# Assessment of Consistency of Census Results with Demographic Benchmarks

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## Executive Summary

This report assesses the accuracy of the Census 2000 Dress Rehearsal results for Sacramento City, Menominee County, and the Columbia, South Carolina site. We examine the consistency of housing and population totals with independent benchmarks for each site. We assess the consistency of key demographic characteristics, such as persons per household, age/sex distributions, race/Hispanic origin distributions, vacancy rates, and group quarters population.

The dress rehearsal census results pass most tests of demographic consistency. For all three sites, the demographic characteristics examined agree with past census data and expected trends.

For Sacramento City, the released census population total of 403,313 is confirmed by independent demographic estimates adjusted for net undercount. Further, the underlying Integrated Coverage Measurement (ICM) estimate of net undercount (6.3 percent) is validated by the independent benchmarks. Without the ICM adjustment, the census result for Sacramento City would be too low.

For Menominee County, Wisconsin, the released census population total of 4,738 is confirmed by independent demographic estimates adjusted for net undercount. The underlying ICM estimate of net undercount (3.0 percent) is broadly validated by the independent benchmarks.

For the South Carolina site, the census housing and population totals fall below expected levels. Population coverage in 1998 declined relative to 1990--attributable in large part to the incompleteness of the address list and the resulting shortfall of census housing units. The large undercoverage in the dress rehearsal results for the site was measured by the Post Enumeration Survey and validated by the demographic benchmarks.

In reaching this assessment, the demographic evaluation answers the four broad questions set forth in the September 15, 1998 outline of the C7 report:

1) Are the overall results plausible?

YES. The age, race and Hispanic origin distributions, household distributions, vacancy rates, and group quarters population conform with past census data and expected trends.

2) Are there coverage problems associated with the 5-person questionnaire?

NO. The distribution of the number of persons per household is consistent with historical trends and changes in the composition of the population. Similarly, when the proportion of households with 6 or more persons is compared to the proportion with 5 persons, the results do not point to coverage problems. It should be noted that this assessment is a face validity check. Tests of statistical significance of differences were not performed.

3) Do the independent demographic benchmarks provide early indications of the magnitude of coverage errors?

YES. The dress rehearsal data were evaluated in sequential comparisons. Early assessment of the Decennial Master Address File suggested a shortage in the number of housing units in the South Carolina site. The demographic indicators gave an early assessment of the magnitude of the population undercount in each site. All the demographic benchmarks signaled the decline in coverage in the South Carolina site relative to 1990.

4) Are the subnational demographic tools effective in validating the census results for geographic areas in a manner similar to the traditional national Demographic Analysis estimates?

YES. In every census since 1950, demographic analysis has played an important role in evaluations of data quality and in assessments of completeness of coverage at the national level. The dress rehearsal demonstrated the application of the demographic benchmark approach at the subnational level. Postcensal housing and population estimates and data from previous censuses were used as demographic benchmarks to examine data consistency and coverage errors at the site and county level. The demographic approach provided important independent benchmarks to validate the census and ICM results.

The results were available internally shortly after the release of the various census data files and in time for inclusion in status reports.

It is recommended that the demographic evaluation of Census 2000 start with the release of the Decennial Master Address File in the summer of 1999. The evaluation should examine the accuracy of the housing unit count based on this file with independent housing benchmarks and historical census data. A coverage assessment before Census Day will provide an opportunity to take corrective actions when necessary.

It is further recommended that in Census 2000 the demographic evaluation approach extends to the subnational level (state and county). Traditionally, demographic analysis has been used to assess the accuracy of the census results and the magnitude of population undercoverage at the national level. This demographic evaluation of the dress rehearsal sites and the earlier evaluation of the 1995 Census Test demonstrate that an expanded demographic analysis program could be a timely, inexpensive, and operationally feasible coverage evaluation tool for Census 2000.

## Section 1. Background

This report assesses the Census 2000 Dress Rehearsal results for Sacramento City, Menominee County, and the Columbia, South Carolina site. The study is designed to answer the following four questions posed in the September 15, 1998 outline of this report (Robinson, 1998):

1. When compared to a battery of independent benchmarks and demographic tools, do the census population and housing distributions look plausible (e.g., age, sex, race distributions, household distributions, vacancy rates, group quarters population)?

2. Is there a discrepancy between the proportion of 5- person and 6-person or more households in the census results that suggests coverage problems associated with the 5-person questionnaire?

3. Do the differences between the census estimates and independent benchmarks inform us early (September- October of 1998) about the magnitude of undercount that will be measured by the Integrated Coverage Measurement (ICM)?

4. Are the subnational demographic analysis (DA) tools effective in validating the census and ICM results for geographic areas, in a manner similar to the traditional use of national DA coverage estimates?

This study represents an extension of the demographic analysis program the Census Bureau has used for many years to evaluate the accuracy of census results and completeness of coverage at the national level (see Siegel, 1974, Fay et al, 1988, and Robinson et al, 1993). The application of demographic techniques to evaluate coverage of subnational areas was successfully used as part of a comprehensive evaluation of the quality of the 1995 test census results for Oakland, CA, Paterson, NJ, and 6 parishes in Louisiana (see Robinson, 1996a, 1996b, and Kohn, 1996).

## Section 2. Methodology

We employ a battery of demographic tools to assess the Census 2000 Dress Rehearsal results. These include population, housing, and group quarters (GQ) estimates, vacancy rates, school enrollment data, Medicare data, sex ratios, age distributions, household distributions, and race/origin distributions. The tools are obtained from different sources.

The Census Bureau produces annual postcensal estimates of total population by the component method of demographic analysis. The component method updates the decennial population count for an area by taking into account net demographic change. This change is obtained by adding births, subtracting deaths, and adding estimates of net domestic migration and international immigration. It should be noted that no adjustments are made for the estimated net population undercount in the census. The number of births and the number of deaths are based on reported vital statistics for each county. Estimates of legal immigration from abroad is estimated using data obtained from the Immigration and Naturalization Service. Emigration and undocumented immigration are estimated using analytic methods. Internal migration, or migration to and from other counties in the United States, is estimated from two different administrative records and in separate estimations for the age groups under and over age 65. For the population under 65, a year to year match of federal income tax returns is used to determine migration

between counties. For the population age 65 and over, the change in Medicare enrollment figures is used to produce the migration estimates. For more details see Appendix B.

The housing unit estimates are produced by the Census Bureau by adding new construction (permit and non- permit) and new mobile homes to the previous years housing stock and subtracting demolitions (permit and non- permit). School enrollment and Medicare data are obtained from administrative files. Sex ratios, age distributions and similar measures are examples of demographic measures obtained through statistical manipulations of the data.

An important element of the evaluation is its sequential nature. The census estimates are evaluated at four points in time: housing counts from the Master Address File (MAF); initial phase estimates from the Census Unedited File-CUF; post-Nonresponse Follow-up (NRFU) estimates from the Census Edited File-CEF; and final census estimates that include the ICM component (for Sacramento and Menominee only). The improvement in data quality and coverage completeness is systematically assessed through these sequential comparisons.

In this report, we focus on the last two stages--the housing and unadjusted population numbers from the CEF and the final adjusted population results that include the ICM component. Previous memoranda have reported on the MAF and the CUF stages. These analyses and other evaluations are available on request.

First, we examine the consistency of the final census population results for Sacramento and Menominee with independent benchmarks adjusted for net undercount (Table 1). For the South Carolina site, we assess the consistency of the census population total with the independent benchmark (Table 2). We also evaluate census estimates adjusted for net undercount with the Post Enumeration Survey (PES) estimates.

Second, we examine the consistency of the housing totals with independent benchmarks for each of the three sites. The housing counts are examined in Table 3.

Next, we assess the consistency of key demographic characteristics, such as the GQ population, vacancy rates, persons per household, age/sex and race/Hispanic origin distributions. Tables 4-8 and Figures 1-2 make comparisons of these demographic characteristics over several censuses.

Finally, we demonstrate how the population estimates are used to make some inferences about the magnitude of population undercoverage independently--and in advance-- of the ICM coverage results. In Table 9, the population estimates are benchmarked on 1990 adjusted counts (as measured by the PES estimates) and carried forward to 1998. The adjusted population estimates have two evaluative purposes: (1) to provide an early assessment of the magnitude of undercoverage in the initial census results, and (2) to broadly validate the ICM/PES results. We also examine sex ratios and other data for the South Carolina site to make additional inferences about differential undercoverage (Tables 10-12 and Figures 3-4).

It is important to note that the methodology of the demographic estimates is entirely different from that of the ICM coverage estimates. The ICM (Dual-System Estimates) are survey-based estimates. As described above, the demographic estimates are based largely on aggregate administrative data (and past census data for some benchmarks) statistical samples are not the foundation of the estimates. The demographic estimates are essentially independent of the census and the errors are of a different nature than those of the ICM survey estimates being evaluated.

## Section 3. Limitations

It should be kept in mind that the reported findings are generally descriptive. Due to uncertainty about the quality of the components that are used to construct the independent estimates and assumptions about migration, the demographic measures may at best provide only rough indicators of differential undercoverage in 1998 and change in coverage historically for the sites.

Another limitation of this study is the lack of accepted statistical basis to assess the accuracy of the independent population estimates or other benchmarks. Until some uncertainty models are developed, the demographic results can be considered only "face validity" indicators.

Despite these limitations, the consistency of the findings across a variety of different demographic benchmarks (e.g., previous census results, current population and housing estimates from different sources, sex ratios, use of school enrollment data and medicare data) provides some check on the reasonableness of the estimates. Furthermore, the demographic approach has the distinct advantage of being operationally feasible, timely, and cost effective.

## Section 4. Results

## 1. Consistency of Population Totals with Independent Benchmarks

We first evaluate the consistency of the results for the Sacramento City and Menominee sites, where all census activities were conducted (including sampling for nonresponse followup and adjustment for net undercoverage). We then evaluate the results for the South Carolina site, where sampling was not used for nonresponse followup and the released census figures do not include an adjustment for net undercount.

**\* Sacramento City, CA and Menominee County, WI:**

Table 1 compares the Census 2000 Dress Rehearsal results for Sacramento City and Menominee County with independent estimates (the initial independent estimates have been adjusted for net undercount). The census population results (released on January 14, 1998) are shown in column 4. Two separate components of the census results are also shown for this evaluation--the initial phase census estimate (col. 1) and the ICM estimate of net undercount (col. 2-3).

For each site, two different independent estimates are compared to the released census population totals. These comparisons allow us to apply face validity checks to the census and ICM/PES results. One of the estimates is derived from the Census Bureau's population estimates program; the other is derived from agency estimates in each State (the adjustment of the Census Bureau and agency population estimates for net undercount is shown in Table 9).

**a) Sacramento City, CA:** <u>The census population estimate of 403,313 (col. 4) is consistent with the range of the demographic estimates adjusted for net undercoverage (391,557 to 405,123).</u> The underlying ICM estimate of net undercount (6.3 percent) is validated by the demographic benchmarks (implied undercoverage of 3.5 to 6.8 percent). Without the ICM adjustment, the initial census estimate (377,741) would be too low.

**b) Menominee County, WI:** <u>The census population estimate of 4,738 is broadly consistent with the range of the demographic estimates adjusted for net undercoverage (4,742 to 5,191).</u> The underlying ICM estimate of net undercount (3.0 percent) is at the low end of the broad range of demographic undercoverage indicators (3.1 to 11.5 percent). The wide range in the demographic numbers reflects the wide range in the independent estimates for such a small area.

**\* South Carolina Site:**

Table 2 evaluates the Census 2000 Dress Rehearsal results for the South Carolina site. Included in the table is the released census population total (col. 1), the PES estimate of net undercount (col. 2-3), and the adjusted population estimate (col. 4). This adjusted estimate is compared to the adjusted independent estimate (col. 5).

<u>The census population result of 662,140 is below expected levels as measured by both the 1998 PES and demographic benchmarks.</u> The population net undercoverage estimated by the PES is 9 percent. This result is broadly consistent with the undercoverage for the South Carolina site implied by the demographic estimate (about 7 percent). Both sets of estimates indicate a decline in population coverage from 1990 (PES estimate of 2.3 percent net undercount--see Table 9).

These findings of population undercoverage in the South Carolina site are consistent with the later analysis of administrative data (Medicare, school enrollment, birth statistics) that indicate a decline in coverage between 1990 and 1998 (see Section 4). The population shortfall is related to a shortfall in housing (see next section).

## 2. Consistency of Housing Totals with Independent Benchmarks

Table 3 provides a comparison of the Census 2000 Dress Rehearsal results (col. 3) with independent housing estimates produced by the Census Bureau and by State agencies (col. 2). Percent differences for housing units are shown in column 5. The South Carolina results are reported for the site and for each county separately. For reference, results from the 1990 Census are provided in column 1.

It should be noted that the housing data are not adjusted for net undercoverage. The adjustment of undercount in the Dress Rehearsal results was applied to population totals only.

**\* Sacramento City, CA:** <u>The 1998 census housing total is lower than the independent estimates.</u> The census housing unit total is below both the Census Bureau and the California Agency estimate (by 0.5 and 1.9 percent)--but the margin of error in the independent estimates could be this large.

**\* Menominee County, WI:** <u>The 1998 census housing total is higher than the independent estimate.</u> The housing unit count is higher than expected (6.9%), but we cannot make any reliability statements given the imprecision in the independent estimate for such a small site.

**\* South Carolina Site:** <u>The 1998 census housing total falls consistently below the independent estimates, with the housing shortfall exceeding 10 percent in one county.</u> The shortage of housing units is reflected in the population shortfall for the site.

For the total site, the census housing total is 5.6 percent below the independent estimate. All counties have fewer housing units than estimated; the shortage exceeds 7 percent in three counties (Marlboro, Newberry, and Union). These differences can be large enough to lead to contrasting trends in housing growth since 1990--the 1998 census results imply housing loss in Marlboro and Union counties whereas the independent estimates indicate expected housing growth. The finding of a low housing count in the South Carolina site is consistent with the results of other Census 2000 Dress Rehearsal evaluations.

The housing deficiency is somewhat surprising given that the Master Address File (MAF) total was higher than our independent estimate (West and Robinson, 1998). Analysis of housing data from the Census Unedited File shows that high levels of deleted units may be in part responsible for this drop. We need to assess the types of housing units included on the MAF extracts used to mail out the census questionnaires and visit the nonresponding units.

### 3. Consistency of Key Demographic Characteristics

In the previous two sections we focused on the consistency of housing and population totals. Now we examine the consistency of housing and population distributions within those totals.

Tables 4-8 and Figures 1-2 provide an historical comparison of the Census 2000 Dress Rehearsal results with census data on six statistics: (1) percent population in group quarters, (2) vacancy rates, (3) persons per household (PPH), (4) age distributions, (5) race distributions and (6) Hispanic origin distributions. Table 4 shows data on the group quarters (GQ) population, vacancy rates and persons per household. Data are shown for 1998, 1990 and 1980. The county level data are shown in Table 5. The percent distribution of households by number of persons per unit are summarized in Table 6 (1980-1998). Table 7 displays the census distributions classified by race (1970-1998). Table 8 shows distributions classified by Hispanic origin (1980-1998). Age distributions are examined in Figures 1 and 2 (1990, 1998).

**\* All three sites (Sacramento City, Menominee County, and South Carolina Site):**

For all the sites, the aforementioned statistics exhibit consistency with previous census data and expected trends.

**a) Group Quarters**--Historically, the GQ population has been large in the South Carolina site (especially in Richland County). The GQ counts appear consistent with results from previous censuses (cols. 2 and 3 of Table 4). Deviations such as the observed increase in the remaining counties in the South Carolina site may be explainable (e.g., construction of prisons--see GQ data for Lancaster, Lee, and Marlboro counties in Table 5).

**b) Vacancy rates**--The vacancy rates also show consistency across censuses (Table 4, col. 6). For example, the rate in Menominee County is very high (33.7%), but is similar to the rate in previous censuses (38.1 and 39.8%). Some changes are noted. For example, in Sacramento, the vacancy rate in 1998 was higher than the vacancy rate in 1990, but similar to the rate in 1980. The vacancy rates have edged up in the counties in the South Carolina site (8.3% in 1990 to 10.1% in 1998). As seen in Table 5, this increase is especially large in five counties (Chester, Chesterfield, Darlington, Lee, and Marlboro).

**c) Persons per household**--Household distributions are important to examine for two reasons: (1) broad trends in the number of persons per household are predictable, and (2) discrepancies in the proportion of households of certain sizes may point to questionnaire design problems. For example, a sharp drop in the proportion of households with 6 or more persons compared to 5 persons may suggest coverage problems associated with the 5-person questionnaire. Examining the dress rehearsal results (Table 6), we find that the trends in PPH pass the first test of consistency--the increasing average size per housing unit in Sacramento (2.39 in 1980 to 2.50 in 1990 and 2.52 in 1998) may be attributed to increased proportions of Asian, Hispanic, and immigrant households in the city. The declining PPH in Menominee and South Carolina for 1998 is consistent with the declines in previous censuses and expected patterns since 1990.

Furthermore, the data in Table 6 do not reveal any evidence of inconsistent 4, 5, 6, and 7 or more person household distributions over the 1980 to 1998 period. The distributional trends are generally in line with those expected based on the overall change in persons per household discussed above. In Menominee, there was a sharper than expected drop in the number of 6 person households compared to the number of 5 person households, but the overall number of observations is too small to arrive at any firm conclusion.

**d) Age Distributions**--Age is an important demographic characteristic, which changes in a very predictable fashion. Figure 1 displays the single-year-of-age distribution for each site in 1990 and 1998.

The profile of the 1998 data generally conforms to the 1990 distributions and reflect the same variability. The "movement" in the population profiles for 1990 and 1998 between ages 40 and 50 is real (see Sacramento and South Carolina profiles)--it is the aging of the leading edge of the baby boomers. The consistency of the age distribution is much clearer when the 1990 and 1998 data are aligned on the basis of birth cohorts (Figure 2).

**e) Race Distributions**--Table 7 displays census population results classified by race. It is important to look at the consistency of race data given the new race questions in the dress rehearsal, where respondents could report more than one race. The last column of Table 7 gives the number of persons in each site who reported two or more races; the other columns reflect single race responses.

Three observations from Table 7 are noted here. First, multiple race reporting was more frequent in Sacramento, a city with a very diverse race and ethnic composition. Slightly over 5 percent of the population is classified in this category (5.4 percent, or 21,965 persons). Multiple reporting accounts for 1.2 percent (59 persons) in Menominee County and 0.8 percent (5,628 persons) in the South Carolina site.

Second, with one exception (see following paragraph), the race distribution in 1998 in each site is consistent with historical trends and shifts expected on the basis of migration patterns since 1990. For Sacramento and South Carolina, the decreasing proportions of Whites and increasing proportions of other racial groups in 1998 reflects the continuation of long-standing trends (the decline for Whites in 1998 is attributable in part to reclassification into the "2 or more" category). For Menominee County, the race distribution is fairly constant over time.

The one exception concerns the increase in the number of persons classified as American Indian and Alaskan Native in Sacramento City. In 1998, this category included 12,327 persons, or 3.1 percent of the total population. In 1990, the number was 4,561, or 1.2 percent of the total. Factors leading to this significant increase are being studied.

**f) Hispanic Origin Distributions**--The population distributions classified by Hispanic Origin also exhibit consistency across censuses (Table 8). The increasing proportions of Hispanics in Sacramento is a result of domestic in-migration and immigration. The Hispanic population remains relatively small in Menominee County and the South Carolina site, reflecting the absence of strong migration trends.


**4. Early Demographic Inferences about the Magnitude of Undercoverage**

The independent estimates shown in Table 9 are benchmarked on 1990 adjusted counts (as measured by the 1990 PES estimates carried forward to 1998). The differences from the unadjusted census numbers (col. 9) for each dress rehearsal site reflects an accounting for both the estimated undercount in 1990 and change in coverage in the dress rehearsal results. We also examine sex ratios and other data to make additional inferences about differential undercoverage in the South Carolina site (Tables 10-12 and Figures 3-4).

The adjusted population estimates are used in this evaluation phase to provide an early assessment of the magnitude of undercoverage in the initial census results. This independent coverage assessment was available in advance of the ICM/PES coverage results. As already described, these early demographic coverage indicators also validated the sample survey-based coverage estimates.

**\* Sacramento City, CA:** A population undercoverage of 3 to 7 percent in the dress rehearsal initial-phase results is implied by the alternative adjusted population estimates (3.5% for the Census Bureau estimate, 6.8% for the California Agency estimate). These figures are generated by applying the 3.0 percent PES undercount adjustment in 1990 to the Census Bureau estimate and the California Agency estimate (col. 3) and estimated demographic change for 1990-98 (col. 5). The range in the implied undercoverage (col. 9) reflects the difference in the two independent estimates for the city (col. 6).

**\* Menominee County, WI:** A population undercoverage of 3 to 11 percent in the dress rehearsal initial-phase results (11.5% for the Census Bureau estimate, 3.1% for the Wisconsin Agency estimate). These figures are generated by using a 10.0 percent undercount adjustment in 1990 and applying it to the Census Bureau estimates and the agency estimate (col. 3) and estimated components of change for 1990-98 (col. 5). The wide range in the implied undercoverage (col. 9) reflects the wide range in the independent estimates for small areas.

**\* South Carolina Site:** A population undercoverage of about 7 percent in the dress rehearsal result is implied by the adjusted population estimate (7.0% for Census Bureau estimate; separate estimates are not available from the South Carolina agency). This number is a product of the 2.3 percent PES undercount adjustment in 1990 (col. 3) and estimated 1990-98 change (col. 5). The difference of the adjusted independent estimate and the dress rehearsal result is greater in the ten counties surrounding

Richland County (8.2%) than in Richland County itself (5.6%). The difference exceeds 10 percent in three counties (Chester, Marlboro, and Union).

We have examined other demographic data to understand better and verify the decline in coverage indicated for the South Carolina site. First, we examine sex ratios to make inferences about the coverage of specific groups. Figure 3 displays the sex ratios (males per 100 females) of Blacks and Whites in the 1990 census and the Census 2000 Dress Rehearsal (unadjusted census data). Relative to Whites, the sex ratios for Blacks are low--indicative in part to the high undercount of black men as documented by the previous national DA estimates. Differential sex ratios also result from factors such as differential mortality and differences in migration patterns, but no doubt the differential high undercount of black men is again a factor--a differential the ICM/PES is designed to reduce. The "gap" between the sex ratios for Blacks and Whites in fact increased from 1990 to 1998 for the South Carolina site.

Figure 4 compares the sex ratios for the 1998 South Carolina results based on two sets of data--one using the unadjusted census data and the other using PES-adjusted census estimates. The sex ratios for Blacks based on the adjusted data are higher and move closer to the sex ratios for Whites, thus indicating that the PES adjustment results in the reduction of the differential undercount for Blacks.

Second, we compare coverage levels in 1990 and 1998 implied by different data sources: Medicare data to assess relative coverage of the population 65 and over; school enrollment data to infer relative coverage of the population aged 7 to 14, and birth statistics and migration estimates to assess relative coverage of the population under age 10 (Tables 10-12). The comparisons for each age group are consistent in indicating a decline in coverage from 1990 to 1998 in the South Carolina site. For example, Table 10 shows that the ratio of the enumerated population 65 and over to the Medicare-enrolled population declined from 102.2 in 1990 to 98.2 in 1998. The ratio of enumerated children 7-14 to the school enrolled population declined from 97.0 in 1990 to 94.9 in 1998 (Table 11). Demographic indicators of net coverage for ages under 10 based on birth statistics and migration estimates decreased from 96.3 percent coverage in 1990 to 93.1 in 1998 with the coverage of black children being lower than for other races (Table 12). These findings of a coverage shortfall for all ages would be expected if the undercount is attributable in large part to missed housing units.

## Section 5. Conclusions/Recommendations

The dress rehearsal results pass most tests of demographic consistency. For all three sites, the demographic characteristics examined (such as persons per households, race/Hispanic origin distributions, and vacancy rates) conform with past census data and expected trends.

For Sacramento and Menominee, the housing and population totals are broadly consistent with independent estimates. For Sacramento City, the released census population total of 403,313 is confirmed by independent demographic estimates adjusted for net undercount. Further, the underlying Integrated Coverage Measurement (ICM) estimate of net undercount (6.3 percent) is validated by the independent benchmarks. Without the ICM adjustment, the census result for Sacramento City would be too low.

For Menominee County, Wisconsin, the released census population total of 4,738 is confirmed by independent demographic estimates adjusted for net undercount. The underlying ICM estimate of net undercount (3.0 percent) is broadly validated by the independent benchmarks.

For the South Carolina site, the housing and population totals fall consistently below expected levels. Population coverage in 1998 declined relative to 1990--attributable in large part to incomplete address lists and thus, the shortfall of census housing units. The undercoverage in the dress rehearsal results implied by the demographic benchmarks are consistent with the undercoverage measured by the PES results for the South Carolina site.

In reaching this assessment, the demographic evaluation answers the four broad questions set forth in the September 15, 1998 outline of the C7 report:

1. Are the overall results plausible? YES
2. Are there coverage problems associated with the 5-person questionnaire? NO
3. Do the independent demographic benchmarks provide early indications of the magnitude of coverage errors? YES
4. Are the subnational demographic tools effective in validating the census results for demographic areas in a manner similar to the traditional national Demographic Analysis estimates? YES

### Recommendations:

1) Evaluate completeness of MAF

The finding of a low housing unit count in the South Carolina site is consistent with the results of other Census 2000 Dress Rehearsal evaluations. A number of important questions can be asked. Is the housing shortfall a consequence of housing units being missed in the MAF? Were the units in the MAF, but erroneously deleted in census operations? Why was the housing shortfall more pronounced in the South Carolina site than in the other sites? Since the completeness of housing is critical to the success of any census, we need to thoroughly assess the quality of the MAF and other activities that affect housing coverage. The demographic evaluation can start in the summer of 1999 with the release of the Decennial Master Address file.

2) Conduct expanded demographic evaluations in Census 2000

Despite the inherent limitations of the demographic estimates, the battery of demographic and analytic tools described here provides an important independent basis to assess the accuracy of the census results and the magnitude of undercoverage. This demographic evaluation of the dress rehearsal sites and the earlier evaluation of the 1995 Census Test demonstrate how an expanded demographic analysis program could be a timely, inexpensive, and operationally feasible coverage evaluation tool for Census 2000 at the state and county levels.

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**Table 1. Comparison of Census 2000 Dress Rehearsal Results with Independent Estimates Adjusted for Net Undercount: Sacramento City and Menominee County**

| | **POPULATION** | | | | | |
|---|---|---|---|---|---|---|
| **Site and Source of Estimate** | 1998 Dress Rehearsal Census | | | | 1998 Indep. Estimate | |
| | Initial-Phase Estimates (unadjusted) (1) | ICM Net Undercount | | Released Census Result (adjusted) (4=1+2) | Estimate (Adjusted) (5) | Implied % Underct. (6) |
| | | Amount (2) | Percent (3=2/4) | | | |
| **Sacramento City, CA** | - | - | - | - | - | - |
| 4-18-1998 Census | 377,741 | 25,572 | 6.3 | **403,313** | - | - |
| - | - | - | - | - | - | - |
| 4-18-1998 Estimate | - | - | - | - | - | - |

| Site and Source of Estimate | Released Census Result (Unadjusted) (1) | Amount (2) | Percent (3=2/4) | Census Estimate (Adjusted) (4=1+2) | Estimate (Adjusted) (5) | Implied % Underct. (6) |
|---|---|---|---|---|---|---|
| Census Bureau | - | - | - | - | 391,557 | 3.5 |
| California Agency | - | - | - | - | 405,123 | 6.8 |
| | - | - | - | - | - | - |
| **Menominee County, Wi** | - | - | - | - | - | - |
| 4-18-1998 Census | 4,595 | 143 | 3.0 | **4,738** | - | - |
| | - | - | - | - | - | - |
| 4-18-1998 Estimate | - | - | - | - | - | - |
| Census Bureau | - | - | - | - | 5,191 | 11.5 |
| Wisconsin Agency | - | - | - | - | 4,742 | 3.1 |

Sources:
Col. 1: From Dress Rehearsal results available on Census Bureau's Internet site (www.census.gov). Census population not adjusted for net undercount.
Col. 4: From Integrated Coverage Measurement results.
Col. 5: From Table 9, col. 6.
Col. 6: From Table 9, col. 9.

**Table 2. Comparison of Census 2000 Dress Rehearsal Results with Independent Estimates Adjusted for Net Undercount: South Carolina Site**

| Site and Source of Estimate | POPULATION | | | | | |
|---|---|---|---|---|---|---|
| | 1998 Dress Rehearsal Census | | | | 1998 Indep. Estimate | |
| | Released Census Result (Unadjusted) (1) | 1998 PES Net Undercount | | Census Estimate (Adjusted) (4=1+2) | Estimate (Adjusted) (5) | Implied % Underct. (6) |
| | | Amount (2) | Percent (3=2/4) | | | |
| **South Carolina Site** | - | - | - | - | - | - |
| 4-18-1998 Census | **662,140** | 65,135 | 9.0 | 727,275 | - | - |
| | - | - | - | - | - | - |
| 4-18-1998 Estimate | - | - | - | - | - | - |
| Census Bureau | - | - | - | - | 712,032 | 7.0 |

Sources:
Col. 1: From Dress Rehearsal results available on Census Bureau's Internet site (www.census.gov). Census population not adjusted for net undercount.
Col. 2: From Post Enumeration Survey estimates.
Col. 5: From Table 9, col. 6.
Col. 6: From Table 9, col. 9.

**Table 3. Comparison of Census 2000 Dress Rehearsal Results on Housing with Independent Estimates**

| Site and Source of Independent Estimate | HOUSING UNITS | | | | |
|---|---|---|---|---|---|
| | Census 4-1-90 (1) | Independent Estimate 4-18-98 (2) | Census Result 4-18-98 (3) | Difference: 1998 Census - Est. | |
| | | | | Amount (4=3-2) | Percent (5=4/2) |
| | - | - | - | - | - |
| **Sacramento City, CA** | - | - | - | - | - |
| Census Bureau | 153,362 | 159,058 | 158,281 | (777) | -0.5% |
| California Agency | 153,362 | 161,348 | 158,281 | (3,067) | -1.9% |
| | - | - | - | - | - |
| **Menominee County, Wi** | - | - | - | - | - |
| Census Bureau | 1,742 | 1,914 | 2,046 | 132 | 6.9% |

| | | | | | |
|---|---|---|---|---|---|
| Wisconsin Agency | n.a. | n.a. | n.a. | n.a. | n.a. |
| | | | | | |
| **South Carolina Site** | | | | | |
| Census Bureau | | | | | |
| Site Total | 253,285 | 289,848 | 273,497 | (16,351) | -5.6% |
| | | | | | |
| **Richland County** | 109,555 | 126,615 | 119,214 | (7,401) | -5.8% |
| | | | | | |
| **Other Counties (Total)** | 143,730 | 163,233 | 154,283 | (8,950) | -5.5% |
| | | | | | |
| Chester | 12,293 | 13,393 | 12,677 | (716) | -5.3% |
| Chesterfield | 15,100 | 18,258 | 17,316 | (942) | -5.2% |
| Darlington | 23,601 | 26,686 | 26,108 | (578) | -2.2% |
| Fairfield | 8,730 | 9,782 | 9,607 | (175) | -1.8% |
| Kershaw | 17,479 | 20,591 | 20,453 | (138) | -0.7% |
| Lancaster | 20,929 | 23,694 | 22,396 | (1,298) | -5.5% |
| Lee | 6,537 | 7,650 | 7,128 | (522) | -6.8% |
| Marlboro | 10,955 | 12,646 | 10,908 | (1,738) | -13.7% |
| Newberry | 14,455 | 15,848 | 14,503 | (1,345) | -8.5% |
| Union | 12,230 | 13,237 | 12,014 | (1,223) | -9.2% |
| | | | | | |
| South Carolina Agency | n.a. | n.a. | n.a. | n.a. | n.a. |

Sources:
Col. 1: Revised data from 1990 Census. Revisions include post-1990 Census corrections of political geography or geographic mis-allocations and boundary updates. Three counties in the South Carolina site are affected: Chesterfield, Marlboro, and Richland.
Col. 2: Independent housing estimates for dress rehearsal Census Day (4-18-98). See Appendix C Table 1 for derivation.
Col 3: From Dress Rehearsal results available on Census Bureau's Internet site (www.census.gov).
Note: The housing data are not adjusted for net undercount. The ICM adjustment is applied to population totals only (such as Table 1, col. 2-4). The housing data for Irmo town in Lexington County is included in the South Carolina site total and 'Other County' total, but is not shown separately.

**Table 4. Comparison of Census 2000 Dress Rehearsal Results on Housing and Population with Previous Censuses: Group Quarters (GQ's), Vacancy Rates, and Persons Per Household**

| Site and Year | Group Quarters | | | Vacancy | | | Persons Per Household | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total Population (1) | GQ Population (2) | Percent GQ (3=2/1) | Housing Units (4) | Vacant (5) | Percent Vacant (6=5/4) | House-holds (7=4-5) | HH Population (8) | Persons per HH (9=8/7) |
| | | | | | | | | | |
| **Sacramento City, CA** | | | | | | | | | |
| Census 4-18-98 [1] | 403,312 | 8,307 | 2.1% | 158,281 | 11,698 | 7.4% | 146,583 | 369,434 | 2.52 |
| Census 4-1-90 | 369,365 | 8,138 | 2.2% | 153,362 | 8,918 | 5.8% | 144,444 | 361,227 | 2.50 |
| Census 4-1-80 | 275,741 | 6,190 | 2.2% | 123,284 | 10,425 | 8.5% | 112,859 | 269,551 | 2.39 |
| | | | | | | | | | |
| **Menominee County, WI** | | | | | | | | | |
| Census 4-18-98 [1] | 4,779 | 45 | 0.9% | 2,046 | 690 | 33.7% | 1,356 | 4,550 | 3.36 |
| Census 4-1-90 | 3,890 | 36 | 0.9% | 1,742 | 663 | 38.1% | 1,079 | 3,854 | 3.57 |
| Census 4-1-80 | 3,373 | 0 | 0.0% | 1,327 | 528 | 39.8% | 799 | 3,373 | 4.22 |

| County and Year | Total Population | GQ Population | Percent GQ | Housing Units | Vacant | Percent Vacant | Households | HH Population | Persons per HH |
|---|---|---|---|---|---|---|---|---|---|
| **South Carolina Site** | | | | | | | | | |
| Census 4-18-98 | 662,140 | 33,524 | 5.1% | 273,497 | 23,608 | 8.6% | 249,889 | 628,616 | 2.52 |
| Census 4-1-90 | 654,115 | 30,717 | 4.7% | 253,292 | 19,856 | 7.8% | 233,436 | 623,398 | 2.67 |
| Census 4-1-80 | 628,016 | 35,777 | 5.7% | 221,036 | 18,001 | 8.1% | 203,035 | 592,239 | 2.92 |
| | | | | | | | | | |
| **Richland County** | | | | | | | | | |
| Census 4-18-98 | 296,709 | 25,278 | 8.5% | 119,214 | 8,064 | 6.8% | 111,150 | 271,431 | 2.44 |
| Census 4-1-90 | 285,720 | 26,091 | 9.1% | 109,564 | 7,974 | 7.3% | 101,590 | 259,629 | 2.56 |
| Census 4-1-80 | 269,735 | 33,009 | 12.2% | 91,912 | 6,451 | 7.0% | 85,461 | 236,726 | 2.77 |
| | | | | | | | | | |
| **Other Counties (Total)** | | | | | | | | | |
| Census 4-18-98 | 365,431 | 8,246 | 2.3% | 154,283 | 15,544 | 10.1% | 138,739 | 357,185 | 2.57 |
| Census 4-1-90 | 368,395 | 4,626 | 1.3% | 143,728 | 11,882 | 8.3% | 131,846 | 363,769 | 2.76 |
| Census 4-1-80 | 358,281 | 2,768 | 0.8% | 129,124 | 11,550 | 8.9% | 117,574 | 355,513 | 3.02 |

Note:

[1] The Total Population (col. 1) figures differ from those in Table 1 (col.4) because of rounding and Census Bureau procedures for handling overcounts. These differences will not occur in Census 2000.

Sources: Col. 1, 2, 4, 5:
1998 Data: From Dress Rehearsal results available on Census Bureau's Internet site (www.census.gov). The total population estimates for Sacramento City and Menominee County in col.1 include the adjustment for net undercount. The population results for the South Carolina site do not include the net undercount adjustment. The data on GQ population (col.2), housing units (col.4), vacant (col.5), households (col.7) and household population (col.8) are not adjusted for net undercount. The ICM adjustment is applied to population totals only (such as the Sacramento total of 403,312 and Menominee total of 4,779 in col.1).

1980 and 1990 Data: 1980 and 1990 census tabulations. The population and housing data for 1990 are based on unrevised data (see footnote to Table 3). The population and housing data for 1990 and 1998 do not include adjustment for net undercount.

See Table 5 for the data pertaining to each of the other 10 countiesand Irmo town (Lexington County) in the South Carolina site.

**Table 5. County Level Comparison of Census 2000 Dress Rehearsal Results on Housing and Population with Previous Censuses: Group Quarters (GQ's), Vacancy Rates, and Persons Per Household**

| County and Year | Group Quarters | | | Vacancy Rates | | | Persons Per Household | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total Population (1) | GQ Population (2) | Percent GQ (3=2/1) | Housing Units (4) | Vacant (5) | Percent Vacant (6=5/4) | House-holds (7=4-5) | HH Population (8=1-2) | Persons per HH (9=8/7) |
| **Chester** | | | | | | | | | |
| Census 4-18-98 [1] | 30,487 | 250 | 0.8% | 12,677 | 1,170 | 9.2% | 11,507 | 30,237 | 2.63 |
| Census 4-1-90 | 32,170 | 118 | 0.4% | 12,293 | 845 | 6.9% | 11,448 | 32,052 | 2.80 |
| Census 4-1-80 | 30,148 | 96 | 0.3% | 10,737 | 761 | 7.1% | 9,976 | 30,052 | 3.01 |
| | | | | | | | | | |
| **Chesterfield** | | | | | | | | | |
| Census 4-18-98 | 39,666 | 549 | 1.4% | 17,316 | 1,968 | 11.4% | 15,348 | 39,117 | 2.55 |
| Census 4-1-90 | 38,577 | 380 | 1.0% | 15,100 | 1,054 | 7.0% | 14,046 | 38,197 | 2.72 |
| Census 4-1-80 | 38,161 | 116 | 0.3% | 13,927 | 1,079 | 7.7% | 12,848 | 38,045 | 2.96 |
| | | | | | | | | | |
| **Darlington** | | | | | | | | | |
| Census 4-18-98 | 61,529 | 1,064 | 1.7% | 26,108 | 2,524 | 9.7% | 23,584 | 60,465 | 2.56 |
| Census 4-1-90 | 61,851 | 1,054 | 1.7% | 23,601 | 1,602 | 6.8% | 21,999 | 60,797 | 2.76 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Census 4-1-80 | 62,717 | 742 | 1.2% | 21,504 | 1,444 | 6.7% | 20,060 | 61,975 | 3.09 |
| | - | - | - | - | - | - | - | - | - |
| **Fairfield** | | - | - | - | - | - | - | - | - |
| Census 4-18-98 | 22,284 | 426 | 1.9% | 9,607 | 1,387 | 14.4% | 8,220 | 21,858 | 2.66 |
| Census 4-1-90 | 22,295 | 435 | 2.0% | 8,730 | 1,263 | 14.5% | 7,467 | 21,860 | 2.93 |
| Census 4-1-80 | 20,700 | 293 | 1.4% | 7,452 | 1,097 | 14.7% | 6,355 | 20,407 | 3.21 |
| | - | - | - | - | - | - | - | - | - |
| **Kershaw** | | - | - | - | - | - | - | - | - |
| Census 4-18-98 | 47,637 | 546 | 1.1% | 20,453 | 2,221 | 10.9% | 18,232 | 47,091 | 2.58 |
| Census 4-1-90 | 43,599 | 409 | 0.9% | 17,479 | 1,669 | 9.5% | 15,810 | 43,190 | 2.73 |
| Census 4-1-80 | 39,015 | 179 | 0.5% | 15,243 | 2,112 | 13.9% | 13,131 | 38,836 | 2.96 |
| | - | - | - | - | - | - | - | - | - |
| **Lancaster** | | | - | - | - | - | - | - | - |
| Census 4-18-98 | 55,212 | 1,528 | 2.8% | 22,396 | 1,447 | 6.5% | 20,949 | 53,684 | 2.56 |
| Census 4-1-90 | 54,516 | 399 | 0.7% | 20,929 | 1,151 | 5.5% | 19,778 | 54,117 | 2.74 |
| Census 4-1-80 | 53,361 | 277 | 0.5% | 19,212 | 1,392 | 7.2% | 17,820 | 53,084 | 2.98 |
| - | - | - | - | - | - | - | - | - | - |
| **Lee** | - | - | - | - | - | - | - | - | - |
| Census 4-18-98 | 18,948 | 1,594 | 8.4% | 7,128 | 710 | 10.0% | 6,418 | 17,354 | 2.70 |
| Census 4-1-90 | 18,437 | 153 | 0.8% | 6,537 | 483 | 7.4% | 6,054 | 18,284 | 3.02 |
| Census 4-1-80 | 18,929 | 3 | 0.0% | 6,138 | 539 | 8.8% | 5,599 | 18,926 | 3.38 |
| | - | - | - | - | - | - | - | - | - |
| **Lexington (Irmo)** | - | - | - | - | - | - | - | - | - |
| Census 4-18-98 | 3,316 | 0 | 0.0% | 1,173 | 34 | 2.9% | 1,139 | 3,316 | 2.91 |
| Census 4-1-90 | 4,080 | 0 | 0.0% | 1,419 | 59 | 4.2% | 1,360 | 4,080 | 3.00 |
| Census 4-1-80 | 1,623 | 0 | 0.0% | 535 | 33 | 6.2% | 502 | 1,623 | 3.23 |
| - | - | - | - | - | - | - | - | - | - |
| **Marlboro** | | - | | - | - | - | - | - | - |
| Census 4-18-98 | 26,380 | 1,200 | 4.5% | 10,908 | 1,193 | 10.9% | 9,715 | 25,180 | 2.59 |
| Census 4-1-90 | 29,361 | 684 | 2.3% | 10,955 | 792 | 7.2% | 10,163 | 28,677 | 2.82 |
| Census 4-1-80 | 31,634 | 215 | 0.7% | 10,691 | 871 | 8.1% | 9,820 | 31,419 | 3.20 |
| - | - | - | - | - | - | - | - | - | - |
| **Newberry** | | - | - | - | - | - | - | - | - |
| Census 4-18-98 | 32,238 | 806 | 2.5% | 14,503 | 2,011 | 13.9% | 12,492 | 31,432 | 2.52 |
| Census 4-1-90 | 33,172 | 766 | 2.3% | 14,455 | 2,141 | 14.8% | 12,314 | 32,406 | 2.63 |
| Census 4-1-80 | 31,242 | 742 | 2.4% | 12,296 | 1,395 | 11.3% | 10,901 | 30,500 | 2.80 |
| | - | - | - | - | - | - | - | - | - |
| **Union** | - | - | - | - | - | - | - | - | - |
| Census 4-18-98 | 27,734 | 283 | 1.0% | 12,014 | 879 | 7.3% | 11,135 | 27,451 | 2.47 |
| Census 4-1-90 | 30,337 | 228 | 0.8% | 12,230 | 823 | 6.7% | 11,407 | 30,109 | 2.64 |
| Census 4-1-80 | 30,751 | 105 | 0.3% | 11,389 | 827 | 7.3% | 10,562 | 30,646 | 2.90 |

Note: The vacant units for the Lexington part of Irmo town for 1980 are not available in published tabulations; a vacancy rate equal to the vacancy rate of Irmo as a whole (in Lexington and Richland) was assumed.

### Table 6. Percent Distribution of Households by Number of Persons per Unit and Average Number of Persons per Household (PPH) for Dress Rehearsal Sites: 1980, 1990 and 1998

| Persons per household | | | | | | | |
|---|---|---|---|---|---|---|---|
| Site and Year | Number of households | Percent Distribution by Size | | | | | PPH |
| | | 1-3 | 4 | 5 | 6 | 7+ | |
| Sacramento City | - | - | - | - | - | - | - |
| 1998 | 146,583 | 77.2 | 11.1 | 5.9 | 2.7 | 3.1 | 2.52 |
| 1990 | 144,444 | 77.8 | 11.4 | 5.6 | 2.6 | 2.6 | 2.50 |
| 1980 | 112,859 | 79.9 | 11.2 | 5.0 | 2.3 | 1.6 | 2.39 |
| - | - | - | - | - | - | - | - |
| Menominee County | - | - | - | - | - | - | - |
| 1998 | 1,356 | 60.3 | 12.1 | 13.2 | 6.3 | 8.1 | 3.36 |
| 1990 | 1,079 | 54.1 | 14.7 | 13.3 | 10.1 | 7.7 | 3.57 |
| 1980 | 799 | 44.8 | 17.7 | 10.7 | 9.3 | 17.5 | 4.22 |
| - | - | - | - | - | - | - | - |
| South Carolina Site | - | - | - | - | - | - | - |
| 1998 | 249,889 | 77.3 | 13.9 | 5.7 | 1.8 | 1.3 | 2.52 |
| 1990 [1] | 232,076 | 73.4 | 15.5 | 6.7 | 2.4 | 1.9 | 2.67 |
| 1980 [1] | 202,533 | 68.2 | 16.2 | 8.1 | 3.7 | 3.8 | 2.92 |

Note:
[1] Figures exclude Irmo town in Lexington County.

Source:
1998 Data : From Dress Rehearsal results available on Census Bureau's Internet site (www.census.gov). The census results for households do not include a net undercount adjustment. The ICM adjustment is applied to population totals only.
1980 and 1990 Data: 1980 and 1990 census tabulations. The data do not include an undercount adjustment.

### Table 7. Distribution of Population by Race for Dress Rehearsal Sites: 1970, 1980, 1990 and 1998

| Site and Year | Total | White | Black | AI/AN | Race Asians/Pacific Islanders | | | Other | Two or more |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Total | Asians | NH/PI | | |
| Sacramento City, CA | - | - | - | - | - | - | - | - | - |
| 1998 | 403,312 | 195,046 | 63,826 | 12,327 | 63,125 | 60,529 | 2,596 | 47,023 | 21,965 |
| 1990 | 369,365 | 221,963 | 56,521 | 4,561 | 55,426 | 52,973 | 2,453 | 30,894 | [-] |
| 1980 | 275,741 | 186,477 | 36,866 | 3,322 | 24,017 | N/A | N/A | 25,059 | [-] |
| 1970 [2] | 254,413 | 207,338 | 27,244 | 1,227 | 16,553 | N/A | N/A | 2,051 | [-] |
| Menominee County, WI | - | - | - | - | - | - | - | - | - |
| 1998 | 4,779 | 579 | 5 | 4,121 | 2 | 1 | 1 | 13 | 59 |
| 1990 | 3,890 | 416 | 0 | 3,469 | 0 | 0 | 0 | 5 | [-] |
| 1980 | 3,373 | 352 | 0 | 3,014 | 2 | N/A | N/A | 5 | [-] |
| 1970 [2] | 2,607 | 292 | 1 | 2,306 | 0 | N/A | N/A | 8 | [-] |
| South Carolina Site | - | - | - | - | - | - | - | - | - |
| 1998 | 662,140 | 379,218 | 263,917 | 2,817 | 6,384 | 5,890 | 494 | 4,176 | 5,628 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1990 [1] | 650,035 | 386,319 | 255,426 | 1,856 | 4,324 | 4,041 | 283 | 2,110 | [-] |
| 1980 [1] | 626,393 | 384,986 | 235,633 | 1,134 | 2,524 | N/A | N/A | 2,116 | [-] |
| 1970 [2] | 552,819 | 260,329 | 190,874 | 386 | 533 | N/A | N/A | 697 | [-] |

| Percent | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sacramento City, CA** | - | - | - | - | - | - | - | - | - |
| 1998 | 100.0 | 48.4 | 15.8 | 3.1 | 15.7 | 15.0 | 0.6 | 11.7 | 5.4 |
| 1990 | 100.0 | 60.1 | 15.3 | 1.2 | 15.0 | 14.3 | 0.7 | 8.4 | [-] |
| 1980 | 100.0 | 67.6 | 13.4 | 1.2 | 8.7 | N/A | N/A | 9.1 | [-] |
| 1970 [2] | 100.0 | 81.5 | 10.7 | 0.5 | 6.5 | N/A | N/A | 0.8 | [-] |
| **Menominee County, WI** | - | - | | - | - | - | - | - | - |
| 1998 | 100.0 | 12.1 | 0.1 | 86.2 | 0.0 | 0.0 | 0.0 | 0.3 | 1.2 |
| 1990 | 100.0 | 10.7 | 0.0 | 89.2 | 0.0 | 0.0 | 0.0 | 0.1 | [-] |
| 1980 | 100.0 | 10.4 | 0.0 | 89.4 | 0.1 | N/A | N/A | 0.1 | [-] |
| 1970 [2] | 100.0 | 11.2 | 0.0 | 88.5 | 0.0 | N/A | N/A | 0.3 | [-] |
| **South Carolina Site** | - | - | - | - | - | - | - | - | - |
| 1998 | 100.0 | 57.3 | 39.9 | 0.4 | 1.0 | 0.9 | 0.1 | 0.6 | 0.8 |
| 1990 [1] | 100.0 | 59.4 | 39.3 | 0.3 | 0.7 | 0.6 | 0.0 | 0.3 | [-] |
| 1980 [1] | 100.0 | 61.5 | 37.6 | 0.2 | 0.4 | N/A | N/A | 0.3 | [-] |
| 1970 [2] | 100.0 | 65.2 | 34.5 | 0.1 | 0.1 | N/A | N/A | 0.1 | [-] |

Notes:
N/A =Data not available.
AI/AN= American Indians/Alaska Natives. NH/PI= Native Hawaiian/Pacific Islanders.
[1] Figures exclude Irmo town in Lexington County.
[2] For 1970, race category AI/AN includes American Indians only and race category Asians/Pacific Islanders includes only Japanese, Chinese and Filipinos.

Sources: 1998 data:. From Dress Rehearsal tabulations available on Census Bureau's Internet site (www.census.gov). Results for Sacramento City and Menominee County include adjustment for net undercount. 1990 - 1970 data: From decennial census publications. The 1970-1990 data do not include an undercount adjustment.

**Table 8. Distribution of Population by Hispanic Origin for the Dress Rehearsal Sites: 1980, 1990, and 1998**

| - | Total | Hispanic | Not Hispanic |
|---|---|---|---|
| **Sacramento City, CA** | - | - | - |
| 1998 | 403,312 | 84,192 | 319,120 |
| 1990 | 369,365 | 60,007 | 309,358 |
| 1980 | 275,741 | 39,161 | 236,580 |
| **Menominee County, WI** | - | - | - |
| 1998 | 4,779 | 151 | 4,628 |
| 1990 | 3,890 | 55 | 3,835 |
| 1980 | 3,373 | 57 | 3,316 |
| **South Carolina Site** | - | - | - |
| 1998 | 662,140 | 12,727 | 649,413 |
| 1990 [1] | 650,035 | 6,030 | 644,005 |
| 1980 [1] | 626,393 | 7,420 | 618,973 |

|  | Percent |  |  |
| --- | --- | --- | --- |
| **Sacramento City, CA** | - | - | - |
| 1998 | 100.0 | 20.9 | 79.1 |
| 1990 | 100.0 | 16.2 | 83.8 |
| 1980 | 100.0 | 14.2 | 85.8 |
| **Menominee County, WI** | - | - | - |
| 1998 | 100.0 | 3.2 | 96.8 |
| 1990 | 100.0 | 1.4 | 98.6 |
| 1980 | 100.0 | 1.7 | 98.3 |
| **South Carolina Site** | - | - | - |
| 1998 | 100.0 | 1.9 | 98.1 |
| 1990 [1] | 100.0 | 0.9 | 99.1 |
| 1980 [1] | 100.0 | 1.2 | 98.8 |

Notes:
[1] Figures exclude Irmo town in Lexington County.

Sources:
1998 data: From dress rehearsal tabulations available on Census Bureau's Internet site (www.census.gov).
Results for Sacramento City and Menominee County include adjustment for net undercount.
1990 - 1980 data: From decennial census publications. The 1980-1990 data do not include an undercount adjustment.

**Table 9. Comparison of Unadjusted Census 2000 Dress Rehearsal Results with Adjusted Independent Estimates**

| Site and Source of Estimate | (Revised) Census 4-1-90 (1) | 1990 PES Net Undercount | | 1990 Census (Adjusted) (4=1+2) | Estimated 1990-98 Change (5) | Indep. 1998 Estimate (Adjusted) (6=4+5) | Initial-Phase Data (7) | Differnece: Initial Phase - Est. | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | Amount (2) | Percent (3=2/4) | | | | | Amount (8=6-7) | Percent (9=8/6) |
| **Sacramento City, CA** | - | - | - | - | - | - | - | - | - |
| Census Bureau | 369,365 | 11,393 | 3.0% | 380,758 | 10,799 | 391,557 | 377,741 | 13,816 | 3.5% |
| California Agency | 369,365 | 11,393 | 3.0% | 380,758 | 24,365 | 405,123 | 377,741 | 27,382 | 6.8% |
| - | - | - | - | - | - | - | - | - | - |
| **Menominee County, Wi** | - | - | - | - | - | - | - | - | - |
| Census Bureau | 3,890 | 434 | 10.0% | 4,324 | 867 | 5,191 | 4,595 | 596 | 11.5% |
| Wisconsin Agency | 3,890 | 434 | 10.0% | 4,324 | 418 | 4,742 | 4,595 | 147 | 3.1% |
| - | - | - | - | - | - | - | - | - | - |
| **South Carolina Site:** | - | - | - | - | - | - | - | - | - |
| | - | - | - | - | - | - | - | - | - |
| **Site Total** | 655,066 | 15,226 | 2.3% | 670,292 | 41,740 | 712,032 | 662,140 | 49,892 | 7.0% |
| | - | - | - | - | - | - | - | - | - |
| **Richland County** | 286,321 | 7,617 | 2.6% | 293,938 | 20,232 | 314,170 | 296,709 | 17,461 | 5.6% |
| | - | - | - | - | - | - | - | - | - |
| **Other Counties (Total)** | 368,745 | 7,609 | 2.0% | 376,354 | 21,508 | 397,862 | 365,431 | 32,431 | 8.2% |
| | - | - | - | - | - | - | - | - | - |
| Chester | 32,170 | 677 | 2.1% | 32,847 | 2,177 | 35,024 | 30,487 | 4,537 | 13.0% |

| County | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Chesterfield | 38,575 | 784 | 2.0% | 39,359 | 2,444 | 41,803 | 39,666 | 2,137 | 5.1% |
| Darlington | 61,851 | 1,330 | 2.1% | 63,181 | 4,406 | 67,587 | 61,529 | 6,058 | 9.0% |
| Fairfield | 22,295 | 591 | 2.6% | 22,886 | 97 | 22,983 | 22,284 | 699 | 3.0% |
| Kershaw | 43,599 | 770 | 1.7% | 44,369 | 4,873 | 49,242 | 47,637 | 1,605 | 3.3% |
| Lancaster | 54,516 | 1,034 | 1.9% | 55,550 | 4,265 | 59,815 | 55,212 | 4,603 | 7.7% |
| Lee | 18,437 | 500 | 2.6% | 18,937 | 1,914 | 20,851 | 18,948 | 1,903 | 9.1% |
| Marlboro | 29,716 | 691 | 2.3% | 30,407 | (124) | 30,283 | 26,380 | 3,903 | 12.9% |
| Newberry | 33,172 | 635 | 1.9% | 33,807 | 1,259 | 35,066 | 32,238 | 2,828 | 8.1% |
| Union | 30,337 | 522 | 1.7% | 30,859 | 154 | 31,013 | 27,734 | 3,279 | 10.6% |
| | - | - | - | - | - | - | - | - | - |
| South Carolina Agency | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |

Sources:
Col. 1: Revised data from 1990 Census. Revisions include post-1990 Census corrections of political geography or geographic mis-allocations and boundary updates. Three counties in the South Carolina site are affected: Chesterfield, Marlboro, and Richland.
Col. 2: From Post-Enumeration Survey estimates; consistent with estimates on Census Bureau's PL94-171 file on Internet site.
Col. 5: Calculated by subtracting independent population estimates for 4-18-98 from revised 4-1-90 Census data (Appendix C Table 1: Col. 8 minus Col. 5). See Appendix C Table 1 for derivation of population estimates for dress rehearsal Census Day (4-18-98).
Col. 6: Independent population estimates for dress rehearsal Census Day (4-18-98) adjusted for net undercount.
Col. 7: The 1998 census population estimates do not include the adjustment for net undercount. These results for Sacramento City and Menominee County are used for evaluation purposes only; the released census totals that include the ICM component are shown in Table 1 (col.4).

Note: The housing and population data for Irmo town in Lexington County are included in the South Carolina site total and 'Othe County' total, but are not shown separately

**Table 10. Comparison of Number of Persons Enrolled in Medicare and Persons Aged 65 and Over Enumerated in the Census: 1990 and 1998 (South Carolina Site)**

| County | 1990 | | | 1998 | | |
|---|---|---|---|---|---|---|
| | Census: Ages 65+ (1) | Medicare Enrollment (2) | Ratio (3)=1/2*100 | Census: Ages 65+ (4) | Medicare Enrollment (5) | Ratio (6)=4/5*100 |
| **South Carolina Site:** | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| **Site total** | 73,863 | 72,272 | 102.2 | 77,792 | 79,186 | 98.2 |
| - | - | - | - | - | - | - |
| **Richland county** | 26,888 | 27,324 | 98.4 | 29,983 | 30,818 | 97.3 |
| - | - | - | - | - | - | - |
| **Other counties (total)** | 46,975 | 44,948 | 104.5 | 47,809 | 48,369 | 98.8 |
| - | - | - | - | - | - | - |
| Chester | 4,258 | 4,153 | 102.5 | 3,885 | 4,255 | 91.3 |
| Chesterfield | 4,888 | 4,618 | 105.8 | 4,930 | 4,720 | 104.4 |
| Darlington | 7,370 | 6,843 | 107.7 | 7,757 | 7,478 | 103.7 |
| Fairfield | 3,021 | 2,705 | 111.7 | 3,100 | 2,889 | 107.3 |
| Kershaw | 5,238 | 5,742 | 91.2 | 6,337 | 6,788 | 93.4 |
| Lancaster | 6,657 | 6,006 | 110.8 | 6,940 | 6,670 | 104.0 |
| Lee | 2,232 | 1,936 | 115.3 | 2,394 | 2,243 | 106.7 |
| Marlboro | 3,733 | 3,553 | 105.1 | 3,314 | 3,521 | 94.1 |
| Newberry | 5,108 | 5,208 | 98.1 | 4,899 | 5,368 | 91.3 |
| Union | 4,470 | 4,184 | 106.8 | 4,253 | 4,437 | 95.9 |

**Table 11. Comparison of Number of Children Enrolled in School (Grade 1 to 8) and Children Ages 7-14 Enumerated in the Census: 1990 and 1998 (South Carolina site)**

| County | 1990 | | | 1998 | | |
|---|---|---|---|---|---|---|
| | Census: Ages 7-14 (1) | School Enrollment 1989-90 (2) | Ratio (3)=1/2*100 | Census: Ages 7-14 (4) | School Enrollment 1997-98 (5) | Ratio (6)=4/5*100 |
| **South Carolina** | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| **Site total** | 74,817 | 77,113 | 97.0 | 74,829 | 78,861 | 94.9 |
| - | - | - | - | - | - | - |
| **Richland** | 29,414 | 28,176 | 104.4 | 32,317 | 31,464 | 102.7 |
| - | - | - | - | - | - | - |
| **Other Counties** | 45,403 | 48,937 | 92.8 | 42,512 | 47,397 | 89.7 |
| - | - | - | - | - | - | - |
| Chester | 4,026 | 4,271 | 94.3 | 3,814 | 4,429 | 86.1 |
| Chesterfield | 4,882 | 5,340 | 91.4 | 4,631 | 5,446 | 85.0 |
| Darlington | 7,994 | 8,466 | 94.4 | 7,134 | 7,505 | 95.1 |
| Fairfield | 2,850 | 2,840 | 100.4 | 2,712 | 2,697 | 100.6 |
| Kershaw | 5,392 | 5,876 | 91.8 | 5,805 | 6,301 | 92.1 |
| Lancaster | 6,487 | 7,063 | 91.8 | 6,463 | 7,232 | 89.4 |
| Lee | 2,650 | 2,917 | 90.8 | 2,313 | 2,611 | 88.6 |
| Marlboro | 3,829 | 4,341 | 88.2 | 3,135 | 3,833 | 81.8 |
| Newberry | 3,732 | 4,064 | 91.8 | 3,526 | 3,919 | 90.0 |
| Union | 3,561 | 3,759 | 94.7 | 2,979 | 3,424 | 87.0 |

**Table 12. Demographic Estimates of Percent Net Undercoverage and Coverage for Children Under Age 10: 1990 and 1998 (South Carolina Site)**

| Category | 1990 | | 1998 | |
|---|---|---|---|---|
| | Net Undercount | Net Coverage | Net Coverage | Net Coverage |
| **South Carolina Site:** | - | - | - | - |
| | - | - | - | - |
| Site Total | 3.7 | 96.3 | 6.9 | 93.1 |
| | | | | |

| | | | | |
|---|---|---|---|---|
| Black | 5.1 | 94.9 | 9.5 | 90.5 |
| Others | 2.2 | 97.8 | 4.3 | 95.7 |

Note: Figures exclude Irmo town in Lexington County.

See Appendix B, Technical Appendix for description of methodology

## **FIGURES**

## **APPENDIX**

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