# Sample Size Worksheet for Cluster Surveys

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This worksheet walks the reader through 6 steps to obtain the sample size necessary to meet the inferential goals of the study.

**Step 1: Calculate the Number of Strata**

A *stratum* is a subpopulation of the total population. Strata are formed on the basis of some known characteristic about the population, which is related to the variable of interest. For example, some coverage surveys sample separately in urban and rural areas with each area (urban or rural) being a stratum, while other surveys might stratify based on region. If a survey is being done based on health facilities, health facilities can be stratified into relatively similar groups based on the number of beds or attending physicians at the health facility. See Table 1 in the Appendix for more examples.

Is the total population planned to be broken out into mutually exclusive groups? If no, write 1 in the box. If yes, write how many strata there will be in the survey in the box. Proceed to Step 2.

1. NStrata = \_\_\_\_\_\_\_\_\_\_

**Step 2: Calculate the Effective Sample Size (ESS)**

The effective sample size (ESS) is the sample size necessary to obtain results as if the study were being conducted using simple random sampling (SRS). The ESS will be multiplied by several scalars to take into account the fact that a cluster survey is being conducted instead of a SRS. Those factors are calculated in other steps. The goal of this step is to calculate the ESS. First, answer the following question.

*Must results to be estimated to within a given precision level at the lowest cluster level?*

Circle answer: YES / NO

If yes, complete this page. If no, skip the rest of this page and go on to the next page.

If results are to be estimated to within a given precision level at the lowest cluster level, then the reader must specify (1) the expected coverage is and (2) the precision with which the coverage should be estimated. Note that the farther from 50% the expected coverage is the lower the ESS will be. The larger the precision level is the lower the ESS. Write the values below:

Expected coverage: \_\_\_\_\_\_\_\_%

Precision level: ±\_\_\_\_\_\_\_%

Use Table 2a in the Appendix to look up the ESS based on the expected coverage and desired precision level. Write the ESS in the box in the lower right corner. Proceed to Step 3.

(b) ESS = \_\_\_\_\_\_\_\_\_

If results DO NOT need to be estimated to within a given precision level at the lowest cluster level, then answer the following question.

*Are results going to be tested if coverage is different from a preset programmatic threshold?*

Circle answer: YES / NO

If yes, complete this page. If no, consult a statistician about your survey goals.

If results are to test if survey results are above or below a programmatic threshold, then the reader must specify (1) the programmatic threshold, (2) the power threshold, (3) the probability of type I error (i.e., α), and (4) the power (i.e., 1-β).

The programmatic threshold is the expected coverage level. Delta is the difference (+ or -) from the programmatic threshold from which you want to be well powered to reject the null hypothesis.

A type I error occurs when a statistically significant difference is found and the null hypothesis is rejected when in fact the null hypothesis is true. The probability of this occurring is usually denoted by α. It is traditional to construct tests with α=5% or α=10%.

A type II error occurs if no statistically significant difference were found and the null hypothesis was therefore not rejected (i.e., observed a high p-value) when in fact the null hypothesis is false. The probability of this occurring is usually denoted by β. The probability 1- β is the statistical power and is the probability that the null hypothesis will be rejected when in fact it is false. It is traditional to construct tests that have at least 80% power.

Write the values below:

Programmatic threshold: \_\_\_\_\_\_\_%

Delta: \_\_\_\_\_\_\_\_\_\_\_%

Probability of type I error (α): \_\_\_\_\_\_%

Power (1-β): \_\_\_\_\_\_\_%

Use Table 2b to look up the ESS based on the programmatic threshold, delta, α, and power inputs. Write the ESS in the box in the lower right corner. Proceed to Step 3.

(b) ESS = \_\_\_\_\_\_\_\_\_

**Step 3: Calculate the Design Effect (DEFF)**

The *design effect* is equal to the ratio of the variance for the method being evaluated to the variance for a simple random sample of the same size:



If the DEFF is larger than 1, the method has less precision (wider confidence intervals) than simple random sampling with the same sample size; if the DEFF is less than 1, the method has greater precision (narrower confidence intervals) than simple random sampling with the same sample size. Note that sometimes DEFT is used, which is the square root of DEFF.

The *intracluster correlation coefficient* (ICC) is a measure of correlation of responses within clusters. This figure affects the sample size calculation and is not usually known in the planning stage, so an observed figure from a recent survey in the study area can be used, or a conservative value that is slightly larger than what is likely to be observed in the field can be used to increase likelihood that the results will have acceptable precision. Appendix B gives some guidance on selecting ICC values.

The DEFF is a function of the target number of respondents per cluster (m) and the ICC.

For campaigns surveys, an ICC between 0.042 and 0.167 is often used. For routine immunization surveys, an ICC between 0.167 and 0.33 is often used. To be conservative, choose a bigger ICC value.

Specify (1) the average number of eligible children sampled per cluster (m) and (2) the ICC. Write the values below:

m = \_\_\_\_\_\_\_

ICC = \_\_\_\_\_\_\_\_\_

Use Table 3 to look up the DEFF based on the m and ICC just recorded or calculate it using the following formula:

DEFF = 1 + (m-1)\*ICC

Write the DEFF in the box to the right. Proceed to Step 4.

(c) DEFF = \_\_\_\_\_\_\_\_\_

**Step 4: Calculate the Number Households to Visit to Find an Eligible Child**

Not every household in the cluster will have an eligible child for the survey. The number of households that need to be visited to find an eligible child (NHH with eligible child) should be estimated before survey work commences. This number will help survey planners know if the cluster size is big enough to find the number of eligible children needed for the survey as well as to allot for the appropriate time it might take to find a household with an eligible child.

If NHH with eligible child is known or easily found from recent census or survey data, then that number should be written in the box below and the reader can proceed to Step 5. If it is not known, it can be estimated in various ways. Birth rates, infant mortality rates, and household size are some rates that may be easy to obtain from recent census or survey data to help estimate NHH with eligible child. Consider the following formulae that uses those rates to estimate NHH with eligible child. Equation (1) estimates NSurvived at birth per HH, which is used in Equation (2) to estimate NHH with eligible child.

(1)

(2)

YC is the number of years of eligible children in the cohort, BR is the birth rate per 1000 population, HS is the average household size, and IM is the infant mortality rate. The first term in Equation (1) estimates the number of live births per household and the second term in Equation (1) estimates the proportion of live births that survived. The multiplier YC assumes everyone survives after their first birthday, so Equation (2) underestimates NHH with eligible child.

Example 1: Suppose a measles campaign is scheduled to occur in Ethiopia and a survey estimating the coverage level for 1-15 year olds is desired. From the 2011 Ethiopia Demographic Health Survey, the birth rate per 1000 population was estimated to be 34.5, the infant mortality rate per 1000 live births was estimated to be 59, and the average household size was estimated to be 4.6. The number of years of eligible children in the cohort is 1. Using Equations (1) and (2) we have

About 1 in every 7 households are estimate to have an eligible child for this survey.

Example 2: In Example 1, if the birth cohort was for 1-5 year olds, then YC=5-1=4 and Equations (1) and (2) yield

Expanding the birth cohort translates to more households with an eligible child for the survey. In this example, about 1 in 2 households are estimated to have an eligible child.

Example 3: In Example 1, if the birth cohort was for 1-15 year olds, then YC=15-1=14 and Equations (1) and (2) yield

Expanding the birth cohort dramatically translates to even more households with an eligible child for the survey. In this example, every household is estimated to have an eligible child.

Using Equations (1) & (2), estimate NHH with eligible child and write it in the box below. Consult a statistician if the rates used in Equations (1) and (2) are not known or well estimated and a different way to estimate NHH with eligible child is needed.

(d) NHH with eligible child = \_\_\_\_\_\_\_\_\_\_

**Step 5: Calculate the Number of Households with an Eligible Child that do not Participate in Survey**

Some households that have a child eligible for survey participation may not be entered into the survey because the caregiver may not be at home when the field staff surveyed the house or because the caregiver refuses to participate in the survey. To account for this, the ESS needs another scalar to be bumped up by.

Specify the percentage of households with an eligible child where no one is at home or the caregiver refuses to participate in the survey (PHH eligible and not respond). Write the value below:

PHH eligible and not respond = \_\_\_\_\_\_\_\_\_%

Use Table 4 to look up the number of households to visit with an eligible child to complete a survey (NHH eligible and complete) or calculate it using the following formula:

NHH eligible and complete = 1/(100 – PHH eligible and not respond)\* 100

Write the NHH eligible and complete in the box to the right. Proceed to Step 6.

(e) NHH eligible and complete = \_\_\_\_\_\_\_\_\_\_\_

**Step 6: Use Values above to Calculate Interesting Quantities**

1. Using values (a)-(c) in the boxes above, calculate the number of completed surveys needed:

Ncs = \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_

(a) (b) (c)

1. Using Ncs just calculated and (d) and (e) in the boxes above, calculate the number of households to visit to get the necessary completed surveys:

NHH to visit = \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_

(Ncs) (d) (e)

1. Using (b) (c) and (d) in the boxes above, calculate the target number of households to visit in each stratum:

NHH to visit per stratum = \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_

(b) (c) (d)

1. Using (b) (c) and m (the average number of respondents per cluster – specified in Step 2), calculate the total number of clusters needed:

Nc = \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ / \_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_

(b) (c) m

**Discussion**

If the quantities calculated in Step 6 require feasible budgets and timelines, then stop here and use these values as the sample sizes for the upcoming survey. Congratulations on designing your survey!

If the quantities calculated above require infeasible budgets and/or timelines, there are several modifications that can be made to try to reduce the sample size such that realistic budgets and timelines result.

1. In Step 1, if the number of strata to survey is large, consider reducing this number. For example if results were desired by region by age group by gender, then consider stratifying only by region. Data analyses can still be broken down by region by age group by gender, but those results might not have the desired precision level or power to classify if results are different from programmatic thresholds.
2. In Step 2, was the ESS calculated using estimation with desired precision? If so, consider:
3. Increasing the level of precision with which the coverage needs to be estimated.
4. If increasing the level of precision still does not produce sample sizes feasible, consider using classification methods instead of estimating with a desired precision level.
5. In Step 2, if the ESS was calculated using classification methods, consider:
   1. Increasing delta (i.e., increasing the difference from the programmatic threshold for which a change is likely to be detected)
   2. Increasing alpha
   3. Lowering the desired power
6. In Step 3, consider modifying m (the average number of respondents per cluster). Increasing m may result in surveying fewer clusters while decreasing m may result in less time (and potentially cost) in a particular cluster.

Fast Track Worksheet

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Step | Letter | Quantity | Inputs | (Specify Inputs) | Output using Table or Formula |
| 1 | (a) | Number of Strata (NStrata) | (no inputs) | |  |
| 2 | (b) | Effective Sample Size (ESS) – Estimation with Desired Precision | Expected coverage |  |  |
| Precision level |  |
| Effective Sample Size (ESS) – Classification | Programmatic threshold |  |
| Delta |  |
| Alpha |  |
| Power |  |
| 3 | (c) | Design Effect (DEFF) | m |  |  |
| ICC |  |
| 4 | (d) | Number of Households to Visit to Find an Eligible Child (NHH with eligible child) | (no inputs) | |  |
| 5 | (e) | Number of Households with an Eligible Child that do not Participate in Survey (NHH eligible and complete) | PHH eligible and not respond |  |  |

1. Using values (a)-(c) in the table above, calculate the number of completed surveys needed:

Ncs = \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_

(a) (b) (c)

1. Using Ncs just calculated and (d) and (e) in the table above, calculate the number of households to visit to get the necessary completed surveys:

NHH to visit = \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_

(Ncs) (d) (e)

1. Using (b) (c) and (d) in the table above, calculate the target number of households to visit in each stratum:

NHH to visit per stratum = \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_

(b) (c) (d)

1. Using (b) (c) and m (the average number of respondents per cluster – specified in Step 3), calculate the total number of clusters needed:

Nc = \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_ / \_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_

(b) (c) m

Quick Comparison Worksheet

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Step 1 | | Step 2 (Choose 1 Method to Calculate ESS) | | | | | | | Step 3 | | | Step 4 | Step 5 | | Step 6 | | | |
|  |  | (a) | Estimation | | Classification | | | | (b) |  |  | (c) | (d) |  | (e) | Ncs | NHH to visit | NHH to visit per stratum | Nc |
| Design # | Description of Strata | NStrata | Expected Threshold | Desired Precision | Programmatic Threshold | Delta | Alpha | Power | ESS | m | ICC | DEFF | NHH with eligible child | PHH eligible and not respond | NHH eligible and complete | (a) X (b) x (c) | (a) x (b) x (c) x (d) x (e) | (b) x (c) x (d) | (b) x (c) / m |
| 1. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Appendix

Table 1. Stratification Schemes for Survey

|  |  |
| --- | --- |
| Strata at Lowest Level Estimated | Number of Strata |
| National results – all strata combined | 1 |
| National results – stratified by demographic | # of demographic groups |
| Sub-national results (e.g., region) - all strata combined | # of sub-nations |
| Sub-national results (e.g., region) - stratified by demographic | (# of sub-nations) x (# of demographic groups) |
| Sub-sub-national results (e.g., district, zone, local government area) - all strata combined | # of sub-sub-nations |
| Sub-sub-national results (e.g., district, zone, local government area) - stratified by demographic | (# of sub-sub-nations) x (# of demographic groups) |

The following examples parallel the levels outlined in Table 1 and illustrate how to calculate the number of strata.

*Example 1a*: Coverage estimates are needed for Ethiopia. The number of strata for this survey is then 1.

*Example 1b*: Coverage estimates for Kano, Nigeria are needed. The number of strata for this survey is then 1.

*Example 2a*: Coverage estimates by geographic area (urban versus rural) are needed. The number of strata for this survey is then 2.

*Example 2b*: Coverage estimates by age group (<5, 5-9, 10-14 years old) are needed. The number of strata for this survey is then 3.

*Example 2c*: Coverage estimates by gender (female versus male) are needed. The number of strata for this survey is then 2.

*Example 3*: Post measles campaign survey in 13 regions. The number of strata for this survey is then 13.

*Example 4*: Post measles campaign survey in 11 regions with target audience stratified by age: <5, 5-9, 10-14 years old. The number of strata for this survey is then 11\*3=33.

*Example 5*: Coverage estimates by local government areas (LGA) in Kano, Nigeria are needed. The number of strata for this survey is the number of LGAs, which is 44.

*Example 6*: Coverage estimates by zone by geographic region (urban verus rural) in Ethiopia are needed. The number of zones in Ethiopia is 96. The number of strata for this sruvey is then 96\*2=192.

Table 2a. Effective Sample Size (ESS) by Expected Coverage & Desired Precision for the 95% Confidence Interval (CI)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Expected Coverage | | | | | | | | | |
|  |  | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% | 95% |
| Precision for 95% CI | ±3% | 1097 | 1097 | 1097 | 1097 | 1097 | 892 | 788 | 663 | 518 | 354 |
| ±4% | 622 | 622 | 622 | 622 | 622 | 517 | 461 | 394 | 315 | 227 |
| ±5% | 401 | 401 | 401 | 401 | 401 | 340 | 306 | 265 | 216 | 162 |
| ±6% | 280 | 280 | 280 | 280 | 280 | 242 | 220 | 192 | 160 | 132 |
| ±7% | 207 | 207 | 207 | 207 | 207 | 182 | 167 | 147 | 125 | 110 |
| ±8% | 159 | 159 | 159 | 159 | 159 | 143 | 131 | 117 | 101 | 93 |
| ±9% | 126 | 126 | 126 | 126 | 126 | 115 | 106 | 96 | 83 | 81 |
| ±10% | 103 | 103 | 103 | 103 | 103 | 95 | 88 | 80 | 70 | 70 |

Note 1. These sample sizes are consistent with sample size formulas on page 35 of Fleiss, Levin, and Paik (2003); Statistical Methods for Rates and Proportions, 3rd edition; John Wiley & Sons, Inc.; Hoboken, New Jersey. Note that within any row, the ESS doesn’t change for coverage levels between 50% and 70%. This is not a mistake in the table, but rather a result of using a conservative upper bound of “k=1” in calculations for these values.  As p moves away from 50% then “k” can be scaled down to something <1 and a reduced sample size results.

Note 2. Recall from the 2005 EPI Cluster Survey Guidelines that when the design effect is 2, a sample of 30x7=210 will yield confidence intervals no wider than +/- 10%. The highest entry in this table for a precision of +/- 10% is 103. If we multiple 103 by a design effect of 2, we obtain a total sample size per stratum of 206 which is essentially the same as 210. So Table 1 is consistent with the 2005 WHO EPI Survey Guidelines in that important respect.

Note 3. If the expected coverage is less than 50%, this table can still be used to determine the effective sample size (ESS); subtract 1 from the expected coverage and look up the ESS for that value. For example, if the expected coverage is 15%, look up the ESS for 1-15%=85%. If the coverage is greater than 95%, use the ESS for 95%. For coverage between two values in the table, to be conservative, look up the ESS for the expected coverage that is closer to 50%. For example, if expected coverage is 73%, look up the ESS using 70%. If expected coverage is 23%, then 1-23%=77% and look up the ESS using 75%.

Table 2b. Effective Sample Sizes (ESS) for Surveys to Classify Coverage

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **alpha=10%; power=80%** | **alpha=5%; power=80%** | **alpha=10%; power=90%** | **alpha=5%; power=90%** |
| Programmatic Threshold (%) | Delta (%) | ESS | ESS | ESS | ESS |
| 50 | 1 | 11,368 | 15,555 | 16,521 | 21,506 |
| 55 | 11,273 | 15,421 | 16,389 | 21,330 |
| 60 | 10,953 | 14,978 | 15,929 | 20,725 |
| 65 | 10,407 | 14,226 | 15,141 | 19,692 |
| 70 | 9,636 | 13,165 | 14,024 | 18,230 |
| 75 | 8,640 | 11,795 | 12,579 | 16,341 |
| 80 | 7,418 | 10,115 | 10,804 | 14,023 |
| 85 | 5,970 | 8,126 | 8,701 | 11,276 |
| 90 | 4,296 | 5,827 | 6,269 | 8,100 |
| 95 | 2,396 | 3,217 | 3,506 | 4,494 |
| 50 | 5 | 469 | 637 | 674 | 873 |
| 55 | 468 | 635 | 674 | 872 |
| 60 | 458 | 620 | 661 | 854 |
| 65 | 439 | 593 | 634 | 818 |
| 70 | 411 | 554 | 595 | 766 |
| 75 | 374 | 502 | 542 | 696 |
| 80 | 328 | 438 | 476 | 609 |
| 85 | 272 | 362 | 397 | 504 |
| 90 | 208 | 272 | 304 | 382 |
| 95 | 133 | 169 | 196 | 241 |
| 50 | 10 | 121 | 163 | 171 | 221 |
| 55 | 122 | 163 | 173 | 222 |
| 60 | 120 | 161 | 171 | 220 |
| 65 | 116 | 155 | 166 | 213 |
| 70 | 110 | 146 | 158 | 201 |
| 75 | 102 | 134 | 146 | 186 |
| 80 | 91 | 119 | 131 | 165 |
| 85 | 78 | 101 | 113 | 141 |
| 90 | 62 | 79 | 91 | 111 |
| 95 | 44 | 53 | 64 | 77 |
| 50 | 15 | 55 | 74 | 77 | 98 |
| 55 | 56 | 74 | 78 | 100 |
| 60 | 56 | 74 | 78 | 100 |
| 65 | 54 | 72 | 77 | 97 |
| 70 | 52 | 68 | 74 | 93 |
| 75 | 49 | 63 | 69 | 87 |
| 80 | 44 | 57 | 63 | 79 |
| 85 | 38 | 49 | 55 | 68 |
| 90 | 32 | 40 | 46 | 56 |
| 95 | 24 | 28 | 35 | 41 |

Note 1. Programmic threhold is the expected coverage level.

Note 2. Delta is the difference (+ or -) from the programmatic threshold from which you want to be well powered to reject the null hypothesis. For example, when ESS = 11,368 a classification based on an upper confidence limit will misclassify strata with true coverage of 50% only 5% of the time, and will have 80% power to correctly classify strata with true coverage of 49% or lower as having low coverage.

Note 3. This table provides ESS based on testing if coverage is below programmatic threshold (i.e., subtract delta from programmatic threshold). In some cases, the ESS would be slightly smaller if testing if coverage is above programmatic threshold (i.e., adding delta to programmatic threshold).

Table 3. Example Design Effects (DEFF) for Coverage Surveys

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ICC | Average Respondents per Cluster *(m)* | | | | | |
| 1 | 5 | 7 | 10 | 15 | 20 |
| 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0.042 | 1 | 1.17 | 1.25 | 1.38 | 1.58 | 1.79 |
| 0.167 | 1 | 1.67 | 2 | 2.50 | 3.33 | 4.17 |
| 0.333 | 1 | 2.33 | 3 | 4 | 5.67 | 7.33 |
| 1 | 1 | 5 | 7 | 10 | 15 | 20 |

Note 1. Design Effect = DEFF = 1 + (m-1) \* ICC

Note 2. ICC = Intracluster Correlation Coefficient (sometimes called Intraclass Correlation Coefficient)

Note 3. ICC=0.042 refers to a plausible ICC value that may result after an excellent campaign.

Note 4. ICC=0.167 refers to a value that is implicit but not stated in the 2005 WHO EPI Cluster Survey Guidelines: a design effect of 2 with 7 respondents per cluster implies that the ICC = 1/6 = 0.167. This is a direct result from the equation in Note 1.

Note 5. ICC=0.333 refers to a more conservative value that will be listed in the 2015 update to the WHO EPI Cluster Survey Guidelines. In RI surveys we sometimes observe ICCs higher than the 0.167 value that was implicit in the 2005 document, so we recommend a conservative value of 0.333, or a design effect of 4.0 when *m*=10.

Table 4. How many households must be visited in order to complete a survey for an eligible respondent (eligible/completion)

|  |  |
| --- | --- |
| % of households with an eligible child where no one is at home or caregiver refuses to respond | # of households to visit with an eligible child to complete a survey |
| 0% | 1 |
| 5% | 1.05 |
| 10% | 1.11 |
| 15% | 1.18 |
| 20% | 1.25 |
| 25% | 1.33 |
| 30% | 1.43 |
| 35% | 1.54 |
| 40% | 1.67 |
| 45% | 1.82 |
| 50% | 2 |
| 55% | 2.22 |
| 60% | 2.5 |
| 65% | 2.86 |
| 70% | 3.33 |
| 75% | 4 |
| 80% | 5 |
| 85% | 6.67 |
| 90% | 10 |
| 95% | 20 |