A "How To" Course on AAPOR Response Rate Calculations and Practical Examples from the Field

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Webinar Overview

Part 1: A Brief Overview of the Basic Structure and Mechanics of Outcome Rates

1. The basic all-purpose "general population" Response Rate
2. Refusal, Cooperation, and Contact Rates
3. Response Rates when there is required screening for qualified respondents
4. A general walkthrough of outcomes and using the AAPOR calculator

Part 2: Different Strokes for Different Folks: Response Rates for Different Study Designs

1. Basic Phone (Legacy Calculator)
2. Dual Frame RDD (DFRDD)
3. Web (including Probability Panels)
4. Mail: Named Persons
5. Mail: Unnamed Persons (ABS, etc.)
6. In-Person

Part 3: Important Considerations from Real World Situations

1. Calculating "e"
2. Hybrid samples and hybrid methodologies
3. Dealing with scrubbed samples
4. Combining multiple Response Rates

Q & A

Credentials

Why me?

1. Current Member of the AAPOR Standard Definitions Committee (2015 – present).
2. Principal advocate in urging AAPOR to develop and sanction a screening-study response rate
3. Chair of the SD subcommittee on new section on Mail Surveys of Unnamed Persons.
4. And, I can't count how many times I have actually had to calculate a response rate!!!

Part 1: Overview of Response Rates

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Firstly, Resources

The AAPOR website currently provided a number of resources:

1. "Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys" 9th Edition 2016.
2. Smith, Tom (2009). A Revised Review of Methods to Estimate the Status of Cases with Unknown Eligibility.
3. The AAPOR Response Rate Calculator, Version 4.0
4. Mail Surveys of Unnamed Persons Addendum.

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The "Basic" AAPOR Response Rate

$$RR3 = \frac{I}{(I + P) + (R + NR + O) + e(UH + UO)}$$

I = interview
P = partial interview
R = refusals
NR = nonresponse
O = other
UH = unknown household
UO = unknown other
e = estimate of household eligibility

Not included: Non-working/bad/business/fax/etc.

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Lets Get Even More Basic

There are really only 4 possible outcomes to a survey in relation to a response rate:

A. The sample element resulted in a found respondent (household), and she did the interview
B. The sample element resulted in a found respondent (household), and he did not do the interview
C. It is inconclusive what was found with the sample element…(is there really a household/person associated with it?)
D. We are sure the sample element failed in finding a respondent (household)

So Even Simpler Still…

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Lets Get Even More Basic

Category 1: Interview
Category 2: Eligible, non-Interview
Category 3: Unknown if Eligible (thus, non-Interview)
Category 4: Not Eligible

$$RR3 = \frac{\text{Cat 1}}{\text{Cat 1} + \text{Cat 2} + e(\text{Cat 3})}$$

What is e? In plain English, it is the "estimate" of Unknown if Eligible records that we assume are actually Cat 2, Eligible non-Interviews.

But how do we calculate it?

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Calculating e

Options:
1. Assume 100% eligible: RR 1 or 2
2. Assume 0%: RR 5 or 6
3. Use the data you gathered to calculate "proportional allocation": RR 3 or 4
4. Use and advanced method (covered later)
5. (Even-numbered Response Rates count partial interviews as completed interviews)

$$RR1 = \frac{I}{(I+P) + (R+NR+O) + (UH+UO)} \qquad RR5 = \frac{I}{(I+P) + (R+NR+O)}$$

$$RR3 = \frac{I}{(I+P) + (R+NR+O) + e(UH+UO)} \qquad e = \frac{\text{Cat 1} + \text{Cat 2}}{\text{Cat 1} + \text{Cat 2} + \text{Cat 4}}$$

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Other AAPOR Outcome Rates

Without going into great detail on the variations of each:

1. Refusal rates (Ref1 through Ref3): The proportion of all cases in which a housing unit or respondent refuses to do an interview
2. Cooperation rates (Coop1 through Coop4): The proportion of all cases interviewed of all eligible units ever contacted
3. Contact rates (Con1 through Con3): Measures the proportion of all cases in which some responsible member of the housing unit was reached by the survey

$$Ref2 = \frac{R}{(I+P)+(R+NC+O) + e(UH + UO)}$$

$$Coop3 = \frac{I}{(I+P)+R}$$

$$Con2 = \frac{(I+P)+R+O}{(I+P)+R+O+NC + e(UH+UO)}$$

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Screening Response Rates

All Well and Good! But…but…what if we have to screen people?

In that case, what the heck does "eligibility" mean?!

As of 2015, AAPOR now provides an official response rate for screening studies:

$$RR3 = \frac{I}{(I + P) + (R + NR + O) + [(UH)e_2]\, e_1 + [(UO)e_1]}$$

Plain English:
e1 = Whether in an **confirmed household/person** there is an **eligible respondent (Respondent Eligibility)**
e2 = Whether there is an actual confirmed household/person **at all (Sample Record Eligibility)**

Basic calculation
e1 = Cat 1 + Cat 2 / Cat1 + Cat 2 + Cat-4-no-eligible-respondent
e2 = Cat 1 + Cat 2 + Cat-3-households + Cat-4-no-eligible-respondent /
Cat 1 + Cat 2 + Cat-3-households + Cat 4

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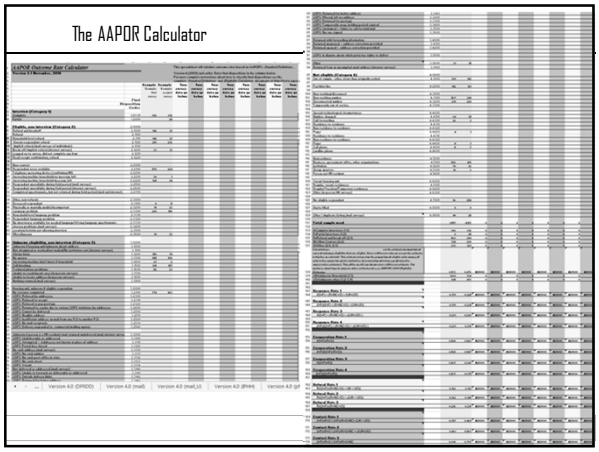
The AAPOR Calculator



Thinking Now In Terms of Outcomes

AAPOR

Interview (Category 1)	Code	N
Complete	1.0/1.10	805
Partial	1.2000	
Eligible, non-interview (Category 2)	2.0000	
Refusal and breakoff	2.1000	142
Refusal	2.1100	
Household-level refusal	2.1110	142
Known-respondent refusal	2.1120	251
Implicit refusal (mail surveys of individuals)	2.1130	
Break off/ Implicit refusal	2.1200	33
Logged on to survey, did not complete any item	2.1210	
Read receipt confirmation, refusal	2.1220	
Non-contact	2.2000	
Respondent never available	2.2100	570
Telephone answering device (confirming HH)	2.2200	
Answering machine household-no message left	2.2210	38
Answering machine household-message left	2.2220	129
Respondent unavailable during field period	2.2500	
Respondent unavailable during field period	2.2600	
Completed questionnaire, but not returned during field	2.2700	
Other, non-refusals	2.3000	
Deceased respondent	2.3100	6
Physically or mentally unable/incompetent	2.3200	18
Language problem	2.3300	205
Household-level language problem	2.3310	
Respondent language problem	2.3320	
No interviewer available for needed language	2.3330	
Literacy problems (mail surveys)	2.3400	
Location/Activity not allowing interview	2.3500	
Miscellaneous	2.3600	19

Total sample used	6557
I=Complete Interviews (1.1)	805
P=Partial Interviews (1.2)	0
R=Refusal and break off (2.1)	568
NC=Non Contact (2.2)	729
O=Other (2.0, 2.3)	238
e	0.533
UH=Unknown Household (3.1)	1369
UO=Unknown other (3.2-3.9)	809
Response Rate 1	
I/(I+P) + (R+NC+O) + (UH+UO)	0.179
Response Rate 2	
(I+P)/(I+P) + (R+NC+O) + (UH+UO)	0.179
Response Rate 3	
I/(I+P) + (R+NC+O) + e(UH+UO))	0.231
Response Rate 4	
(I+P)/((I+P) + (R+NC+O) + e(UH+UO))	0.231

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Thinking Now In Terms of Outcomes

AAPOR

Unknown eligibility, non-interview (Category 3)	3.0000	
Unknown if housing unit/unknown about address	3.1000	
Not attempted or worked/not mailed/No invitation sent (internet surveys)	3.1100	
Always busy	3.1200	150
No answer	3.1300	955
Answering machine-don't know if household	3.1400	27
Call blocking	3.1500	188
Technical phone problems	3.1600	53
Unable to reach/unsafe area (in-person surveys)	3.1700	
Unable to locate address (in-person surveys)	3.1800	
Nothing returned (mail surveys)	3.1900	
Housing unit, unknown if eligible respondent	3.2000	
No screener completed	3.2100	773
Other	3.9000	37
Returned from an unsampled email address (internet surveys)	3.9100	
Not eligible (Category 4)	4.0000	
Out of sample - other strata than originally coded	4.1000	189
Fax/data line	4.2000	143
Non-working/disconnect	4.3000	
Non-working number	4.3100	567
Disconnected number	4.3200	215
Temporarily out of service	4.3300	
Special technological circumstances	4.4000	
Number changed	4.4100	64
Call forwarding	4.4300	28
Residence to residence	4.4310	
Non-residence to residence	4.4320	
Pager	4.4400	4
Cell phone	4.4500	5
Landline phone	4.4600	
Nonresidence	4.5000	
Business, government office, other organizations	4.5100	596
Institution	4.5200	79
Group quarters	4.5300	10
Person not HH resident	4.5400	
No eligible respondent	4.7000	98
Quota filled	4.8000	0
Other / duplicate listing (mail surveys)	4.9000	49

Total sample used	6557
I=Complete Interviews (1.1)	805
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Response Rate 1	
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Response Rate 3	
I/(I+P) + (R+NC+O) + e(UH+UO))	0.231
Response Rate 4	
(I+P)/((I+P) + (R+NC+O) + e(UH+UO))	0.231

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Issues with Outcomes

AAPOR

It is important to note that final outcomes (disposition codes) can be different than temporary disposition codes. A CATI system that gets a callback (category 2), then a no answer (Category 3), might hold a temporary code of "no answer" but if that is the last attempt the final outcome would be callback

That said, there is no such thing as a callback in the AAPOR outcome codes! This may be called a "respondent never available" in the AAPOR code.

As a general note, each interviewing software system has its own codes and these do not perfectly correspond with AAPOR codes: researchers must make their own decisions as to what matches with what (and it is almost always commonsensical).

Examples:

CATI software	AAPOR outcome
Privacy manager	Call blocking
Ineligible	Physically/mentally incompetent
Modem	Fax/data line

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Dual Frame RDD/Screening Studies

First: recognize that interviewing on a cell phone for the general adult population is a screening study: one has to term for those under 18. As such, the cell phone side of a dual frame RDD is a screening study.

Second, note there is no cost to calculating a non-screening study with the screening study response rate: E1 will simply be 100%.

Importantly, you should NOT disposition any record as Category 2 if you were NOT ABLE to administer the screener. For example, if someone hangs up on you, they are NOT a refusal, they are "No screener completed, residential and live contact made" (a special code in Cat 3).

Note that not only do screener studies have the special response rate calculation reviewed earlier, but special refusal, contact, and cooperation rates as well.

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DFRDD/Screening

Eligible, Interview (Category 1)	LL	Cell
Complete	504	1,505
Partial	41	134
Eligible, Non-interview (Category 2)		
Refusal and breakoff	38	79
Refusal	2,401	
Household-level refusal		
Known respondent refusal		
Break off		
Non-contact		
Respondent never available	3	
Telephone AM (confirming HH)		
Answering machine-no message left	1,498	
Answering machine-message left		
Other, non-refusals		
Deceased respondent		
Physically or mentally unable	55	
Language problem	50	
Household-level language problem		
Respondent language problem		
No interviewer for needed language		
Miscellaneous		

Unknown eligibility, non-interview (Category 3)	LL	Cell
Unknown if housing unit		
Not attempted or worked		
Always busy	219	609
No answer	2,806	2,418
Answering machine-don't know if household		
Call blocking	51	111
Technical phone problems		
Residential, unknown if eligible respondent		
No screener completed, residential and live contact made		5,888
No screener completed, residential and no live contact		12,816
Other		

SUMMARY DISPOSITIONS	LL	Cell
I=Complete Interviews (1.1)	**504**	**1,505**
P=Partial Interviews (1.2)	**41**	**134**
R=Refusal and break off with eligible case (2.1)	**2,439**	**79**
NC=Non-contact with eligible case (2.2)	**1,501**	**0**
O=Other non-interview with eligible case (2.0, 2.3)	**105**	**0**
UH=Unknown if residential (3.0, 3.1)	3,076	3,138
UO=Unknown other (3.2, 3.9) (residential, unknown if eligible)	0	**18,704**
NNR = Ineligible: Not residential (4.0,4.1,4.2,4.3,4.4,4.5,4.8,4.9)	20,239	**11,631**
INR=Ineligible: Residential but ineligible for survey (4.7)	**0**	**636**
Total	27,905	35,827
ADDRESSING CASES WITH UNDETERMINED ELIGIBILITY		
e1 = the % of known-residential cases estimated to have eligible R	100.0%	73.0%
e2 = the % of unknown-if-residential cases that are estimated to be residential	18.5%	64.4%

e1 = x / x + y

e2 = x / x + y

Not eligible (Category 4)	LL	Cell
Out of sample		
Fax/data line	432	43
Non-working/disconnect	18,141	8,779
Non-working number		
Disconnected number		
Temporarily out of service	531	2,116
Special tech circumstances		
Number changed		
Cell phone		
Call forwarding		
Residence to residence		
Non-residence to residence		
Pager		
Nonresidence		
Business	1,133	693
Institution		
Group quarters		
No eligible respondent	0	636
Quota filled		
Other	2	

INNR
INR

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Web Surveys

This includes 1) Internet surveys of specifically-named persons (i.e., using list-based samples), 2) probability-based Internet panels, 3) non-probability Internet panels, also called opt-in or access panels, and 4) river samples or self-recruited online samples.

AAPOR recommends the term "participation rate" for #3 and #4 above to avoid confusion with the response rates described in the rest of this document, and given the denominator in #4 is rarely known, suggests not calculating any sort of rate at all for river samples.

A failure to receive a reply to an Internet survey would place a case in the unknown eligibility category, since it could not be confirmed that it was still currently active. That said, if it is known that the list is both accurate and current, it can be assumed that all those from whom one receives no response are eligible sample persons who therefore must be treated as nonrespondents.

An undelivered e-mail message (bounce back) is unknown if eligible unless it can be verified by other means.

Typically, web surveys use only a few codes of the response rate sheet, such as simply completes, break offs, and an unknown code.

Typically, if nonresponders all fall into Cat 3, then a large burden of the response rate falls on e. If there are no non-eligible sample records, e=100% and thus all Cat3 cases are in effect considered Cat 2.

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Probability Panels

Probability panels have multiple stages and each must be calculated, the product of which is the response rate for a given study from the probability panel:

1. Recruitment
2. Enrollment (profile)
3. Survey Completion

$$\text{Recruitment rate (RECR)} = \frac{IC}{IC + (R + NC + O) + e(UH + UO)}$$

$$\text{Profile rate (PROR)} = \frac{(I + P)}{(I + P) + (R + NC + O)}$$

$$\text{Completion rate (COMR)} = \frac{(I + P)}{(I + P) + (R + NC + O)}$$

$$\text{Cumulative response rate (CUMRR)} = \text{RECR} \times \text{PROR} \times \text{COMR}$$

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Mail Named Persons

Highly similar to Internet surveys in terms of response rate calculations

Assumes that only the named person is the appropriate respondent and that some confirmation is needed that the named respondent is at the target address or otherwise still eligible for inclusion.

A failure to receive a reply, for many studies, places the sample record in the unknown eligibility category, since it could not be confirmed that the person was still part of the community being sampled. Similarly, various postal return codes that failed to establish whether the person still lives at the mailed address would continue to leave eligibility unknown. For some surveys of specifically named persons, however, one should assume that the selected person was eligible, unless otherwise determined.

There are many potential Cat 3 codes in mail surveys (see table).

Typically, if nonresponders all fall into Cat 3, then a large burden of the response rate falls on e.

USPS: Refused by addressee
USPS: Refused to accept
USPS: Refused to pay postage (mail, mail_U)
USPS: Returned to sender due to various USPS violations by addressee
USPS: Cannot be delivered
USPS: Illegible address
USPS: Insufficient address on mail from one P.O to another P.O.
USPS: No mail receptacle
USPS: Delivery suspended to commercial mailing agency
Unknown if person is a HH resident/ mail returned undelivered
USPS: Undeliverable as addressed
USPS: Attempted – Addressee not known at place of address
USPS: Postal box closed
No such address
USPS: No such number
USPS: No such post office in state
USPS: No such street
USPS: Vacant
Not delivered as addressed
USPS: Unable to forward, no deliverable as addressed
USPS: Outside delivery limits
USPS: Returned for better address
USPS: Moved, left no address
USPS: Returned for postage
USPS: Temporarily away, holding period expired
USPS: Unclaimed – failure to call for held mail
USPS: No one signed
Returned with forwarding information
Returned unopened – address correction provided
Returned opened – address correction provided
USPS: In dispute about which party has rights to deliver

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Mail Unnamed Persons

Most ABS mail studies fall into this category: The address is sampled, then a screener selects a person to interview.

A failure to receive a reply to the survey questionnaire in this example would place an address into the "Unknown Eligibility" category, since it cannot be confirmed that the address was an occupied dwelling unit. For some of these surveys, however, one should assume that the selected "type" of person was eligible, unless otherwise determined.

It is not uncommon in ABS surveys to append a name to the address. However, in most cases that person is not pre-selected, rather the use of the name is simply a tool to try to reduce nonresponse. As such, mail returned with "no such person" or "person moved no forwarding address" are not necessarily ineligible.

Once again, it is not uncommon for a large number of records to end up in the unknown category, placing significant burden on e.

Then again, some studies can have no Cat 4s…but is that real?

Interview (Category 1)	
Complete	679
Partial	21
Eligible, non-interview (Category 2)	
Refusal and breakoff	1
Refusal	
Household-level refusal	
Known-respondent refusal	
Implicit refusal (mail surveys of individuals)	10
Break off/ Implicit refusal (Internet surveys)	24
Logged on to survey, did not complete any item	
Read receipt confirmation, refusal	
Non-contact	383
Unknown eligibility, non-interview (Category 3)	
Unknown if person is a HH resident	
USPS: Undeliverable as addressed	10
USPS: Attempted – Addressee not known at place of address	
USPS: Postal box closed	
Not eligible (Category 4)	
Non-working/disconnect	
Non-working number	
No eligible respondent	0
Other / duplicate listing (mail surveys)	
Total phone numbers used	1128
I=Complete Interviews (1.1)	679
P=Partial Interviews (1.2)	21
R=Refusal and break off (2.1)	35
NC=Non Contact (2.2)	383
O=Other (2.0, 2.3)	0
e	1.000
UH=Unknown Household (3.1)	0
UO=Unknown other (3.2-3.9)	10
Response Rate 3	
I/((I+P) + (R+NC+O) + e(UH+UO))	60.2%

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In-Person Surveys

After all we have just been though, in-person surveys are fairly straightforward.

Assume that the sampling level is household, but that, like general population adult telephone surveys, we also assume that 100% of all households have someone age 18 and older.

Refusals, also like in general population telephone, can be household-level (or for establishment surveys, any level from someone in a business with "supervisory authority").

Unknown cases include situations where an interviewer is unable to gain access to the geography of a household and thus cannot confirm its status as occupied, and even situations where sample is selected but an interviewer is never sent to that sample record location.

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Important Considerations and Examples

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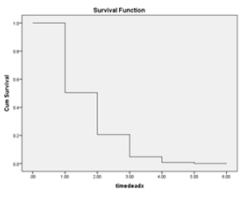
Calculating e

We have reviewed RR1/2 and RR5/6, and proportional allocation. It may appear as if we have covered then, the too hot, too cold, and just right/goldilocks estimates. That said, it is typically understood that proportional representation is conservative, and in many cases downright inaccurate. Thus at times researchers might choose to calculate e by some other means. Possibilities:

1. Allocation based on disposition codes:
   - ✓ For example, assume all AMs are eligible and all NAs are not, etc.
   - ✓ More refined would be to use available information to have a specific non-0/non-100 eligibility rate for each of these dispositions.
2. Survival analysis
   - ✓ Basic Kaplan-Meier where each contact attempt is a stage in survival.
3. Getting outside data
   - ✓ Data from telephone companies on the status of unknown numbers
   - ✓ Data from databases on the status of unknown numbers
   - ✓ Data from the DSF or other databases to estimate e for ABS surveys



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Multi-Mode Studies

AAPOR currently provides very little guidance on calculating response rates for multi-mode surveys, only stating that one should use codes for whatever modes are applicable.

OK, fine, but what do you determine as your final disposition for each case?

My recommendation is to develop a hierarchy of codes. In general, the mode that matches the sampling frame should take precedence, but it is not always clear that is the right thing.

At issue for example is an ABS study that appends phones and in addition to mailing surveys, makes phone calls. But it is unclear in any case whether a phone disposition should trump a mail disposition (other than a complete of course).

Does a bad number on the phone trump a mail non-response?

Does a refusal on the phone trump a mail non-response?

And, what do these decisions do for e?

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Scrubbed Samples

Scrubbing: a technique whereby a sample provide excludes certain telephone numbers from a frame, such as running an RDD sample through a business database and excluding any number that is found in that database.

To include in the response rate or not?

AAPOR has no clear guidance, but my two cents are:

If the scrubbing included an attempted contact, include them. Otherwise, do not.

Example: MSG ID+ and CSS procedures include a daytime dial attempt to scrub out non-working and business numbers, so include the sample.

Example: MSG Cell-WINS does not include a contact attempt, so do not include the sample.

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Combining Multiple Sample Frames

The latest AAPOR Standard Definitions has guidance for DFRDD, namely:

$$\text{Combined response rate} = [(RR_{LL}*K_{LL}) + (RR_{CP}*(1-K_{LL}))]/100$$

Where K is the proportion of interviews coming from that particular frame.

But there are other situations where an alternative method might be considered.

To the right: CRR = 42.2%. But the interviews are not proportionate to the number of HHs reached by frame

		List	RDD	Total
Eligible, Interview (Category 1)				
Complete	1.0/1.10	878	114	992
Eligible, non-interview (Category 2)	2.000			
Refusal and breakoff	2.100	84	24	108
Break-off	2.120	36	30	66
Answering machine household	2.222	69	29	98
Physically or mentally unable	2.320	2	1	3
Language problem	2.330	5	2	7
Always busy	3.120	3	543	946
Unknown if eligible (Category 3)				
No answer	3.130	127	8441	8568
Answering machine-DK# HH	3.140	530	5828	6358
Call blocking	3.150	6	52	58
Housing unit, unknown if eligible R	3.200	414	6102	6516
No screener completed	3.210	64	268	332
Not eligible (Category 4)	4.000		0	
Fax/data line	4.200	96	3278	3374
Non-working number	4.310	333	47323	47656
Business	4.510	30	2979	3009
No eligible respondent	4.700	104	6038	6142
Total phone numbers used		**2781**	**81452**	**84233**
I=Complete Interviews (1.1)		878	114	992
P=Partial Interviews (1.2)		0	0	0
R=Refusal and break off (2.1)		120	54	174
NC=Non Contact (2.2)		76	32	108
e1 (Eligible Person)		91%	3%	17%
e2 (Eligible Household)		78%	19%	20%
Raw e1		1968	489	2457
Raw e2		2159	15248	17691
UH=Unknown household (3.1)		730	15532	16262
UO=Unknown other (3.2, 3.9)		414	6102	6516
RR3		**44.6%**	**23.3%**	**33.4%**

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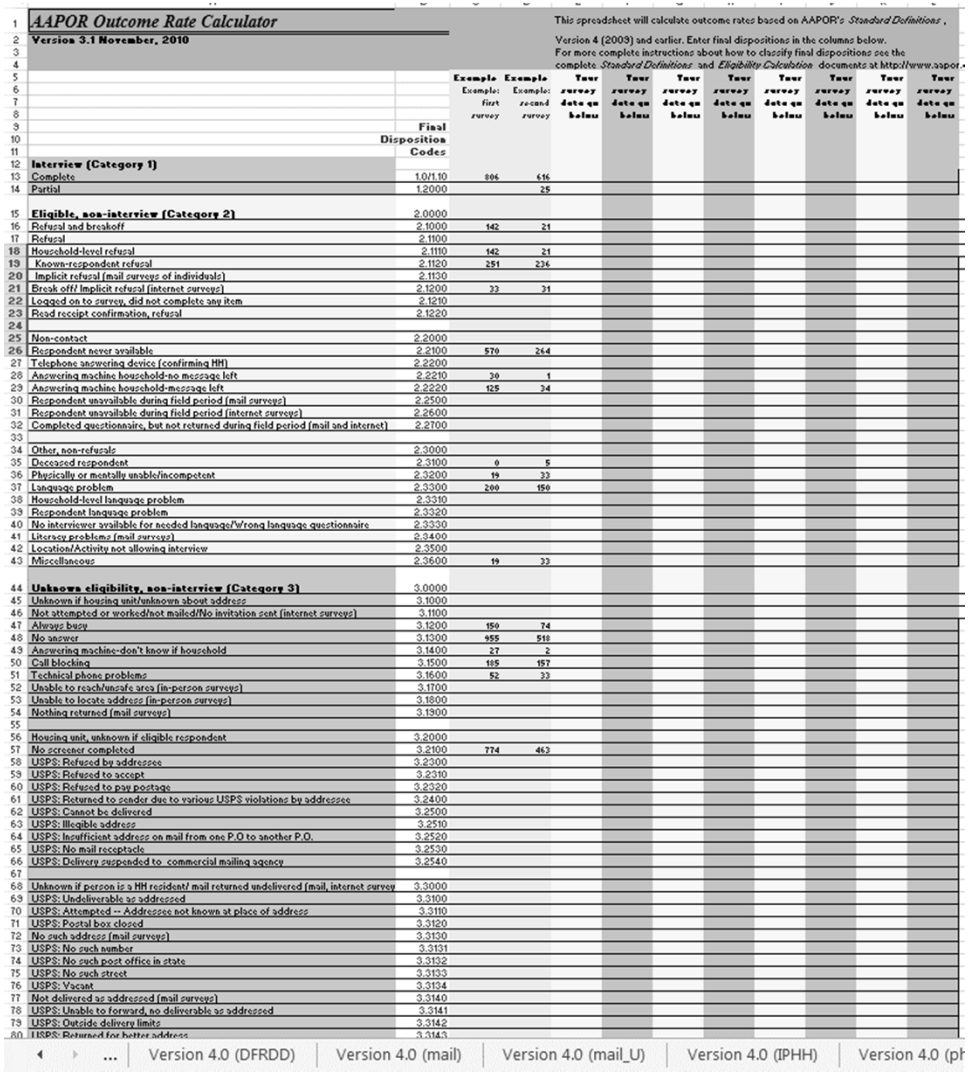
research. refined.
contact me
with any questions
DDutwin@ssrs.com | 484-840-4406 | @ddutwin

The AAPOR Calculator



1	***AAPOR Outcome Rate Calculator***			This spreadsheet will calculate outcome rates based on AAPOR's *Standard Definitions*.								
2	**Version 3.1 November, 2010**			Version 4 (2009) and earlier. Enter final dispositions in the columns below.								
3				For more complete instructions about how to classify final dispositions see the								
4				complete *Standard Definitions* and *Eligibility Calculation* documents at http://www.aapor.								
5			Example	Example	Your	Your	Your	Your	Your	Your	Your	Your
6			Example:	Example:	survey	survey	survey	survey	survey	survey	survey	survey
7			first	second	data go	data go	data go	data go	data go	data go	data go	data go
8			survey	survey	below	below	below	below	below	below	below	below
9		Final										
10		Disposition										
11		Codes										
12	**Interview (Category 1)**											
13	Complete	1.0/1.10	806	616								
14	Partial	1.2000		25								
15	**Eligible, non-interview (Category 2)**	2.0000										
16	Refusal and breakoff	2.1000	142	21								
17	Refusal	2.1100										
18	Household-level refusal	2.1110	142	21								
19	Known-respondent refusal	2.1120	251	236								
20	Implicit refusal (mail surveys of individuals)	2.1130										
21	Break off/ Implicit refusal (internet surveys)	2.1200	33	31								
22	Logged on to survey, did not complete any item	2.1210										
23	Read receipt confirmation, refusal	2.1220										
24												
25	Non-contact	2.2000										
26	Respondent never available	2.2100	570	264								
27	Telephone answering device (confirming HH)	2.2200										
28	Answering machine household-no message left	2.2210	30	1								
29	Answering machine household-message left	2.2220	125	34								
30	Respondent unavailable during field period (mail surveys)	2.2500										
31	Respondent unavailable during field period (internet surveys)	2.2600										
32	Completed questionnaire, but not returned during field period (mail and internet)	2.2700										
33												
34	Other, non-refusals	2.3000										
35	Deceased respondent	2.3100	0	5								
36	Physically or mentally unable/incompetent	2.3200	19	33								
37	Language problem	2.3300	200	150								
38	Household-level language problem	2.3310										
39	Respondent language problem	2.3320										
40	No interviewer available for needed language/Wrong language questionnaire	2.3330										
41	Literacy problems (mail surveys)	2.3400										
42	Location/Activity not allowing interview	2.3500										
43	Miscellaneous	2.3600	19	33								
44	**Unknown eligibility, non-interview (Category 3)**	3.0000										
45	Unknown if housing unit/unknown about address	3.1000										
46	Not attempted or worked/not mailed/No invitation sent (internet surveys)	3.1100										
47	Always busy	3.1200	150	74								
48	No answer	3.1300	955	518								
49	Answering machine-don't know if household	3.1400	27	2								
50	Call blocking	3.1500	185	157								
51	Technical phone problems	3.1600	52	33								
52	Unable to reach/unsafe area (in-person surveys)	3.1700										
53	Unable to locate address (in-person surveys)	3.1800										
54	Nothing returned (mail surveys)	3.1900										
55												
56	Housing unit, unknown if eligible respondent	3.2000										
57	No screener completed	3.2100	774	463								
58	USPS: Refused by addressee	3.2300										
59	USPS: Refused to accept	3.2310										
60	USPS: Refused to pay postage	3.2320										
61	USPS: Returned to sender due to various USPS violations by addressee	3.2400										
62	USPS: Cannot be delivered	3.2500										
63	USPS: Illegible address	3.2510										
64	USPS: Insufficient address on mail from one P.O to another P.O.	3.2520										
65	USPS: No mail receptacle	3.2530										
66	USPS: Delivery suspended to commercial mailing agency	3.2540										
67												
68	Unknown if person is a HH resident/ mail returned undelivered (mail, internet survey	3.3000										
69	USPS: Undeliverable as addressed	3.3100										
70	USPS: Attempted -- Addressee not known at place of address	3.3110										
71	USPS: Postal box closed	3.3120										
72	No such address (mail surveys)	3.3130										
73	USPS: No such number	3.3131										
74	USPS: No such post office in state	3.3132										
75	USPS: No such street	3.3133										
76	USPS: Vacant	3.3134										
77	Not delivered as addressed (mail surveys)	3.3140										
78	USPS: Unable to forward, no deliverable as addressed	3.3141										
79	USPS: Outside delivery limits	3.3142										
80	USPS: Returned for better address	3.3143										
81	USPS: Moved, left no address	3.3200										
82	USPS: Returned for postage	3.3300										
83	USPS: Temporarily away, holding period expired	3.3400										
84	USPS: Unclaimed -- failure to call for held mail	3.3500										
85	USPS: No one signed	3.3600										
86												
87	Returned with forwarding information	3.4000										
88	Returned unopened -- address correction provided	3.4100										
89	Returned opened -- address correction provided	3.4200										
90												
91	USPS: In dispute about which party has rights to deliver	3.5000										
92												
93	Other	3.9000	21	15								
94	Returned from an unsampled email address (internet surveys)	3.9100										
95	**Not eligible (Category 4)**	4.0000										
96	Out of sample - other strata than originally coded	4.1000	189	143								
97												
98	Fax/data line	4.2000	142	121								
99												
100	Non-working/disconnect	4.3000										
101	Non-working number	4.3100	567	349								
102	Disconnected number	4.3200	219	220								
103	Temporarily out of service	4.3300										
104												
105	Special technological circumstances	4.4000										
106	Number changed	4.4100	64	35								
107	Call forwarding	4.4300	26	3								
108	Residence to residence	4.4310										
109	Non-residence to residence	4.4320										
110	Pager	4.4400	4	1								
108	Residence to residence	4.4310										
109	Non-residence to residence	4.4320										
110	Pager	4.4400	4	1								
111	Cell phone	4.4500	5	7								
112	Landline phone	4.4600										
113												
114	Nonresidence	4.5000										
115	Business, government office, other organizations	4.5100	596	419								
116	Institution	4.5200	79	36								
117	Group quarters	4.5300	10	8								
118	Person not HH resident	4.5400										
119												
120	Vacant housing unit	4.6000										
121	Regular, vacant residences	4.6100										
122	Regular/Vacation/Temporary residences	4.6200										
123	Other (in-person HH surveys)	4.6300										
124												
125	No eligible respondent	4.7000	96	254								
126												
127	Quota filled	4.8000	0	0								
128												
129	Other / duplicate listing (mail surveys)	4.3000	49	25								
130												
131	**Total sample used**		6557	4353	0	0	0	0	0	0	0	0
132												
133	I=Complete Interviews (1.1)		806	616	0	0	0	0	0	0	0	0
134	P=Partial Interviews (1.2)		0	25	0	0	0	0	0	0	0	0
135	R=Refusal and break off (2.1)		563	309	0	0	0	0	0	0	0	0
136	NC=Non Contact (2.2)		725	299	0	0	0	0	0	0	0	0
137	O=Other (2.0, 2.3)		239	221	0	0	0	0	0	0	0	0
	Calculating e: e is the estimated proportion of cases of unknown eligibility that are eligible. Enter a different value or accept the estimate in this line as a default. This estimate is based on the proportion of eligible units among all units in the sample for which a definitive determination of status was obtained (a conservative estimate). This will be used if you do not enter a different estimate. For guidance about how to compute other estimates or e, see AAPOR's 2009 *Eligibility Estimator*.											
138			0.533	0.476	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
139	UH=Unknown Household (3.1)		1249	784	0	0	0	0	0	0	0	0
140	UO=Unknown other (3.2-3.9)		895	478	0	0	0	0	0	0	0	0
141												
142												
143	**Response Rate 1**											
144	I/(I+P) + (R+NC+O) + (UH+UO)		0.179	0.225	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
145	**Response Rate 2**											
146	(I+P)/(I+P) + (R+NC+O) + (UH+UO)		0.179	0.235	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
147	**Response Rate 3**											
148	I/[(I+P) + (R+NC+O) + e(UH+UO)]		0.231	0.298	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
149												
150	**Response Rate 4**											
151	(I+P)/[(I+P) + (R+NC+O) + e(UH+UO)]		0.231	0.310	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
152												
153	**Cooperation Rate 1**											
154	I/(I+P)+R+O)		0.500	0.524	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
155	**Cooperation Rate 2**											
156	(I+P)/[(I+P)+R+O)]		0.500	0.547	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
157	**Cooperation Rate 3**											
158	I/[(I+P)+R)]		0.587	0.648	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
159	**Cooperation Rate 4**											
160	(I+P)/[(I+P)+R)]		0.587	0.675	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
161												
162	**Refusal Rate 1**											
163	R/[(I+P)+(R+NC+O) + UH + UO)]		0.126	0.113	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
164	**Refusal Rate 2**											
165	R/[(I+P)+(R+NC+O) + e(UH + UO)]		0.162	0.149	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
166	**Refusal Rate 3**											
167	R/[(I+P)+(R+NC+O)]		0.243	0.219	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
168												
169	**Contact Rate 1**											
170	(I+P)+R+O / (I+P)+R+O+NC+ (UH + UO)		0.257	0.429	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
171	**Contact Rate 2**											
172	(I+P)+R+O / (I+P)+R+O+NC + e(UH+UO)		0.461	0.566	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
173	**Contact Rate 3**											
174	(I+P)+R+O / (I+P)+R+O+NC		0.690	0.797	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
175												

... | Version 4.0 (DFRDD) | Version 4.0 (mail) | Version 4.0 (mail_U) | Version 4.0 (IPHH) | Version 4.0 (ph

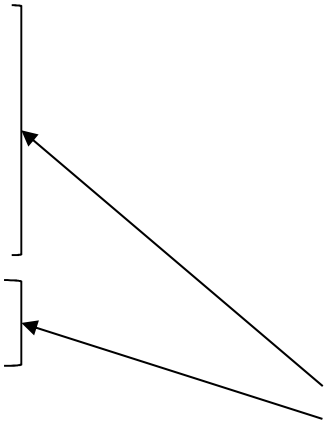
Thinking Now In Terms of Outcomes

Interview (Category 1)	Code	N
Complete	1.0/1.10	806
Partial	1.2000	
Eligible, non-interview (Category 2)	2.0000	
Refusal and breakoff	2.1000	142
Refusal	2.1100	
Household-level refusal	2.1110	142
Known-respondent refusal	2.1120	251
Implicit refusal (mail surveys of individuals)	2.1130	
Break off/ Implicit refusal	2.1200	33
Logged on to survey, did not complete any item	2.1210	
Read receipt confirmation, refusal	2.1220	
Non-contact	2.2000	
Respondent never available	2.2100	570
Telephone answering device (confirming HH)	2.2200	
Answering machine household-no message left	2.2210	30
Answering machine household-message left	2.2220	125
Respondent unavailable during field period	2.2500	
Respondent unavailable during field period	2.2600	
Completed questionnaire, but not returned during field	2.2700	
Other, non-refusals	2.3000	
Deceased respondent	2.3100	0
Physically or mentally unable/incompetent	2.3200	19
Language problem	2.3300	200
Household-level language problem	2.3310	
Respondent language problem	2.3320	
No interviewer available for needed language	2.3330	
Literacy problems (mail surveys)	2.3400	
Location/Activity not allowing interview	2.3500	
Miscellaneous	2.3600	19

Total sample used	6557
I=Complete Interviews (1.1)	806
P=Partial Interviews (1.2)	0
R=Refusal and break off (2.1)	568
NC=Non Contact (2.2)	725
O=Other (2.0, 2.3)	238
e	0.533
UH=Unknown Household (3.1)	1369
UO=Unknown other (3.2-3.9)	805
Response Rate 1	
I/(I+P) + (R+NC+O) + (UH+UO)	0.179
Response Rate 2	
(I+P)/(I+P) + (R+NC+O) + (UH+UO)	0.179
Response Rate 3	
I/((I+P) + (R+NC+O) + e(UH+UO))	0.231
Response Rate 4	
(I+P)/((I+P) + (R+NC+O) + e(UH+UO))	0.231

Thinking Now In Terms of Outcomes

Unknown eligibility, non-interview (Category 3)	3.0000	
Unknown if housing unit/unknown about address	3.1000	
Not attempted or worked/not mailed/No invitation sent (internet surveys)	3.1100	
Always busy	3.1200	150
No answer	3.1300	955
Answering machine-don't know if household	3.1400	27
Call blocking	3.1500	185
Technical phone problems	3.1600	52
Unable to reach/unsafe area (in-person surveys)	3.1700	
Unable to locate address (in-person surveys)	3.1800	
Nothing returned (mail surveys)	3.1900	
Housing unit, unknown if eligible respondent	3.2000	
No screener completed	3.2100	774
Other	3.9000	31
Returned from an unsampled email address (internet surveys)	3.9100	
Not eligible (Category 4)	4.0000	
Out of sample - other strata than originally coded	4.1000	189
Fax/data line	4.2000	142
Non-working/disconnect	4.3000	
Non-working number	4.3100	567
Disconnected number	4.3200	219
Temporarily out of service	4.3300	
Special technological circumstances	4.4000	
Number changed	4.4100	64
Call forwarding	4.4300	26
Residence to residence	4.4310	
Non-residence to residence	4.4320	
Pager	4.4400	4
Cell phone	4.4500	5
Landline phone	4.4600	
Nonresidence	4.5000	
Business, government office, other organizations	4.5100	596
Institution	4.5200	79
Group quarters	4.5300	10
Person not HH resident	4.5400	
No eligible respondent	4.7000	96
Quota filled	4.8000	0
Other / duplicate listing (mail surveys)	4.9000	49



Total sample used	6557
I=Complete Interviews (1.1)	806
P=Partial Interviews (1.2)	0
R=Refusal and break off (2.1)	568
NC=Non Contact (2.2)	725
O=Other (2.0, 2.3)	238
e	0.533
UH=Unknown Household (3.1)	1369
UO=Unknown other (3.2-3.9)	805
Response Rate 1	
I/(I+P) + (R+NC+O) + (UH+UO)	0.179
Response Rate 2	
(I+P)/(I+P) + (R+NC+O) + (UH+UO)	0.179
Response Rate 3	
I/((I+P) + (R+NC+O) + e(UH+UO))	0.231
Response Rate 4	
(I+P)/((I+P) + (R+NC+O) + e(UH+UO))	0.231

DFRDD/Screening

Eligible, Interview (Category 1)	LL	Cell
Complete	504	1,505
Partial	41	134
Eligible, Non-interview (Category 2)		
Refusal and breakoff	38	79
Refusal	2,401	
Household-level refusal		
Known respondent refusal		
Break off		
Non-contact		
Respondent never available	3	
Telephone AM (confirming HH)		
Answering machine-no message left	1,498	
Answering machine-message left		
Other, non-refusals		
Deceased respondent		
Physically or mentally unable	55	
Language problem	50	
Household-level language problem		
Respondent language problem		
No interviewer for needed language		
Miscellaneous		

Unknown eligibility, non-interview (Category 3)	LL	Cell
Unknown if housing unit		
Not attempted or worked		
Always busy	219	609
No answer	2,806	2,418
Answering machine-don't know if household		
Call blocking	51	111
Technical phone problems		
Residential, unknown if eligible respondent		
No screener completed, residential and live contact made		5,888
No screener completed, residential and no live contact		12,816
Other		

SUMMARY DISPOSITIONS	LL	Cell
I=Complete Interviews (1.1)	**504**	**1,505**
P=Partial Interviews (1.2)	**41**	**134**
R=Refusal and break off with eligible case (2.1)	**2,439**	**79**
NC=Non-contact with eligible case (2.2)	**1,501**	**0**
O=Other non-interview with eligible case (2.0, 2.3)	**105**	**0**
UH=Unknown if residential (3.0, 3.1)	3,076	3,138
UO=Unknown other (3.2, 3.9) (residential, unknown if eligible)	0	**18,704**
INNR = Ineligible: Not residential (4.0,4.1,4.2,4.3,4.4,4.5,4.8,4.9)	20,239	**11,631**
INR=Ineligible: Residential but ineligible for survey (4.7)	**0**	**636**
Total	27,905	35,827
ADDRESSING CASES WITH UNDETERMINED ELIGIBILITY		
e1 = the % of known-residential cases estimated to have eligible R	100.0%	73.0%
e2 = the % of unknown-if-residential cases that are estimated to be residential	18.5%	64.4%

e1 = x / x + y

e2 = x / x + y

Not eligible (Category 4)	LL	Cell
Out of sample		
Fax/data line	432	43
Non-working/disconnect	18,141	8,779
Non-working number		
Disconnected number		
Temporarily out of service	531	2,116
Special tech circumstances		
Number changed		
Cell phone		
Call forwarding		
Residence to residence		
Non-residence to residence		
Pager		
Nonresidence		
Business	1,133	693
Institution		
Group quarters		
No eligible respondent	0	636
Quota filled		
Other	2	

INNR

INR

Combining Multiple Sample Frames

The latest AAPOR Standard Definitions has guidance for DFRDD, namely:

$$\text{Combined response rate} =$$

$$[(RR_{LL}*K_{LL}) + (RR_{CP}*(1-K_{LL}))]/100$$

Where K is the proportion of interviews coming from that particular frame.

But there are other situations where an alternative method might be considered.

To the right: CRR = 42.2%. But the interviews are not proportionate to the number of HHs reached by frame

		List	RDD	Total
Eligible, Interview (Category 1)				
Complete	1.0/1.10	878	114	992
Eligible, non-interview (Category 2)	2.000			
Refusal and breakoff	2.100	84	24	108
Break off	2.120	36	30	66
Answering machine household	2.222	69	29	98
Physically or mentally unable	2.320	2	1	3
Language problem	2.330	5	2	7
Always busy	3.120	3	943	946
Unknown if eligible (Category 3)				
No answer	3.130	127	8441	8568
Answering machine-DKif HH	3.140	530	5828	6358
Call blocking	3.150	6	52	58
Housing unit, unknown if eligible R	3.200	414	6102	6516
No screener completed	3.210	64	268	332
Not eligible (Category 4)	4.000		0	
Fax/data line	4.200	96	3278	3374
Non-working number	4.310	333	47323	47656
Business	4.510	30	2979	3009
No eligible respondent	4.700	104	6038	6142
Total phone numbers used		**2781**	**81452**	**84233**
I=Complete Interviews (1.1)		878	114	992
P=Partial Interviews (1.2)		0	0	0
R=Refusal and break off (2.1)		120	54	174
NC=Non Contact (2.2)		76	32	108
E1 (Eligible Person)		91%	3%	17%
E2 (Eligible Household)		78%	19%	20%
Raw e1		1968	489	2457
Raw e2		2159	15248	17691
UH=Unknown household (3.1)		730	15532	16262
UO=Unknown other (3.2, 3.9)		414	6102	6516
RR3		**44.6%**	**23.3%**	**33.4%**