

Supporting Document A
Variables, Rates, and Formulae for Calculating Response
Rates and Reporting Requirements: Demographic Surveys
and Decennial Censuses

Version 1.2

Issued: 21 Jun 07

*Census Bureau Standard
Response Rate Definitions*

Authored by:

Nancy A. Bates (DSD)
(Team Leader)
Deborah H. Griffin (DIR)
Rita J. Petroni (ESMPD)
James B. Treat (PRED)

USCENSUSBUREAU

Helping You Make Informed Decisions



Document Management & Control

Version	Issue Date	Approval	Description
1.0	05 July 05	Associate Directors	Initial Release
1.1	09 Mar 06	Quality Prog. Mgr.	Inserted hyperlink for main standard.
1.2	21 Jun 07	Quality Prog. Mgr.	Removed hyperlink for main standard.

The most current version of this document is maintained on the Census Bureau Intranet and may be accessed from the Methodology & Standards Council Intranet Web Site.

Variables, Rates, and Formulae for Calculating Response Rates and Reporting Requirements: Demographic Surveys and Decennial Censuses

1. Variables¹

The variables needed to calculate demographic survey and decennial census response rates are partitioned into three groups. The first set of variables describes eligibility status. These variables distinguish between units that are known to be eligible for data collection, known to be ineligible for data collection, or to have an unknown eligibility for data collection. The data collection target population guides the distinction between eligible and ineligible units. The second variable describes the response status for eligible units. The third set of variables provide detail on the nonresponse universe by identifying the type of (or the reason for) the nonresponse.

1.1 Eligibility Status Variables

Three variables - E, I, and U describe the eligibility status of the universe. All units are classified as either eligible for data collection (E), ineligible for data collection (I) or of unknown eligibility for data collection (U). The target population determines the classification of a unit as eligible or ineligible. The target population refers to persons, households, or other units upon which inferences (estimates) are made. Units with a similar disposition may be considered eligible in one census or survey but ineligible for another, depending upon the target population. For example, in a survey of housing, vacant units may be part of the target population – these same vacant units may be outside the target population in an income survey and classified as ineligible.

<i>Variable</i>	E
<i>Definition</i>	The number of units that are eligible for data collection. A person, household, or other unit is eligible if an attempt has been made to collect data and the unit is confirmed to be a member of the target population. Both occupied and vacant units can be considered eligible.
<i>Computation</i>	Sum of all eligible units.
<i>AAPOR²</i>	Equivalent to the sum of “Interview” disposition code (1.0) and “Eligible, non-interview” disposition code (2.0).

¹ In the documentation that follows, all variables are defined as, “the number of...” with computation described as, “ the sum of...”. This will be true in most survey applications. When the survey uses subsampling, the variables are defined by an estimate, not a count.

² This row indicates how the Census Bureau variable or rate compares to the AAPOR disposition code or rate.

Variable	I
Definition	The number of units that are ineligible for data collection. This is the number of units for which an attempt has been made to collect data and it is confirmed that the unit is not a member of the target population. This information may come from observation, from a respondent, or from another source. Some examples of ineligible units include: demolished structure, entire household in armed forces, unit under construction, unit built after April 1, 1990, unit screened out, nonresidential unit, fax/data line or disconnected number (in random-digit dial surveys), and vacant units.
Computation	Sum of all ineligible units.
AAPOR	Equivalent to “Not Eligible” disposition code (4.0).
Variable	U
Definition	The number of units for which eligibility could not be determined. This occurs if data are not collected from a unit and there is no information available about whether or not the unit is a member of the target population. Some examples of units with unknown eligibility include: unable to locate unit, unable to reach/unsafe area, address never assigned/worked, number always busy or call screening/blocking (in random digit dial surveys).
Computation	Sum of all units with an unknown eligibility.
Note	Surveys that have large number of units with unknown eligibility (e.g random-digit-dial surveys), may adjust the number of I’s and E’s by estimating what proportion of cases of unknown eligibility is actually eligible (<i>e</i>). When this proportion is estimated, the number of eligibles is adjusted by adding <i>e</i> (U) to E. The number of ineligibles is adjusted by adding U - <i>e</i> (U) to I. See Reporting Requirement 6 below for further explanation.
AAPOR	Equivalent to “Unknown Eligibility, Non-interview” disposition code (3.0).

1.2 Response Status Variable

Response status is determined only for eligible units. The definition of sufficient data will vary across surveys and will impact the count of responding units.

Variable	R
Definition	The number of eligible units with sufficient data to be classified as a response. In a multi-mode survey or census, responses could be obtained by mail, internet, telephone, fax, touch-tone data entry/voice recognition, or personal visit.
Computation	Sum of all responses across data collection modes.
AAPOR	Equivalent to “I”+”P” (complete interviews + partial interviews) disposition codes (1.1) and (1.2).

1.3 Detailed Reasons for Nonresponse Variables

To improve interpretation of the response rate and better manage resources, it is recommended that whenever possible, detailed reasons for (or types of) nonresponse be measured. Seven specific variables describing nonresponse reasons are defined below. The first six variables (REF, NOH, TA, LB, INSF, and OTH) define specific nonresponse reasons for eligible units. The seventh variable (U) reflects nonresponse when the eligibility status of the unit was unknown.

Variable **REF**

Definition The number of eligible units that did not respond due to respondent refusal.

Computation Sum of all units with a final outcome of "refusal."

AAPOR Equivalent to "R" (refusal and break-off) -- disposition code (2.10).

Variable **NOH**

Definition The number of eligible units that did not respond because no one was found at home during the interviewing period.

Computation Sum of all units with a final outcome of "no one home."

AAPOR Equivalent to "No one at residence" -- disposition code (2.24).

Variable **TA**

Definition The number of eligible units that did not respond because the occupants were away temporarily during the interviewing period.

Computation Sum of all units with a final outcome of "temporarily absent."

AAPOR Equivalent to "Respondent away/unavailable" -- disposition code (2.25).

Variable **LB**

Definition The number of eligible units that did not respond because an interviewer or interpreter was not available to conduct the interview in the required language.

Computation Sum of all units with a final outcome of "language barrier."

AAPOR Equivalent to "Language" -- disposition code (2.33).

Variable **INSF**

Definition The number of eligible units that participated but did not provide sufficient data to qualify as a response.

Computation Sum of all units with a final outcome of "insufficient data."

AAPOR Equivalent to "Break off" and "Break-off questionnaire too incomplete to process" -- disposition code (2.12).

Variable **OTH**

Definition The number of eligible units that did not respond for a reason other than refusal, no one home, language barrier, temporarily absent, or insufficient data.

Computation Sum of all units with a final outcome of "other noninterview."

AAPOR Equivalent to "Other", "Dead", "Physically or mentally unable", and "Miscellaneous" -- disposition codes (2.30), (2.31), (2.32) and (2.35).

<i>Variable</i>	U
<i>Definition</i>	The number of units for which eligibility could not be determined.
<i>Computation</i>	Sum of all units with unknown eligibility. Surveys that have a large number of units with unknown eligibility (e.g. random-digit-dial surveys), may adjust the number of I's and E's by estimating what proportion of cases of unknown eligibility is actually eligible (<i>e</i>). When this proportion is estimated, the number of eligibles is adjusted by adding <i>e</i> (U) to E. The number of ineligibles is adjusted by adding U - <i>e</i> (U) to I. See Reporting Requirement 6 below for further explanation.
<i>AAPOR</i>	Equivalent to "Unknown Eligibility, Non-interview" -- disposition code (3.0).

2. Rates and Formulae

2.1 Primary Rates

<i>Rate</i>	Response Rate
<i>Definition</i>	The rate of responding units to the sum of eligible units and units of unknown eligibility.
<i>Computation</i>	$[R/(E+U)] * 100$
<i>AAPOR</i>	Equivalent to Response Rate 2 (RR2).

<i>Rate</i>	Alternative Response Rate
<i>Definition</i>	The rate of responding units to total estimated eligible units.
<i>Computation</i>	$[R/[(E)+e(U)]*100$ where: <i>e</i> = estimated proportion of cases of unknown eligibility that are actually eligible. If there is no basis for estimating <i>e</i> , then the survey should not produce this response rate.
<i>AAPOR</i>	Equivalent to Response Rate 3 (RR3).

2.2 Detailed Rates

<i>Rate</i>	Refusal Rate
<i>Definition</i>	The rate of units classified as "refusals" to the sum of eligible units and units of unknown eligibility.
<i>Computation</i>	$[REF/(E+U)] * 100$
<i>AAPOR</i>	Equivalent to Refusal Rate 1 (REF1).

<i>Rate</i>	No One Home Rate
<i>Definition</i>	The rate of units classified as "no one home" to the sum of eligible units and units of unknown eligibility.
<i>Computation</i>	$[NOH/(E+U)] * 100$
<i>AAPOR</i>	No AAPOR equivalent.

<i>Rate</i>	Temporary Absent Rate
<i>Definition</i>	The rate of units classified as “temporarily absent” to the sum of eligible units and units of unknown eligibility.
<i>Computation</i>	$[TA/(E+U)] * 100$
<i>AAPOR</i>	No AAPOR equivalent.
<i>Rate</i>	Language Barrier Rate
<i>Definition</i>	The rate of units classified as “language barriers” to the sum of eligible units and units of unknown eligibility.
<i>Computation</i>	$[LB/(E+U)] * 100$
<i>AAPOR</i>	No AAPOR equivalent.
<i>Rate</i>	Insufficient Data Rate
<i>Definition</i>	The rate of units classified as having “insufficient data” to the sum of eligible units and units of unknown eligibility.
<i>Computation</i>	$[INSF/(E+U)] * 100$
<i>AAPOR</i>	No AAPOR equivalent.
<i>Rate</i>	Other Reason for Nonresponse Rate
<i>Definition</i>	The rate of units classified as “other reasons for nonresponse” to the sum of eligible units and units of unknown eligibility.
<i>Computation</i>	$[OTH/(E+U)] * 100$
<i>AAPOR</i>	No AAPOR equivalent.
<i>Rate</i>	Unknown Eligibility Rate
<i>Definition</i>	The rate of units classified as having an unknown eligibility to the sum of eligible units and units of unknown eligibility.
<i>Computation</i>	$[U/(E+U)] * 100$
<i>AAPOR</i>	No AAPOR equivalent.
<i>Rate</i>	Alternative Unknown Eligibility Rate
<i>Definition</i>	The estimated rate of units with an unknown eligibility to the sum of eligible units and the estimated number of units of unknown eligibility.
<i>Computation</i>	$\{e(U)/[e(U)+E]\} * 100$ where: e = estimated proportion of cases of unknown eligibility that are actually eligible. If there is no basis for estimating the value of e , then this rate should not be calculated.
<i>AAPOR</i>	No AAPOR equivalent.

3. Response Rate Reporting Requirements: Demographic Surveys and Decennial Censuses

Reporting Requirement 1: *When a response rate is reported, the universe of inference or target population for that survey or census must also be described.*

To report the universe of inference or target population, the documentation should indicate what constitutes eligible versus ineligible units. For example, in a survey where the universe of inference is the U.S. civilian population, a unit containing all occupants on active duty armed forces is ineligible. Conversely, a unit where the sole respondent is absent, ill, or hospitalized during the survey period is eligible.

Reporting Requirement 2: *Surveys or censuses that allow partial interviews to be counted as interviews must report the definition or threshold by which the sufficient partial is defined.*

Many surveys and censuses allow some leeway when defining an interview. Each survey or census that counts sufficient partials as interviews should establish an a priori definition of what constitutes a complete versus partial interview and what distinguishes a partial interview from an insufficient partial. For example, an income survey may require that 100% of critical questions about earnings and assets be answered and 80% of other questions be answered to qualify as an interview.

Reporting Requirement 3: *When a response rate is being reported in comparison to other surveys, the rate should be based on the initial wave or round of interviewing. If the initial interview is not used as the base, this must be noted.*

The most appropriate 'generic' or standardized measure of nonresponse across surveys having different features are the rates based upon initial contact. In most cases, this means the first time a unit is in sample. Nonresponse rates measured at the initial interview can be more readily applied across different surveys because the rate controls for several of the design factors hypothesized to influence nonresponse such as number of interviews, frequency of interviews, and interview length.

For surveys where the unit of interest is an address, and there are repeated interviews at that address, this means using only the first outcome with the address. For longitudinal surveys that follow people, this means using units in the first round or wave of interviewing. For one-time or annual surveys, this means using units in the sample at a specified time.

When calculating an annual initial nonresponse rate for a monthly survey with rotating samples (like the Current Population Survey), the correct computation is to sum all of the initial contact noninterview types relevant to that particular rate (e.g., all first contact noninterviews due to refusals), over the twelve months in sample and divide by the sum of all initial contact eligible units over the twelve months in sample.

Reporting Requirement 4: *When a response rate is reported, it must be noted whether the rate is weighted or unweighted.*

When surveys use complex sample designs, such as single-stage samples with unequal probabilities of selection, multi-stage sample designs, or two-phase sample designs, it may be best to produce weighted response rates that take these designs into account. For example, the American Community Survey (ACS) sample involves unequal probabilities of selection as well as a two-phase sample design. Nonrespondents are subsampled after mail and phone efforts for personal visit follow-up. The response rates for the ACS are therefore weighted to account for both the selection probabilities and the probability associated with the subsampling.

Reporting Requirement 5: *When available, response rates should be calculated using the final, edited data or edited outcome codes. If final edited data are not used, this must be noted.*

The outcomes used to calculate response rates should reflect outcomes after the data have undergone any edits or other post-data collection processing. For surveys and censuses that undergo post-delivery sponsor edits that result in changes to interview outcomes, the sponsoring agency will be the source for the nonresponse data, otherwise the collecting agency will be the data source. For more recent years when final codes may not be readily available, the interim outcomes may be used but this fact must be noted in the text and/or tables when rates are presented.

Reporting Requirement 6: *When reporting a response rate for a survey with a large number of units with unknown eligibility, the analyst may choose to estimate the proportion of unknown eligibles that are actually eligible (the “e” value). If this is the case, the basis for “e” must be explicitly stated and detailed.*

In estimating what proportion of cases of unknown eligibility is actually eligible the analyst must be guided by the best available scientific information available. The estimate must not select a proportion in order to boost the response rate. The basis for the estimate must be explicitly stated and detailed. It may consist of separate estimates for the sub-components of unknowns and/or a range of estimators based of differing procedures. In each case, the basis of all estimates must be indicated (AAPOR, pg. 29, 2004). See Smith (2003) for methods of estimating “e”.

Example: Reporting a response rate in a demographic survey.

The response rate for Wave 1 of the 1993 SIPP is 91.1%. The target population for SIPP consists of residents in U.S. households and persons living in group quarters, such as dormitories, rooming houses, religious group dwellings, and family-type housing on military bases (*reporting requirement 1*). Persons living in military barracks and in institutions, such as prisons and nursing homes are ineligible. Partial interviews are counted as complete if sections on labor force earnings, asset interest earnings, asset dividend earnings, and health insurance are completed (*reporting requirement 2*). The response rate is unweighted (*reporting requirement 4*).