**Appendix – Results Tables**

Simple Survey, Full Response

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| Total population estimates for simple survey, with full response (True population size = 641880) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| Mean | 641000 | NA | 660000 | 666000 | 885000 | 641000 | 641000 |
| variance | 38400000 | NA | 11300000 | 10300000 | 174000000 | 29000000 | 35000000 |
| Bias | -700 | NA | 18400 | 24100 | 243000 | -1000 | -810 |
| relative Bias | 0.00 | NA | 0.03 | 0.04 | 0.38 | 0.00 | 0.00 |
| MSE | 38900000 | NA | 351000000 | 590000000 | 59300000000 | 30200000 | 35700000 |
| RMSE | 6240 | NA | 18700 | 24300 | 244000 | 5500 | 5980 |
| RRMSE | 0.01 | NA | 0.03 | 0.04 | 0.28 | 0.01 | 0.01 |
|   |   |   |   |   |   |   |   |
| Population estimates for males, for simple survey, with full response (True population size = 314650) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 314000 | NA | 324000 | 326000 | 480000 | 314000 | 314000 |
| variance | 19400000 | NA | 3670000 | 3410000 | 67000000 | 14900000 | 18000000 |
| bias | -750 | NA | 9410 | 11700 | 165000 | -1100 | -770 |
| relative Bias | 0.00 | NA | 0.03 | 0.04 | 0.53 | 0.00 | 0.00 |
| MSE | 20000000 | NA | 92200000 | 141000000 | 27500000000 | 16200000 | 18600000 |
| RMSE | 4470 | NA | 9600 | 11900 | 166000 | 4030 | 4310 |
| RRMSE | 0.01 | NA | 0.03 | 0.04 | 0.35 | 0.01 | 0.01 |
|   |   |   |   |   |   |   |   |
| Population estimates for females, for simple survey, with full response (True population size = 327230) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 327000 | NA | 336000 | 340000 | 483000 | 327000 | 327000 |
| variance | 14000000 | NA | 3610000 | 3080000 | 66600000 | 10800000 | 12500000 |
| bias | 50 | NA | 9030 | 12300 | 156000 | 51 | -38 |
| relative Bias | 0.00 | NA | 0.03 | 0.04 | 0.48 | 0.00 | 0.00 |
| MSE | 14000000 | NA | 85200000 | 155000000 | 24300000000 | 10800000 | 12500000 |
| RMSE | 3740 | NA | 9230 | 12500 | 156000 | 3280 | 3530 |
| RRMSE | 0.01 | NA | 0.03 | 0.04 | 0.32 | 0.01 | 0.01 |
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| Simple Survey, Household Non-responseTotal population estimates for simple survey, with household non-response (True population size = 641880) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 320000 | 641000 | 660000 | 666000 | 670000 | 639000 | 640000 |
| variance | 20800000 | 83100000 | 21300000 | 20000000 | 198000000 | 45700000 | 63100000 |
| bias | -320000 | -970 | 18600 | 24400 | 28400 | -3100 | -1800 |
| relative Bias | -0.50 | 0.00 | 0.03 | 0.04 | 0.04 | -0.01 | 0.00 |
| MSE | 103000000000 | 84100000 | 366000000 | 614000000 | 1000000000 | 55500000 | 66400000 |
| RMSE | 321000 | 9170 | 19100 | 24800 | 31700 | 7450 | 8150 |
| RRMSE | 1.00 | 0.01 | 0.03 | 0.04 | 0.05 | 0.01 | 0.01 |
|  |  |  |  |  |  |  |  |
| Population estimates for males, for simple survey, with household non-response (True population size = 314650) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 157000 | 314000 | 324000 | 327000 | 379000 | 313000 | 314000 |
| variance | 9600000 | 38400000 | 6970000 | 6360000 | 74000000 | 23600000 | 30800000 |
| bias | -150000 | -670 | 9540 | 11900 | 64300 | -2000 | -1100 |
| relative Bias | -0.50 | 0.00 | 0.03 | 0.04 | 0.20 | -0.01 | 0.00 |
| MSE | 24900000000 | 38900000 | 98000000 | 148000000 | 4210000000 | 27700000 | 32000000 |
| RMSE | 158000 | 6230 | 9900 | 12200 | 64900 | 5260 | 5660 |
| RRMSE | 1.01 | 0.02 | 0.03 | 0.04 | 0.17 | 0.02 | 0.02 |
|   |   |   |   |   |   |   |   |
| Population estimates for females, for simple survey, with household non-response (True population size = 327230) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 163000 | 327000 | 336000 | 340000 | 376000 | 326000 | 327000 |
| variance | 7220000 | 28900000 | 6810000 | 5840000 | 66200000 | 16200000 | 22000000 |
| bias | -160000 | -300 | 9050 | 12500 | 48500 | -1100 | -720 |
| relative Bias | -0.50 | 0.00 | 0.03 | 0.04 | 0.15 | 0.00 | 0.00 |
| MSE | 26800000000 | 29000000 | 88700000 | 162000000 | 2420000000 | 17400000 | 22500000 |
| RMSE | 164000 | 5380 | 9420 | 12700 | 49200 | 4170 | 4740 |
| RRMSE | 1.00 | 0.02 | 0.03 | 0.04 | 0.13 | 0.01 | 0.02 |
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| Simple Survey, Household and Individual Non-responseTotal population estimates for simple survey, with household and individual non-response (True population size = 641880) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 256000 | 641000 | 528000 | 666000 | 565000 | 513000 | 513000 |
| variance | 13300000 | 83000000 | 13600000 | 21700000 | 145000000 | 53600000 | 53100000 |
| bias | -386000 | -975 | -114000 | 24400 | -77000 | -128000 | -129000 |
| relative Bias | -0.60 | 0.00 | -0.18 | 0.04 | -0.12 | -0.20 | -0.20 |
| MSE | 149000000000 | 84000000 | 12900000000 | 617000000 | 6080000000 | 16500000000 | 16600000000 |
| RMSE | 386000 | 9160 | 114000 | 24800 | 78000 | 129000 | 129000 |
| RRMSE | 1.50 | 0.01 | 0.22 | 0.04 | 0.14 | 0.25 | 0.25 |
|   |   |   |   |   |   |   |   |
| Population estimates for males, for simple survey, with household and individual non-response (True population size = 314650) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 126000 | 314000 | 260000 | 327000 | 343000 | 252000 | 252000 |
| variance | 7710000 | 48200000 | 10200000 | 7250000 | 63200000 | 31000000 | 30300000 |
| bias | -180000 | -210 | -54000 | 12100 | 28200 | -62000 | -63000 |
| relative Bias | -0.60 | 0.00 | -0.18 | 0.04 | 0.09 | -0.20 | -0.20 |
| MSE | 35700000000 | 48200000 | 3030000000 | 153000000 | 861000000 | 3990000000 | 4000000000 |
| RMSE | 189000 | 6940 | 55000 | 12400 | 29300 | 63100 | 63300 |
| RRMSE | 1.50 | 0.02 | 0.21 | 0.04 | 0.09 | 0.25 | 0.25 |
|  |  |  |  |  |  |  |  |
| Population estimates for females, for simple survey, with household and individual non-response (True population size = 327230) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 131000 | 326000 | 269000 | 340000 | 341000 | 262000 | 261000 |
| variance | 5700000 | 35700000 | 9740000 | 6440000 | 58500000 | 23600000 | 22200000 |
| bias | -190000 | -760 | -58000 | 12300 | 13500 | -65000 | -65000 |
| relative Bias | -0.60 | 0.00 | -0.18 | 0.04 | 0.04 | -0.20 | -0.20 |
| MSE | 38700000000 | 36200000 | 3440000000 | 159000000 | 242000000 | 4320000000 | 4350000000 |
| RMSE | 197000 | 6020 | 58700 | 12600 | 15500 | 65700 | 65900 |
| RRMSE | 1.51 | 0.02 | 0.22 | 0.04 | 0.05 | 0.25 | 0.25 |
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| Clustered Survey, Full ResponseTotal population estimates for clustered survey, with full response (True population size = 641880) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 646000 | NA | 659000 | 665000 | 636000 | 663000 | 664000 |
| variance | 828000000 | NA | 10200000 | 12800000 | 144000000 | 43000000 | 34900000 |
| bias | 4600 | NA | 17600 | 23000 | -5640 | 21500 | 21800 |
| relative Bias | 0.01 | NA | 0.03 | 0.04 | -0.01 | 0.03 | 0.03 |
| MSE | 849000000 | NA | 318000000 | 541000000 | 175000000 | 503000000 | 510000000 |
| RMSE | 29100 | NA | 17800 | 23300 | 13200 | 22400 | 22600 |
| RRMSE | 0.05 | NA | 0.03 | 0.04 | 0.02 | 0.03 | 0.03 |
|  |  |  |  |  |  |  |  |
| Population estimates for males, clustered survey, with full response (True population size = 314650) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 317000 | NA | 324000 | 326000 | 312000 | 325000 | 325000 |
| variance | 211000000 | NA | 2840000 | 3360000 | 36100000 | 9360000 | 6580000 |
| bias | 2230 | NA | 8980 | 11200 | -2720 | 10500 | 10800 |
| relative Bias | 0.01 | NA | 0.03 | 0.04 | -0.01 | 0.03 | 0.03 |
| MSE | 216000000 | NA | 83500000 | 130000000 | 43500000 | 120000000 | 123000000 |
| RMSE | 14700 | NA | 9140 | 11400 | 6600 | 11000 | 11100 |
| RRMSE | 0.05 | NA | 0.03 | 0.04 | 0.02 | 0.03 | 0.03 |
|   |   |   |   |   |   |   |   |
| Population estimates for females, clustered survey, with full response (True population size = 327230) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 330000 | NA | 336000 | 339000 | 324000 | 338000 | 338000 |
| variance | 225000000 | NA | 3210000 | 4150000 | 34900000 | 14900000 | 12600000 |
| bias | 2370 | NA | 8570 | 11800 | -2770 | 10900 | 11000 |
| relative Bias | 0.01 | NA | 0.03 | 0.04 | -0.01 | 0.03 | 0.03 |
| MSE | 231000000 | NA | 76700000 | 142000000 | 42600000 | 134000000 | 135000000 |
| RMSE | 15200 | NA | 8760 | 11900 | 6530 | 11600 | 11600 |
| RRMSE | 0.05 | NA | 0.03 | 0.04 | 0.02 | 0.03 | 0.03 |
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| Clustered Survey, Household Non-responseTotal population estimates for clustered survey, with household non-response (True population size = 641880) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 323000 | 647000 | 659000 | 665000 | 639000 | 661000 | 663000 |
| variance | 225000000 | 899000000 | 19700000 | 21900000 | 151000000 | 67500000 | 58500000 |
| bias | -319000 | 4770 | 17500 | 23000 | -3250 | 19200 | 21200 |
| relative Bias | -0.50 | 0.01 | 0.03 | 0.04 | -0.01 | 0.03 | 0.03 |
| MSE | 102000000000 | 922000000 | 327000000 | 551000000 | 161000000 | 435000000 | 509000000 |
| RMSE | 319000 | 30400 | 18100 | 23500 | 12700 | 20900 | 22600 |
| RRMSE | 0.99 | 0.05 | 0.03 | 0.04 | 0.02 | 0.03 | 0.03 |
|   |   |   |   |   |   |   |   |
| Population estimates for males, for clustered survey, with household non-response (True population size = 314650) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 159000 | 317000 | 323000 | 326000 | 313000 | 324000 | 325000 |
| variance | 58900000 | 236000000 | 5530000 | 5780000 | 46200000 | 16400000 | 12500000 |
| bias | -156000 | 2400 | 8830 | 11100 | -1380 | 9290 | 10500 |
| relative Bias | -0.50 | 0.01 | 0.03 | 0.04 | 0.00 | 0.03 | 0.03 |
| MSE | 24400000000 | 241000000 | 83500000 | 130000000 | 48100000 | 103000000 | 122000000 |
| RMSE | 156000 | 15500 | 9140 | 11400 | 6940 | 10100 | 11000 |
| RRMSE | 0.99 | 0.05 | 0.03 | 0.04 | 0.02 | 0.03 | 0.03 |
|  |  |  |  |  |  |  |  |
| Population estimates for females, for clustered survey, with household non-response (True population size = 327230) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 165000 | 330000 | 336000 | 339000 | 326000 | 337000 | 338000 |
| variance | 61800000 | 247000000 | 6420000 | 7180000 | 43100000 | 20900000 | 18700000 |
| bias | -162000 | 2370 | 8690 | 11900 | -1700 | 9890 | 10800 |
| relative Bias | -0.50 | 0.01 | 0.03 | 0.04 | -0.01 | 0.03 | 0.03 |
| MSE | 26400000000 | 253000000 | 81900000 | 148000000 | 46000000 | 119000000 | 135000000 |
| RMSE | 163000 | 15900 | 9050 | 12200 | 6780 | 10900 | 11600 |
| RRMSE | 0.99 | 0.05 | 0.03 | 0.04 | 0.02 | 0.03 | 0.03 |
|   |   |   |   |   |   |   |   |

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| --- |
| Clustered Survey, Household and Individual Non-responseTotal population estimates for clustered survey, with household and individual non-response (True population size = 641880) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 259000 | 647000 | 528000 | 665000 | 639000 | 568000 | 567000 |
| variance | 144000000 | 902000000 | 12600000 | 23600000 | 147000000 | 691000000 | 695000000 |
| bias | -383000 | 4820 | -114000 | 23100 | -3000 | -74200 | -74600 |
| relative Bias | -0.60 | 0.01 | -0.18 | 0.04 | -0.01 | -0.12 | -0.12 |
| MSE | 147000000000 | 925000000 | 13100000000 | 558000000 | 156000000 | 6190000000 | 6260000000 |
| RMSE | 383000 | 30400 | 114000 | 23600 | 12500 | 78700 | 79100 |
| RRMSE | 1.48 | 0.05 | 0.22 | 0.04 | 0.02 | 0.14 | 0.14 |
|  |  |  |  |  |  |  |  |
| Population estimates for males, for clustered survey, with household and individual non-response (True population size = 314650) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 127000 | 317000 | 259000 | 326000 | 313000 | 278000 | 278000 |
| variance | 38700000 | 242000000 | 8480000 | 6520000 | 60000000 | 187000000 | 191000000 |
| bias | -188000 | 2140 | -56100 | 11200 | -1450 | -36800 | -36700 |
| relative Bias | -0.60 | 0.01 | -0.18 | 0.04 | -0.01 | -0.12 | -0.12 |
| MSE | 35400000000 | 247000000 | 3160000000 | 131000000 | 62100000 | 1540000000 | 1540000000 |
| RMSE | 188000 | 15700 | 56200 | 11500 | 7880 | 39200 | 39200 |
| RRMSE | 1.48 | 0.05 | 0.22 | 0.04 | 0.03 | 0.14 | 0.14 |
|   |   |   |   |   |   |   |   |
| Population estimates for females, for clustered survey, with household and individual non-response (True population size = 327230) |
| Measures | Horvitz Thompson | Horvitz Thompson, adjusted | Ratio | DSE | Two stage | Gibbs | Back-calculation |
| mean | 132000 | 330000 | 269000 | 339000 | 326000 | 290000 | 289000 |
| variance | 41100000 | 257000000 | 8310000 | 8370000 | 47400000 | 195000000 | 194000000 |
| bias | -195000 | 2690 | -58300 | 12000 | -1200 | -37400 | -37900 |
| relative Bias | -0.60 | 0.01 | -0.18 | 0.04 | 0.00 | -0.11 | -0.12 |
| MSE | 38200000000 | 264000000 | 3400000000 | 152000000 | 48900000 | 1590000000 | 1630000000 |
| RMSE | 195000 | 16300 | 58300 | 12300 | 6990 | 39900 | 40400 |
| RRMSE | 1.48 | 0.05 | 0.22 | 0.04 | 0.02 | 0.14 | 0.14 |