.

Descriptive statistical analyses were conducted, including injury death and hospitalization rates. Fisher exact test and chi squared were used to assess differences between groups. Significance was established at the 0.05 level. It was necessary to consider the resident status of those injured in order to determine rates of injury by age. Rates are figured for the resident population. Injury rates are calculated by dividing the number of injuries by the population at risk for injury (residents in particular age groups). Rates were determined using 1990 Hawai'i Census population estimates for this report<sup>4,13</sup>. In addition, the number of residents at risk for each activity is not known. Therefore, only residents will be used as the denominator for this analysis. This means the actual rate of injuries is often underestimated.

Disability rates were based on hospitalizations longer than two weeks, a time frame considered clinically relevant. Additionally, outpatient referral proportions were calculated. For the purposes of this paper, ethnicity was divided into two categories — Native Hawaiians and non-Hawaiians. It is

important to note the limitations of the ethnicity information. No measure of blood quantification was available. Additionally, the manner in which this information was originally obtained varied. Each of the hospitals in Hawai'i have specific procedures for recording ethnic information. In some instances, patients are asked to identify their primary category. In other instances, hospital personnel record the ethnic category, therefore, findings may reflect their biases. In the past few years, more emphasis has been placed on obtaining statistics on ethnic groups. While researchers agree that definitions must be established and validated for ethnic classifications and respondents must understand these definitions, this remains a limitation.

## Results

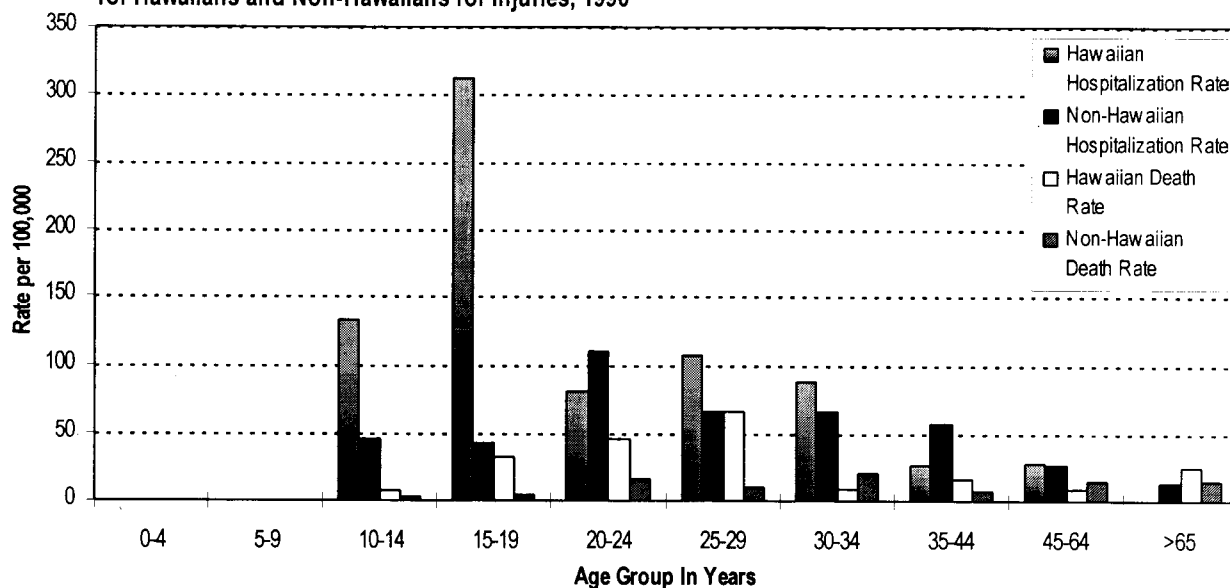
In 1990, 106 Native Hawaiians were killed and 995 Native Hawaiians were hospitalized as a result of injuries. Of those hospitalized, 102 Native Hawaiians were disabled and 131 Native Hawaiians were referred for outpatient services. Three hundred eighty-eight non-Hawaiians were killed and 5608 non-Hawaiians were hospitalized during that same year. Eight hundred eleven non-Hawaiians were disabled and 1063 were referred.

Injury death and hospitalization rates are displayed in figures 1-5. In order to provide more detail for each major cause of injury, the scales of the graphs are different. Assault hospitalization rates were significantly higher for Native Hawaiians ages 10-34 and homicide rates were significantly higher for Native Hawaiians ages 30-34 (Figure 1). The relative risk for was more than eight times higher among Native Hawaiians ages 10-14, nearly two times higher among Native Hawaiians ages 15-19, more than one and a half times higher for Native Hawaiians ages 20-24 and

more than two times higher for Native Hawaiians ages 25-29 when compared to non-Hawaiians the same ages (RR=8.39, 95% CI 1.54, 45.80; RR=1.86, 95% CI 1.01, 3.42; RR=1.53, 95% CI 0.94, 2.47; RR=2.31, 95% CI 1.43, 3.74, respectively). The hospitalization rate was significantly higher for Native Hawaiian women (20.0%) and children (27.4%) compared to non-Hawaiians ( $\chi^2=7.93$ ,  $p=0.005$ ;  $\chi^2=3.83$ ,  $p=0.050$ , respectively). The relative risk for homicide was more than two times higher among Native Hawaiians ages 30-34 than among non-Hawaiians (RR=2.15, 95% CI 1.21, 3.80). There was no significant difference in homicide-related disability proportions between Native Hawaiians (10.8%) and non-Hawaiians (4.6%). However, non-Hawaiians were 2.4 times more likely to be referred for outpatient services ( $\chi^2=5.27$ ,  $p=0.022$ ).

Suicide hospitalization rates were significantly higher for Native Hawaiians ages 10-19 and suicide success rates were higher for Native Hawaiians ages 15-29 (see Figure 2). The relative risk for suicide attempts was nearly three times higher among Native Hawaiians ages 10-14 and more than seven times higher among Native Hawaiians ages 15-19 than among non-Hawaiians the same ages (RR=2.95, 95% CI 1.58, 5.50; RR=7.28, 95% CI 4.46, 11.88, respectively). The relative risk for successful suicide among Native Hawaiians ages 15-19 was nearly seven times higher, nearly three times higher among Native Hawaiians ages 20-24 and more than six times higher among Native Hawaiians ages 25-29 than among non-Hawaiians the same ages (RR=6.73, 95% CI 1.51, 30.09; RR=2.79, 95% CI 1.00, 7.82; RR=6.54, 95% CI 2.53, 16.96, respectively). While in nearly every instance rates for males are higher than for females, suicide attempt rates were higher for females, particularly Native Hawaiian females. The proportion of suicide-related disability was significantly lower among Native Hawaiians (<1.0%) than

**Figure 2. Age-specific suicide death and hospitalization rates for Hawaiians and Non-Hawaiians for injuries, 1990**



among non-Hawaiians (4.4%), primarily due to method of attempt among adults ( $\chi^2=6.61, p=0.010$ ). The proportion of referrals for outpatient services was not significantly different among Native Hawaiians (27%) and non-Hawaiians (36%), regardless of age group.

Traffic rates were significantly higher for Native Hawaiians ages 15-29 and traffic hospitalization rates were higher for Native Hawaiians ages 0-44 (Figure 3). Traffic hospitalization rates were higher for non-Hawaiians ages 65 and over, though not significantly. The relative risk of traffic injury hospitalization was more than two times higher for Native Hawaiians ages 0-4, more than three times higher among Native Hawaiians ages 5-9, more than 2.5 times higher among Native Hawaiians ages 10-14, nearly two times higher among Native Hawaiians ages 15-19, nearly two times higher among Native Hawaiians ages 20-29 and nearly two times higher among Native Hawaiians ages 35-44 when compared to non-Hawaiians of the same age (RR=2.10, 95% CI 1.16, 3.78; RR=3.10, 95% CI 1.94, 4.96; RR=2.54, 95% CI 1.56, 4.13; RR=1.82, 95% CI 1.29, 2.58; RR=1.92, 95% CI 1.37, 2.70; RR=1.73, 95% CI 1.18, 2.52, respectively). The relative risk for traffic injury death was more than five times higher among Native Hawaiians ages 15-19, more than three times higher among Native Hawaiians ages 20-24 and more than three times higher among Native Hawaiians ages 25-29 than among non-Hawaiians of the same age (RR=5.05, 95% CI 2.34, 10.87; RR=3.63, 95% CI 1.70, 7.75; RR=3.49, 95% CI 1.58, 7.72, respectively). Traffic incidents accounted for 41% of all disabling injuries among Native Hawaiians and only 22% among non-Hawaiians ( $\chi^2=18.25, p=0.00002$ ). There was no difference in referral proportion between Native Hawaiians and non-Hawaiians.

Fall hospitalization rates were significantly higher for Native Hawaiian children ages 5-9 and adults 35-44 and signifi-

cantly lower for elderly Native Hawaiians ages 65 and over (see Figure 4). Note that the rate of hospitalization from falls among the elderly was the highest for any cause of injury. The relative risk for fall injury hospitalization was more than 1.6 times lower among Native Hawaiians ages 65 and over than among elderly non-Hawaiians (RR=1.61, 95% CI 1.19, 2.22). The relative risk of fall injury hospitalization was more than two times higher among Native Hawaiians ages 5-9 and nearly two times higher among Native Hawaiians ages 35-44 when compared to non-Hawaiians the same age (RR=2.63, 95% CI 1.61, 4.27; RR=1.85, 95% CI 1.19, 2.87, respectively). Falls accounted for 54% of all disabling injuries among non-Hawaiians and only 26% among Native Hawaiians ( $\chi^2=26.88, p=0.000002$ ). There were no differences between Native Hawaiians and non-Hawaiians with respect to outpatient referrals nor fall-related deaths.

Recreational injury death rates did not significantly differ among Native Hawaiians and non-Hawaiians (see Figure 5). Recreational injury hospitalization rates were significantly higher for Native Hawaiians ages 15-19. The relative risk for recreational injury hospitalization was nearly two times higher among Native Hawaiians ages 15-19 when compared to non-Hawaiians (RR=1.93, 95% CI 1.23, 3.03). Hospitalization rates were higher for Native Hawaiians ages 0-14 and lower for Native Hawaiians ages 20 and over, though not significantly so. Approximately 8% of Native Hawaiians and 5% of non-Hawaiians were disabled by recreational injuries. However, there was no difference in recreational injury disability proportions. Non-Hawaiians were referred for outpatient services for their recreational injuries significantly more (16%) than Native Hawaiians (8%) ( $\chi^2=4.23, p=0.04$ ).

**Figure 3. Age-specific traffic death and hospitalization rates for Hawaiians and Non-Hawaiians for injuries, 1990**

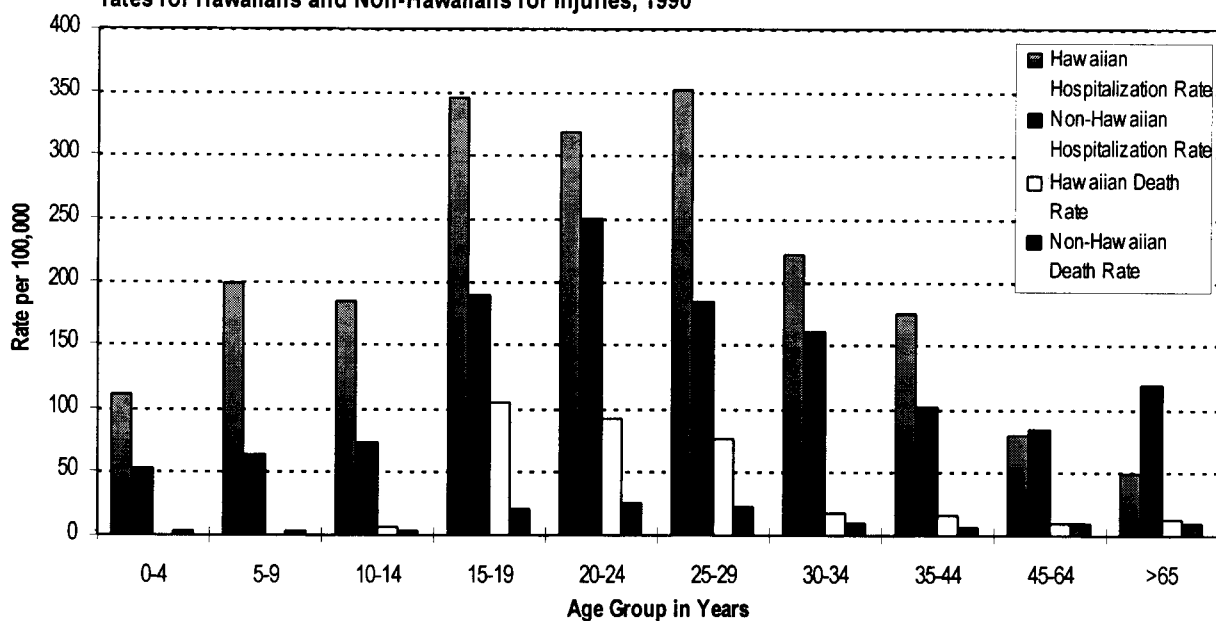
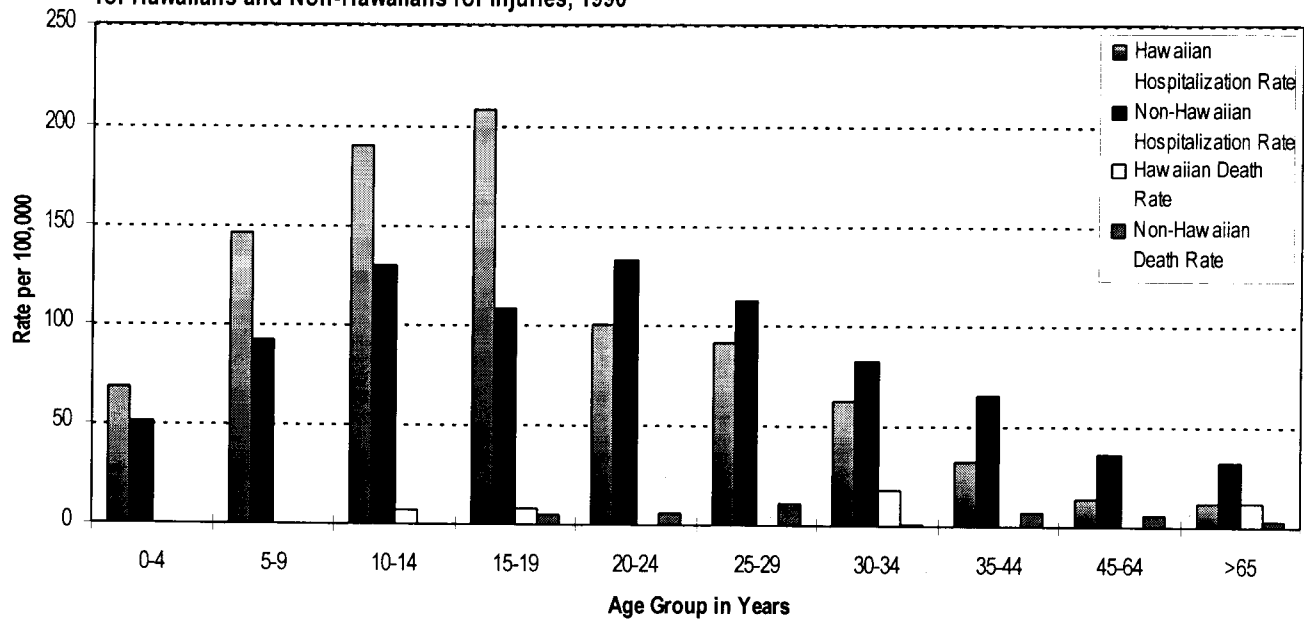


Figure 5. Age-specific recreation death and hospitalization rates for Hawaiians and Non-Hawaiians for injuries, 1990



## Discussion

Overall injury rates for Native Hawaiians obscure their risk. Compatible and/or lower rates among adults over 45 may be a reflection of increasing risk for other diseases. However, Native Hawaiian children and young adults are clearly at increased risk for injury and disability.

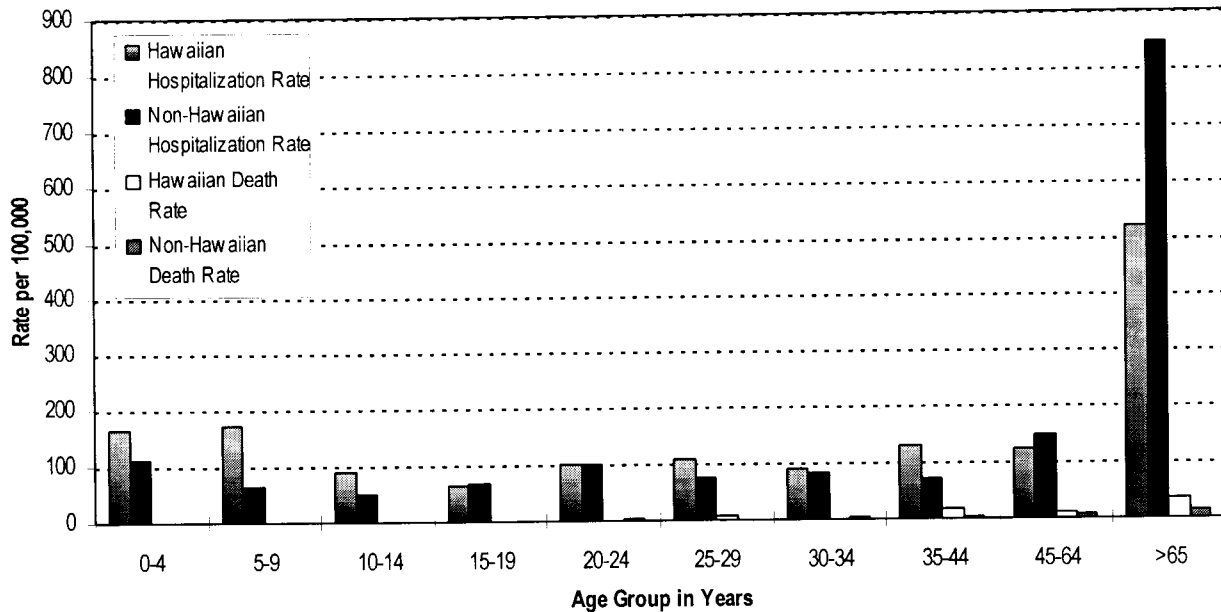
The most disturbing findings unveiled in the results are the high suicide attempt rates among Native Hawaiian youth and high suicide success rates among Native Hawaiian young adults. Perhaps even more disturbing, this confirms high attempt rates among Native Hawaiians ages 10–29 that were determined more than 25 years ago<sup>14</sup>. Recently, Yuen and colleagues found that 4.3% of Native Hawaiian adolescents had attempted suicide within the six-month period prior to the survey<sup>15</sup>. Native Hawaiian adolescents who attempt suicide have a greater number of psychiatric symptoms, particularly depression and substance abuse. Whereas friend support had no measurable influence, rates were lower in Native Hawaiian adolescents with strong family support suggesting a potential protective factor. The authors suggest that the family and extended family, or *‘ohana*, assume greater importance for Native Hawaiian adolescents. Native Hawaiian cultural values of sharing and unity within the family, rather than separation from the family, throughout adolescence and adulthood can have a positive influence on health. The development of a suicide prevention project for Native Hawaiian adolescents is currently underway.

Assaultive injury rates are also higher among young Native Hawaiian children and Native Hawaiian youth and young adults. Twenty percent of all women hospitalized for domes-

tic violence are Native Hawaiian, compared to 9.8% of the general population. Among children, 27.4% of victims are Native Hawaiian, where as Native Hawaiians represent only 18.4% of the child population. These findings are almost identical to those based on victim reporting<sup>16,17</sup>. In response to these higher rates among Native Hawaiians, the Hawai‘i Department of Health, Community Nursing Division developed *Identifying Family Violence: A Community Prototype Incorporating Native Hawaiian Values and Practices*, a training manual for health care professionals to aid in identifying and managing family violence situations<sup>18</sup>. Operating under the basic assumption that the family is the foundation of a safe society, the curriculum integrates Native Hawaiian values — such as *aloha*, *kokua*, *‘ohana*, *pule* and *ho‘oponopono* — into the process. Phases of the process include: identification without judgement, an interview encouraging disclosure, an examination, presentation of enabling resources and options, and forgiveness and closure. The manual is designed to be expanded, refined and even modified as appropriate to the situation. A culturally integrated approach is a necessary component of local strategies to address this problem.

Traffic injuries result in the highest death and hospitalization rates and are most disabling of all unintentional injuries for Native Hawaiian children, youth and young adults. Wai‘anae is a community along the west coast of O‘ahu where 31% of the population is Native Hawaiian. Injury statistics reveal that 25% of all traffic fatalities and 20% of traffic-related hospitalizations occur in this district, almost all along the main road, Farrington Highway<sup>19,20</sup>. Children ages 5–9 have the highest risk for pedestrian injuries when crossing the street during daylight hours<sup>21</sup>. Community leaders, parents, teachers, students and public health educators met to discuss Maile’s (a town in Wai‘anae district) pedestrian injury prob-

**Figure 4. Age-specific fall death and hospitalization rates for Hawaiians and Non-Hawaiians for injuries, 1990**



lem and possible strategies to address it<sup>22</sup>. Under the leadership of the Zangerle family, whose daughter was disabled after being hit by a car while crossing Farrington Highway, a day-long workshop was held bringing together 40 children ranging in age from 5–16 years. In small groups, the youth discussed traffic safety issues and developed a skit that illustrated typical traffic safety situation encountered by Maile's young people. The role-playing culminated into the production of a video called *Watch It! Don't Dodge It!*, a lesson plan and activity book shaped by the community and produced by the Hawaii Department of Health, Injury Prevention & Control Program<sup>23</sup>. While this project has not been evaluated, it appears to be successful. Matsunaga and colleagues found that community participation in project development and implementation was essential for generating acceptance among Native Hawai'ian communities<sup>24</sup>.

While interventions must target those who engage in high-risk behaviors, the social, physical and contextual environments must be considered<sup>25</sup>. Rather than focusing on risk factors, prevention programs are increasingly integrating other factors that may be protective by lessening risk or encouraging healthy behaviors. Many of these strategies incorporate cultural values. Such approaches accentuating protective factors are necessary for communities to impact these rates. Current efforts show promise. The effectiveness of these strategies in reducing injury risk among Native Hawai'ians warrants further investigation.

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He ma'i nui ka hilahila.

**Humiliation is a great disease.**

Shame and humiliation can make one sick at heart.

*'Ōlelo No'eau #783*