

ETHNIC DIFFERENCES IN POTENTIALLY PREVENTABLE HOSPITALIZATIONS AMONG ASIAN AMERICANS, NATIVE HAWAIIANS, AND OTHER PACIFIC ISLANDERS: IMPLICATIONS FOR REDUCING HEALTH CARE DISPARITIES

Objectives: A serious challenge to eliminating US health disparities stems from the inability to reliably measure outcomes, particularly for numerically small populations. Our study aimed to produce reliable estimates of health care quality among Native Hawaiian (NH), Other Pacific Islander (PI), and Asian American (AA) subgroups.

Design: Prevention Quality Indicators (PQIs) from the Agency for Healthcare Research and Quality were used to calculate 3 PQI composites and 8 individual chronic condition indicators. Data sources were the Healthcare Cost and Utilization Project State Inpatient Databases and the Hawaii Health Survey.

Main Outcome Measures: Risk-adjusted PQI rates for adults were computed for 2005 through 2007. Relative rates for 2007 were calculated for each racial/ethnic group and compared to Whites. Statistical significance was based on $P < .05$ from a two-sided t test.

Results: The combined AANHPI group had higher overall and chronic PQI composite rates than Whites in 2007. When disaggregated into discrete racial/ethnic subgroups, Chinese and Japanese had lower rates than Whites for all 3 composites, whereas NH and Other PI subgroups typically had the worst health outcomes. Trends in PQI rates from 2005 through 2007 showed persistent gaps between groups, especially across chronic PQIs.

Conclusions: Despite recent efforts to reduce racial/ethnic health care disparities, significant gaps remain in potentially preventable hospitalization rates. Practical tools that measure inequities across diverse, numerically small populations may suggest ways to optimally funnel limited resources toward improving racial/ethnic differences in health outcomes. (*Ethn Dis.* 2013;23[1]:6–11)

Key Words: Quality of Health Care, Health Care Disparities, Minority Health

From Center for Quality Improvement and Patient Safety, Agency for Healthcare Research and Quality (EM, KC, RA) and Department of Native Hawaiian Health, John A. Burns School of Medicine, University of Hawaii (MM) and Truven Health Analytics (SR) and M.L. Barrett Inc. (MB) and Hawaii Health Information Corporation (JM).

Ernest Moy, MD; Marjorie K. Mau, MD; Susan Raetzman, MSPH; Marguerite Barrett, MS; Jill B. Miyamura, PhD; Karen H. Chaves, MHS; Roxanne Andrews, PhD

INTRODUCTION

Studies of health care disparities often combine Asian American (AA), Native Hawaiian (NH), and Other Pacific Islander (PI) populations and find that this merged AANHPI group achieves health outcomes that are similar to or better than those of White populations. However, when research has distinguished between AANHPI subgroups, wide variation has been observed in health behaviors, service utilization, disease prevalence, psychological distress, and self-reported health status.^{1–6} For example, the 2009 National Healthcare Disparities Report found that Californians of Chinese, Korean, or Vietnamese descent were less likely to receive colorectal cancer screening than White Californians or other AA subgroups.⁷

Recognizing the heterogeneity of broad racial categories, the Institute of Medicine recommended that health data collection include information on granular ethnicity—based on a person's ancestry—to facilitate understanding of disparities.⁸ The US Department of Health and Human Services recently published new data-collection standards to be implemented in federal surveys that include granular AANHPI categories.⁹ However, even when subgroups can be identified, the challenge of generating reliable statistics for

In this study, we built on Hawaii's hospital administrative data to produce reliable estimates of potentially preventable hospitalization rates among AANHPI subgroups.

subgroups with small sample sizes remains.¹⁰

Hospital administrative data that include information on AANHPI subgroups offer a potential solution to the small numbers problem. The datasets are typically large and include all hospitalizations; hence, they are not subject to sampling error. In this study, we built on Hawaii's hospital administrative data to produce reliable estimates of potentially preventable hospitalization rates among AANHPI subgroups.

METHODS

This analysis compares racial and ethnic differences in rates of potentially preventable hospitalizations for ambulatory-care sensitive conditions among AANHPI subgroups and White persons in Hawaii. Potentially preventable hospitalizations are measured using Version 3.1 of the Agency for Healthcare Research and Quality (AHRQ) Prevention Quality Indicators (PQIs).¹¹ The PQIs examine access to quality care by focusing on hospitalizations for which

Address correspondence to Susan Raetzman, MSPH; Truven Health Analytics; 4301 Connecticut Ave., N.W., Suite 330; Washington, DC 20008; 202.719.7869; 202.719.7801 (fax); susan.raetzman@truvenhealth.com

Table 1. Distribution of adult (age ≥ 18 years) hospital inpatient discharges by race and ethnicity in Hawaii, 2007

Race/ethnicity	Adult Hospital Discharges, Weighted (% of All Discharges)	Adult State Population Estimate (%)
White	28,057 (28)	259,581 (27)
Japanese	19,146 (19)	211,656 (22)
Native Hawaiian ^a	15,209 (15)	194,049 (20)
Filipino	14,404 (15)	146,670 (15)
Other Pacific Islander	3,803 (4)	27,186 (3)
Chinese	3,966 (4)	55,811 (6)
Other Asian	4,589 (5)	19,437 (2)
Hispanic ^b	2,243 (2)	26,794 (3)
Black ^b	923 (1)	11,524 (1)
Other (not listed above) ^b	6,631 (7)	23,211 (2)
TOTAL	98,971 (100)	975,919 (100)

Source: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Hawaii State Inpatient Databases.

^a Native Hawaiian includes full- and part-Native Hawaiian.

^b These racial/ethnic groups were eliminated from further analysis because of unstable estimates caused by small sample sizes.

appropriate outpatient care can potentially prevent the need for hospitalization. The PQIs are not definitive measures of quality; rather, they serve as screens for evaluating access to and quality of outpatient and preventive care and for identifying areas that may need more in-depth assessment.^{1,2,11}

Data Sources

All PQIs were constructed using 2005 through 2007 hospital administrative data from the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases and population data from the Hawaii Health Survey. The HCUP is a family of health care databases developed through a voluntary federal-state-industry partnership sponsored by AHRQ. The Hawaii Health Information Corporation, an HCUP state Partner, supplied HCUP with summary records for each hospitalization that included patient demographics, diagnoses, and procedures performed. The analysis included all inpatient discharges from non-federal community and nonrehabilitation hospitals in Hawaii. The Hawaii Health Survey is a statewide household survey of health and sociodemographic conditions, which is modeled after the National Health Interview Survey.^{12,13}

The two Hawaiian data sources use the same racial/ethnic categories. White is specified in both sources as White/Caucasian. When multiple races are listed, a standard algorithm assigns one race according to the following accepted hierarchy: if Hawaiian is listed, then part-Hawaiian is coded; if both non-White and White ethnicities are listed, then the non-White ethnicity is coded; if more than one non-White or White ethnicity is listed, then the first one is coded.¹⁴

Standard methods were applied to assign missing values and to account for excluded hospitals.¹⁵ A “hot deck” imputation method was used to assign values to the small percentage of HCUP discharges that were missing data elements essential to the calculation of the PQIs or to reporting by subpopulation. One hospital that did not report patient race on any inpatient discharge was excluded. Other Hawaiian hospitals reported patient race on 55% to 100% of discharges (average, 95%). Discharge-level weights were developed to account for a few community hospitals that were not included in the state data.

Study Population

Data were from adults aged ≥ 18 years who were living in Hawaii during 2005 through 2007. Prevention Quality Indicator rates were stratified

according to existing State of Hawaii methodology for identifying the following racial/ethnic groups: Whites (non-Hispanic), Blacks (non-Hispanic), Hispanics, Native Hawaiian and Pacific Islanders (with further categorization into Native Hawaiians or Other Pacific Islanders), and Asian Americans.¹⁶ Asian Americans were further categorized into Japanese, Chinese, Filipino, and Other Asians. Results for Hispanics, Blacks, and other racial/ethnic groups with insufficient sample size were not reported because of unstable calculations (ie, PQI rates with a relative standard error greater than 30 percent).

Statistical Analysis

Rates were calculated for 3 PQI composite indicators (overall, chronic, and acute) and for the 8 individual condition indicators comprising the chronic PQI composite: admission rates for chronic obstructive pulmonary disease, asthma, hypertension, congestive heart failure, angina, diabetes with short-term complications, diabetes with long-term complications, and diabetic lower extremity amputations. The acute PQI composite was based on admission rates for dehydration, bacterial pneumonia, and urinary tract infections.^{11,16}

Prevention Quality Indicator rates for 2007 were computed and adjusted

Table 2. Prevention Quality Indicator (PQI) composite rates per 100,000 population ≥18 years by race and ethnicity in state of Hawaii, 2007^a

Race/ethnicity	Overall (PQI 90) ^b	Acute (PQI 91) ^c	Chronic (PQI 92) ^d
White	899	394	505
Asian and Pacific Islander	1032 ^f	391	640 ^f
Asian American	845 ^f	361 ^e	484
Japanese	636 ^f	310 ^f	327 ^f
Filipino	1415 ^f	527 ^f	888 ^f
Chinese	538 ^f	236 ^f	303 ^f
Other Asian	1839 ^f	804 ^f	1036 ^f
Native Hawaiian and Pacific Islander	1477 ^f	445 ^e	1031 ^f
Native Hawaiian	1292 ^f	369	923 ^f
Other Pacific Islander	3129 ^f	1106 ^f	2023 ^f

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Hawaii State Inpatient Databases and AHRQ Quality Indicators, version 3.1.

^a Rates are adjusted by age and sex using the total US population for 2000 as the standard population.

^b PQI 90, Overall Prevention Quality Indicator Composite.

^c PQI 91, Acute Prevention Quality Indicator Composite.

^d PQI 92, Chronic Prevention Quality Indicator Composite.

^e $P < .05$.

^f $P < .01$ for comparison to Whites.

by age and sex across racial/ethnic subgroups based on methods of direct standardization.¹⁷ Rates for 2005 and 2006 were also calculated for trending purposes. Risk adjustment was computed using the standard population of the United States in 2000; except for ages 18–24 and ≥85, age was categorized

into 5-year increments (eg, 25–29, 30–34). Standard error calculations were based on the HCUP data.

Relative rates for 2007 were calculated to compare PQI composite rate differences across all racial/ethnic subgroups using White as the referent group. Comparisons of independent

subgroups were based on probability values from a two-sided *t* test and were considered statistically significant if the $P < .05$.

RESULTS

Table 1 contains the distribution of adult hospital inpatient discharges by race and ethnicity in 2007. The discharges generally reflected the population distribution of the state; the most prevalent populations were White, Japanese, Native Hawaiian, and Filipino.

The combined AANHPI group had higher overall and chronic PQI composite rates than the White group in 2007, but they had similar acute PQI composite rates (Table 2). When disaggregated into individual subgroups and compared to the White group, Other Pacific Islanders, Filipinos, and Other Asians had higher rates for all three composite PQIs, whereas both Chinese and Japanese subgroups had lower rates. In fact, either Chinese or Japanese always had the lowest PQI composite rates in 2005, 2006, and 2007. (See Figure 1a and Figure 1b for 2005 through 2007 trends in chronic and acute PQI composite rates by race/ethnicity, respectively).

Using Whites as the reference group to examine relative rates for PQI composites, the greatest variation across subgroups was in chronic PQI composite rates. Acute PQI composite rates were similar in pattern to chronic rates, but there was considerably less variation between racial/ethnic groups (Figure 2). Filipinos, Other Asians, Native Hawaiians, and Other Pacific Islanders had higher relative rates for the chronic PQI composite.

Racial/ethnic differences among AANHPI subgroups were also identified across the individual PQI indicators that contributed to the chronic PQI composite in 2007 (Table 3). Similar to the general pattern observed for chronic and overall PQI composite rates, individual chronic

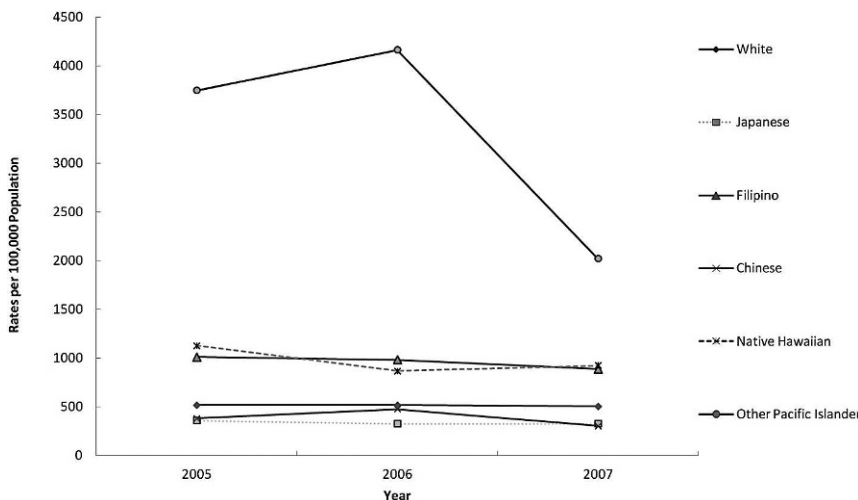


Fig 1a. Trends in chronic Prevention Quality Indicator composite by race/ethnicity, 2005–2007

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Hawaii State Inpatient Databases and AHRQ Quality Indicators, version 3.1

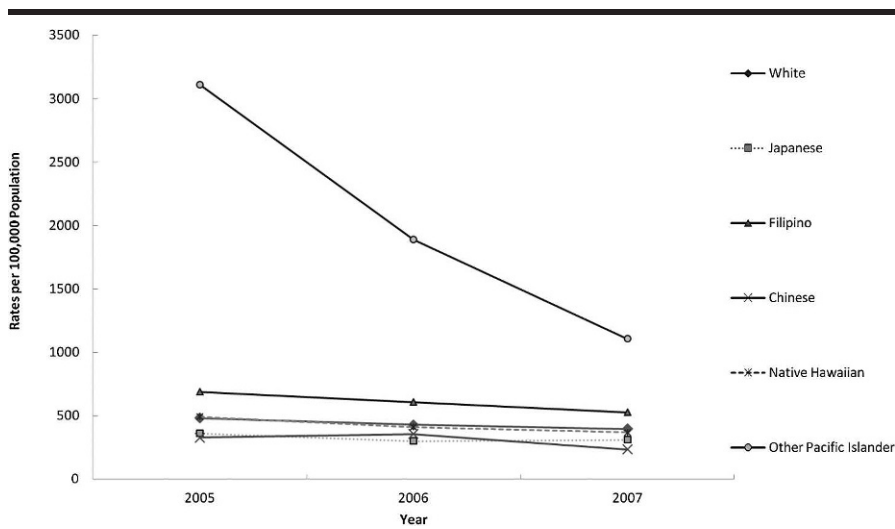


Fig 1b. Trends in acute Prevention Quality Indicator composite by race/ethnicity, 2005–2007

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Hawaii State Inpatient Databases and AHRQ Quality Indicators, version 3.1

PQI rates for Native Hawaiians and Filipinos were generally higher than those of Whites. In addition, Japanese had comparable or lower rates for all individual chronic PQIs compared to Whites.

The general trends were toward decreases in potentially preventable hospitalizations based on acute and chronic PQI composites for all racial/ethnic groups from 2005 to 2007.

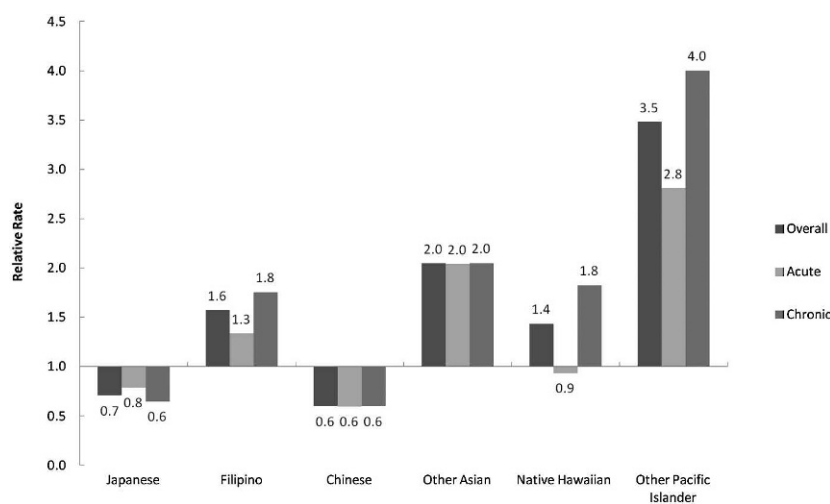


Fig 2. Racial and ethnic comparison of relative rates of overall, acute, and chronic Prevention Quality Indicator (PQI) composites relative to Whites, 2007

P < .01 for all relative rate comparisons except Native Hawaiian for Acute PQI Composite

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Hawaii State Inpatient Databases and AHRQ Quality Indicators, version 3.1

(Figures 1a and 1b). The greatest improvements in acute and chronic PQI composite rates were for Other Pacific Islanders. Still, the gap in PQI rates between racial/ethnic groups persisted across the multi-year period. Most disparate were the higher chronic PQI composite rates for Native Hawaiians, Filipinos, and Other Pacific Islanders (ie, these subgroups had more potentially preventable hospitalizations) compared to lower rates for Japanese, Chinese, or Whites (ie, these subgroups had fewer potentially preventable hospitalizations).

DISCUSSION

Previous efforts to generate statistically reliable estimates for assessing health care quality and disparities in the AANHPI subpopulations have been seriously challenged by small sample sizes. This situation occurs even with data collection efforts in states where AA subpopulations are more prevalent¹⁸ and when there is multi-year pooling of national survey data.¹⁹ Because the AANHPI subgroups in Hawaii were large enough to support reliable estimates for adults, our approach provides valuable information that is not generally available from other states about the health care of subpopulations. As a result, this study provides new insights that are relevant to understanding health outcome disparities among AANHPIs.

First, despite more than a decade of national attention on minority health and health care disparities, significant gaps exist in potentially preventable hospitalization rates between Whites, AAs, and NHPIs. Past comparisons of national rates of potentially preventable hospitalizations show mixed results depending on the condition, with AANHPIs having a lower rate than Whites on about half of the individual PQIs and similar rates on the other half.^{7,20} In our study, however, not all AANHPI subgroups had better PQI rates. For example, Filipinos consistently showed higher rates of potentially preventable hospitalizations compared to

Table 3. Selected chronic Prevention Quality Indicator (PQI) rates per 100,000 population ≥18 years by race and ethnicity in state of Hawaii, 2007^a

Race/ethnicity	Diabetes			Respiratory		Cardiovascular		
	Short-Term Complications (PQI 1) ^b	Long-Term Complications (PQI 3) ^c	Lower Limb Amputations (PQI 16) ^d	Chronic Obstructive Pulmonary Disease (PQI 5) ^e	Asthma (PQI 15) ^f	Hypertension (PQI 7) ^g	Congestive Heart Failure (PQI 8) ^h	Angina (PQI 13) ⁱ
White	45	55	23	97	64	12	189	26
Asian and Pacific Islander (AANHPI)	31 ^k	89 ^m	42 ^m	68 ^m	91 ^m	20 ^m	289 ^m	23
Asian American (AA)	21 ^m	64	26	52 ^m	65	17	226 ^m	20
Japanese	12 ^m	53	21	39 ^m	22 ^m	13	159 ^m	14 ^m
Filipino	28 ^k	98 ^m	33	103	168 ^m	34 ^m	393 ^m	36
Chinese	DSU ^j	41	23	18 ^m	DSU ^j	DSU ^j	182	DSU ^j
Other Asian	DSU ^j	151 ^m	99 ^k	118	136 ^k	DSU ^j	372 ^m	DSU ^j
Native Hawaiian and Pacific Islander (NHPI)	48	146 ^m	82 ^m	117 ^k	154 ^m	24 ^m	461 ^m	31
Native Hawaiian	39	119 ^m	66 ^m	104	139 ^m	20	428 ^m	30
Other Pacific Islander	109 ^m	414 ^m	232 ^m	180 ^k	315 ^m	DSU ^j	816 ^m	DSU ^j

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Hawaii State Inpatient Databases and AHRQ Quality Indicators, version 3.1.

^a Rates are adjusted by age and sex using the total US population for 2000 as the standard population.

^b PQI 1, Admissions for diabetes with short-term complications (excluding obstetric admissions and transfers from other institutions).

^c PQI 3, Admissions for diabetes with long-term complications (excluding obstetric admissions and transfers from other institutions).

^d PQI 16, Lower extremity amputations among patients with diabetes (excluding trauma, obstetric admissions, and transfers from other institutions).

^e PQI 5, Admission for chronic obstructive pulmonary disease (excluding obstetric admissions and transfers from other institutions).

^f PQI 15, Asthma admissions (excluding patients with cystic fibrosis or anomalies of the respiratory system, obstetric admissions, and transfers from other institutions).

^g PQI 7, Admissions for hypertension (excluding patients with cardiac procedures, obstetric conditions, and transfers from other institutions).

^h PQI 8, Admissions for congestive heart failure (excluding patients with cardiac procedures, obstetric conditions, and transfers from other institutions).

ⁱ PQI 13, Admissions for angina without procedure (excluding patients with cardiac procedures, transfers from other institutions, and obstetric admissions).

^j DSU, Data do not meet the criteria for statistical reliability, data quality, or confidentiality.

^k $P < .05$.

^m $P < .01$ for comparison to Whites.

Whites – more closely mirroring PQI rates among Native Hawaiians and Other Pacific Islanders than the other 2 AA subpopulations of Japanese and Chinese.

This diversity in health outcomes among and between AA and NHPI subgroups compared with Whites is similar to those reported in the literature and provides further evidence of the need to disaggregate AAs from NHPIs.²¹ Future research could capitalize on the adequate subgroup size in Hawaii's data to examine PQI rates at the community level (eg, analyze discharge data by ZIP Code) and by community household income, which is a proxy for socioeconomic status. Determining whether similar patterns of health care quality disparities hold for children is also important.

The second major insight was the extent to which existing health care administrative information systems that

are designed to identify racial and ethnic subpopulations were able to demonstrate trends in health care outcomes using standardized research methods. Indeed, the ability to analyze numerically small populations is likely to grow in importance as the United States continues to become more racially/ethnically diverse. The recent confluence of new health information technology incentives for providers, standards for reporting granular ethnicity, and other tools may help private organizations, states, and federal entities produce more uniform and specific subgroup information for reducing health care disparities.^{8,22}

In economically challenging times, an approach such as the AHRQ PQIs serves as a useful tool for policymakers, public health officials, and the clinical community to more efficiently and

precisely target populations and conditions where changes have the potential to improve health outcomes. Standardized measures of health care outcomes such as PQI rates may also serve as a useful tool for testing the impact of programs,

Standardized measures of health care outcomes such as PQI rates may also serve as a useful tool for testing the impact of programs, practices, and policies aimed at achieving health equity for all.

practices, and policies aimed at achieving health equity for all.

The results of our study must be tempered by some limitations. First, this analysis focused on a single state whose AA and NHPI populations may not be representative of AAs and NHPIs throughout the United States. However, Hawaii continues to have the largest, most stable population of AAs and NHPIs in a single geographic area. Second, data collected for administrative purposes may have inherent nuances that influence data attributes across various hospitals. However, the consistency of our results with other clinical and public health studies demonstrating racial/ethnic differences between AAs, NHPIs, and Whites suggests generalizability. Finally, the HCUP data did not include federal hospitals or Hawaiian residents who were admitted to hospitals outside of the state. However, the proportion of these patients compared to the total Hawaiian hospitalized patient population is minimal and unlikely to significantly affect results.

ACKNOWLEDGMENTS

The authors thank Elizabeth Stranges, MS, for assistance with a review of the literature, and Kay Baker, PhD, of the Hawaii State Department of Health for assistance in providing population estimates. This study was funded by the Agency for Healthcare Research and Quality (AHRQ) under a contract to Truven Health Analytics for developing and supporting the Healthcare Cost and Utilization Project (HCUP). The views expressed in this article are those of the authors and do not necessarily reflect those of AHRQ or the US Department of Health and Human Services.

REFERENCES

- Gaskin DJ, Hoffman C. Racial and ethnic differences in preventable hospitalizations across 10 states. *Med Care Res Rev*. 2000;57 Suppl 1:85–107.
- Basu J, Friedman B, Burstin H. Preventable hospitalization and Medicaid managed care: does race matter? *J Health Care Poor Underserved*. 2006;17(1):101–115.
- Mau MK, Sinclair K, Saito EP, Baumhofer KN, Kaholokula JK. Cardiometabolic health

- disparities in native Hawaiians and other Pacific Islanders. *Epidemiol Rev*. 2009;31:113–29. PMID: 2893232.
- Grandinetti A, Chang HK, Theriault A, Mor J. Metabolic syndrome in a multiethnic population in rural Hawaii. *Ethn Dis*. 2005;15(2):233–237.
- Grandinetti A, Kaholokula JK, Theriault AG, Mor JM, Chang HK, Waslien C. Prevalence of diabetes and glucose intolerance in an ethnically diverse rural community of Hawaii. *Ethn Dis*. 2007;17(2):250–255.
- Taira DA, Seto TB, Marciel C. Ethnic disparities in care following acute coronary syndromes among Asian Americans and Pacific Islanders during the initial hospitalization. *Cell Mol Biol*. 2001;47(7):1209–1215.
- U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality. 2009 *National Healthcare Disparities Report*. ahrq.gov/QUAL/nhdr09/nhdr09.pdf. Accessed February 2012.
- Institute of Medicine. Subcommittee on Standardized Collection of Race/Ethnicity Data for Healthcare Quality Improvement Board on Health Care Services. *Race, Ethnicity, and Language Data: Standardization for Health Care Quality Improvement*. Washington DC: National Academies Press; 2009.
- Ida DJ, SooHoo J, Chapa T. *Integrated care for Asian Americans, Native Hawaiian and Pacific Islander Communities: A Blueprint for Action: Consensus Statements and Recommendations*. Rockville, MD: U.S. Department of Health and Human Services, Office of Minority Health. January 2012.
- Moy E, Holmes J, Ho K, Arispe I, Andrews R. Disparities in data: gaps in information needed to assess racial, ethnic, and socioeconomic disparities in healthcare. *Harvard Health Policy Rev*. 2007;8(2):78–88.
- Agency for Healthcare Research and Quality. *AHRQ Quality Indicators. Guide to Prevention Quality Indicators: Hospital Admission for Ambulatory Care Sensitive Conditions*. ahrq.gov/downloads/pub/ahrqi/pqiguide.pdf. Accessed September 2012.
- U.S. Department of Health and Human Services. Office of the Assistant Secretary for Planning and Evaluation. Data on Health and Well-being of American Indians, Alaska Natives, and Other Native Americans, Data Catalog 2006. aspe.hhs.gov/hsp/06/Catalog-AI-AN-NA/index.htm. Accessed September 2012.
- State of Hawaii, Department of Health, Hawaii Health Survey website. hawaii.gov/health/statistics/hhs/index.html. Accessed September 2012.
- Hawaii Department of Health, Vital Statistics Report 2007, General Notes: Presentation of

- Vital Statistics Data. hawaii.gov/health/statistics/vital-statistics/vr_07/index.html. Accessed July 2011.
- Coffey R, Barrett M, Houchens R, Moy E, Ho K, Andrews R, Moles E. Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the Eighth (2010) NHQR NHDR. HCUP Methods Series, Report #2010-06. Rockville, Md: Agency for Healthcare Research and Quality. hcup-us.ahrq.gov/reports/methods/methods.jsp. Accessed September 2012.
- Agency for Healthcare Research and Quality. Prevention Quality Indicators Overview. AHRQ Quality Indicators. July 2004. qualityindicators.ahrq.gov/modules/pqi_overview.aspx. Accessed September 2012.
- Fleiss JL. *Statistical Methods for Rates and Proportions*. New York: Wiley; 1973.
- Holtby S, Zahnd E, Chia Y, Lordi N, Grant D, Rao M. Health of California's Adults, Adolescents and Children: Findings from CHIS 2005 and CHIS 2003. Los Angeles: UCLA Center for Health Policy Research. healthpolicy.ucla.edu/pubs/files/Hlth_CAs_RT_090908.pdf. Accessed September 2012.
- Schiller JS, Bernadel L. Summary health statistics for the U.S. population: National Health Interview Survey, 2002. *Vital Health Stat* 10. 2004(220):1–101.
- Russo CA, Andrews RM, Coffey RM. *Racial and Ethnic Disparities in Potentially Preventable Hospitalizations, 2003*. HCUP Statistical Brief #10. 2006. Rockville, Md: Agency for Healthcare Research and Quality. hcup-us.ahrq.gov/reports/statbriefs/sb10.pdf. Accessed June 2009.
- Mau MK, West MR, Shara NM, et al. Epidemiologic and clinical factors associated with chronic kidney disease among Asian Americans and Native Hawaiians. *Ethn Health*. 2007;12(2):111–127.
- U.S. Department of Health and Human Services. Medicare and Medicaid Programs; Electronic Health Record Incentive Program; Final Rule. 2010.

AUTHOR CONTRIBUTIONS

Design and concept of study: Moy, Raetzman, Miyamura, Chaves, Andrews
Acquisition of data: Barrett, Miyamura, Chaves, Andrews
Data analysis and interpretation: Moy, Mau, Raetzman, Barrett, Miyamura, Chaves, Andrews
Manuscript draft: Moy, Mau, Raetzman, Chaves
Statistical expertise: Barrett
Administrative: Moy, Raetzman, Barrett, Miyamura, Chaves, Andrews
Supervision: Raetzman, Andrews