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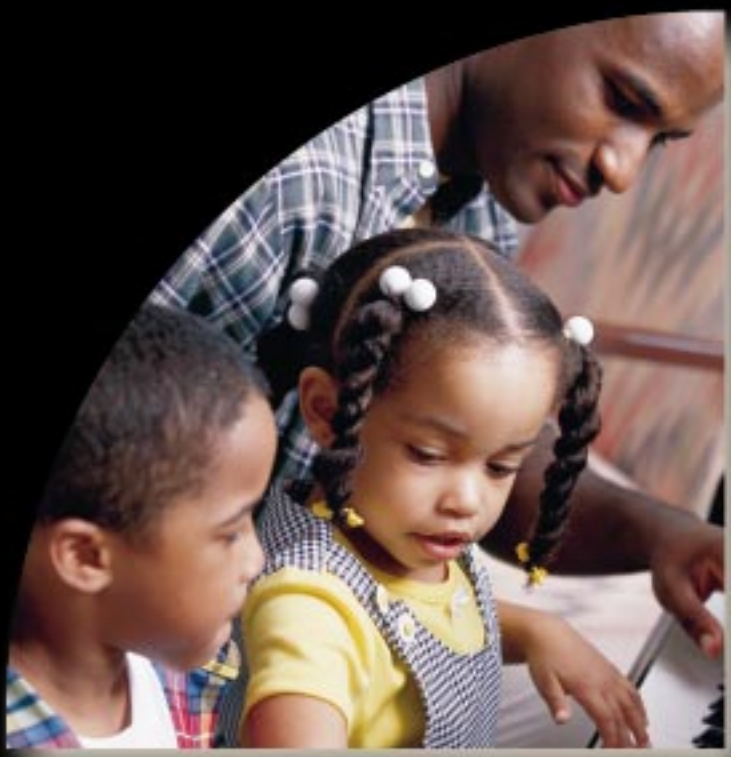

THE 2000 CENSUS CHALLENGE

- Recent Census History
- What Is a Good Census?
- A Constant Stream of Change

Premiere Issue

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Dear Readers:

Population size, distribution, and composition—and the pace at which these change—influence American society in profound and far-reaching ways. In some states, increases in the immigrant population have changed educational systems, shaped the labor force, and modified political institutions. The aging of the American population will force changes in the way America provides security to its older citizens. And recent trends in marriage patterns have caused us to learn about blended families and latchkey kids.

Not enough is generally known about the determinants and consequences of these population changes. PRB is beginning this new series, PRB Reports on America, to expand the national conversation about important demographic issues and their effects on American society.

PRB Reports on America will appear at least four times a year. Each issue will be written by a noted demographic expert and will address a significant national issue in a comprehensive but easy-to-understand way. We will spell out what the issue is, why it is important, and what its implications are.

This premiere issue deals with the 2000 census. The census is the basis of our representative government and a key information resource for government, industry, and interest groups around the country. The results of the census will determine congressional representation and provide the information baseline for what we know about a wide range of social and economic issues.

We know that you will find this issue of PRB Reports on America to be thought provoking and filled with the same kind of accurate reporting and solid data that PRB is known for providing.

Peter J. Donaldson
President

THE 2000 CENSUS CHALLENGE

BY BARRY EDMONSTON

CENTER FOR POPULATION RESEARCH AND CENSUS

PORTLAND STATE UNIVERSITY

The decennial census is an essential ingredient in the American democracy. No other source provides as much comprehensive information about who we are. In addition, no other data have such important consequences for the way we govern ourselves. Our representative government—and a huge amount of federal dollars—are distributed based on the census reports of the number of people living in different places. The 2000 census will be as important as any in our history.

Unfortunately, the census has become too expensive, too burdensome, and too inaccurate for the U.S. Census Bureau to conduct the 2000 census in the same way it conducted the 1990 census.

Redesign is inevitable. Congressional leaders of both political parties have agreed on one fact: The 2000 census must be different from previous censuses. But while there is consensus on the need for change, there is disagreement on the specific changes that should be implemented in the 2000 census.

Although the census count of the population of the United States has never been quite complete (no census ever is), public concerns about its incompleteness have increased in recent decades.

After the 1990 census, one which was conducted amidst the difficulties of counting a large and increasingly diverse and mobile population, two issues emerged. The 1990 census cost more than any other census, even after allowing for population growth, inflation, and declines in mail response rates; and the 1990 census didn't count some population groups as completely as it counted other groups—a lingering and growing problem also experienced in the censuses that preceded it. Given these two problems, many experts began to question whether census costs might continue to climb with no likelihood of narrowing the undercount.

Yet while these problems are discussed, and given that one possible solution to the undercount—sampling—has been removed from consideration for purposes of apportioning congressional seats among the states by a recent U.S. Supreme Court decision, the Census Bureau is in the final stages of preparation for the 2000 census. In April, the Census Bureau will begin printing 300 million questionnaires in order to have them ready for the start of the census in mid-March 2000.

During 1999, the Census Bureau will complete preparations of the nation's mailing address list. The bureau will send copies of mailing addresses to 39,000 local governments by the end of 1999, asking for their help in checking the accuracy of addresses and related census maps.

The Census Bureau will add about 5,000 temporary employees in 1999 and open hundreds of local census offices. These local offices will recruit and train at least 250,000 enumerators who will conduct special operations like enumerating the homeless, will contact nonresponding households, and will work on the large independent data-quality survey.

By the time census field operations are completed in mid-2000, data processing will already be in full swing. Data checking and tabulation will be continued—with the possible use of sample surveys to complete the count—in late 2000. The Census Bureau must report the official population counts to the president and to the secretary of commerce on Dec. 31, 2000.

This report discusses the serious and complex problems associated with taking a modern census—concentrating on what has been learned over the past eight years about options for reforming the traditional census.

BARRY EDMONSTON directs Oregon's Center for Population Research and Census, at Portland State University. He is also a professor in the university's College of Urban and Public Affairs, where he teaches courses in demography and directs the graduate program in applied demography. His most recent publications include *The New Americans: Economic, Demographic, and Fiscal Effects of Immigration* (1997), and *The Immigration Debate* (1998), both co-edited with James P. Smith and published by the National Academy Press.

RECENT CENSUS HISTORY

The bedrock purpose of the census in the United States is to determine the population of every state for apportioning seats in the House of Representatives. Census data are also used to determine the boundaries of congressional, state, and local political districts.

The Undercount

The net national undercount (the number of people omitted minus the number overcounted) dropped from the 1940 census until the 1990 census. The undercount was 7 million in 1940 and 2.8 million in 1980. But in 1990, the undercount jumped to 4.7 million—the first rise in 50 years (see Figures 1 and 2).

According to 1990 estimates, almost three-fourths of those who were undercounted were whites. The rate of undercount, however, was over four times higher for blacks than for nonblacks. In the 1990 census, the undercount rate for both men and women was also about four to five times higher for blacks than for nonblacks; it varied from 8.5 percent for black men to 0.6 percent for white women.

In 1940, the black undercount rate was 3.4 percentage points higher than the nonblack rate (see Figure 3). The difference between black and nonblack net undercount rates has increased since 1940, reaching 4.4 percentage points in 1990, higher than in 1970 at the beginning of massive efforts by the Census Bureau to narrow the difference.

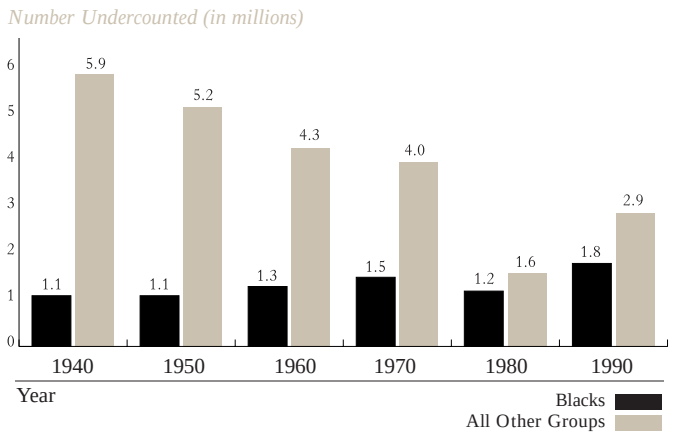
Net undercount rates are also higher for Asian and Pacific Islanders, Hispanics, American Indians and Alaska Natives than for whites. The undercount of Asian and Hispanic groups is likely to have been influenced by the relatively large number of people in both these groups who are foreign-born and who may not have understood census questionnaires and procedures.

There are several implications for the undercount for minority groups. In political representation and funding based on population, undercounted groups get less credit for their actual population than they are due. Political districts for undercounted areas, drawn relative to population, are "overpopulated" (they have more people than the official data report) compared with accurately counted districts. "Overpopulated" districts are underrepresented at all levels of government that base political representation on population size.

Underenumeration in the census has serious political, economic, and social implications.

THE NET UNDERCOUNT OF PEOPLE DECREASED FROM 1940 TO 1980, BUT INCREASED IN 1990 FOR THE FIRST TIME IN 50 YEARS.

Figure 1



The census is the sole basis for apportionment of congressional seats, and half of all federal funds distributed to states are based to some extent on census counts. The results of the decennial census affect the geographic boundaries for congressional districts, state legislative districts, and city council districts. Under the "equal proportions" methods for federal apportionment, a shift of relatively few people could potentially change a state's number of representatives.

If undercounts were eliminated, population counts would increase in areas with a large number of such high-undercount groups as minorities and inner-city residents. If statistical methods had been used to correct the 1990 undercount, estimates of the percentage undercounted—taking age, sex, race, region, and urban-rural characteristics into account—would have been made for each of 7 million census blocks in the nation.

What would have happened to the 1990 reapportionment if the state populations had been corrected for undercoverage? It is difficult to determine precisely how the application of corrections for the estimated undercoverage in the 1990 census would have affected congressional reapportionment, because the adjustment would have been done for small geographic areas. If correction factors had been applied to each state's population data, Georgia, Montana, and California would each have gained one congressional seat, and Oklahoma, Pennsylvania, and Wisconsin would each have lost one seat.

Congressional redistricting would be affected more than apportionment because virtually all congressional districts, except for those in states that have only one district, would have their boundaries changed by adjusted census block data. Moreover, a census that is corrected for undercoverage in the physical enumeration would affect the redistricting for state legislatures and city councils that rely on decennial census data.

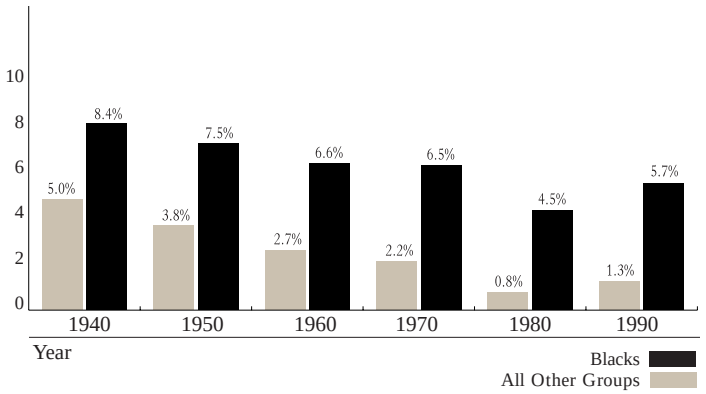
The undercount can also affect the distribution of federal and state funds, which are allocated on the basis of population. Funds for education, health, transportation, housing, community services, and job training are allocated to geographic areas according to population size and social and economic factors.

In 1990, the federal government disbursed about $125 billion to state and local governments, and nearly half of this amount was distributed using formulas based on census data. Several studies of the 1970, 1980, and 1990 censuses concluded, however, that the impact of census population adjustment on grant allocations would have been small.

THE NET UNDERCOUNT RATE HAS BEEN HIGHER FOR BLACKS THAN FOR THE REST OF THE POPULATION.

Figure 2

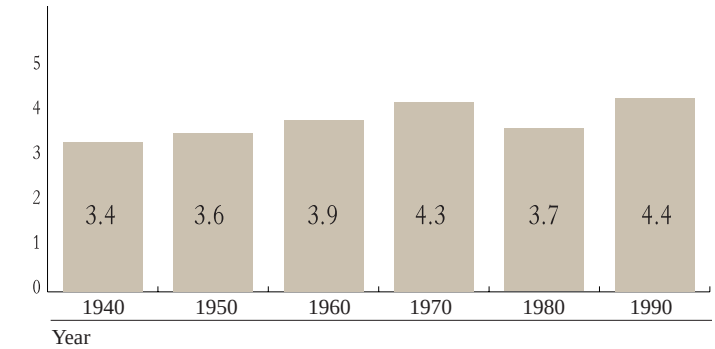
Net Undercount Rate (in percent)



THE GAP BETWEEN THE HIGHER UNDERCOUNT RATE FOR BLACKS AND FOR OTHERS HAS INCREASED SINCE 1940.

Figure 3

Percentage Point Difference Between Black Undercount Rate and All Other Undercount Rate.



The Costs

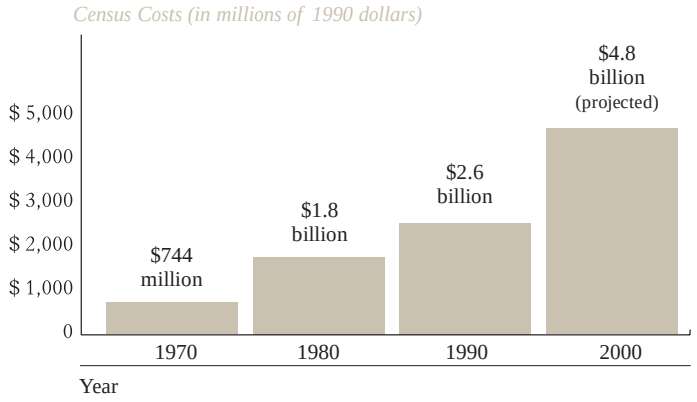
The cost of census activities has increased sharply since 1970. In 1990 dollars, the 1970 census cost about $744 million (see Figure 4). The 1990 census cost $2.6 billion, an increase of about 250 percent from 1970 after adjusting for inflation.

After accounting for inflation, census costs have increased for three reasons:

- Some of the growth can be attributed to the fall-off in mail response rates (see Figure 5). If a mail questionnaire was not returned to the census office, a field worker visited the address in an attempt to count the number of household residents. Under 1990 census procedures, as many as six visits could have been made. Of the roughly $1.9 billion inflation-adjusted cost increase between 1970 and 1990, somewhere between $95 million and $225 million can be attributed to the fall in the response rates.
- Some of the census cost increases can be attributed to population growth and an increased number of housing units to be counted. Since census costs depend primarily on the expense of delivering a mail questionnaire to a household or having an enumerator visit a housing unit, it is more realistic to relate cost growth to the rise in the number of housing units rather than to population growth. Even when housing units are vacant, there is a cost to finding that out. The number of housing units grew from 71 million in 1970 to 104 million in 1990, accounting for about $350 million of the cost increases from 1970 to 1990.
- The remaining $1.4 billion cost increase from 1970 to 1990 is due primarily to the Census Bureau's increased efforts to reduce census undercount through highly labor-intensive and expensive efforts to count every resident, and to the bureau's major investments in new technology. The bureau used new computers to automate the data gathering and processing, including converting questionnaires to computer-readable data, tabulating the data, and preparing thousands of reports. Since 1960, the Census Bureau has responded to outside pressures from such important "stakeholder" groups as congressional representatives, minority organizations, and other census data users to produce a "better" census. There was an increased demand for accurate population counts at very detailed geographic subdivi-

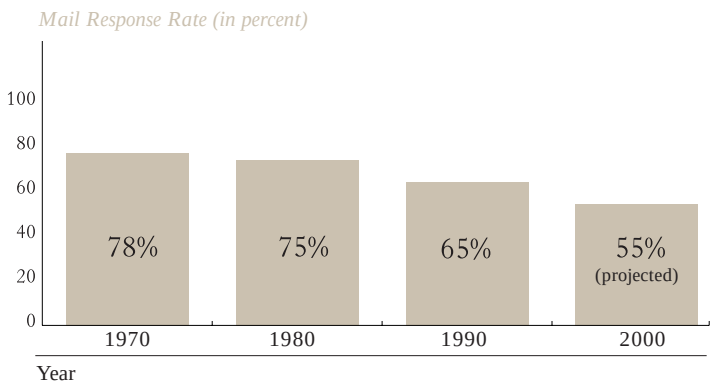
Census costs have increased rapidly since 1970.

Figure 4



Response rates to mailed surveys have declined since 1970 and are likely to decline in 2000.

Figure 5



sions and in hard-to-enumerate areas for purposes of congressional and legislative redistricting and for otherwise carrying out the Voting Rights Act and its amendments ("one person, one vote").

At the same time, public cooperation with the census process, as measured by the mail response rate, declined and was lowest precisely in the areas in which the pressures for an accurate count were greatest. The Census Bureau responded by sinking resources into efforts to count every person.

If mail response rates continue to decline, as they have done for the past several censuses, the national mail response rate may be less than 60 percent in 2000 (mail response rates would drop to about 55 percent if they continue to decline at the rate experienced between the 1970 and 1990 censuses).

The U.S. General Accounting Office estimates that the 2000 census would cost $4.8 billion, in 1992 dollars, if the 2000 census is conducted using the same methods as the 1990 census. Although it may be convincingly argued that the value of the census data far exceeds projected costs, the Congress and the Census Bureau are responsible for ensuring that every effort is made to contain costs while providing data of the highest possible quality.

But in the debate about a future census, we need to recognize that there are no changes we can make to the way census data is collected that will simultaneously meet all of the following objectives: continue a highly intensive census effort, relying principally on physical enumeration and labor-intensive follow-up techniques to overcome the consequences of declining mail response rates; provide detailed and reliable small-area data for redistricting and the Voting Rights Act; provide the other housing and demographic data widely demanded for data on several variables at the same time for blocks and census tracts; reduce the differential undercount; and keep costs from growing rapidly. There is, in short, no magic bullet that will hit all the objectives.

Also, trends in census costs indicate that efforts to decrease differential undercoverage and to deal with decreasing mail response rates, especially through labor-intensive enumeration techniques, have been a key factor in driving up census costs.

Moreover, efforts to improve differential coverage have had a diminishing return (more money was spent in 1990 than in 1980, but there was no gain achieved in coverage). These efforts may have been carried to the point at

WHAT'S THE STORY?

Census data tell a story to Americans about Americans. Gathering some data for the story is legally mandated. Almost all items in the 1990 census were required by federal government agencies to meet specific legislative mandates. For example, subsequent amendments to the 1965 Voting Rights Act require the Census Bureau to determine which political jurisdictions must implement procedures for bilingual voting in order to protect the rights of those who speak languages other than English. These determinations are made using census data on citizenship, educational attainment, and English-language ability, together with information on age, race, and ethnicity.

The government gets the story through two kinds of questionnaires: a short form that every household receives and a longer sample questionnaire (distributed to one of every six households in 1990). The 1990 short form had 13 questions—six about population characteristics (age, sex, race, Hispanic origin, household relationship, and marital status) and seven about housing.

With only seven questions, the 2000 short form has six fewer questions than the 1990 short form. The 2000 form will have six questions about population characteristics and one about housing. But the 2000 sample form will have 52 questions, including the seven short-form questions (down from 57 questions on the 1990 long form). The 2000 sample long form will include a never-before-asked question about grandparents who are primary caregivers for their grandchildren (information required by recent welfare reform legislation).

The number of households that receive the longer form has declined over the years. In 1960, 25 percent of households received the long form; 16 percent received it in 1990.

The census alone, through its sample data, provides a broad range of information, encompassing the whole population, that can be cross-tabulated for small geographic areas and small population subgroups.

Census results not only are fundamental for congressional apportionment and redistricting, they also provide information to thousands of people in the public and private sectors who make decisions about health and education, transportation planning, the environment, community services, housing, consumer marketing, economic strategies, social equity, and many other issues. Census results measure progress and give direction for future actions.

Census Bureau Director Prepares for the Count

Given the controversies that surround the 2000 census, Census Bureau director Kenneth Prewitt has assumed his responsibilities during a particularly challenging time.

Sworn in last November, Prewitt heads a staff that now, given the Jan. 25 U.S. Supreme Court decision to bar sampling, will carry out a traditional headcount for the decennial census so that congressional seats may be apportioned. But the high court's decision is only one of many concerns for the new director. The economy may limit his ability to recruit staff, and the growing diversity of the nation and the increasing politicization of the census have already caused more scrutiny of his work than that of any other director.

In a recent interview with PRB, Prewitt discussed the logistical, social, and political dynamics at work in the 2000 census.

PRB: *How does the recent Supreme Court decision on sampling affect the Census Bureau's plans for taking the 2000 census?*

Prewitt: It immediately focuses us on planning a census that will count and account for the distribution of every resident in the United States as of April 1, 2000, in order to meet the obligation to have apportionment numbers by the end of the year. It is doubtful that we will find every resident, or that every resident located will cooperate with the census. But we will certainly design census procedures that have a full and accurate count as their goal. We anticipate giving more emphasis to certain procedures already under development, such as our partnership program, and we expect to improve on the coverage improvement methods that were employed in 1990.

PRB: *Demographers divide census operations into three categories: data capture, data production, and data dissemination. What kinds of innovations do you plan for in these areas?*

Prewitt: Let me first start with data capture. With respect to the innovation in 2000, the data capture phase of a census is by far the biggest innovation. We are using optical scanning devices. The other big innovation is our data dissemination ... the American FactFinder. This is a whole new mechanism for dissemination, a state-of-the-art, online technological breakthrough.

The third innovation of real consequence to the user community is the possibility of launching the American Community Survey. We hope to have sufficient resources to do enough work on the survey that we will be able to evaluate a suitable substitution for the long form. ... After five years, you will have sufficient data to give you estimates of populations as small as 25,000. These could be geographic areas or functional groups, [for instance] all of the engineers that were trained since 1970, demographers, anything. For any population of that size, you will have a pretty good estimate of its characteristics after five years.

PRB: *One of the issues that people are concerned about is the differential undercount, not just overall coverage. Are special efforts underway not only to improve coverage overall but also to reduce the differential undercount?*

Prewitt: Census 2000 is the first census you would think about in terms of social justice rather than just in terms of accuracy. Not that we haven't been concerned with that before, but the big discussion about sampling, after all, is a discussion about social justice. What is the most accurate way to count the people who are left out? So we feel very strongly at the bureau that we have an obligation to conduct not just an accurate but also a fair census. Bear in mind that the reason that we can debate the differential undercount in American society is because the Census Bureau itself does the work. We give ourselves a

grade: 'Here's who we missed, here's how many we missed, here's why we think we missed them.'

Yes we are doing special things [to reduce undercount]. We have an advertising campaign, which has the differential undercount as a major part of the focus. We have a complicated partnership program which would bring leading groups in society, like Hispanic groups, American Indian groups, groups that work with the homeless, a whole array of partnership strategies focused on the more difficult-to-count parts of the population ... We would feel very unhappy with a census that counted 100 percent of the upper middle class, white American residents, and counted only 95 percent of American Indians or American blacks or Hispanics or Asians ...

PRB: *Do you feel that the 2000 enumeration will be better than the 1990 enumeration?*

Prewitt: The Census Bureau is better than it was in 1990. That is, it does improve its own capacity. It has better training materials. It has created a more user-friendly short form, printed in multiple languages. And it's setting up telephone assistance centers and advertising campaigns. My guess is that we are running harder to stay in place. That is, we need census operations better than 1990 in order to count as well as we did in 1990. Even without sampling, we expect to do, give or take, as well as 1990. That is, it won't be a precipitous drop. It may be a 1.9 or 1.8 undercount. It may be 1.7. My guess is that we're doing a lot of things that are very intelligent that allow us to stay in place.

PRB: *How do you feel about a two-number census?*

Prewitt: It would not be our first choice to produce a two-number census, for we believe there can be only one accurate count, but obviously the bureau is obligated to follow the law. If law requires us to produce two numbers, we will do so.

PRB: *You talk about politics coming into the design and what we should do is rely on the judgment of professionals. One of the things that one hears is that there are morale problems caused by congressional oversight. Now you have a tremendous amount of congressional oversight. Can you say something about what the proper relationship with Congress is?*

Prewitt: We have a real responsibility to be accountable. We have a major public function. Just like any other major federal agency, whether it is the CIA, or the U.S. military, or the IRS, [we] should be accountable to the elected representatives of the country. Can you overdo oversight? Absolutely. Have they overdone oversight this time around with respect to the U.S. census? Absolutely ... You have both Republicans and Democrats, the GAO, the Inspector General, and the Commerce Department, and now it's the monitoring board. Each in their own right is a legitimate exercise, it seems to me, of congressional or administrative oversight responsibility. It's the panoply of them that suddenly means that you've got to have a dedicated staff doing nothing but answering requests for more information. Is there redundancy in that? Yes ... I appreciate the fact that there has to be public accountability ... Perhaps there are models, such as the Federal Reserve Board, which could indicate how better to balance accountability and autonomy.

PRB: *Look ahead to the 2010 census. Maybe you'll have an independent Census Bureau with the status of the Federal Reserve Board? What other innovations do you think will be important?*

Prewitt: I really hope that the American Community Survey will have been perfected and will be in place, and replace the long form. I can imagine, by 2010, a much more effective use of administrative records than we are able to do today. Hopefully, no politics about the design question.

PRB: *A longer short form?*

Prewitt: If the American Community Survey is up and running, we will not need a longer short form. We could even imagine having a shorter short form.

which additional effort and expense may not improve coverage or avoid undercounts. Expensive efforts to improve census coverage are understandable given such forces as the impetus of the Voting Rights Act to provide detailed data on race and ethnicity at the block level. Nevertheless, it is appropriate to ask if this continued effort to improve differential coverage, which so far has been unsuccessful and has increased census costs, is warranted for future censuses.

The Forms

Historically, the census has collected information beyond what's needed from all households for reapportionment and redistricting. Since 1960, most of the additional data have been collected on a long form sent to a sample of households (all households receive the short form questions, and in 1990 about one in six households received a "long" form). These additional data encompass subjects like education, income, labor force, migration, travel to work, disability, and housing characteristics and costs.

The data are widely used and serve many important purposes. The nation needs the breadth of information for small areas and small population groups that only these census data provide.

Determining the content of the census (both the short form and the sample long form) requires balancing the data needs of federal agencies against considerations of questionnaire length and feasibility. Some data cannot be collected on the census because they require a lengthy number of questions or are considered to be unacceptable to ask—a person's religion, for instance.

Given the importance of the broad range of data that the census currently collects for small areas and small population groups, the main question is whether those data should be collected as part of the census or by some other means. Is the census the right vehicle to collect sample information? Do the added questions increase census costs or impair data quality?

Many experts argue that the sample form is a problem because respondents find it too long and complex. It lowers the overall mail response return rate and thus increases census costs. The lower mail return rate may also contribute to undercount.

The sample form draws intense interest and strong opinion from almost every user of census data. Many data users, impassioned in their defense of the sample form, reject the idea that it hurts the basic census and argue for the need for the rich range of data that the long form provides for small areas and small population groups. But others see the sample form as a threat to the cost and quality of the census data that are needed to fulfill constitutional requirements.

The sample form adds costs to the census in a number of ways: extra printing costs, extra postage, additional follow-up for every percentage point that the mail return rate for the sample form is lower than that for the short form, additional editing and follow-up for item nonresponse, coding of such items as industry and occupation, and additional data processing and publication costs. Even so, the sample form represents a marginal extra cost. Moreover, the costs associated with the sample form do not explain the escalation in census costs that have occurred in recent decades.

The cost of the sample form, including follow-up, may have contributed about 10 percent (roughly $250 million) to the $2.6 billion cost of the 1990 census. More recent estimates from the Census Bureau suggest that the cost of the 1990 long form may range from 11 percent to 19 percent of the total costs. Overall, the marginal cost of the sample long form is quite low and appears to be far outweighed by the value of the data collected.

The sample form's return rate in 1980 was close to the return rate for the short form: The mail return rate was 82 percent for the short form and 80 percent for the sample form. But in 1990, the sample form mail return rate was 70 percent; the short form's return rate was 75 percent. (There is some evidence that the sample-form/short-form differential in return rates was greater in hard-to-enumerate areas.) Since only one-sixth of all households received the sample form, however, the difference in return rates reduced the overall mail return rates for the nation by less than 1 percent.

Indeed, what stands out about mail return rates in the 1990 census is not the relatively minor difference between the short form and the sample form, but the overall decline in mail return rates for both forms. A 1990 survey conducted by the National Opinion Research Center to find out why people did not send back their census questionnaires showed that most of the reasons cited applied to either the short form or to the sample long form. Some respondents said they opened the form but did not start to fill it out or did not complete it; some said they filled it out but never mailed it back. But most said they never received a form or never opened it if they did receive it.

A challenge for future censuses is to make Americans aware of the census, make sure that everyone gets a questionnaire, and motivate people to open their census mail and return it.

Coverage errors in the 1990 census—people missed within households—were higher for data obtained by enumerators compared with forms that households filled out themselves and mailed back. The reason, presumably, is not that enumerators did a poor job, but that people who do not mail back their questionnaires also do not respond well to follow-up.

This difference means that the somewhat lower mail return rates for sample forms in 1990 could have had the effect of increasing the undercount. Overall, however, the effect of the sample form on missing people within households in 1990 was trivial because most people (five out of six) did not receive the sample form.

U.S. Supreme Court Bars Sampling in 2000 Census

On Jan. 25, 1999, the U.S. Supreme Court decided two important lawsuits concerning the 2000 census. One case was filed in 1998 in the U.S. District Court in Washington, D.C., by the U.S. House of Representatives at the direction of then-Speaker of the House Newt Gingrich. The second case, similar to the first, was filed in the U.S. District Court in the Eastern District of Virginia by the Southeastern Legal Foundation, a conservative legal group.

Both cases challenged the constitutionality of sampling, a method proposed by the Census Bureau to improve the count and to save money. As originally proposed for the 2000 census to complete the population count, the bureau would take a sample of households who did not respond to the mail questionnaire. In addition, the Census Bureau would conduct a separate quality-control survey to estimate the number and characteristics of those people missed by the census.

Both federal district courts in the original lawsuits ruled that the Census Act (the federal statutes for the Census Bureau) bars the use of sampling to produce the population counts used to apportion seats in Congress among the states. Supporters of the Census Bureau's plan, however, pointed to another section of the Census Act that allows the bureau to conduct the census using any methods, including sampling. In previous census cases, several district and appellate courts have considered these seemingly conflicting provisions and found that the law does not bar sampling to supplement "good faith" direct counting efforts.

The Justice Department appealed both federal district court decisions to the Supreme Court, seeking to overturn the rulings that prevent the Census Bureau from using sampling methods to produce the population counts used for congressional apportionment. The Supreme Court took up both cases, consolidating them for oral arguments heard on Nov. 30, 1998.

In their ruling, issued on Jan. 25, 1999, the Supreme Court decided that "the Census Act prohibits the use of statistical sampling to determine the population for congressional apportionment purposes." Although sampling could be used in the census for such purposes as collecting some demographic data from a sample of all enumerated households, the high court ruled that the population count for apportionment must be based on a direct, physical enumeration of the population.

Of the two proposed uses of sampling, the high court's ruling unquestionably prohibits the use of sampling for nonresponse follow-up in the 2000 census. Sampling for nonresponse follow-up cannot be used because it would affect the final apportionment counts. The use of a quality control survey is still possible: The survey could be used only for nonapportionment purposes, however, including for congressional redistricting within states. In past censuses, the Census Bureau has conducted a quality control survey in order to estimate the demographic characteristics of the under-counted population. Such a survey deserves to be included in the 2000 census program as well.

WHAT IS A GOOD CENSUS?

There are major national policy choices involved in considering requirements and techniques for the decennial census. Some options for conducting future censuses illustrate the dilemma in thinking about what a census should look like.

A first choice is how to implement the basic requirements of court decisions mandating equality in population size of voting districts. Court decisions and the Voting Rights Act—grounded firmly in the Constitution, including the 14th and 15th Amendments—mandate census data requirements. The requirements specify that the decennial census must be carried out at a single point in time, once every 10 years, and must attempt to count every resident.

A second choice involves the level of information beyond basic demographic detail that must be provided for small areas or small population groups. Many federal entitlement programs are based on census data. In theory, many of these programs and their funding allocations could rely on either a large ongoing household survey—large enough to provide estimates for states and larger urban areas, for example—or administrative records. The required detail for the decennial census is limited to a few key demographic characteristics—including age, sex, and race—that must be tabulated for small geographic areas.

Third, there are trade-offs involving costs, accuracy, and the acceptability of statistical adjustment. A census in which physical enumeration efforts are reduced through the use of sampling would lower overall costs. A census relying more on these techniques would improve census coverage at the national level and for most state and metropolitan areas and would reduce differential undercoverage for racial and Hispanic-origin groups. Such a census would not be perfect, but it would offer substantial improvements.

There are two basic ways to count the population: a traditional census and an alternative, "redesigned" census. The traditional census, used in 1990, relies completely on intensive physical efforts to count the entire population. A redesigned census would combine an initial stage of direct counting with statistical estimation techniques. The redesign would incorporate sampling—a way to count the population using statistical estimation rather than direct enumeration.

THE TRADITIONAL APPROACH

The traditional approach begins with the construction of an address register, including elaborate procedures to improve the register's comprehensiveness. Census forms are then mailed to a list of residential addresses, with instructions to mail back the completed questionnaires. Additionally, special programs to contact groups not living in households (such as homeless people) are carried out.

But not all households return their completed questionnaires within a reasonable period of time. For households that do not respond to the main questions about the number of family members and their key demographic characteristics (35 percent of housing units in 1990), census enumerators undertake intensive follow-up efforts to determine whether the housing units are occupied and, if so, to contact the households and obtain responses. Repeat visits are made, and administrative records are sometimes examined. The process continues for an extended period of time in order to physically count every household and all the people in every household.

In recent censuses, special programs have been directed toward improving coverage. These programs are expensive, both in absolute terms and often in terms of the cost per person or housing unit. These special programs have included, for example, a follow-up of people reporting a change of address to the U.S. Postal Service during the census enumeration period, a campaign to find people missed from the census by contacting community organizations or visiting places frequented by transients, and efforts to match administrative records to census lists for selected areas.

The results from all these efforts—the returned mail questionnaires, enumerator follow-up, and special coverage improvement efforts—produce the actual census count of the U.S. population.

But the traditional approach of direct enumeration has serious shortcomings, as evidenced by the continued high and rising costs and differential undercount. The traditional approach has been pushed well beyond the point at which it adds to the overall accuracy of the census count. Furthermore, the 1990 census produced a net undercount of 1.8 percent for the nation as a whole. This net undercount included overcounting in some areas and among some groups, which was more than offset by undercounting among other areas and groups. Blacks and Hispanics, Asian and Pacific Islanders, American Indians and Native Alaskans, renters, and residents of poor inner-city areas were undercounted by larger percentages than the nation as a whole.

New procedures could not substantially reduce the differential undercount that results from a traditional census approach. Historically undercounted population groups will likely not witness improved coverage through a more intensive, expensive, but still-traditional census in the year 2000.

The Alternative Approach

To avoid the problems associated with the traditional census, a census could be designed to combine an initial stage of direct counting with various statistical estimation techniques. Correctly designed, this approach would rely on a large independent survey to produce statistical estimates—by area, racial group, and other relevant demographic characteristics—of the net undercount or overcount in the census data. By designing the survey as an integral component of the census, the census could eliminate all operations that add relatively little to accuracy but have high unit costs. The traditional labor-intensive physical task of counting every person could be redesigned to simultaneously reduce costs and improve accuracy and coverage.

In theory, a redesigned census would keep costs down, reduce error in the population count, and improve data quality through four components, all aimed at sampling the people who do not respond to the mailed questionnaire:

- Sampling would be used to estimate the number and characteristics of the nonrespondent households that remain after reasonable efforts to count everyone have been expended, and to improve the estimate of the overall count with a final data quality survey. It is likely that statistical estimation can be used, in combination with the mail questionnaire and a reduced scale of follow-up of nonrespondents, to produce a better census at reduced costs.

The use of these statistical techniques, however, would increase the variability for small areas. If the major concern with improving the population coverage in the nation's decennial census lies in the national and major population groups, then it is important to recognize that these data are improved at some reduction in the accuracy of small-area data. Statistical estimation techniques have long been used in the census for a number of purposes, including finding a neighbor or someone who knows about a missing household and asking them for information; determining vacant housing units; and taking a random sample selection of a previous person in order to supply information for a person with missing information.

Using statistical methods for sampling nonrespondents and using surveys to complete the count acknowledges that modern statistical procedures can improve the process, reduce costs, and produce better data for the country as a whole and for large areas and population groups by reducing the differential undercount.

- Improving the questionnaires and telling people why they should complete and mail back their questionnaires can improve the mail response rate. While the Census Bureau would continue to stress the mandatory nature of the census in 2000, it will be able to increase the mail response

rate (including easy-to-understand census forms), to lower costs, and to raise accuracy. Having a complete and accurate master address list is a critical component for the 2000 census.

- Greater reliance on sampling would reduce census costs by anywhere from $300 million to $400 million. Many of the methods developed for use in the 1980 and 1990 censuses assumed that only households contacted through direct enumeration would be counted. But if statistical methods are used, then many expensive census operations could be omitted.
- Partnerships with state and local governments will be needed for the 2000 census—especially if there are new methods, changes in census enumeration operations, and the use of sampling to complete the count. Local and state governments will need to be informed of these new approaches and to understand how they will affect census operations in their areas.

A special goal for improved cooperation between the Census Bureau and local governments is to reach agreement on the housing address list for the decennial census. Approximately one-half of the census undercount is attributable to missed housing units. Local governments have often criticized past censuses because they believe that housing units exist that were not counted by the census. In the past, however, the census address list has been deemed confidential by the Census Bureau, so local governments have not been able to make direct comparisons between their address lists and the list used for the census. Recent federal legislation now allows the Census Bureau and local governments to work together to construct the best possible address list for the census.

The second major partnership needed for the 2000 census is between the Census Bureau and the U.S. Postal Service. The Postal Service has helped develop and improve the address list by checking addresses prior to the census. The Postal Service must also deliver census questionnaires promptly and to the correct addresses; automate the sorting of mail returns and deliver them to centralized census-processing offices; check for correct addresses for matched questionnaires (in 1990, about 3 million questionnaires were submitted by people who were unsure if they had been enumerated); and help provide information on whether nonresponding households were actually vacant units.

Identifying Race and Ethnicity

Historically, the decennial census has included questions on race and ethnicity. The growing racial and ethnic diversity of the American population, changing attitudes about race and ethnicity, and the increasing use of census data now make census questions on race and ethnicity a controversial topic.

After the 1990 census, public pressure became more intense for revising and expanding race and ethnic classifications in the census, given the nation's diversity. At the same time, people recognized the ambiguity of racial and ethnic identities, especially because survey respondents were allowed to "self-identify" their race and ethnicity. At the direction of the Office of Management and Budget (OMB), the 1990 census included a race question that asked people to identify themselves as white, black or Negro, American Indian, Eskimo, Aleut, Asian or Pacific Islander, or other. American Indians were asked to provide a specific tribal affiliation. Asians and Pacific Islanders were asked to select from a list of nationality groups.

Separate from the race question, respondents were asked if they were of Spanish or Hispanic origin or descent and, if so, to choose Mexican, Puerto Rican, Cuban, or other. Write-in items in the 1990 census elicited more than 300 race responses, approximately 600 American Indian tribes, 70 different Hispanic-origin groups, and more than 600 ancestry groups. Almost 10 million people wrote in their race after selecting "other race." Many of the write-in responses were from individuals with two or more racial and Hispanic origins.

At the direction of OMB, the 2000 census will include race and Hispanic items similar to those in 1990, but respondents will have the opportunity to check more than one race group. Unlike previous censuses when people of multiple racial backgrounds needed to check "other" and then write in a response, the 2000 census will collect direct information on the specific backgrounds for people of multiple racial ancestry.

A CONSTANT STREAM OF CHANGE

Change in the U.S. census is not new. The census has evolved over the past 200 years, changing as American society has become larger and more diverse, and employing new methods as technology has improved. The first censuses, in 1790 and the early decades of the 1800s, were conducted by federal enumerators who canvassed the country on foot or horseback, counting people by filling out tally sheets. The 1960 census was the first to use widespread mail-out, mail-back census questionnaires in order to reduce the costs of having enumerators visit every household in the country.

Cost savings are still necessary. The census has become exceedingly expensive. Using the traditional approach, 2000 census costs will continue to grow, probably without any improvement in the accuracy or quality of the data.

Moreover, the Census Bureau will encounter increasing challenges to recruit a large number of satisfactory enumerators, given the temporary and part-time nature of these positions. Even if the 2000 census were redesigned to rely on statistical methods and to reduce the dependence on enumerators, there are serious questions about the Census Bureau's ability to recruit an adequate workforce of enumerators because of a shrinking labor pool dominated by high employment levels of men and women.

Coverage improvements also are needed. Although progress was made in reducing the overall net undercount rate for censuses through 1980, the net undercount rate rose in 1990. More important, the differential undercount rate between minorities and whites failed to narrow from 1940 to 1990, despite the best efforts of the Census Bureau to reduce the undercount of minorities. By 1990, there was an all-time high undercount of 1.8 million black residents, substantially disenfranchising them. For the national population, 4.7 million people were not counted—affecting political representation as well as denying federal funds to many poor rural areas and cities and towns.

After three censuses—1970, 1980, and 1990—in which the Census Bureau spent heavily on traditional approaches, we know that only fundamental reform can improve census coverage.

In response to widespread criticism of the 1990 census, and relying on advice from the Congress and scientific advisory panels, the Census Bureau has proposed some fundamental changes in the ways in which it will conduct the 2000 census. The far-reaching goals for the 2000 census, set by the Census Bureau, are to reduce costs and improve accuracy, and to reduce the persistent differential undercounts of the minorities and the poor.

There is widespread agreement about several of the new methods that the Census Bureau has proposed for a redesigned 2000 census:

- Census questionnaires will be simpler and clearer, with new ways used to increase the mail response rate. Even modest increases in response rates will save the Census Bureau millions of dollars in follow-up costs.
- New partnerships with local officials will improve the accuracy and completeness of the count. Local officials will check the accuracy of the census mailing address lists and thereby reduce an important source of census undercoverage.
- New computer technology for linking questionnaires will be used to weed out duplicate census questionnaires. This technology will allow the Census Bureau to supplement mailed questionnaires by placing them in public places—such as post offices—for mail return. This should help to reduce the undercount for traditionally hard-to-enumerate groups.
- The Census Bureau will spend $100 million on paid advertising to encourage the public to participate in the 2000 census. In previous censuses, the Census Bureau relied totally on donated advertising.

What does the January 1999 Supreme Court ruling mean for the design of the 2000 census? The ruling is based in the Census Act, so it is clear that the prohibition on sampling for apportionment purposes will affect the 2000 census unless Congress changes the Census Act. It is unlikely that the Census Act will be altered within the next year, so the Census Bureau will need to plan to conduct a 2000 census without sampling for nonresponse follow-up. The bureau might conduct a quality control survey to complete the count as part of 2000 census activities, but it would not be allowed to use the results to correct for undercount in the apportionment population count. This means that the 2000 census design will be a traditional design, similar to 1990, but with several modifications aimed at improving the overall response rate.

The Supreme Court ruling was limited to population counts for apportionment. The court did not prohibit the use of sampling for other census purposes. In particular, the bureau might conduct a quality control survey in order to correct for population undercount for some purposes—issuing population numbers for the 2000 census that could be used for such important purposes as federal revenue payments to state and local areas, and state and local redistricting.

But there are concerns about the use of statistical methods to complete the count beyond the 2000 census. Although public criticism of statistical methods planned for the 2000 census often treats all methods alike, proposed statistical sampling would be used in three different ways in future censuses.

First, a longer census questionnaire would be mailed to a sample of all housing units—as has been done in censuses since 1960. There does not seem to be debate about the use of a sample census questionnaire in the 2000 census.

Second, among those households that do not return a census questionnaire, after two attempts to contact them by mail, enumerators would then contact a sample of nonresponding households. The Census Bureau knows about the nonresponding households; the purpose of the sample is to estimate the characteristics of people living in these households. The Supreme Court ruling prohibited this type of sampling for use in the 2000 census. If Congress changed the Census Act, however, sampling for nonresponding households could be used in later censuses.

Third, in order to complete the count, a large separate sample of the U.S. population would be selected to provide an independent estimate of the census undercount, the only conceivable method for estimating census undercoverage for small geographic areas. Although the results of such a survey could not be used to correct the population counts for apportionment purposes—based on the recent Supreme Court decision—such a survey has been a valuable component of recent censuses and should be included in the 2000 census program.

The last two proposals for statistical methods in the 2000 census are at the center of public debate.

The debate about statistical methods for the 2000 census does not seem to be about the methods themselves, about which there is strong agreement among statisticians and demographers. Rather, the debate has focused on the potential for manipulation of statistical methods so that the census counts might favor one political party or the other. While previous censuses counted some people without physical enumeration (for example, people who did not respond to mail questionnaires were sometimes counted if neighbors or letter carriers could provide sufficient information about a household and its members), the current debate has not centered on the required evidence for physical enumeration. Instead, it has centered on persistent qualms about the expanded role that statistical methods would play in the 2000 census. Although the Census Bureau has long-standing credibility for confidentiality and for the quality of its data, there are demands for additional guarantees for data integrity for the new uses of statistical methods.

To guarantee census data integrity, the U.S. House of Representatives has established a new Subcommittee on the Census as part of the Committee on Government Reform. This subcommittee has commissioned a monitoring board that will observe census operations to guard against manipulation of statistical estimates and to protect the independent role of the Census Bureau.

Source for Figures 1 through 5: Barry Edmonston and Charles Schultze (editors), *Modernizing the U.S. Census* (Washington, DC: National Academy Press, 1995).

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