Journal of Official Statistics, Vol. 24, No. 1, 2008, pp. 1–11

The Morris Hansen Lecture 2004
Bridging the Gap: Moving to the 1997 Standards for Collecting Data on Race and Ethnicity

Jennifer H. Madans[1]

The publication in 1997 by the U.S. Office of Management and Budget (OMB) of revised standards for the collection of data on race and ethnicity affected the statistical system's ability to maintain long-term trend statistics. The need for a mechanism to bridge between the 1977 and 1997 standards was also important for the calculation of rates where different standards were used in the data collection systems supplying the numerator and denominator data as was the case for vital rates at the National Center for Health Statistics (NCHS). In order to calculate valid race-specific rates, a bridging mechanism was developed that modified the population estimates using models that characterize the relationship between race reporting under the new and the old standard. Staff from throughout NCHS was involved in this project and it is their work that is reported in this article.

Key words: OMB standards; population estimates.

1. Introduction

Systems for classifying persons by race, ethnic background and other attributes make it possible to compare population characteristics across data collection programs and over time. However, population changes make it necessary to update such systems periodically. To monitor population trends, bridges need to be built that allow for the transition between systems.

Standards for the collection of data on race and ethnicity were revised and released in 1997 (OMB 1997, pp. 58781–58790). These standards, designed to improve the quality and comparability of data collected or supported by federal government agencies, presented many challenges, particularly in regard to the change that allowed respondents to choose more than one race. The need for a bridging mechanism was particularly acute at the National Center for Health Statistics (NCHS). Calculating vital rates, a major NCHS program activity, requires population estimates based on census data for the denominators but counts of vital events from state vital statistics offices for the numerators. Although the 2000 Census adopted the 1997 standards for the collection of data on race and ethnicity, state vital statistics offices did not make the transition in 2000. Thus the race classifications used for vital records were not comparable with those used to estimate population counts. In order to calculate valid

[1] National Center for Health Statistics, 3311 Toledo Road, Hyattsville, MD 20782, U.S.A. Email: jhm4@cdc.gov
Acknowledgments: The National Center for Health Statistics' (U.S.A.) research program on the transition to new standards for collecting data on race and ethnicity involved staff from throughout the organization. The results of our joint efforts are reported here. I want to thank my colleagues for their commitment to this project and for the creativity and expertise that they brought to each of the challenges we faced.

race-specific rates, it was necessary to bridge this gap by developing strategies to modify data from one or both of the data sources using models that characterize the relationship between race reporting under the new and the old standard. The decision was made to develop a methodology that would bridge information collected under the new standards into the old categorization and then to apply this method to population estimates from 2000 onward until there was no further need for the estimates. In the course of this project, multiple data sets were analyzed to address different aspects of multiple-race reporting with the objective of developing and evaluating a bridging methodology. Additional methodological investigations into basic issues of conceptualization and measurement of race and the relationship between race and health were also conducted. Staff from throughout NCHS was involved in this project and it is their work that is reported in this article.

2. Background

Investigating the relationship between race and health has always been part of the mission of the National Center for Health Statistics (NCHS). For example, trends in infant mortality by race are available starting with data from 1915 and there is great interest in being able to continue to track racial differences in this major health outcome. The need to deal with changing standards or classifications is not new or unique to race. Major classifications of disease and of occupations and industries have undergone significant revisions and the statistical system has developed ways to maintain continuity in trends. In the case of occupation, industry or disease, the underlying information collected did not change; the way that information was coded changed. As a result, it has been possible to code the same information using different classifications to quantify the effect of the change. The case of the change in the standards for collecting information on race is more complex as the nature of the underlying information has changed. Differences between the 1977 and 1997 standards are outlined in Figure 1. The 1977 standards stipulated that a four-category race classification be used at a minimum, whereas in the 1997 standards a five-category classification was stipulated where the category of Asian and Other Pacific Islander was divided into two – Asian and Native Hawaiian and other Pacific Islander. Of equal importance was the new requirement that allowed persons to report more than one of the race categories. Because of these changes in the core data

Differences between the 1977 standards and the 1997 standards		
	1977	1997
What are the minimum categories for race?	American Indian or Alaskan Native Asian or Pacific Islander Black White	American Indian or Alaskan Native Asian Black or African American Native Hawaiian or Other Pacific Islander White
How many races can be reported?	Only one race	More than one race

Fig. 1. Differences between the 1977 and 1997 standards

collected, the methods needed to estimate the effect of the change in standards will also be more complex but they are needed to assure that comparable data are available over time. This article focuses on the effect of the change in standards on data from the vital statistics system but the issues apply broadly across a wide range of data collection systems.

Registration of vital events is a state, not federal, function. However, to maximize consistency in reporting across jurisdictions, standard certificates are developed collaboratively among the states and the Federal government and used by individual states usually with only minor changes. Certificates were revised in 1989. In 1998, an expert panel evaluated the 1989 standard certificate and recommended changes. One of the key recommendations was to use the U.S. Census questions on race and Hispanic origin. The goal was to implement the revised certificates soon after the 2000 Census but the need to reengineer the basic registration process coupled with a lack of resources to do so have delayed the implementation of the revised certificates. It is anticipated that full implementation will take several years.

This delay in the implementation of the revised certificates resulted in a lack of comparability in how race data were obtained for the numerators (from vital records) and denominators (Census-based estimates of population size) of vital rates. Issues of noncomparability in the reporting of race between these two independent data sources are not new. Race on death certificates, for example, is recorded by the funeral director, usually in consultation with family members or other informants but sometimes based on observation. Race information on the Census is obtained by self-report or is reported by a family respondent. To ascertain the consistency of race reporting across data systems, death records are matched to Census or survey records for the same individuals. Consistently, death records are found to underestimate American Indian, Asian or Pacific Islander and Hispanic deaths. A study done in 1999 showed that if race was classified according to how it was reported on the survey rather than on the death certificate, there would be 37% more American Indian deaths, 13% more Asian or Pacific Islander deaths and 7% more Hispanic deaths (Rosenberg et al. 1999). It was hypothesized that the new standards which allowed for the reporting of more than one race would increase the number of errors. In 2000, a workshop was held to address what could be done to deal with the new challenge. While no specific recommendations were made, some overall guidance was provided concerning the generic problem of comparability of race reporting across vital records and censuses (Durch and Madans 2001).

The need to develop ways to bridge between standards was addressed by the interagency workgroups, which also assisted in the development of the new standards and provided guidance for their incorporation into ongoing and new data collections. While the new standard addressed several aspects of the collection of data on race and ethnicity, the most significant related to the reporting of more than one race. Criteria for evaluating bridging methods to address this change along with a set of possible methods were developed. All methods use assumptions about how individuals providing information under the new standards would have reported under the old standards. The work of this group was published in a report released in 2000 by the U.S. Office of Management and Budget (OMB), the office responsible for developing the standards (OMB 2000). Bridging between the two classifications involves the reassignment of multiple-race responses into a single-race category. It helps explain the relationship between the old and new data series

and facilitates trend analyses across the two standards. In the case of vital rates, bridging provides consistent numerators and denominators during the transition to revised certificates. NCHS was actively involved in the early work on bridging. Due to the pressing need for denominators that would be consistent with the vital record numerators, NCHS expanded on this work and developed bridged population estimates for 2000, for 1991–1999 (intercensal estimates) and for the post-censal period general use.

This article provides a summary of the work undertaken by NCHS staff, in collaboration with colleagues at the U.S. Census Bureau, to create the bridging methodology and the bridged estimates. In addition, the work that supported and informed the construction of the bridge and work which was generated as a result of the bridging project will also be described. This included revisiting some basic questions of about how race is conceptualized and measured.

3. The Empirical Basis for the Bridging Method

In order to create the bridge, it was necessary to determine how persons who responded to the 1997 version of the race questions and reported more than one race would have responded to the 1977 version of the question (it was assumed that persons reporting a single-race on the 1997 version would have reported the same way on the 1977 version). The National Health Interview Survey (NHIS) conducted by NCHS offered a source of this information for making the determination. The NHIS is an in-person, multi-purpose health survey that has been conducted since 1957. Currently, approximately 35,000 households and 88,000 persons are included in the survey, with oversampling of African Americans, Hispanics, and Asians.

Since 1976, the NHIS has used a question that allows respondents to report more than one race. If more than one race is reported, a follow-up question is asked which directs the respondent to select the group that best represents their race. This selection is labeled the primary race. It should be noted that race information is sometimes reported by a proxy (always for children). Information on all the races reported has been captured since 1982. The NHIS was the only major source of data on multiple-race reporting prior to 2000. If one can assume that the response to the follow-up question is how the respondent would have answered a question that did not allow for multiple-race reporting (the 1977 standard question), the information from both questions can be used to create a bridge between the two standards. The percent of the population classified as having more than one race did not vary much between 1982 and 2002, ranging from 1.2 percent to 1.7 percent.

Extensive analysis of NHIS data has been conducted to address many of the issues involved in constructing a bridging methodology. Data from the 1997 through 2002 NHIS were combined to improve precision. During this period, American Indian and Alaskan Native (AIAN) persons were the most likely to report more than one race. Forty-three percent of persons who were AIAN also were of another race. Persons who were both AIAN and White represented the largest multiple-race group. About 30 percent of all persons of more than one race were in this group. Persons who were both Black and White and those who were Asian or Pacific Islander (API) and White made up the next two largest groups, each accounting for about 20 percent of those who were more than one race.

Characteristics of persons reporting more than one race were compared to those of persons who reported a single-race. It had been hypothesized that persons reporting more

than one race would have characteristics close to the average of those of the corresponding single-races. However, the patterns were not consistent across groups or characteristics. For example, whereas the percent under 18 was about the same for the AIAN/White, AIAN and White groups, those who are Black/White and API/White are significantly younger than the single-race persons. The pattern for being in fair or poor health is also different. There, those who are both AIAN and White are more similar to those who are AIAN, and those who are both Black and White are more similar to those who are Black. The percents are very similar for those who are API and White, those who are API and those who are White.

4. Development of a Bridging Methodology and Bridged Population Estimates

Responses to the follow-up question that ascertains the primary race among multiple-race respondents provides the core information needed to construct the bridge. This information is used to determine what fractions of the different multiple-race groups should be reallocated to the corresponding single-race categories so that the distributions will mimic what would have occurred had the old questions been used. Figure 2 shows the distribution of primary race identification for three multiple-race groups. About half of the respondents who were Black and White have a primary race of Black whereas the great majority (about 80 percent) of those who are AIAN and White have the non-White race as their primary race. The split is more even for those who are API and White with about 35 percent selecting the non-White race and 47 percent selecting White.

A simple bridging method allocates the multiple-race populations according to the distributions of primary race identifications as shown in Figure 2. A more complex method would adjust the proportions based on characteristics of the group that are related to the selection of the primary race. For example, if age were related to selecting a primary race, the allocation across single-race groups would vary by age. In fact, age is related to the selection of primary race. Almost 63 percent of those who are AIAN and White but whose primary race is AIAN are under 18 years of age, as opposed to about 50% whose primary race is White. Among those who are both Black and White, the proportion under 18 is lower (about 25%) for those whose primary race is Black, whereas about 35% of those

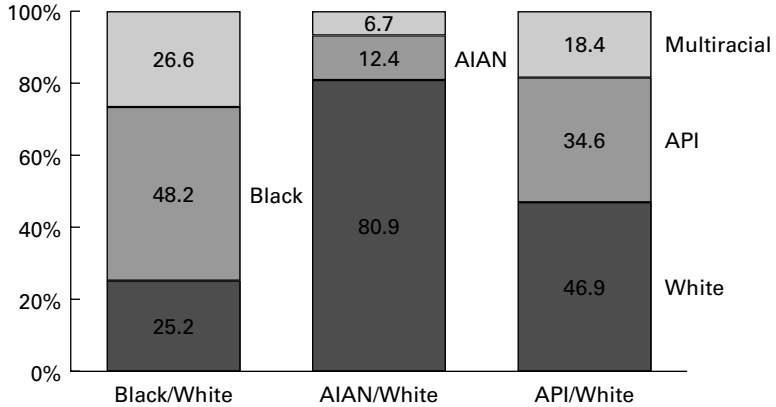


Fig. 2. Distribution of primary race identification for multiple-race groups

whose primary race is White are under 18. NHIS data were analyzed to identify characteristics of the multiple-race population according to the primary race selected. The distribution of primary race identification varies by other factors such as Hispanic origin, poverty status, insurance status, and health status.

A regression model was developed that incorporated factors related to the selection of primary race (Parker et al. 2002; Schenker and Parker 2003; Parker et al. 2004). The key assumption of the model is that the primary race reported in the NHIS follow-up question has a similar distribution, given the covariates, to that which multiple-race reporters in the census would have reported using the 1977 standards. Categorical regression models were fit to NHIS data from 1997–2000 to predict primary race as a function of personal and county level characteristics. The multiple-race reporters in the Census 2000 modified race data summary file were grouped into multiple-race, county and person-level covariate combinations. The populations in these combinations were then distributed into the 1977 race categories in proportion to the estimated probabilities for primary race. The predictors that could be included in the model had to be available on both the NHIS and the Census 2000 modified race summary file. Age, sex and Hispanic origin and county-specific urbanicity and race distributions were selected for inclusion in the model. Separate models were developed for the six largest groups (AIAN and White; API and White; AIAN and Black; AIAN, Black and White; API and Black; Black and White). A combined model is used for the remaining groups because of their small sample sizes. The models produce estimates that reflect variation across the country, and predictors differ across the multiple-race groups. The covariates examined are not very strong predictors of primary race. There are likely better predictors of primary race but these would not be available on both the Census 2000 summary file and the NHIS.

Table 1 shows the bridged counts for the four race categories in the 1977 standards along with the single-race populations as enumerated in the census prior to bridging. The "All Inclusive" column includes any mention of the race group and the last column presents the difference between the 2000 enumerated counts and the 1990-based post-censal estimate. The bridged count for AIAN is 300,000 larger (about 12%) than the single-race estimate. The increase in the White group is 2 million but this represents less than a 1% increase. Approximately 4 million persons were reported to be AIAN either alone or in combination with some other race; about half of this group reported AIAN alone. Files of bridged counts for 1990–2002 by county, sex, Hispanic origin and race

Table 1. Bridged and enumerated U.S. population by race: Census 2000

Bridged and enumerated U.S. population by race: Census 2000					
Race	Single-race	Total bridged	Percent increase	All inclusive	July 2000, 1990 base
All races	277,668,953	281,421,906	1.4	NA	275,264,999
White	228,104,485	230,085,762	0.9	231,434,388	226,251,833
Black	35,704,124	36,594,309	2.5	37,104,248	35,303,751
AIAN	2,663,818	2,984,150	12.0	4,225,058	2,436,153
API	11,196,526	11,757,685	5.0	12,643,285	11,273,262

were developed by NCHS with the assistance of the U.S. Census Bureau and are available on the NCHS web site (Ingram 2003). Although Census counts are often considered nonrandom population quantities, bridged counts are estimates and therefore have a random component. Methods have been developed for assessing the uncertainty due to bridging. The magnitude of the uncertainty was evaluated by calculating the relative standard errors for birth and death rates at the national level both including and not including the uncertainty due to bridging (Schenker 2003, pp. 818–828). Bridging did not add substantially to the relative standard errors.

5. Using the Bridged Estimates

The bridged population estimates were used to recalculate vital rates from 1991 forward (Hamilton, Sutton, and Ventura 2003; Ventura, Abma, Mosher, and Henshaw 2003; Ventura, Hamilton, and Sutton 2003). The trends in teenage birth rates for 1990 and 2001 for the four main race groups were compared using single-race (those reporting only one race) or bridged race (those reporting only one race plus the reallocated part of those reporting that race in combination with one or more other races) estimates to calculate the 2001 rates. The single-race estimates would be the only estimates available if bridging were not done. The bridged rates for 2001 are somewhat lower than the single-race rates so that using the latter would have depressed the decline in teenage birth rates that had occurred since 1990, as is shown in Figure 3. The differences are larger for the AIAN and API groups. A similar comparison was done for death rates focusing on the AIAN population. Using the single-race rates without bridging exaggerates the death rates, especially among those over 74.

6. Evaluating the Model and Estimates

Data from the Census Quality Survey (CQS) were used to evaluate the modeling process and resulting estimates. The CQS is an independent data source having a large sample size

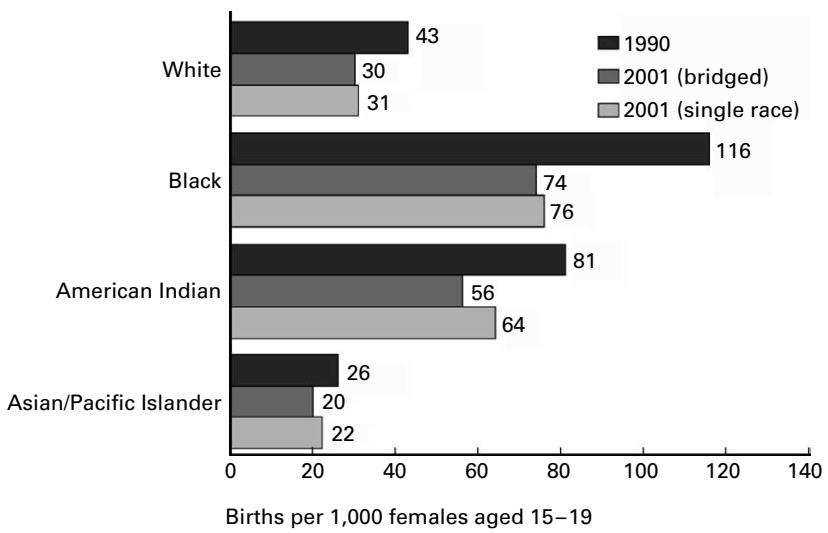


Fig. 3. Using the bridged estimates: Teenage birth rates 1990 and 2001

allowing for the exploration of individual models and alternative approaches for the smaller multiple-race groups. There was also the possibility of improving the models by incorporating data from Census 2000. The NHIS regression models were estimated using the CQS data and the magnitude of the coefficients were compared to those obtained using the NHIS data. Some of the CQS and NHIS coefficients are similar but others differ in magnitude, direction and/or statistical significance. These findings were not unexpected given the low power of the models. This evaluation project is continuing with an emphasis on the effect that the different models have on the bridged counts.

Another aspect of the evaluation was the investigation of whether the models were consistent over time. The NHIS models were refit using data from 1997 through 2002 and including a time covariate. The time covariate was not significant for the model estimates for the Black/White or AIAN/White groups. Separate models were also run for 2001–2002 and the coefficients compared to those of the 1997–2000 model. For the AIAN/White and Black/White groups, the coefficients of the indicators of urbanicity differed across time. For the Black/White group, the coefficient for the percent of the population that was Black increased over time. The models were also refit with additional variables (median income, percent with less than a high school education, percent foreign born and percent Hispanic) but no major differences were found.

7. Related Methodological Work

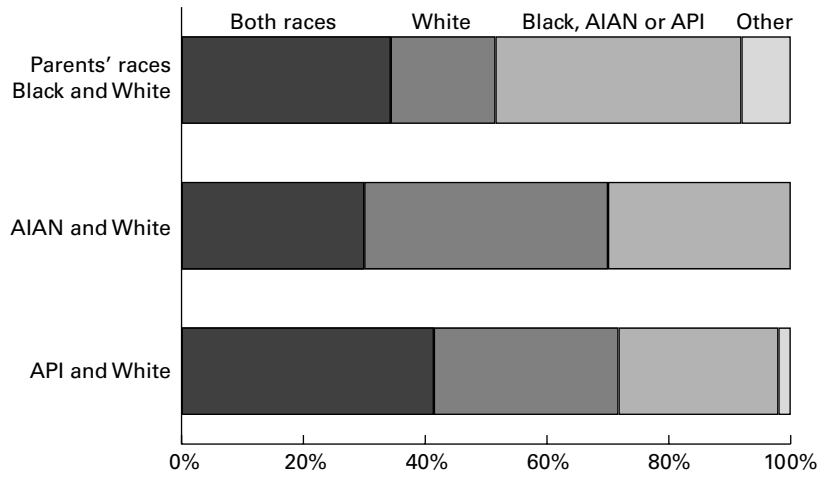
Full implementation of the revised standard certificates will be phased in over the decade. As a result, there will be variation in the standards used to collect the numerator data and it will be necessary to bridge some of the latter data as well as the denominator data. NCHS has developed computer programs to code and edit multiple-race data from vital records that use both checkboxes and literal entries for race. These programs bridge the edited race data for parents and decedents to the 1977 four race categories using the same bridging algorithm used to bridge population estimates.

The transition to multiple-race reporting is likely to have the greatest effect on mortality data. To investigate this, mortality records that included all races listed on the death certificate were obtained from California (Heck, Parker, and McKendry 2004). Multiple-race decedents were more likely to be young, Hispanic, male and never-married. The age-adjusted death rates for the three largest multiple-race groups were implausibly low and substantial variation by county of residence was observed.

To determine the future size of the multiple-race population, natality records were analyzed to determine the trend in the percent of interracial births by mother's race (Parker and Madans 2002). In 1971, 1.2 percent of all births were to parents of different races. In 2002, this increased to 5.4%. For AIAN mothers, the percent increased from 25.8 in 1971 to 48.5 in 2002 but for API mothers the percent declined from 29.9 to 22, reflecting changes in the composition of the API population. An analysis was then done to determine if the observed increases in the percent of births occurring to parents of different races was consistent with the reporting of multiple-race on the NHIS. Overall, multiple-race survey responses corresponded to expectations based on interracial births but there were discrepancies for specific multiple-race groups. Generally, fewer Black/White survey responses but more AIAN/White and API/White responses were observed than had been

expected. Washington State is the only state that includes an item on the birth certificate that obtains the race of the infant in addition to the standard reporting of the race of the parents. Data from 1999–2002 were analyzed to compare parents' race to the reported race of the child. Seventy-five percent of infants born to parents of different races were reported to be multiple-race. This percent increased to 81 if at least one of the parents was of more than one race. The percents varied by the races of the parents. The percent reported to be multiple-race was higher if the father was Black rather than the mother being Black. A similar analysis can be done with the NHIS data for all children. Figure 4 shows the distribution of the child's race by the race of the parents. When their parents are of different races, less than half of the children are reported as being of both parents' (i.e., multiple-race) race. Looking at children of parents who are Black and White, about 34% are reported to be both races and 40% are reported to be Black. Children of AIAN and White parents are split more evenly among those reported to be both races, those reported to be White and those reported to be AIAN. A similar pattern was found for children of API and White parents.

When trying to develop models that would allow race data to be bridged from one classification to another, questions arose about how race was being conceptualized. These questions led to the development of a methodological research component that revisited some of the basic issues related to how the population interprets the race questions that are included in Censuses and surveys. A cognitive testing protocol was developed to investigate response patterns to the standard race questions and the follow-up question used in the bridge. This information was useful for the bridging project but would also inform efforts to develop improved race questions. Four basic patterns were identified. Race was conceptualized as having social, cultural, official or ancestral underpinnings. Persons using the social concept answered on the basis of their beliefs about others' perception of them or what others would have said. Persons using a cultural approach based their responses on the community to which they had the strongest sense of



SOURCE: CDC/NCHS, National health interview survey, 1993–1995

Fig. 4. Reported child's race among children with interaction parents

belonging. Respondents also viewed the question from an official point of view and answered as they would if filling out an administrative or official form such as an employment or school application. Finally, some responded on the basis of which group composed the largest percentage of their genealogy. The fluid nature of race reporting that has been observed over time is likely related to these different ways of conceptualizing the basic concept of race.

8. The Costs and Benefits of Bridge Construction

The costs of bridge building are considerable, especially when the tools used were not developed explicitly to meet the requirements of the task. The samples used to develop the models were too small and important predictor variables could not be included, leading to models that lack explanatory power. However, without the bridge there would have been a break between data collected under the 1977 and 1997 standards. While the effect of ignoring the break would have been small for most of the groups at the national level, this was not judged to be an appropriate solution. The federal statistical system had the responsibility for understanding and bridging the gap. The bridge did provide a defensible, explainable way to transition between standards. It provided a single set of population estimates that can and have been used by multiple users for multiple purposes. The ability to provide a set of intercensal population estimates enabled a better understanding of trends during the intercensal period. Perhaps most important, it refocused attention on the need for basic methodological research into the challenges of collecting data on race and ethnicity.

Work on the bridge continues. The need for bridged estimates for the calculation of vital rates will continue until the use of the revised certificate is universal. This will make it necessary to investigate whether the bridge needs repairs that incorporate societal changes in the reporting of race as well as any new information on the characteristics of the multiple-race population that becomes available. Even when the need for bridging is over, there will still be an issue of the quality of race reporting on administrative records, particularly the death certificate. As the population of multiple-race persons increases, misreporting of race on the death certificate will become a bigger problem and one that is harder to deal with. This suggests the need for new and better methods of incorporating race into analyses where race reporting is problematic.

The race bridging project involved many investigators from multiple agencies drawing on a range of expertise and knowledge. Many research projects were developed to provide the information needed to construct the bridging models. It was necessary to use creativity, perseverance and critical thinking in a collaborative environment. In these ways, this project followed the methods promulgated by Morris Hansen and for which he is honored by this lecture.

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Received July 2007