

APPENDIX E

Comparison of results for data from the Weibull distribution

Following the Monte Carlo simulation, the bias, S_{MAD} and root median square error (RMSE) of B-lives for the Weibull and Lognormal models can be calculated. Tables E.1 to E.10 show the Bias/(True value), S_{MAD} /(True value) and RMSE/(True value) of the chosen B-lives (i.e. B-1, B-0.1, B-0.01, B-0.001 and B-0.0001 lives) for complete and censored data (10%(20%)70%) from the Weibull $\eta = 10,000$ and various β (0.5, 1, 3 and 5) and sample sizes n (10, 25, 50 and 100) for the Weibull and Lognormal models using MRR and MLE methods. In each case, in these tables, a coloured entry indicates the more accurate value, (light red for Bias/(True value), blue for S_{MAD} /(True value) and green for RMSE/(True value)).

For the MRR method: clearly, for Bias/(True value) and RMSE/(True value), the Weibull model is more accurate than the Lognormal model in all cases. For S_{MAD} /(True value), the Weibull model is also more accurate than the Lognormal model in all cases (including complete and censored cases) except for B-1 life when $\beta = 5$. For the MLE method: the Weibull model is more accurate than the Lognormal model in all cases except for B-1 life when $\beta = 5$, $n = 10$ and censoring percentages 50% and 70%. For both methods, the Lognormal model overestimates the chosen B-lives. For all cases, the MLE

Appendix E **Comparison of results for data from the Weibull distribution**

method overestimates the chosen B-lives when using the Weibull model. For complete data, the MRR method generally underestimates the chosen B-lives when using the Weibull model. What if we choose the wrong model? For example, if data is really from the Weibull distribution and we use the Lognormal model to estimate B-0.0001 life. The error could be very serious when $\beta \leq 1$.

Appendix E Comparison of results for data from the Weibull distribution

Table E.1 B-life estimations from the Weibull data using the Weibull and Lognormal models (MRR)

| $\beta=0.5$ | | Weibull | | | Lognormal | | |
|-------------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 1.0101 | -0.156 | 1.234 | 1.244 | 11 | 16 | 20 |
| B-0.1 | 0.0100 | -0.190 | 1.200 | 1.215 | 177 | 257 | 312 |
| B-0.01 | 0.0001 | -0.235 | 1.134 | 1.158 | 4000 | 5859 | 7095 |
| B-0.001 | 1.0E-06 | -0.260 | 1.097 | 1.128 | 106296 | 156837 | 189464 |
| B-0.0001 | 1.0E-08 | -0.310 | 1.022 | 1.068 | 3127986 | 4625994 | 5584274 |
| n=25 | | | | | | | |
| B-1 | 1.0101 | -0.150 | 1.148 | 1.158 | 9 | 12 | 15 |
| B-0.1 | 0.0100 | -0.193 | 1.176 | 1.192 | 156 | 202 | 256 |
| B-0.01 | 0.0001 | -0.244 | 1.119 | 1.145 | 3273 | 4474 | 5543 |
| B-0.001 | 1.0E-06 | -0.291 | 1.051 | 1.091 | 85470 | 120192 | 147483 |
| B-0.0001 | 1.0E-08 | -0.355 | 0.956 | 1.020 | 2493656 | 3575248 | 4358981 |
| n=50 | | | | | | | |
| B-1 | 1.0101 | -0.156 | 0.983 | 0.995 | 9 | 9 | 12 |
| B-0.1 | 0.0100 | -0.217 | 1.074 | 1.096 | 146 | 158 | 215 |
| B-0.01 | 0.0001 | -0.285 | 1.038 | 1.076 | 3066 | 3615 | 4740 |
| B-0.001 | 1.0E-06 | -0.332 | 0.987 | 1.041 | 78449 | 98293 | 125761 |
| B-0.0001 | 1.0E-08 | -0.393 | 0.899 | 0.981 | 2207406 | 2862486 | 3614757 |
| n=100 | | | | | | | |
| B-1 | 1.0101 | -0.029 | 0.793 | 0.793 | 9 | 6 | 11 |
| B-0.1 | 0.0100 | -0.067 | 1.068 | 1.070 | 151 | 119 | 192 |
| B-0.01 | 0.0001 | -0.084 | 1.216 | 1.219 | 3197 | 2862 | 4291 |
| B-0.001 | 1.0E-06 | -0.120 | 1.248 | 1.254 | 82896 | 81108 | 115975 |
| B-0.0001 | 1.0E-08 | -0.148 | 1.238 | 1.247 | 2377753 | 2489635 | 3442672 |

Table E.2 B-life estimations from the Weibull data using the Weibull and Lognormal models (MLE)

| $\beta=0.5$ | | Weibull | | | Lognormal | | |
|-------------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 1.0101 | 1.386 | 3.399 | 3.671 | 18 | 27 | 32 |
| B-0.1 | 0.0100 | 2.783 | 5.575 | 6.231 | 365 | 528 | 642 |
| B-0.01 | 0.0001 | 4.984 | 8.865 | 10.170 | 9303 | 13636 | 16507 |
| B-0.001 | 1.0E-06 | 8.567 | 14.182 | 16.569 | 284417 | 419059 | 506462 |
| B-0.0001 | 1.0E-08 | 13.879 | 22.060 | 26.063 | 9191006 | 13604066 | 16417832 |
| n=25 | | | | | | | |
| B-1 | 1.0101 | 0.284 | 1.569 | 1.594 | 10 | 13 | 17 |
| B-0.1 | 0.0100 | 0.539 | 2.153 | 2.220 | 178 | 237 | 297 |
| B-0.01 | 0.0001 | 0.763 | 2.574 | 2.685 | 3949 | 5479 | 6754 |
| B-0.001 | 1.0E-06 | 1.086 | 3.083 | 3.268 | 105802 | 150644 | 184086 |
| B-0.0001 | 1.0E-08 | 1.490 | 3.690 | 3.980 | 3138688 | 4543506 | 5522210 |
| n=50 | | | | | | | |
| B-1 | 1.0101 | 0.204 | 1.094 | 1.113 | 9 | 9 | 13 |
| B-0.1 | 0.0100 | 0.332 | 1.567 | 1.602 | 155 | 165 | 227 |
| B-0.01 | 0.0001 | 0.464 | 1.968 | 2.022 | 3348 | 3919 | 5155 |
| B-0.001 | 1.0E-06 | 0.633 | 2.322 | 2.407 | 87257 | 108616 | 139324 |
| B-0.0001 | 1.0E-08 | 0.868 | 2.720 | 2.855 | 2520686 | 3268533 | 4127610 |
| n=100 | | | | | | | |
| B-1 | 1.0101 | 0.001 | 0.769 | 0.769 | 7 | 6 | 9 |
| B-0.1 | 0.0100 | 0.018 | 1.029 | 1.029 | 118 | 106 | 158 |
| B-0.01 | 0.0001 | 0.049 | 1.253 | 1.254 | 2397 | 2369 | 3370 |
| B-0.001 | 1.0E-06 | 0.035 | 1.375 | 1.376 | 60218 | 64789 | 88452 |
| B-0.0001 | 1.0E-08 | 0.045 | 1.462 | 1.462 | 1682858 | 1926296 | 2557856 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.1 (continued) B-life estimations from the Weibull data using the Weibull and Lognormal models (MRR)

| $\beta=1$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 100.503 | 0.021 | 1.201 | 1.201 | 2.578 | 3.381 | 4.252 |
| B-0.1 | 10.005 | -0.015 | 1.366 | 1.366 | 13.541 | 15.999 | 20.961 |
| B-0.01 | 1.000 | -0.014 | 1.442 | 1.442 | 66.225 | 80.951 | 104.589 |
| B-0.001 | 0.100 | -0.006 | 1.471 | 1.471 | 340.462 | 433.420 | 551.150 |
| B-0.0001 | 0.010 | -0.017 | 1.456 | 1.457 | 1855.970 | 2456.572 | 3078.859 |
| n=25 | | | | | | | |
| B-1 | 100.503 | -0.086 | 0.792 | 0.797 | 2.187 | 2.136 | 3.057 |
| B-0.1 | 10.005 | -0.126 | 1.016 | 1.024 | 11.404 | 9.968 | 15.146 |
| B-0.01 | 1.000 | -0.158 | 1.113 | 1.124 | 56.133 | 51.237 | 76.001 |
| B-0.001 | 0.100 | -0.163 | 1.182 | 1.193 | 289.467 | 282.964 | 404.796 |
| B-0.0001 | 0.010 | -0.207 | 1.155 | 1.174 | 1560.206 | 1633.244 | 2258.701 |
| n=50 | | | | | | | |
| B-1 | 100.503 | -0.053 | 0.616 | 0.618 | 2.201 | 1.495 | 2.661 |
| B-0.1 | 10.005 | -0.076 | 0.822 | 0.826 | 11.432 | 7.249 | 13.537 |
| B-0.01 | 1.000 | -0.093 | 0.994 | 0.999 | 55.847 | 37.981 | 67.538 |
| B-0.001 | 0.100 | -0.134 | 1.090 | 1.098 | 290.471 | 216.239 | 362.122 |
| B-0.0001 | 0.010 | -0.149 | 1.147 | 1.157 | 1573.297 | 1253.337 | 2011.497 |
| n=100 | | | | | | | |
| B-1 | 100.503 | -0.017 | 0.469 | 0.469 | 2.167 | 1.119 | 2.439 |
| B-0.1 | 10.005 | -0.025 | 0.668 | 0.668 | 11.365 | 5.378 | 12.573 |
| B-0.01 | 1.000 | -0.032 | 0.833 | 0.833 | 55.947 | 28.286 | 62.691 |
| B-0.001 | 0.100 | -0.047 | 0.979 | 0.980 | 289.507 | 160.191 | 330.871 |
| B-0.0001 | 0.010 | -0.053 | 1.082 | 1.083 | 1559.542 | 936.453 | 1819.098 |

Table E.2 (continued) B-life estimations from the Weibull data using the Weibull and Lognormal models (MLE)

| $\beta=1$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 100.503 | 0.593 | 1.683 | 1.785 | 3.235 | 4.282 | 5.367 |
| B-0.1 | 10.005 | 1.030 | 2.623 | 2.818 | 17.201 | 20.956 | 27.111 |
| B-0.01 | 1.000 | 1.544 | 3.640 | 3.954 | 86.928 | 110.760 | 140.799 |
| B-0.001 | 0.100 | 2.197 | 4.688 | 5.178 | 483.901 | 638.718 | 801.324 |
| B-0.0001 | 0.010 | 3.001 | 5.914 | 6.632 | 2867.929 | 3921.881 | 4858.618 |
| n=25 | | | | | | | |
| B-1 | 100.503 | 0.226 | 0.953 | 0.980 | 2.580 | 2.550 | 3.628 |
| B-0.1 | 10.005 | 0.325 | 1.348 | 1.387 | 13.486 | 12.421 | 18.334 |
| B-0.01 | 1.000 | 0.470 | 1.753 | 1.815 | 68.486 | 66.297 | 95.319 |
| B-0.001 | 0.100 | 0.618 | 2.140 | 2.228 | 360.408 | 372.656 | 518.427 |
| B-0.0001 | 0.010 | 0.789 | 2.497 | 2.619 | 1980.713 | 2167.298 | 2936.053 |
| n=50 | | | | | | | |
| B-1 | 100.503 | 0.109 | 0.607 | 0.616 | 2.199 | 1.692 | 2.774 |
| B-0.1 | 10.005 | 0.160 | 0.855 | 0.870 | 11.518 | 7.907 | 13.971 |
| B-0.01 | 1.000 | 0.209 | 1.122 | 1.141 | 55.804 | 41.212 | 69.373 |
| B-0.001 | 0.100 | 0.244 | 1.332 | 1.354 | 288.643 | 232.433 | 370.594 |
| B-0.0001 | 0.010 | 0.311 | 1.548 | 1.579 | 1554.405 | 1345.559 | 2055.895 |
| n=100 | | | | | | | |
| B-1 | 100.503 | 0.046 | 0.417 | 0.419 | 2.066 | 1.169 | 2.374 |
| B-0.1 | 10.005 | 0.064 | 0.607 | 0.610 | 10.731 | 5.572 | 12.092 |
| B-0.01 | 1.000 | 0.092 | 0.788 | 0.793 | 52.692 | 29.075 | 60.181 |
| B-0.001 | 0.100 | 0.112 | 0.953 | 0.959 | 268.592 | 160.774 | 313.033 |
| B-0.0001 | 0.010 | 0.141 | 1.122 | 1.131 | 1432.451 | 942.679 | 1714.806 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.1 (continued) B-life estimations from the Weibull data using the Weibull and Lognormal models (MRR)

| $\beta=3$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 2158 | -0.047 | 0.508 | 0.510 | 0.485 | 0.583 | 0.758 |
| B-0.1 | 1000 | -0.062 | 0.714 | 0.717 | 1.329 | 1.125 | 1.741 |
| B-0.01 | 464 | -0.087 | 0.880 | 0.884 | 2.874 | 2.167 | 3.599 |
| B-0.001 | 215 | -0.121 | 1.008 | 1.016 | 5.673 | 4.179 | 7.046 |
| B-0.0001 | 100 | -0.147 | 1.064 | 1.074 | 10.670 | 8.029 | 13.353 |
| n=25 | | | | | | | |
| B-1 | 2158 | -0.026 | 0.302 | 0.303 | 0.460 | 0.332 | 0.567 |
| B-0.1 | 1000 | -0.032 | 0.428 | 0.429 | 1.292 | 0.642 | 1.443 |
| B-0.01 | 464 | -0.043 | 0.555 | 0.557 | 2.836 | 1.241 | 3.096 |
| B-0.001 | 215 | -0.058 | 0.667 | 0.670 | 5.634 | 2.396 | 6.122 |
| B-0.0001 | 100 | -0.071 | 0.762 | 0.766 | 10.609 | 4.587 | 11.558 |
| n=50 | | | | | | | |
| B-1 | 2158 | -0.033 | 0.229 | 0.231 | 0.452 | 0.249 | 0.516 |
| B-0.1 | 1000 | -0.047 | 0.318 | 0.321 | 1.279 | 0.487 | 1.369 |
| B-0.01 | 464 | -0.065 | 0.407 | 0.412 | 2.774 | 0.923 | 2.924 |
| B-0.001 | 215 | -0.082 | 0.493 | 0.500 | 5.465 | 1.773 | 5.746 |
| B-0.0001 | 100 | -0.096 | 0.564 | 0.572 | 10.306 | 3.372 | 10.844 |
| n=100 | | | | | | | |
| B-1 | 2158 | -0.019 | 0.163 | 0.164 | 0.455 | 0.174 | 0.487 |
| B-0.1 | 1000 | -0.021 | 0.236 | 0.237 | 1.293 | 0.337 | 1.336 |
| B-0.01 | 464 | -0.023 | 0.307 | 0.308 | 2.802 | 0.636 | 2.873 |
| B-0.001 | 215 | -0.026 | 0.379 | 0.380 | 5.540 | 1.216 | 5.672 |
| B-0.0001 | 100 | -0.033 | 0.450 | 0.451 | 10.436 | 2.337 | 10.694 |

Table E.2 (continued) B-life estimations from the Weibull data using the Weibull and Lognormal models (MLE)

| $\beta=3$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 2158 | 0.145 | 0.469 | 0.491 | 0.606 | 0.567 | 0.830 |
| B-0.1 | 1000 | 0.244 | 0.716 | 0.756 | 1.603 | 1.123 | 1.958 |
| B-0.01 | 464 | 0.335 | 0.977 | 1.032 | 3.436 | 2.212 | 4.087 |
| B-0.001 | 215 | 0.425 | 1.256 | 1.325 | 6.801 | 4.296 | 8.044 |
| B-0.0001 | 100 | 0.541 | 1.547 | 1.639 | 12.921 | 8.393 | 15.408 |
| n=25 | | | | | | | |
| B-1 | 2158 | 0.058 | 0.284 | 0.290 | 0.503 | 0.382 | 0.632 |
| B-0.1 | 1000 | 0.084 | 0.411 | 0.420 | 1.379 | 0.751 | 1.570 |
| B-0.01 | 464 | 0.112 | 0.545 | 0.556 | 2.975 | 1.428 | 3.300 |
| B-0.001 | 215 | 0.130 | 0.685 | 0.697 | 5.871 | 2.758 | 6.487 |
| B-0.0001 | 100 | 0.160 | 0.811 | 0.827 | 11.044 | 5.280 | 12.241 |
| n=50 | | | | | | | |
| B-1 | 2158 | 0.020 | 0.201 | 0.202 | 0.452 | 0.255 | 0.519 |
| B-0.1 | 1000 | 0.027 | 0.292 | 0.293 | 1.286 | 0.501 | 1.380 |
| B-0.01 | 464 | 0.036 | 0.384 | 0.386 | 2.787 | 0.972 | 2.952 |
| B-0.001 | 215 | 0.049 | 0.478 | 0.481 | 5.499 | 1.880 | 5.812 |
| B-0.0001 | 100 | 0.056 | 0.559 | 0.561 | 10.384 | 3.601 | 10.990 |
| n=100 | | | | | | | |
| B-1 | 2158 | 0.008 | 0.133 | 0.133 | 0.440 | 0.183 | 0.477 |
| B-0.1 | 1000 | 0.010 | 0.189 | 0.190 | 1.255 | 0.360 | 1.306 |
| B-0.01 | 464 | 0.011 | 0.250 | 0.250 | 2.733 | 0.692 | 2.819 |
| B-0.001 | 215 | 0.019 | 0.309 | 0.310 | 5.390 | 1.325 | 5.551 |
| B-0.0001 | 100 | 0.025 | 0.371 | 0.372 | 10.153 | 2.539 | 10.466 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.1 (continued) B-life estimations from the Weibull data using the Weibull and Lognormal models (MRR)

| $\beta=5$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 3985 | -0.020 | 0.300 | 0.300 | 0.274 | 0.284 | 0.394 |
| B-0.1 | 2512 | -0.024 | 0.436 | 0.437 | 0.675 | 0.465 | 0.820 |
| B-0.01 | 1585 | -0.032 | 0.565 | 0.565 | 1.279 | 0.733 | 1.474 |
| B-0.001 | 1000 | -0.040 | 0.691 | 0.692 | 2.170 | 1.136 | 2.449 |
| B-0.0001 | 631 | -0.042 | 0.802 | 0.803 | 3.444 | 1.749 | 3.863 |
| n=25 | | | | | | | |
| B-1 | 3985 | -0.016 | 0.213 | 0.213 | 0.260 | 0.192 | 0.323 |
| B-0.1 | 2512 | -0.023 | 0.310 | 0.310 | 0.653 | 0.311 | 0.723 |
| B-0.01 | 1585 | -0.034 | 0.396 | 0.397 | 1.241 | 0.494 | 1.336 |
| B-0.001 | 1000 | -0.043 | 0.487 | 0.489 | 2.098 | 0.767 | 2.234 |
| B-0.0001 | 631 | -0.049 | 0.575 | 0.577 | 3.339 | 1.169 | 3.538 |
| n=50 | | | | | | | |
| B-1 | 3985 | -0.009 | 0.135 | 0.136 | 0.260 | 0.125 | 0.288 |
| B-0.1 | 2512 | -0.013 | 0.198 | 0.198 | 0.655 | 0.200 | 0.685 |
| B-0.01 | 1585 | -0.018 | 0.260 | 0.261 | 1.245 | 0.317 | 1.285 |
| B-0.001 | 1000 | -0.028 | 0.316 | 0.317 | 2.106 | 0.490 | 2.162 |
| B-0.0001 | 631 | -0.032 | 0.372 | 0.373 | 3.345 | 0.759 | 3.430 |
| n=100 | | | | | | | |
| B-1 | 3985 | -0.011 | 0.100 | 0.100 | 0.257 | 0.091 | 0.272 |
| B-0.1 | 2512 | -0.015 | 0.147 | 0.148 | 0.648 | 0.149 | 0.665 |
| B-0.01 | 1585 | -0.022 | 0.192 | 0.194 | 1.229 | 0.232 | 1.251 |
| B-0.001 | 1000 | -0.029 | 0.235 | 0.237 | 2.083 | 0.361 | 2.114 |
| B-0.0001 | 631 | -0.034 | 0.280 | 0.282 | 3.313 | 0.559 | 3.360 |

Table E.2 (continued) B-life estimations from the Weibull data using the Weibull and Lognormal models (MLE)

| $\beta=5$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 3985 | 0.078 | 0.250 | 0.262 | 0.325 | 0.268 | 0.422 |
| B-0.1 | 2512 | 0.118 | 0.362 | 0.381 | 0.772 | 0.438 | 0.888 |
| B-0.01 | 1585 | 0.164 | 0.489 | 0.516 | 1.441 | 0.685 | 1.595 |
| B-0.001 | 1000 | 0.208 | 0.627 | 0.660 | 2.431 | 1.071 | 2.657 |
| B-0.0001 | 631 | 0.254 | 0.778 | 0.818 | 3.860 | 1.661 | 4.202 |
| n=25 | | | | | | | |
| B-1 | 3985 | 0.031 | 0.162 | 0.165 | 0.285 | 0.185 | 0.340 |
| B-0.1 | 2512 | 0.045 | 0.243 | 0.247 | 0.693 | 0.306 | 0.758 |
| B-0.01 | 1585 | 0.059 | 0.323 | 0.328 | 1.310 | 0.487 | 1.398 |
| B-0.001 | 1000 | 0.076 | 0.402 | 0.409 | 2.212 | 0.760 | 2.339 |
| B-0.0001 | 631 | 0.094 | 0.483 | 0.492 | 3.514 | 1.168 | 3.703 |
| n=50 | | | | | | | |
| B-1 | 3985 | 0.012 | 0.108 | 0.109 | 0.255 | 0.131 | 0.287 |
| B-0.1 | 2512 | 0.018 | 0.159 | 0.160 | 0.647 | 0.214 | 0.681 |
| B-0.01 | 1585 | 0.027 | 0.207 | 0.208 | 1.234 | 0.337 | 1.279 |
| B-0.001 | 1000 | 0.037 | 0.257 | 0.260 | 2.093 | 0.526 | 2.158 |
| B-0.0001 | 631 | 0.042 | 0.309 | 0.312 | 3.327 | 0.806 | 3.423 |
| n=100 | | | | | | | |
| B-1 | 3985 | 0.012 | 0.081 | 0.082 | 0.243 | 0.098 | 0.262 |
| B-0.1 | 2512 | 0.017 | 0.117 | 0.118 | 0.627 | 0.158 | 0.647 |
| B-0.01 | 1585 | 0.021 | 0.152 | 0.154 | 1.200 | 0.251 | 1.226 |
| B-0.001 | 1000 | 0.026 | 0.187 | 0.189 | 2.037 | 0.391 | 2.074 |
| B-0.0001 | 631 | 0.031 | 0.222 | 0.224 | 3.236 | 0.600 | 3.291 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.3 B-life estimations from the Weibull data (including 10% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=0.5$ | | Weibull | | | Lognormal | | |
|-------------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 1.0101 | 0.141 | 1.683 | 1.689 | 12 | 18 | 22 |
| B-0.1 | 0.0100 | 0.168 | 1.731 | 1.739 | 195 | 288 | 348 |
| B-0.01 | 0.0001 | 0.105 | 1.639 | 1.642 | 4253 | 6289 | 7592 |
| B-0.001 | 1.0E-06 | 0.235 | 1.831 | 1.846 | 107280 | 158866 | 191697 |
| B-0.0001 | 1.0E-08 | 0.186 | 1.759 | 1.769 | 3073655 | 4554984 | 5495019 |
| n=25 | | | | | | | |
| B-1 | 1.0101 | -0.156 | 1.146 | 1.157 | 9 | 12 | 15 |
| B-0.1 | 0.0100 | -0.302 | 1.023 | 1.067 | 140 | 186 | 233 |
| B-0.01 | 0.0001 | -0.385 | 0.911 | 0.989 | 2815 | 3896 | 4806 |
| B-0.001 | 1.0E-06 | -0.478 | 0.773 | 0.909 | 69674 | 99183 | 121210 |
| B-0.0001 | 1.0E-08 | -0.548 | 0.670 | 0.866 | 1910592 | 2757743 | 3354923 |
| n=50 | | | | | | | |
| B-1 | 1.0101 | -0.086 | 1.067 | 1.071 | 8 | 9 | 12 |
| B-0.1 | 0.0100 | -0.189 | 1.108 | 1.124 | 130 | 142 | 193 |
| B-0.01 | 0.0001 | -0.298 | 1.020 | 1.063 | 2592 | 3066 | 4015 |
| B-0.001 | 1.0E-06 | -0.385 | 0.906 | 0.985 | 62196 | 78660 | 100278 |
| B-0.0001 | 1.0E-08 | -0.461 | 0.798 | 0.922 | 1689165 | 2219433 | 2789115 |
| n=100 | | | | | | | |
| B-1 | 1.0101 | 0.040 | 0.963 | 0.964 | 9 | 7 | 11 |
| B-0.1 | 0.0100 | -0.038 | 1.131 | 1.132 | 134 | 115 | 177 |
| B-0.01 | 0.0001 | -0.107 | 1.192 | 1.196 | 2643 | 2530 | 3659 |
| B-0.001 | 1.0E-06 | -0.185 | 1.154 | 1.168 | 65382 | 67901 | 94262 |
| B-0.0001 | 1.0E-08 | -0.244 | 1.097 | 1.124 | 1793788 | 1978783 | 2670816 |

Table E.4 B-life estimations from the Weibull data (including 10% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=0.5$ | | Weibull | | | Lognormal | | |
|-------------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 1.0101 | 1.711 | 3.930 | 4.287 | 20 | 30 | 37 |
| B-0.1 | 0.0100 | 3.335 | 6.416 | 7.232 | 395 | 580 | 702 |
| B-0.01 | 0.0001 | 5.835 | 10.132 | 11.692 | 9663 | 14276 | 17239 |
| B-0.001 | 1.0E-06 | 9.153 | 15.052 | 17.617 | 282169 | 417820 | 504176 |
| B-0.0001 | 1.0E-08 | 14.312 | 22.701 | 26.836 | 9006827 | 13346010 | 16100898 |
| n=25 | | | | | | | |
| B-1 | 1.0101 | 0.627 | 2.065 | 2.159 | 11 | 15 | 19 |
| B-0.1 | 0.0100 | 0.941 | 2.767 | 2.922 | 181 | 246 | 305 |
| B-0.01 | 0.0001 | 1.218 | 3.254 | 3.474 | 3764 | 5318 | 6515 |
| B-0.001 | 1.0E-06 | 1.584 | 3.824 | 4.139 | 97037 | 140037 | 170372 |
| B-0.0001 | 1.0E-08 | 1.982 | 4.420 | 4.844 | 2760069 | 4029979 | 4884538 |
| n=50 | | | | | | | |
| B-1 | 1.0101 | 0.334 | 1.365 | 1.405 | 9 | 10 | 14 |
| B-0.1 | 0.0100 | 0.401 | 1.765 | 1.810 | 144 | 171 | 223 |
| B-0.01 | 0.0001 | 0.470 | 2.037 | 2.090 | 2875 | 3674 | 4666 |
| B-0.001 | 1.0E-06 | 0.523 | 2.199 | 2.260 | 70026 | 93373 | 116714 |
| B-0.0001 | 1.0E-08 | 0.591 | 2.335 | 2.409 | 1964838 | 2709741 | 3347131 |
| n=100 | | | | | | | |
| B-1 | 1.0101 | 0.394 | 1.169 | 1.233 | 9 | 8 | 12 |
| B-0.1 | 0.0100 | 0.481 | 1.610 | 1.681 | 139 | 134 | 194 |
| B-0.01 | 0.0001 | 0.567 | 1.944 | 2.025 | 2762 | 2949 | 4041 |
| B-0.001 | 1.0E-06 | 0.667 | 2.252 | 2.349 | 67436 | 77672 | 102862 |
| B-0.0001 | 1.0E-08 | 0.784 | 2.513 | 2.633 | 1851796 | 2246776 | 2911555 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.3 (continued) B-life estimations from the Weibull data (including 10% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=1$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 100.503 | -0.032 | 1.171 | 1.171 | 2.402 | 3.396 | 4.160 |
| B-0.1 | 10.005 | -0.043 | 1.356 | 1.357 | 12.096 | 15.058 | 19.314 |
| B-0.01 | 1.000 | -0.032 | 1.424 | 1.424 | 58.438 | 75.333 | 95.342 |
| B-0.001 | 0.100 | -0.009 | 1.468 | 1.468 | 299.819 | 403.343 | 502.570 |
| B-0.0001 | 0.010 | 0.003 | 1.487 | 1.487 | 1628.735 | 2258.878 | 2784.835 |
| n=25 | | | | | | | |
| B-1 | 100.503 | -0.023 | 0.888 | 0.888 | 2.131 | 2.194 | 3.059 |
| B-0.1 | 10.005 | -0.085 | 1.093 | 1.097 | 10.712 | 9.972 | 14.635 |
| B-0.01 | 1.000 | -0.129 | 1.178 | 1.185 | 51.597 | 50.568 | 72.245 |
| B-0.001 | 0.100 | -0.178 | 1.176 | 1.189 | 261.798 | 276.419 | 380.717 |
| B-0.0001 | 0.010 | -0.220 | 1.140 | 1.161 | 1386.781 | 1555.195 | 2083.697 |
| n=50 | | | | | | | |
| B-1 | 100.503 | 0.042 | 0.718 | 0.720 | 2.267 | 1.682 | 2.823 |
| B-0.1 | 10.005 | 0.024 | 0.958 | 0.959 | 11.420 | 7.836 | 13.849 |
| B-0.01 | 1.000 | 0.015 | 1.130 | 1.130 | 54.548 | 40.383 | 67.870 |
| B-0.001 | 0.100 | 0.002 | 1.269 | 1.269 | 276.328 | 223.208 | 355.217 |
| B-0.0001 | 0.010 | -0.021 | 1.334 | 1.334 | 1451.847 | 1256.348 | 1919.966 |
| n=100 | | | | | | | |
| B-1 | 100.503 | 0.042 | 0.547 | 0.549 | 2.144 | 1.238 | 2.475 |
| B-0.1 | 10.005 | -0.007 | 0.737 | 0.737 | 10.840 | 5.761 | 12.276 |
| B-0.01 | 1.000 | -0.036 | 0.926 | 0.926 | 51.193 | 29.096 | 58.884 |
| B-0.001 | 0.100 | -0.070 | 1.023 | 1.026 | 256.920 | 159.789 | 302.557 |
| B-0.0001 | 0.010 | -0.109 | 1.087 | 1.092 | 1350.660 | 906.422 | 1626.617 |

Table E.4 (continued) B-life estimations from the Weibull data (including 10% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=1$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 100.503 | 0.630 | 1.755 | 1.865 | 3.514 | 4.374 | 5.611 |
| B-0.1 | 10.005 | 0.994 | 2.635 | 2.816 | 18.361 | 21.865 | 28.552 |
| B-0.01 | 1.000 | 1.371 | 3.395 | 3.662 | 93.073 | 115.649 | 148.449 |
| B-0.001 | 0.100 | 1.893 | 4.244 | 4.647 | 510.495 | 663.425 | 837.101 |
| B-0.0001 | 0.010 | 2.566 | 5.271 | 5.862 | 2909.433 | 3906.599 | 4870.967 |
| n=25 | | | | | | | |
| B-1 | 100.503 | 0.287 | 0.948 | 0.990 | 2.541 | 2.547 | 3.598 |
| B-0.1 | 10.005 | 0.441 | 1.435 | 1.501 | 13.067 | 11.993 | 17.736 |
| B-0.01 | 1.000 | 0.561 | 1.890 | 1.971 | 64.967 | 62.597 | 90.216 |
| B-0.001 | 0.100 | 0.747 | 2.320 | 2.437 | 336.855 | 351.324 | 486.724 |
| B-0.0001 | 0.010 | 0.912 | 2.686 | 2.837 | 1812.909 | 2038.321 | 2727.891 |
| n=50 | | | | | | | |
| B-1 | 100.503 | 0.210 | 0.718 | 0.748 | 2.254 | 1.750 | 2.854 |
| B-0.1 | 10.005 | 0.260 | 1.030 | 1.062 | 11.491 | 8.216 | 14.126 |
| B-0.01 | 1.000 | 0.316 | 1.314 | 1.352 | 55.850 | 43.089 | 70.539 |
| B-0.001 | 0.100 | 0.379 | 1.589 | 1.634 | 285.508 | 237.954 | 371.667 |
| B-0.0001 | 0.010 | 0.456 | 1.858 | 1.913 | 1520.222 | 1372.537 | 2048.154 |
| n=100 | | | | | | | |
| B-1 | 100.503 | 0.170 | 0.500 | 0.528 | 2.165 | 1.357 | 2.555 |
| B-0.1 | 10.005 | 0.201 | 0.715 | 0.743 | 10.834 | 6.229 | 12.497 |
| B-0.01 | 1.000 | 0.238 | 0.942 | 0.971 | 51.476 | 32.061 | 60.644 |
| B-0.001 | 0.100 | 0.270 | 1.137 | 1.168 | 257.109 | 174.789 | 310.896 |
| B-0.0001 | 0.010 | 0.307 | 1.325 | 1.360 | 1343.065 | 983.981 | 1664.945 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.3 (continued) B-life estimations from the Weibull data (including 10% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=3$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 2158 | 0.021 | 0.532 | 0.533 | 0.534 | 0.614 | 0.814 |
| B-0.1 | 1000 | 0.019 | 0.754 | 0.754 | 1.411 | 1.195 | 1.849 |
| B-0.01 | 464 | 0.029 | 0.952 | 0.953 | 2.992 | 2.269 | 3.755 |
| B-0.001 | 215 | 0.062 | 1.138 | 1.140 | 5.843 | 4.314 | 7.263 |
| B-0.0001 | 100 | 0.100 | 1.321 | 1.325 | 11.037 | 8.293 | 13.805 |
| n=25 | | | | | | | |
| B-1 | 2158 | -0.009 | 0.358 | 0.358 | 0.476 | 0.396 | 0.619 |
| B-0.1 | 1000 | -0.027 | 0.498 | 0.499 | 1.305 | 0.767 | 1.513 |
| B-0.01 | 464 | -0.039 | 0.639 | 0.640 | 2.798 | 1.457 | 3.154 |
| B-0.001 | 215 | -0.058 | 0.743 | 0.745 | 5.496 | 2.771 | 6.155 |
| B-0.0001 | 100 | -0.077 | 0.850 | 0.853 | 10.312 | 5.328 | 11.607 |
| n=50 | | | | | | | |
| B-1 | 2158 | 0.030 | 0.240 | 0.242 | 0.492 | 0.260 | 0.557 |
| B-0.1 | 1000 | 0.026 | 0.350 | 0.351 | 1.333 | 0.513 | 1.428 |
| B-0.01 | 464 | 0.021 | 0.458 | 0.459 | 2.856 | 0.972 | 3.017 |
| B-0.001 | 215 | 0.019 | 0.563 | 0.563 | 5.597 | 1.846 | 5.894 |
| B-0.0001 | 100 | 0.013 | 0.661 | 0.661 | 10.491 | 3.552 | 11.076 |
| n=100 | | | | | | | |
| B-1 | 2158 | 0.009 | 0.169 | 0.169 | 0.459 | 0.181 | 0.494 |
| B-0.1 | 1000 | 0.000 | 0.243 | 0.243 | 1.266 | 0.347 | 1.313 |
| B-0.01 | 464 | -0.011 | 0.318 | 0.318 | 2.726 | 0.668 | 2.806 |
| B-0.001 | 215 | -0.021 | 0.389 | 0.389 | 5.338 | 1.286 | 5.490 |
| B-0.0001 | 100 | -0.030 | 0.459 | 0.460 | 10.008 | 2.482 | 10.311 |

Table E.4 (continued) B-life estimations from the Weibull data (including 10% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=3$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 2158 | 0.184 | 0.499 | 0.531 | 0.666 | 0.632 | 0.918 |
| B-0.1 | 1000 | 0.275 | 0.795 | 0.841 | 1.710 | 1.282 | 2.137 |
| B-0.01 | 464 | 0.365 | 1.094 | 1.153 | 3.574 | 2.564 | 4.399 |
| B-0.001 | 215 | 0.470 | 1.429 | 1.504 | 7.071 | 4.974 | 8.645 |
| B-0.0001 | 100 | 0.571 | 1.719 | 1.812 | 13.429 | 9.656 | 16.540 |
| n=25 | | | | | | | |
| B-1 | 2158 | 0.087 | 0.292 | 0.305 | 0.525 | 0.394 | 0.656 |
| B-0.1 | 1000 | 0.113 | 0.420 | 0.435 | 1.399 | 0.762 | 1.593 |
| B-0.01 | 464 | 0.147 | 0.568 | 0.586 | 3.005 | 1.473 | 3.347 |
| B-0.001 | 215 | 0.174 | 0.713 | 0.734 | 5.904 | 2.812 | 6.540 |
| B-0.0001 | 100 | 0.211 | 0.867 | 0.892 | 11.108 | 5.439 | 12.368 |
| n=50 | | | | | | | |
| B-1 | 2158 | 0.051 | 0.199 | 0.205 | 0.474 | 0.268 | 0.544 |
| B-0.1 | 1000 | 0.060 | 0.287 | 0.294 | 1.299 | 0.519 | 1.399 |
| B-0.01 | 464 | 0.074 | 0.373 | 0.381 | 2.784 | 1.003 | 2.959 |
| B-0.001 | 215 | 0.088 | 0.465 | 0.473 | 5.470 | 1.926 | 5.799 |
| B-0.0001 | 100 | 0.098 | 0.551 | 0.560 | 10.301 | 3.694 | 10.943 |
| n=100 | | | | | | | |
| B-1 | 2158 | 0.048 | 0.137 | 0.145 | 0.464 | 0.196 | 0.504 |
| B-0.1 | 1000 | 0.054 | 0.199 | 0.206 | 1.284 | 0.382 | 1.340 |
| B-0.01 | 464 | 0.058 | 0.265 | 0.271 | 2.751 | 0.727 | 2.845 |
| B-0.001 | 215 | 0.064 | 0.326 | 0.332 | 5.378 | 1.380 | 5.552 |
| B-0.0001 | 100 | 0.071 | 0.388 | 0.394 | 10.053 | 2.639 | 10.394 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.3 (continued) B-life estimations from the Weibull data (including 10% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=5$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 3985 | -0.009 | 0.305 | 0.305 | 0.272 | 0.287 | 0.395 |
| B-0.1 | 2512 | -0.008 | 0.447 | 0.447 | 0.664 | 0.469 | 0.813 |
| B-0.01 | 1585 | -0.021 | 0.575 | 0.575 | 1.254 | 0.726 | 1.450 |
| B-0.001 | 1000 | -0.029 | 0.704 | 0.704 | 2.113 | 1.129 | 2.396 |
| B-0.0001 | 631 | -0.035 | 0.819 | 0.820 | 3.328 | 1.734 | 3.752 |
| n=25 | | | | | | | |
| B-1 | 3985 | -0.002 | 0.207 | 0.207 | 0.263 | 0.193 | 0.326 |
| B-0.1 | 2512 | -0.014 | 0.296 | 0.296 | 0.645 | 0.308 | 0.715 |
| B-0.01 | 1585 | -0.028 | 0.380 | 0.381 | 1.225 | 0.486 | 1.318 |
| B-0.001 | 1000 | -0.033 | 0.463 | 0.464 | 2.072 | 0.755 | 2.205 |
| B-0.0001 | 631 | -0.046 | 0.540 | 0.541 | 3.292 | 1.158 | 3.489 |
| n=50 | | | | | | | |
| B-1 | 3985 | 0.014 | 0.153 | 0.153 | 0.267 | 0.138 | 0.300 |
| B-0.1 | 2512 | 0.011 | 0.220 | 0.220 | 0.652 | 0.227 | 0.690 |
| B-0.01 | 1585 | 0.009 | 0.287 | 0.287 | 1.229 | 0.359 | 1.280 |
| B-0.001 | 1000 | 0.005 | 0.354 | 0.354 | 2.076 | 0.558 | 2.149 |
| B-0.0001 | 631 | 0.000 | 0.425 | 0.425 | 3.280 | 0.855 | 3.390 |
| n=100 | | | | | | | |
| B-1 | 3985 | 0.011 | 0.103 | 0.103 | 0.261 | 0.094 | 0.277 |
| B-0.1 | 2512 | 0.005 | 0.149 | 0.150 | 0.645 | 0.154 | 0.664 |
| B-0.01 | 1585 | -0.002 | 0.198 | 0.198 | 1.221 | 0.242 | 1.245 |
| B-0.001 | 1000 | -0.008 | 0.244 | 0.244 | 2.056 | 0.373 | 2.089 |
| B-0.0001 | 631 | -0.013 | 0.287 | 0.288 | 3.262 | 0.569 | 3.311 |

Table E.4 (continued) B-life estimations from the Weibull data (including 10% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=5$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 3985 | 0.090 | 0.271 | 0.285 | 0.345 | 0.287 | 0.449 |
| B-0.1 | 2512 | 0.131 | 0.416 | 0.436 | 0.794 | 0.476 | 0.925 |
| B-0.01 | 1585 | 0.177 | 0.560 | 0.588 | 1.461 | 0.759 | 1.646 |
| B-0.001 | 1000 | 0.217 | 0.716 | 0.748 | 2.451 | 1.196 | 2.727 |
| B-0.0001 | 631 | 0.258 | 0.863 | 0.901 | 3.893 | 1.846 | 4.308 |
| n=25 | | | | | | | |
| B-1 | 3985 | 0.052 | 0.174 | 0.182 | 0.290 | 0.202 | 0.353 |
| B-0.1 | 2512 | 0.067 | 0.255 | 0.264 | 0.698 | 0.330 | 0.772 |
| B-0.01 | 1585 | 0.089 | 0.338 | 0.350 | 1.303 | 0.522 | 1.403 |
| B-0.001 | 1000 | 0.105 | 0.427 | 0.440 | 2.195 | 0.815 | 2.341 |
| B-0.0001 | 631 | 0.131 | 0.515 | 0.532 | 3.477 | 1.253 | 3.696 |
| n=50 | | | | | | | |
| B-1 | 3985 | 0.039 | 0.125 | 0.131 | 0.271 | 0.134 | 0.303 |
| B-0.1 | 2512 | 0.046 | 0.180 | 0.186 | 0.661 | 0.219 | 0.696 |
| B-0.01 | 1585 | 0.054 | 0.242 | 0.248 | 1.246 | 0.345 | 1.293 |
| B-0.001 | 1000 | 0.064 | 0.303 | 0.309 | 2.103 | 0.533 | 2.170 |
| B-0.0001 | 631 | 0.072 | 0.359 | 0.366 | 3.336 | 0.824 | 3.436 |
| n=100 | | | | | | | |
| B-1 | 3985 | 0.032 | 0.087 | 0.092 | 0.261 | 0.105 | 0.282 |
| B-0.1 | 2512 | 0.037 | 0.127 | 0.132 | 0.643 | 0.170 | 0.665 |
| B-0.01 | 1585 | 0.044 | 0.166 | 0.172 | 1.216 | 0.266 | 1.245 |
| B-0.001 | 1000 | 0.052 | 0.204 | 0.211 | 2.056 | 0.414 | 2.097 |
| B-0.0001 | 631 | 0.057 | 0.246 | 0.253 | 3.258 | 0.631 | 3.318 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.5 B-life estimations from the Weibull data (including 30% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=0.5$ | | Weibull | | | Lognormal | | |
|-------------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 1.0101 | 0.516 | 2.244 | 2.303 | 12 | 19 | 23 |
| B-0.1 | 0.0100 | 0.365 | 2.023 | 2.056 | 175 | 260 | 314 |
| B-0.01 | 0.0001 | 0.241 | 1.840 | 1.855 | 3357 | 4976 | 6003 |
| B-0.001 | 1.0E-06 | 0.181 | 1.750 | 1.760 | 78560 | 116457 | 140477 |
| B-0.0001 | 1.0E-08 | 0.048 | 1.554 | 1.554 | 2031575 | 3011870 | 3632996 |
| n=25 | | | | | | | |
| B-1 | 1.0101 | 0.583 | 2.209 | 2.284 | 11 | 16 | 20 |
| B-0.1 | 0.0100 | 0.472 | 2.169 | 2.220 | 156 | 218 | 268 |
| B-0.01 | 0.0001 | 0.346 | 1.994 | 2.024 | 2933 | 4211 | 5132 |
| B-0.001 | 1.0E-06 | 0.245 | 1.846 | 1.862 | 67443 | 98216 | 119142 |
| B-0.0001 | 1.0E-08 | 0.185 | 1.756 | 1.766 | 1729833 | 2544240 | 3076602 |
| n=50 | | | | | | | |
| B-1 | 1.0101 | 0.618 | 1.986 | 2.080 | 11 | 12 | 17 |
| B-0.1 | 0.0100 | 0.482 | 2.101 | 2.156 | 146 | 177 | 230 |
| B-0.01 | 0.0001 | 0.311 | 1.928 | 1.953 | 2575 | 3341 | 4218 |
| B-0.001 | 1.0E-06 | 0.179 | 1.745 | 1.754 | 58282 | 78983 | 98158 |
| B-0.0001 | 1.0E-08 | 0.114 | 1.651 | 1.654 | 1457163 | 2047476 | 2513062 |
| n=100 | | | | | | | |
| B-1 | 1.0101 | 0.858 | 1.755 | 1.953 | 11 | 9 | 14 |
| B-0.1 | 0.0100 | 0.763 | 2.182 | 2.311 | 147 | 139 | 203 |
| B-0.01 | 0.0001 | 0.671 | 2.340 | 2.434 | 2629 | 2797 | 3839 |
| B-0.001 | 1.0E-06 | 0.576 | 2.303 | 2.374 | 58720 | 67832 | 89717 |
| B-0.0001 | 1.0E-08 | 0.555 | 2.295 | 2.361 | 1474877 | 1808401 | 2333576 |

Table E.6 B-life estimations from the Weibull data (including 30% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=0.5$ | | Weibull | | | Lognormal | | |
|-------------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 1.0101 | 4.628 | 8.208 | 9.423 | 29 | 44 | 52 |
| B-0.1 | 0.0100 | 8.709 | 14.389 | 16.819 | 540 | 798 | 964 |
| B-0.01 | 0.0001 | 16.558 | 26.031 | 30.851 | 12440 | 18425 | 22231 |
| B-0.001 | 1.0E-06 | 30.957 | 47.379 | 56.595 | 355072 | 526273 | 634854 |
| B-0.0001 | 1.0E-08 | 51.934 | 78.478 | 94.106 | 11532017 | 17095484 | 20621420 |
| n=25 | | | | | | | |
| B-1 | 1.0101 | 1.760 | 3.608 | 4.014 | 15 | 21 | 26 |
| B-0.1 | 0.0100 | 2.214 | 4.647 | 5.148 | 232 | 322 | 397 |
| B-0.01 | 0.0001 | 3.048 | 5.977 | 6.709 | 4645 | 6628 | 8093 |
| B-0.001 | 1.0E-06 | 3.939 | 7.316 | 8.309 | 110621 | 160934 | 195286 |
| B-0.0001 | 1.0E-08 | 5.150 | 9.116 | 10.470 | 2968324 | 4362258 | 5276386 |
| n=50 | | | | | | | |
| B-1 | 1.0101 | 1.570 | 2.790 | 3.202 | 13 | 15 | 20 |
| B-0.1 | 0.0100 | 1.860 | 3.794 | 4.225 | 186 | 225 | 292 |
| B-0.01 | 0.0001 | 2.275 | 4.672 | 5.196 | 3413 | 4494 | 5643 |
| B-0.001 | 1.0E-06 | 2.617 | 5.303 | 5.914 | 77429 | 107185 | 132226 |
| B-0.0001 | 1.0E-08 | 2.939 | 5.825 | 6.524 | 1987912 | 2817286 | 3448028 |
| n=100 | | | | | | | |
| B-1 | 1.0101 | 1.230 | 1.878 | 2.245 | 12 | 11 | 16 |
| B-0.1 | 0.0100 | 1.304 | 2.558 | 2.871 | 165 | 165 | 233 |
| B-0.01 | 0.0001 | 1.432 | 3.092 | 3.408 | 2998 | 3361 | 4504 |
| B-0.001 | 1.0E-06 | 1.625 | 3.572 | 3.924 | 68249 | 82212 | 106849 |
| B-0.0001 | 1.0E-08 | 1.753 | 3.921 | 4.295 | 1747670 | 2214156 | 2820786 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.5 (continued) B-life estimations from the Weibull data (including 30% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=1$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 100.503 | 0.279 | 1.666 | 1.689 | 2.821 | 4.358 | 5.191 |
| B-0.1 | 10.005 | 0.291 | 1.878 | 1.901 | 13.275 | 18.399 | 22.688 |
| B-0.01 | 1.000 | 0.296 | 1.917 | 1.940 | 62.505 | 87.186 | 107.276 |
| B-0.001 | 0.100 | 0.258 | 1.865 | 1.883 | 315.322 | 448.787 | 548.487 |
| B-0.0001 | 0.010 | 0.264 | 1.874 | 1.893 | 1624.499 | 2347.901 | 2855.107 |
| n=25 | | | | | | | |
| B-1 | 100.503 | 0.205 | 1.153 | 1.171 | 2.462 | 2.666 | 3.629 |
| B-0.1 | 10.005 | 0.128 | 1.434 | 1.440 | 11.258 | 11.470 | 16.072 |
| B-0.01 | 1.000 | 0.045 | 1.465 | 1.466 | 51.323 | 55.433 | 75.544 |
| B-0.001 | 0.100 | -0.042 | 1.395 | 1.395 | 251.960 | 294.043 | 387.228 |
| B-0.0001 | 0.010 | -0.097 | 1.334 | 1.337 | 1302.868 | 1595.439 | 2059.828 |
| n=50 | | | | | | | |
| B-1 | 100.503 | 0.326 | 0.988 | 1.041 | 2.621 | 2.109 | 3.364 |
| B-0.1 | 10.005 | 0.275 | 1.315 | 1.343 | 11.858 | 9.298 | 15.069 |
| B-0.01 | 1.000 | 0.244 | 1.528 | 1.547 | 54.181 | 45.859 | 70.983 |
| B-0.001 | 0.100 | 0.210 | 1.630 | 1.643 | 263.137 | 241.604 | 357.230 |
| B-0.0001 | 0.010 | 0.176 | 1.660 | 1.669 | 1331.382 | 1333.126 | 1884.092 |
| n=100 | | | | | | | |
| B-1 | 100.503 | 0.362 | 0.700 | 0.788 | 2.497 | 1.341 | 2.834 |
| B-0.1 | 10.005 | 0.336 | 0.979 | 1.035 | 11.331 | 6.103 | 12.870 |
| B-0.01 | 1.000 | 0.334 | 1.262 | 1.306 | 51.063 | 30.268 | 59.360 |
| B-0.001 | 0.100 | 0.309 | 1.462 | 1.494 | 245.621 | 159.884 | 293.074 |
| B-0.0001 | 0.010 | 0.283 | 1.593 | 1.618 | 1228.681 | 877.860 | 1510.065 |

Table E.6 (continued) B-life estimations from the Weibull data (including 30% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=1$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 100.503 | 1.204 | 2.584 | 2.851 | 4.430 | 5.340 | 6.938 |
| B-0.1 | 10.005 | 1.846 | 3.908 | 4.322 | 21.772 | 26.685 | 34.440 |
| B-0.01 | 1.000 | 2.589 | 5.214 | 5.822 | 107.994 | 139.800 | 176.654 |
| B-0.001 | 0.100 | 3.652 | 6.867 | 7.777 | 581.479 | 786.222 | 977.886 |
| B-0.0001 | 0.010 | 4.888 | 8.722 | 9.998 | 3303.075 | 4586.573 | 5652.164 |
| n=25 | | | | | | | |
| B-1 | 100.503 | 0.538 | 1.241 | 1.352 | 2.859 | 2.800 | 4.002 |
| B-0.1 | 10.005 | 0.624 | 1.751 | 1.859 | 13.313 | 12.567 | 18.308 |
| B-0.01 | 1.000 | 0.761 | 2.207 | 2.334 | 61.519 | 63.058 | 88.096 |
| B-0.001 | 0.100 | 0.903 | 2.605 | 2.757 | 303.917 | 338.701 | 455.065 |
| B-0.0001 | 0.010 | 1.048 | 2.925 | 3.107 | 1587.084 | 1861.791 | 2446.447 |
| n=50 | | | | | | | |
| B-1 | 100.503 | 0.541 | 0.967 | 1.108 | 2.714 | 2.277 | 3.543 |
| B-0.1 | 10.005 | 0.606 | 1.391 | 1.517 | 12.399 | 10.275 | 16.103 |
| B-0.01 | 1.000 | 0.670 | 1.760 | 1.884 | 56.364 | 51.727 | 76.502 |
| B-0.001 | 0.100 | 0.765 | 2.123 | 2.256 | 273.849 | 275.053 | 388.133 |
| B-0.0001 | 0.010 | 0.849 | 2.414 | 2.559 | 1401.135 | 1511.718 | 2061.182 |
| n=100 | | | | | | | |
| B-1 | 100.503 | 0.532 | 0.700 | 0.879 | 2.600 | 1.560 | 3.032 |
| B-0.1 | 10.005 | 0.587 | 1.054 | 1.207 | 11.837 | 6.932 | 13.718 |
| B-0.01 | 1.000 | 0.633 | 1.346 | 1.487 | 53.383 | 34.440 | 63.528 |
| B-0.001 | 0.100 | 0.707 | 1.671 | 1.814 | 258.669 | 183.628 | 317.220 |
| B-0.0001 | 0.010 | 0.753 | 1.927 | 2.069 | 1295.267 | 1014.862 | 1645.498 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.5 (continued) B-life estimations from the Weibull data (including 30% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=3$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 2158 | 0.125 | 0.600 | 0.613 | 0.623 | 0.679 | 0.922 |
| B-0.1 | 1000 | 0.149 | 0.880 | 0.893 | 1.522 | 1.348 | 2.033 |
| B-0.01 | 464 | 0.171 | 1.160 | 1.172 | 3.171 | 2.602 | 4.102 |
| B-0.001 | 215 | 0.186 | 1.364 | 1.377 | 6.130 | 4.978 | 7.897 |
| B-0.0001 | 100 | 0.202 | 1.532 | 1.545 | 11.397 | 9.472 | 14.819 |
| n=25 | | | | | | | |
| B-1 | 2158 | 0.063 | 0.392 | 0.397 | 0.515 | 0.429 | 0.670 |
| B-0.1 | 1000 | 0.045 | 0.571 | 0.573 | 1.317 | 0.820 | 1.552 |
| B-0.01 | 464 | 0.021 | 0.726 | 0.726 | 2.780 | 1.567 | 3.192 |
| B-0.001 | 215 | -0.002 | 0.852 | 0.852 | 5.343 | 2.959 | 6.108 |
| B-0.0001 | 100 | -0.028 | 0.963 | 0.963 | 9.860 | 5.580 | 11.329 |
| n=50 | | | | | | | |
| B-1 | 2158 | 0.090 | 0.264 | 0.279 | 0.509 | 0.283 | 0.582 |
| B-0.1 | 1000 | 0.075 | 0.383 | 0.390 | 1.289 | 0.544 | 1.399 |
| B-0.01 | 464 | 0.063 | 0.495 | 0.499 | 2.706 | 1.033 | 2.896 |
| B-0.001 | 215 | 0.052 | 0.612 | 0.614 | 5.228 | 1.964 | 5.585 |
| B-0.0001 | 100 | 0.032 | 0.708 | 0.709 | 9.674 | 3.685 | 10.353 |
| n=100 | | | | | | | |
| B-1 | 2158 | 0.096 | 0.202 | 0.224 | 0.503 | 0.219 | 0.548 |
| B-0.1 | 1000 | 0.080 | 0.298 | 0.308 | 1.276 | 0.426 | 1.345 |
| B-0.01 | 464 | 0.067 | 0.388 | 0.394 | 2.659 | 0.799 | 2.777 |
| B-0.001 | 215 | 0.054 | 0.476 | 0.479 | 5.135 | 1.506 | 5.352 |
| B-0.0001 | 100 | 0.039 | 0.558 | 0.559 | 9.505 | 2.847 | 9.923 |

Table E.6 (continued) B-life estimations from the Weibull data (including 30% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=3$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 2158 | 0.298 | 0.548 | 0.624 | 0.765 | 0.661 | 1.011 |
| B-0.1 | 1000 | 0.402 | 0.867 | 0.956 | 1.828 | 1.327 | 2.259 |
| B-0.01 | 464 | 0.510 | 1.215 | 1.318 | 3.770 | 2.640 | 4.603 |
| B-0.001 | 215 | 0.624 | 1.561 | 1.681 | 7.293 | 5.136 | 8.920 |
| B-0.0001 | 100 | 0.753 | 1.948 | 2.089 | 13.607 | 10.145 | 16.973 |
| n=25 | | | | | | | |
| B-1 | 2158 | 0.213 | 0.336 | 0.398 | 0.622 | 0.404 | 0.741 |
| B-0.1 | 1000 | 0.276 | 0.519 | 0.588 | 1.558 | 0.807 | 1.755 |
| B-0.01 | 464 | 0.336 | 0.714 | 0.789 | 3.204 | 1.602 | 3.583 |
| B-0.001 | 215 | 0.397 | 0.918 | 1.000 | 6.191 | 3.130 | 6.937 |
| B-0.0001 | 100 | 0.472 | 1.135 | 1.229 | 11.536 | 6.012 | 13.009 |
| n=50 | | | | | | | |
| B-1 | 2158 | 0.163 | 0.256 | 0.304 | 0.557 | 0.302 | 0.634 |
| B-0.1 | 1000 | 0.182 | 0.371 | 0.414 | 1.380 | 0.595 | 1.503 |
| B-0.01 | 464 | 0.203 | 0.499 | 0.539 | 2.857 | 1.151 | 3.080 |
| B-0.001 | 215 | 0.230 | 0.626 | 0.667 | 5.506 | 2.200 | 5.929 |
| B-0.0001 | 100 | 0.250 | 0.756 | 0.796 | 10.208 | 4.201 | 11.038 |
| n=100 | | | | | | | |
| B-1 | 2158 | 0.141 | 0.166 | 0.218 | 0.525 | 0.207 | 0.564 |
| B-0.1 | 1000 | 0.152 | 0.243 | 0.286 | 1.322 | 0.415 | 1.386 |
| B-0.01 | 464 | 0.162 | 0.321 | 0.360 | 2.753 | 0.798 | 2.867 |
| B-0.001 | 215 | 0.172 | 0.401 | 0.436 | 5.312 | 1.526 | 5.527 |
| B-0.0001 | 100 | 0.181 | 0.482 | 0.515 | 9.801 | 2.940 | 10.233 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.5 (continued) B-life estimations from the Weibull data (including 30% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=5$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 3985 | 0.048 | 0.353 | 0.356 | 0.310 | 0.338 | 0.459 |
| B-0.1 | 2512 | 0.038 | 0.502 | 0.504 | 0.703 | 0.572 | 0.906 |
| B-0.01 | 1585 | 0.033 | 0.664 | 0.665 | 1.295 | 0.899 | 1.577 |
| B-0.001 | 1000 | 0.030 | 0.803 | 0.804 | 2.144 | 1.403 | 2.562 |
| B-0.0001 | 631 | 0.021 | 0.932 | 0.933 | 3.358 | 2.132 | 3.978 |
| n=25 | | | | | | | |
| B-1 | 3985 | 0.050 | 0.219 | 0.225 | 0.299 | 0.200 | 0.360 |
| B-0.1 | 2512 | 0.042 | 0.323 | 0.325 | 0.688 | 0.326 | 0.761 |
| B-0.01 | 1585 | 0.039 | 0.427 | 0.429 | 1.261 | 0.519 | 1.364 |
| B-0.001 | 1000 | 0.028 | 0.524 | 0.525 | 2.099 | 0.794 | 2.244 |
| B-0.0001 | 631 | 0.018 | 0.624 | 0.624 | 3.289 | 1.217 | 3.507 |
| n=50 | | | | | | | |
| B-1 | 3985 | 0.050 | 0.159 | 0.167 | 0.279 | 0.145 | 0.315 |
| B-0.1 | 2512 | 0.041 | 0.237 | 0.240 | 0.645 | 0.242 | 0.689 |
| B-0.01 | 1585 | 0.032 | 0.313 | 0.315 | 1.192 | 0.382 | 1.252 |
| B-0.001 | 1000 | 0.023 | 0.387 | 0.388 | 1.997 | 0.579 | 2.080 |
| B-0.0001 | 631 | 0.015 | 0.461 | 0.461 | 3.139 | 0.891 | 3.263 |
| n=100 | | | | | | | |
| B-1 | 3985 | 0.055 | 0.114 | 0.127 | 0.276 | 0.107 | 0.296 |
| B-0.1 | 2512 | 0.047 | 0.169 | 0.175 | 0.638 | 0.176 | 0.661 |
| B-0.01 | 1585 | 0.038 | 0.222 | 0.226 | 1.179 | 0.275 | 1.211 |
| B-0.001 | 1000 | 0.029 | 0.276 | 0.278 | 1.974 | 0.424 | 2.019 |
| B-0.0001 | 631 | 0.021 | 0.329 | 0.330 | 3.108 | 0.646 | 3.175 |

Table E.6 (continued) B-life estimations from the Weibull data (including 30% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=5$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 3985 | 0.164 | 0.321 | 0.361 | 0.399 | 0.340 | 0.524 |
| B-0.1 | 2512 | 0.211 | 0.490 | 0.533 | 0.855 | 0.573 | 1.029 |
| B-0.01 | 1585 | 0.275 | 0.673 | 0.728 | 1.528 | 0.918 | 1.783 |
| B-0.001 | 1000 | 0.334 | 0.851 | 0.914 | 2.520 | 1.452 | 2.908 |
| B-0.0001 | 631 | 0.384 | 1.047 | 1.115 | 3.945 | 2.255 | 4.544 |
| n=25 | | | | | | | |
| B-1 | 3985 | 0.100 | 0.186 | 0.211 | 0.321 | 0.205 | 0.381 |
| B-0.1 | 2512 | 0.117 | 0.272 | 0.296 | 0.718 | 0.339 | 0.794 |
| B-0.01 | 1585 | 0.132 | 0.362 | 0.385 | 1.316 | 0.536 | 1.421 |
| B-0.001 | 1000 | 0.147 | 0.456 | 0.479 | 2.188 | 0.833 | 2.341 |
| B-0.0001 | 631 | 0.161 | 0.545 | 0.568 | 3.450 | 1.281 | 3.681 |
| n=50 | | | | | | | |
| B-1 | 3985 | 0.109 | 0.133 | 0.172 | 0.320 | 0.153 | 0.355 |
| B-0.1 | 2512 | 0.129 | 0.199 | 0.237 | 0.709 | 0.256 | 0.754 |
| B-0.01 | 1585 | 0.144 | 0.268 | 0.305 | 1.290 | 0.403 | 1.352 |
| B-0.001 | 1000 | 0.165 | 0.339 | 0.377 | 2.142 | 0.626 | 2.232 |
| B-0.0001 | 631 | 0.183 | 0.407 | 0.447 | 3.359 | 0.969 | 3.496 |
| n=100 | | | | | | | |
| B-1 | 3985 | 0.080 | 0.093 | 0.122 | 0.285 | 0.111 | 0.306 |
| B-0.1 | 2512 | 0.083 | 0.139 | 0.162 | 0.653 | 0.183 | 0.678 |
| B-0.01 | 1585 | 0.089 | 0.183 | 0.204 | 1.205 | 0.282 | 1.237 |
| B-0.001 | 1000 | 0.094 | 0.224 | 0.243 | 2.010 | 0.437 | 2.057 |
| B-0.0001 | 631 | 0.098 | 0.267 | 0.284 | 3.155 | 0.670 | 3.225 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.7 B-life estimations from the Weibull data (including 50% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=0.5$ | | Weibull | | | Lognormal | | |
|-------------|------------|-----------|----------|-----------|-----------|----------|-----------|
| n=10 | True value | Bias/True | MAD/True | RMSE/True | Bias/True | MAD/True | RMSE/True |
| B-1 | 1.0101 | 1.910 | 4.302 | 4.707 | 18 | 28 | 33 |
| B-0.1 | 0.0100 | 1.905 | 4.307 | 4.709 | 236 | 350 | 422 |
| B-0.01 | 0.0001 | 1.762 | 4.095 | 4.458 | 4338 | 6432 | 7758 |
| B-0.001 | 1.0E-06 | 1.818 | 4.178 | 4.557 | 93455 | 138554 | 167126 |
| B-0.0001 | 1.0E-08 | 1.784 | 4.128 | 4.497 | 2381147 | 3530235 | 4258218 |
| n=25 | | | | | | | |
| B-1 | 1.0101 | 2.346 | 4.679 | 5.234 | 17 | 23 | 29 |
| B-0.1 | 0.0100 | 2.526 | 5.203 | 5.783 | 202 | 288 | 352 |
| B-0.01 | 0.0001 | 2.596 | 5.330 | 5.929 | 3518 | 5138 | 6227 |
| B-0.001 | 1.0E-06 | 2.644 | 5.403 | 6.015 | 77621 | 114217 | 138096 |
| B-0.0001 | 1.0E-08 | 2.687 | 5.466 | 6.091 | 1914403 | 2829199 | 3416037 |
| n=50 | | | | | | | |
| B-1 | 1.0101 | 2.399 | 4.145 | 4.789 | 16 | 18 | 24 |
| B-0.1 | 0.0100 | 2.345 | 4.761 | 5.307 | 175 | 222 | 283 |
| B-0.01 | 0.0001 | 2.279 | 4.825 | 5.336 | 2733 | 3703 | 4603 |
| B-0.001 | 1.0E-06 | 2.137 | 4.645 | 5.113 | 54312 | 76608 | 93907 |
| B-0.0001 | 1.0E-08 | 2.053 | 4.526 | 4.970 | 1229987 | 1773479 | 2158263 |
| n=100 | | | | | | | |
| B-1 | 1.0101 | 2.878 | 4.025 | 4.948 | 16 | 15 | 22 |
| B-0.1 | 0.0100 | 2.895 | 5.136 | 5.896 | 178 | 193 | 262 |
| B-0.01 | 0.0001 | 2.949 | 5.657 | 6.379 | 2778 | 3381 | 4376 |
| B-0.001 | 1.0E-06 | 3.015 | 5.894 | 6.620 | 54790 | 71301 | 89921 |
| B-0.0001 | 1.0E-08 | 3.052 | 5.994 | 6.726 | 1246113 | 1688008 | 2098135 |

Table E.8 B-life estimations from the Weibull data (including 50% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=0.5$ | | Weibull | | | Lognormal | | |
|-------------|------------|-----------|----------|-----------|-----------|----------|-----------|
| n=10 | True value | Bias/True | MAD/True | RMSE/True | Bias/True | MAD/True | RMSE/True |
| B-1 | 1.0101 | 8.752 | 14.337 | 16.797 | 43 | 64 | 77 |
| B-0.1 | 0.0100 | 15.390 | 24.297 | 28.761 | 634 | 939 | 1133 |
| B-0.01 | 0.0001 | 31.042 | 47.505 | 56.748 | 12714 | 18845 | 22733 |
| B-0.001 | 1.0E-06 | 48.764 | 73.779 | 88.438 | 348120 | 516075 | 622512 |
| B-0.0001 | 1.0E-08 | 93.843 | 140.612 | 169.050 | 9981073 | 14797501 | 17849029 |
| n=25 | | | | | | | |
| B-1 | 1.0101 | 3.629 | 6.302 | 7.272 | 22 | 30 | 37 |
| B-0.1 | 0.0100 | 4.388 | 7.888 | 9.026 | 277 | 395 | 482 |
| B-0.01 | 0.0001 | 5.161 | 9.121 | 10.480 | 5021 | 7322 | 8878 |
| B-0.001 | 1.0E-06 | 6.164 | 10.619 | 12.278 | 110031 | 161850 | 195710 |
| B-0.0001 | 1.0E-08 | 6.965 | 11.808 | 13.709 | 2817146 | 4161516 | 5025389 |
| n=50 | | | | | | | |
| B-1 | 1.0101 | 3.257 | 4.858 | 5.849 | 18 | 21 | 28 |
| B-0.1 | 0.0100 | 3.498 | 6.185 | 7.105 | 207 | 271 | 341 |
| B-0.01 | 0.0001 | 3.943 | 7.181 | 8.192 | 3350 | 4660 | 5739 |
| B-0.001 | 1.0E-06 | 4.500 | 8.109 | 9.274 | 68299 | 98184 | 119603 |
| B-0.0001 | 1.0E-08 | 4.857 | 8.672 | 9.939 | 1586160 | 2316107 | 2807179 |
| n=100 | | | | | | | |
| B-1 | 1.0101 | 3.118 | 3.733 | 4.864 | 16 | 15 | 22 |
| B-0.1 | 0.0100 | 3.182 | 5.071 | 5.987 | 183 | 199 | 270 |
| B-0.01 | 0.0001 | 3.371 | 5.938 | 6.828 | 2925 | 3503 | 4564 |
| B-0.001 | 1.0E-06 | 3.576 | 6.552 | 7.464 | 57818 | 74257 | 94111 |
| B-0.0001 | 1.0E-08 | 3.779 | 6.991 | 7.947 | 1330916 | 1776418 | 2219684 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.7 (continued) B-life estimations from the Weibull data (including 50% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=1$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 100.503 | 0.660 | 2.203 | 2.300 | 3.338 | 5.154 | 6.140 |
| B-0.1 | 10.005 | 0.667 | 2.441 | 2.531 | 13.936 | 20.311 | 24.632 |
| B-0.01 | 1.000 | 0.643 | 2.434 | 2.518 | 61.734 | 89.582 | 108.794 |
| B-0.001 | 0.100 | 0.634 | 2.422 | 2.503 | 289.287 | 423.704 | 513.042 |
| B-0.0001 | 0.010 | 0.624 | 2.408 | 2.487 | 1438.781 | 2118.533 | 2560.912 |
| n=25 | | | | | | | |
| B-1 | 100.503 | 0.867 | 1.873 | 2.064 | 3.374 | 3.571 | 4.913 |
| B-0.1 | 10.005 | 0.942 | 2.524 | 2.694 | 14.211 | 15.444 | 20.987 |
| B-0.01 | 1.000 | 0.964 | 2.795 | 2.957 | 62.448 | 73.245 | 96.253 |
| B-0.001 | 0.100 | 0.987 | 2.915 | 3.077 | 290.752 | 365.240 | 466.838 |
| B-0.0001 | 0.010 | 1.014 | 2.977 | 3.145 | 1451.581 | 1906.534 | 2396.239 |
| n=50 | | | | | | | |
| B-1 | 100.503 | 0.778 | 1.374 | 1.579 | 2.932 | 2.453 | 3.823 |
| B-0.1 | 10.005 | 0.739 | 1.864 | 2.005 | 11.874 | 10.185 | 15.643 |
| B-0.01 | 1.000 | 0.699 | 2.133 | 2.245 | 49.750 | 46.169 | 67.873 |
| B-0.001 | 0.100 | 0.654 | 2.277 | 2.369 | 223.031 | 225.457 | 317.133 |
| B-0.0001 | 0.010 | 0.595 | 2.290 | 2.367 | 1069.132 | 1157.710 | 1575.861 |
| n=100 | | | | | | | |
| B-1 | 100.503 | 1.042 | 1.168 | 1.565 | 3.293 | 1.971 | 3.838 |
| B-0.1 | 10.005 | 1.057 | 1.723 | 2.022 | 12.906 | 8.493 | 15.449 |
| B-0.01 | 1.000 | 1.085 | 2.213 | 2.465 | 54.307 | 40.374 | 67.671 |
| B-0.001 | 0.100 | 1.132 | 2.608 | 2.843 | 247.899 | 202.912 | 320.355 |
| B-0.0001 | 0.010 | 1.156 | 2.884 | 3.107 | 1183.116 | 1049.725 | 1581.672 |

Table E.8 (continued) B-life estimations from the Weibull data (including 50% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=1$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 100.503 | 2.000 | 3.707 | 4.212 | 5.571 | 7.345 | 9.219 |
| B-0.1 | 10.005 | 2.992 | 5.711 | 6.448 | 25.174 | 33.830 | 42.169 |
| B-0.01 | 1.000 | 4.093 | 7.514 | 8.557 | 119.465 | 165.516 | 204.126 |
| B-0.001 | 0.100 | 5.603 | 9.782 | 11.273 | 609.857 | 868.552 | 1061.276 |
| B-0.0001 | 0.010 | 7.947 | 13.263 | 15.462 | 3286.905 | 4766.323 | 5789.782 |
| n=25 | | | | | | | |
| B-1 | 100.503 | 1.359 | 2.084 | 2.488 | 4.031 | 4.209 | 5.828 |
| B-0.1 | 10.005 | 1.620 | 3.047 | 3.451 | 17.082 | 18.698 | 25.326 |
| B-0.01 | 1.000 | 1.996 | 3.971 | 4.445 | 75.921 | 89.455 | 117.329 |
| B-0.001 | 0.100 | 2.441 | 4.860 | 5.439 | 369.292 | 462.264 | 591.662 |
| B-0.0001 | 0.010 | 2.885 | 5.640 | 6.335 | 1883.416 | 2464.479 | 3101.760 |
| n=50 | | | | | | | |
| B-1 | 100.503 | 1.096 | 1.329 | 1.723 | 3.422 | 2.674 | 4.343 |
| B-0.1 | 10.005 | 1.203 | 2.004 | 2.337 | 13.768 | 11.356 | 17.847 |
| B-0.01 | 1.000 | 1.296 | 2.545 | 2.856 | 58.399 | 52.971 | 78.844 |
| B-0.001 | 0.100 | 1.376 | 2.982 | 3.284 | 271.548 | 268.764 | 382.063 |
| B-0.0001 | 0.010 | 1.425 | 3.302 | 3.596 | 1308.807 | 1401.913 | 1917.899 |
| n=100 | | | | | | | |
| B-1 | 100.503 | 1.147 | 1.022 | 1.536 | 3.249 | 1.964 | 3.796 |
| B-0.1 | 10.005 | 1.231 | 1.592 | 2.012 | 12.715 | 8.251 | 15.157 |
| B-0.01 | 1.000 | 1.304 | 2.112 | 2.482 | 53.679 | 38.696 | 66.172 |
| B-0.001 | 0.100 | 1.404 | 2.586 | 2.942 | 243.698 | 192.897 | 310.802 |
| B-0.0001 | 0.010 | 1.478 | 2.983 | 3.329 | 1165.279 | 1004.659 | 1538.575 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.7 (continued) B-life estimations from the Weibull data (including 50% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=3$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 2158 | 0.237 | 0.686 | 0.726 | 0.686 | 0.764 | 1.027 |
| B-0.1 | 1000 | 0.255 | 1.027 | 1.058 | 1.568 | 1.485 | 2.159 |
| B-0.01 | 464 | 0.255 | 1.306 | 1.331 | 3.170 | 2.866 | 4.274 |
| B-0.001 | 215 | 0.266 | 1.532 | 1.555 | 6.044 | 5.404 | 8.107 |
| B-0.0001 | 100 | 0.280 | 1.693 | 1.716 | 11.150 | 10.270 | 15.159 |
| n=25 | | | | | | | |
| B-1 | 2158 | 0.207 | 0.463 | 0.508 | 0.607 | 0.500 | 0.786 |
| B-0.1 | 1000 | 0.204 | 0.697 | 0.727 | 1.422 | 0.978 | 1.725 |
| B-0.01 | 464 | 0.205 | 0.915 | 0.937 | 2.859 | 1.884 | 3.424 |
| B-0.001 | 215 | 0.210 | 1.108 | 1.127 | 5.457 | 3.558 | 6.514 |
| B-0.0001 | 100 | 0.216 | 1.287 | 1.305 | 9.966 | 6.636 | 11.973 |
| n=50 | | | | | | | |
| B-1 | 2158 | 0.227 | 0.337 | 0.407 | 0.598 | 0.356 | 0.696 |
| B-0.1 | 1000 | 0.220 | 0.512 | 0.557 | 1.367 | 0.691 | 1.531 |
| B-0.01 | 464 | 0.208 | 0.684 | 0.715 | 2.747 | 1.316 | 3.046 |
| B-0.001 | 215 | 0.197 | 0.833 | 0.856 | 5.182 | 2.451 | 5.732 |
| B-0.0001 | 100 | 0.174 | 0.969 | 0.985 | 9.416 | 4.550 | 10.458 |
| n=100 | | | | | | | |
| B-1 | 2158 | 0.224 | 0.246 | 0.333 | 0.581 | 0.268 | 0.640 |
| B-0.1 | 1000 | 0.210 | 0.372 | 0.427 | 1.336 | 0.515 | 1.432 |
| B-0.01 | 464 | 0.201 | 0.489 | 0.529 | 2.686 | 0.974 | 2.857 |
| B-0.001 | 215 | 0.191 | 0.602 | 0.632 | 5.033 | 1.838 | 5.358 |
| B-0.0001 | 100 | 0.176 | 0.705 | 0.727 | 9.101 | 3.393 | 9.713 |

Table E.8 (continued) B-life estimations from the Weibull data (including 50% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=3$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 2158 | 0.449 | 0.705 | 0.836 | 0.882 | 0.788 | 1.183 |
| B-0.1 | 1000 | 0.573 | 1.107 | 1.247 | 1.964 | 1.662 | 2.573 |
| B-0.01 | 464 | 0.700 | 1.541 | 1.693 | 3.910 | 3.219 | 5.064 |
| B-0.001 | 215 | 0.864 | 2.033 | 2.209 | 7.401 | 6.288 | 9.712 |
| B-0.0001 | 100 | 1.022 | 2.459 | 2.663 | 13.623 | 11.934 | 18.111 |
| n=25 | | | | | | | |
| B-1 | 2158 | 0.300 | 0.410 | 0.508 | 0.668 | 0.485 | 0.826 |
| B-0.1 | 1000 | 0.332 | 0.628 | 0.710 | 1.526 | 0.967 | 1.806 |
| B-0.01 | 464 | 0.366 | 0.835 | 0.912 | 3.072 | 1.850 | 3.586 |
| B-0.001 | 215 | 0.396 | 1.034 | 1.107 | 5.816 | 3.527 | 6.802 |
| B-0.0001 | 100 | 0.433 | 1.241 | 1.314 | 10.689 | 6.734 | 12.633 |
| n=50 | | | | | | | |
| B-1 | 2158 | 0.310 | 0.272 | 0.412 | 0.662 | 0.350 | 0.749 |
| B-0.1 | 1000 | 0.337 | 0.419 | 0.538 | 1.481 | 0.706 | 1.641 |
| B-0.01 | 464 | 0.361 | 0.570 | 0.675 | 2.962 | 1.353 | 3.257 |
| B-0.001 | 215 | 0.396 | 0.734 | 0.835 | 5.579 | 2.514 | 6.119 |
| B-0.0001 | 100 | 0.423 | 0.883 | 0.979 | 10.114 | 4.798 | 11.194 |
| n=100 | | | | | | | |
| B-1 | 2158 | 0.278 | 0.216 | 0.352 | 0.630 | 0.253 | 0.679 |
| B-0.1 | 1000 | 0.289 | 0.330 | 0.439 | 1.421 | 0.495 | 1.505 |
| B-0.01 | 464 | 0.299 | 0.445 | 0.536 | 2.834 | 0.938 | 2.986 |
| B-0.001 | 215 | 0.311 | 0.549 | 0.631 | 5.314 | 1.758 | 5.597 |
| B-0.0001 | 100 | 0.325 | 0.655 | 0.731 | 9.633 | 3.283 | 10.177 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.7 (continued) B-life estimations from the Weibull data (including 50% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=5$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 3985 | 0.131 | 0.401 | 0.422 | 0.363 | 0.402 | 0.542 |
| B-0.1 | 2512 | 0.136 | 0.610 | 0.625 | 0.748 | 0.652 | 0.992 |
| B-0.01 | 1585 | 0.158 | 0.808 | 0.823 | 1.327 | 1.031 | 1.680 |
| B-0.001 | 1000 | 0.172 | 0.993 | 1.008 | 2.193 | 1.592 | 2.710 |
| B-0.0001 | 631 | 0.180 | 1.156 | 1.170 | 3.410 | 2.471 | 4.211 |
| n=25 | | | | | | | |
| B-1 | 3985 | 0.117 | 0.236 | 0.263 | 0.333 | 0.233 | 0.406 |
| B-0.1 | 2512 | 0.128 | 0.362 | 0.383 | 0.698 | 0.392 | 0.800 |
| B-0.01 | 1585 | 0.136 | 0.490 | 0.508 | 1.254 | 0.615 | 1.397 |
| B-0.001 | 1000 | 0.138 | 0.615 | 0.630 | 2.063 | 0.962 | 2.277 |
| B-0.0001 | 631 | 0.139 | 0.735 | 0.748 | 3.204 | 1.464 | 3.523 |
| n=50 | | | | | | | |
| B-1 | 3985 | 0.141 | 0.180 | 0.229 | 0.334 | 0.178 | 0.378 |
| B-0.1 | 2512 | 0.141 | 0.283 | 0.316 | 0.699 | 0.297 | 0.760 |
| B-0.01 | 1585 | 0.142 | 0.376 | 0.402 | 1.245 | 0.477 | 1.333 |
| B-0.001 | 1000 | 0.143 | 0.473 | 0.495 | 2.038 | 0.733 | 2.165 |
| B-0.0001 | 631 | 0.144 | 0.569 | 0.587 | 3.158 | 1.118 | 3.350 |
| n=100 | | | | | | | |
| B-1 | 3985 | 0.138 | 0.131 | 0.190 | 0.322 | 0.124 | 0.345 |
| B-0.1 | 2512 | 0.139 | 0.198 | 0.242 | 0.674 | 0.207 | 0.705 |
| B-0.01 | 1585 | 0.137 | 0.266 | 0.299 | 1.201 | 0.324 | 1.244 |
| B-0.001 | 1000 | 0.134 | 0.334 | 0.360 | 1.969 | 0.499 | 2.031 |
| B-0.0001 | 631 | 0.137 | 0.409 | 0.431 | 3.061 | 0.770 | 3.157 |

Table E.8 (continued) B-life estimations from the Weibull data (including 50% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=5$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 3985 | 0.252 | 0.387 | 0.462 | 0.466 | 0.387 | 0.605 |
| B-0.1 | 2512 | 0.313 | 0.612 | 0.687 | 0.916 | 0.671 | 1.135 |
| B-0.01 | 1585 | 0.376 | 0.836 | 0.917 | 1.584 | 1.095 | 1.926 |
| B-0.001 | 1000 | 0.453 | 1.085 | 1.176 | 2.575 | 1.733 | 3.104 |
| B-0.0001 | 631 | 0.527 | 1.338 | 1.438 | 4.006 | 2.690 | 4.825 |
| n=25 | | | | | | | |
| B-1 | 3985 | 0.177 | 0.214 | 0.278 | 0.357 | 0.229 | 0.424 |
| B-0.1 | 2512 | 0.200 | 0.334 | 0.390 | 0.746 | 0.383 | 0.838 |
| B-0.01 | 1585 | 0.224 | 0.460 | 0.511 | 1.321 | 0.610 | 1.455 |
| B-0.001 | 1000 | 0.243 | 0.578 | 0.627 | 2.157 | 0.946 | 2.356 |
| B-0.0001 | 631 | 0.270 | 0.709 | 0.758 | 3.354 | 1.449 | 3.654 |
| n=50 | | | | | | | |
| B-1 | 3985 | 0.173 | 0.161 | 0.236 | 0.346 | 0.167 | 0.384 |
| B-0.1 | 2512 | 0.181 | 0.243 | 0.303 | 0.711 | 0.284 | 0.766 |
| B-0.01 | 1585 | 0.193 | 0.329 | 0.381 | 1.265 | 0.456 | 1.344 |
| B-0.001 | 1000 | 0.207 | 0.410 | 0.459 | 2.067 | 0.717 | 2.188 |
| B-0.0001 | 631 | 0.224 | 0.497 | 0.545 | 3.208 | 1.102 | 3.392 |
| n=100 | | | | | | | |
| B-1 | 3985 | 0.158 | 0.112 | 0.194 | 0.337 | 0.126 | 0.359 |
| B-0.1 | 2512 | 0.163 | 0.174 | 0.239 | 0.694 | 0.214 | 0.726 |
| B-0.01 | 1585 | 0.170 | 0.232 | 0.288 | 1.235 | 0.337 | 1.280 |
| B-0.001 | 1000 | 0.174 | 0.289 | 0.337 | 2.016 | 0.524 | 2.083 |
| B-0.0001 | 631 | 0.180 | 0.346 | 0.391 | 3.126 | 0.809 | 3.229 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.9 B-life estimations from the Weibull data (including 70% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=0.5$ | | Weibull | | | Lognormal | | |
|-------------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 1.0101 | 6.210 | 10.660 | 12.337 | 36 | 54 | 65 |
| B-0.1 | 0.0100 | 8.790 | 14.514 | 16.968 | 497 | 737 | 889 |
| B-0.01 | 0.0001 | 11.116 | 17.963 | 21.124 | 9023 | 13376 | 16135 |
| B-0.001 | 1.0E-06 | 15.307 | 24.176 | 28.615 | 215825 | 319972 | 385957 |
| B-0.0001 | 1.0E-08 | 22.015 | 34.122 | 40.607 | 5633761 | 8352469 | 10074870 |
| n=25 | | | | | | | |
| B-1 | 1.0101 | 6.776 | 11.203 | 13.093 | 28 | 40 | 49 |
| B-0.1 | 0.0100 | 8.082 | 13.450 | 15.691 | 283 | 416 | 503 |
| B-0.01 | 0.0001 | 8.567 | 14.183 | 16.569 | 4156 | 6144 | 7418 |
| B-0.001 | 1.0E-06 | 9.362 | 15.362 | 17.990 | 80962 | 119936 | 144705 |
| B-0.0001 | 1.0E-08 | 10.008 | 16.320 | 19.145 | 1753262 | 2598738 | 3134863 |
| n=50 | | | | | | | |
| B-1 | 1.0101 | 7.505 | 11.301 | 13.566 | 28 | 35 | 45 |
| B-0.1 | 0.0100 | 7.870 | 12.980 | 15.179 | 266 | 373 | 458 |
| B-0.01 | 0.0001 | 8.119 | 13.504 | 15.757 | 3688 | 5358 | 6504 |
| B-0.001 | 1.0E-06 | 8.218 | 13.666 | 15.947 | 68369 | 100585 | 121621 |
| B-0.0001 | 1.0E-08 | 8.701 | 14.382 | 16.809 | 1423249 | 2102373 | 2538820 |
| n=100 | | | | | | | |
| B-1 | 1.0101 | 7.963 | 9.706 | 12.555 | 25 | 25 | 35 |
| B-0.1 | 0.0100 | 8.011 | 12.330 | 14.704 | 216 | 257 | 336 |
| B-0.01 | 0.0001 | 8.242 | 13.451 | 15.775 | 2764 | 3632 | 4563 |
| B-0.001 | 1.0E-06 | 8.448 | 13.953 | 16.311 | 47607 | 66236 | 81570 |
| B-0.0001 | 1.0E-08 | 8.478 | 14.044 | 16.405 | 937114 | 1338852 | 1634230 |

Table E.10 B-life estimations from the Weibull data (including 70% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=0.5$ | | Weibull | | | Lognormal | | |
|-------------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 1.0101 | 16.046 | 25.113 | 29.802 | 66 | 98 | 119 |
| B-0.1 | 0.0100 | 31.620 | 48.358 | 57.779 | 1013 | 1502 | 1812 |
| B-0.01 | 0.0001 | 64.977 | 97.816 | 117.431 | 21463 | 31817 | 38379 |
| B-0.001 | 1.0E-06 | 117.885 | 176.256 | 212.045 | 537152 | 796356 | 960581 |
| B-0.0001 | 1.0E-08 | 238.157 | 354.569 | 427.127 | 14600766 | 21646770 | 26110631 |
| n=25 | | | | | | | |
| B-1 | 1.0101 | 12.354 | 18.436 | 22.192 | 43 | 60 | 74 |
| B-0.1 | 0.0100 | 15.447 | 24.275 | 28.773 | 455 | 663 | 803 |
| B-0.01 | 0.0001 | 18.876 | 29.460 | 34.988 | 6954 | 10260 | 12395 |
| B-0.001 | 1.0E-06 | 23.583 | 36.446 | 43.411 | 140134 | 207379 | 250287 |
| B-0.0001 | 1.0E-08 | 29.480 | 45.189 | 53.955 | 3171168 | 4698393 | 5668439 |
| n=50 | | | | | | | |
| B-1 | 1.0101 | 10.776 | 14.023 | 17.685 | 34 | 39 | 52 |
| B-0.1 | 0.0100 | 12.852 | 19.475 | 23.334 | 323 | 427 | 535 |
| B-0.01 | 0.0001 | 14.607 | 22.830 | 27.102 | 4472 | 6334 | 7754 |
| B-0.001 | 1.0E-06 | 16.486 | 25.869 | 30.675 | 80293 | 116542 | 141524 |
| B-0.0001 | 1.0E-08 | 18.439 | 28.809 | 34.204 | 1639167 | 2407649 | 2912669 |
| n=100 | | | | | | | |
| B-1 | 1.0101 | 9.632 | 10.409 | 14.182 | 28 | 28 | 40 |
| B-0.1 | 0.0100 | 9.844 | 13.873 | 17.011 | 234 | 283 | 367 |
| B-0.01 | 0.0001 | 9.883 | 15.504 | 18.386 | 2986 | 3985 | 4979 |
| B-0.001 | 1.0E-06 | 9.894 | 15.974 | 18.790 | 49229 | 69207 | 84930 |
| B-0.0001 | 1.0E-08 | 9.850 | 16.043 | 18.826 | 947199 | 1362484 | 1659382 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.9 (continued) B-life estimations from the Weibull data (including 70% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=1$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 100.503 | 1.748 | 3.556 | 3.962 | 4.903 | 7.028 | 8.569 |
| B-0.1 | 10.005 | 2.237 | 4.729 | 5.232 | 20.074 | 28.720 | 35.040 |
| B-0.01 | 1.000 | 2.699 | 5.479 | 6.108 | 88.136 | 128.120 | 155.508 |
| B-0.001 | 0.100 | 3.269 | 6.329 | 7.123 | 437.197 | 640.264 | 775.293 |
| B-0.0001 | 0.010 | 4.008 | 7.425 | 8.438 | 2248.393 | 3314.176 | 4004.876 |
| n=25 | | | | | | | |
| B-1 | 100.503 | 2.130 | 3.347 | 3.968 | 4.899 | 5.484 | 7.354 |
| B-0.1 | 10.005 | 2.499 | 4.799 | 5.411 | 17.997 | 22.460 | 28.781 |
| B-0.01 | 1.000 | 2.938 | 5.722 | 6.432 | 74.690 | 98.496 | 123.612 |
| B-0.001 | 0.100 | 3.275 | 6.310 | 7.109 | 337.037 | 465.833 | 574.973 |
| B-0.0001 | 0.010 | 3.999 | 7.405 | 8.415 | 1587.271 | 2256.665 | 2758.979 |
| n=50 | | | | | | | |
| B-1 | 100.503 | 1.884 | 2.429 | 3.074 | 4.198 | 3.749 | 5.629 |
| B-0.1 | 10.005 | 1.902 | 3.501 | 3.984 | 14.630 | 15.180 | 21.082 |
| B-0.01 | 1.000 | 1.899 | 4.004 | 4.432 | 56.170 | 64.692 | 85.674 |
| B-0.001 | 0.100 | 1.947 | 4.262 | 4.685 | 240.970 | 296.116 | 381.774 |
| B-0.0001 | 0.010 | 2.017 | 4.438 | 4.875 | 1103.599 | 1433.706 | 1809.266 |
| n=100 | | | | | | | |
| B-1 | 100.503 | 2.040 | 1.933 | 2.810 | 4.214 | 2.890 | 5.109 |
| B-0.1 | 10.005 | 2.036 | 2.846 | 3.499 | 14.199 | 11.259 | 18.121 |
| B-0.01 | 1.000 | 1.990 | 3.564 | 4.082 | 53.418 | 47.913 | 71.757 |
| B-0.001 | 0.100 | 1.954 | 3.952 | 4.408 | 222.661 | 222.654 | 314.885 |
| B-0.0001 | 0.010 | 1.949 | 4.168 | 4.601 | 989.047 | 1061.155 | 1450.608 |

Table E.10 (continued) B-life estimations from the Weibull data (including 70% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=1$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 100.503 | 3.028 | 5.187 | 6.006 | 7.109 | 9.729 | 12.050 |
| B-0.1 | 10.005 | 4.374 | 7.797 | 8.940 | 30.921 | 43.682 | 53.518 |
| B-0.01 | 1.000 | 6.633 | 11.283 | 13.089 | 141.730 | 204.924 | 249.161 |
| B-0.001 | 0.100 | 9.430 | 15.461 | 18.110 | 709.559 | 1036.320 | 1255.959 |
| B-0.0001 | 0.010 | 12.937 | 20.663 | 24.378 | 3771.259 | 5550.865 | 6710.774 |
| n=25 | | | | | | | |
| B-1 | 100.503 | 2.890 | 3.706 | 4.700 | 5.967 | 6.620 | 8.913 |
| B-0.1 | 10.005 | 3.520 | 5.780 | 6.768 | 21.610 | 26.433 | 34.143 |
| B-0.01 | 1.000 | 4.307 | 7.577 | 8.716 | 88.549 | 116.318 | 146.187 |
| B-0.001 | 0.100 | 5.159 | 9.048 | 10.415 | 408.039 | 559.783 | 692.714 |
| B-0.0001 | 0.010 | 6.070 | 10.466 | 12.098 | 1985.595 | 2811.192 | 3441.713 |
| n=50 | | | | | | | |
| B-1 | 100.503 | 2.260 | 2.348 | 3.259 | 4.624 | 4.022 | 6.129 |
| B-0.1 | 10.005 | 2.344 | 3.451 | 4.172 | 15.715 | 15.335 | 21.957 |
| B-0.01 | 1.000 | 2.422 | 4.273 | 4.911 | 61.302 | 67.220 | 90.975 |
| B-0.001 | 0.100 | 2.525 | 4.870 | 5.486 | 262.194 | 311.909 | 407.472 |
| B-0.0001 | 0.010 | 2.624 | 5.207 | 5.831 | 1191.098 | 1491.628 | 1908.840 |
| n=100 | | | | | | | |
| B-1 | 100.503 | 2.393 | 1.840 | 3.019 | 4.602 | 2.839 | 5.407 |
| B-0.1 | 10.005 | 2.518 | 2.928 | 3.862 | 15.284 | 11.618 | 19.198 |
| B-0.01 | 1.000 | 2.618 | 3.842 | 4.649 | 57.795 | 49.505 | 76.099 |
| B-0.001 | 0.100 | 2.764 | 4.572 | 5.342 | 245.503 | 234.086 | 339.217 |
| B-0.0001 | 0.010 | 2.907 | 5.156 | 5.919 | 1091.183 | 1132.077 | 1572.348 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.9 (continued) B-life estimations from the Weibull data (including 70% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=3$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 2158 | 0.326 | 0.782 | 0.847 | 0.741 | 0.873 | 1.145 |
| B-0.1 | 1000 | 0.356 | 1.184 | 1.236 | 1.651 | 1.754 | 2.408 |
| B-0.01 | 464 | 0.378 | 1.553 | 1.599 | 3.306 | 3.353 | 4.709 |
| B-0.001 | 215 | 0.422 | 1.802 | 1.851 | 6.264 | 6.416 | 8.966 |
| B-0.0001 | 100 | 0.441 | 1.968 | 2.017 | 11.444 | 12.121 | 16.670 |
| n=25 | | | | | | | |
| B-1 | 2158 | 0.432 | 0.574 | 0.718 | 0.762 | 0.612 | 0.977 |
| B-0.1 | 1000 | 0.445 | 0.893 | 0.998 | 1.586 | 1.209 | 1.995 |
| B-0.01 | 464 | 0.469 | 1.207 | 1.295 | 3.067 | 2.311 | 3.840 |
| B-0.001 | 215 | 0.500 | 1.492 | 1.574 | 5.644 | 4.355 | 7.129 |
| B-0.0001 | 100 | 0.526 | 1.744 | 1.821 | 10.100 | 8.054 | 12.918 |
| n=50 | | | | | | | |
| B-1 | 2158 | 0.424 | 0.449 | 0.618 | 0.742 | 0.474 | 0.880 |
| B-0.1 | 1000 | 0.433 | 0.724 | 0.843 | 1.514 | 0.949 | 1.786 |
| B-0.01 | 464 | 0.436 | 0.990 | 1.082 | 2.898 | 1.803 | 3.413 |
| B-0.001 | 215 | 0.448 | 1.211 | 1.291 | 5.324 | 3.350 | 6.290 |
| B-0.0001 | 100 | 0.455 | 1.424 | 1.494 | 9.465 | 6.218 | 11.325 |
| n=100 | | | | | | | |
| B-1 | 2158 | 0.452 | 0.298 | 0.542 | 0.740 | 0.316 | 0.804 |
| B-0.1 | 1000 | 0.459 | 0.493 | 0.674 | 1.483 | 0.623 | 1.609 |
| B-0.01 | 464 | 0.468 | 0.666 | 0.814 | 2.818 | 1.173 | 3.052 |
| B-0.001 | 215 | 0.475 | 0.851 | 0.975 | 5.111 | 2.178 | 5.556 |
| B-0.0001 | 100 | 0.482 | 1.033 | 1.140 | 9.057 | 4.040 | 9.917 |

Table E.10 (continued) B-life estimations from the Weibull data (including 70% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=3$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 2158 | 0.582 | 0.817 | 1.003 | 0.990 | 0.867 | 1.316 |
| B-0.1 | 1000 | 0.719 | 1.321 | 1.504 | 2.138 | 1.794 | 2.791 |
| B-0.01 | 464 | 0.869 | 1.838 | 2.033 | 4.177 | 3.534 | 5.471 |
| B-0.001 | 215 | 1.025 | 2.324 | 2.540 | 7.836 | 6.787 | 10.367 |
| B-0.0001 | 100 | 1.222 | 2.831 | 3.083 | 14.463 | 12.957 | 19.419 |
| n=25 | | | | | | | |
| B-1 | 2158 | 0.537 | 0.555 | 0.772 | 0.866 | 0.642 | 1.078 |
| B-0.1 | 1000 | 0.590 | 0.888 | 1.066 | 1.750 | 1.281 | 2.169 |
| B-0.01 | 464 | 0.637 | 1.214 | 1.371 | 3.289 | 2.453 | 4.103 |
| B-0.001 | 215 | 0.698 | 1.525 | 1.678 | 6.023 | 4.605 | 7.581 |
| B-0.0001 | 100 | 0.751 | 1.790 | 1.941 | 10.767 | 8.615 | 13.789 |
| n=50 | | | | | | | |
| B-1 | 2158 | 0.495 | 0.391 | 0.631 | 0.791 | 0.438 | 0.904 |
| B-0.1 | 1000 | 0.522 | 0.625 | 0.814 | 1.593 | 0.876 | 1.818 |
| B-0.01 | 464 | 0.548 | 0.857 | 1.017 | 3.012 | 1.672 | 3.445 |
| B-0.001 | 215 | 0.576 | 1.084 | 1.228 | 5.500 | 3.139 | 6.332 |
| B-0.0001 | 100 | 0.596 | 1.296 | 1.426 | 9.766 | 5.864 | 11.391 |
| n=100 | | | | | | | |
| B-1 | 2158 | 0.506 | 0.275 | 0.576 | 0.779 | 0.298 | 0.834 |
| B-0.1 | 1000 | 0.522 | 0.436 | 0.680 | 1.539 | 0.599 | 1.651 |
| B-0.01 | 464 | 0.531 | 0.606 | 0.805 | 2.902 | 1.136 | 3.116 |
| B-0.001 | 215 | 0.549 | 0.774 | 0.949 | 5.275 | 2.152 | 5.697 |
| B-0.0001 | 100 | 0.554 | 0.923 | 1.077 | 9.312 | 3.960 | 10.119 |

Appendix E Comparison of results for data from the Weibull distribution

Table E.9 (continued) B-life estimations from the Weibull data (including 70% censoring) using the Weibull and Lognormal models (MRR)

| $\beta=5$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 3985 | 0.173 | 0.432 | 0.465 | 0.388 | 0.420 | 0.572 |
| B-0.1 | 2512 | 0.173 | 0.675 | 0.696 | 0.783 | 0.706 | 1.054 |
| B-0.01 | 1585 | 0.199 | 0.899 | 0.921 | 1.363 | 1.136 | 1.775 |
| B-0.001 | 1000 | 0.213 | 1.125 | 1.145 | 2.194 | 1.748 | 2.805 |
| B-0.0001 | 631 | 0.229 | 1.310 | 1.330 | 3.394 | 2.672 | 4.320 |
| n=25 | | | | | | | |
| B-1 | 3985 | 0.218 | 0.291 | 0.363 | 0.394 | 0.292 | 0.491 |
| B-0.1 | 2512 | 0.219 | 0.464 | 0.513 | 0.752 | 0.505 | 0.906 |
| B-0.01 | 1585 | 0.221 | 0.637 | 0.675 | 1.287 | 0.802 | 1.517 |
| B-0.001 | 1000 | 0.224 | 0.799 | 0.830 | 2.070 | 1.249 | 2.418 |
| B-0.0001 | 631 | 0.226 | 0.935 | 0.962 | 3.171 | 1.895 | 3.694 |
| n=50 | | | | | | | |
| B-1 | 3985 | 0.234 | 0.230 | 0.328 | 0.387 | 0.218 | 0.444 |
| B-0.1 | 2512 | 0.231 | 0.368 | 0.434 | 0.722 | 0.377 | 0.814 |
| B-0.01 | 1585 | 0.233 | 0.508 | 0.559 | 1.227 | 0.595 | 1.364 |
| B-0.001 | 1000 | 0.231 | 0.647 | 0.686 | 1.963 | 0.919 | 2.167 |
| B-0.0001 | 631 | 0.230 | 0.776 | 0.809 | 2.995 | 1.394 | 3.304 |
| n=100 | | | | | | | |
| B-1 | 3985 | 0.242 | 0.165 | 0.293 | 0.380 | 0.160 | 0.412 |
| B-0.1 | 2512 | 0.235 | 0.273 | 0.360 | 0.699 | 0.277 | 0.752 |
| B-0.01 | 1585 | 0.231 | 0.377 | 0.442 | 1.188 | 0.443 | 1.268 |
| B-0.001 | 1000 | 0.225 | 0.477 | 0.527 | 1.896 | 0.684 | 2.016 |
| B-0.0001 | 631 | 0.221 | 0.571 | 0.612 | 2.887 | 1.027 | 3.064 |

Table E.10 (continued) B-life estimations from the Weibull data (including 70% censoring) using the Weibull and Lognormal models (MLE)

| $\beta=5$ | | Weibull | | | Lognormal | | |
|-----------|------------|-----------|------------------------|-----------|-----------|------------------------|-----------|
| n=10 | True value | Bias/True | S _{MAD} /True | RMSE/True | Bias/True | S _{MAD} /True | RMSE/True |
| B-1 | 3985 | 0.292 | 0.413 | 0.506 | 0.498 | 0.408 | 0.643 |
| B-0.1 | 2512 | 0.355 | 0.677 | 0.765 | 0.945 | 0.710 | 1.182 |
| B-0.01 | 1585 | 0.430 | 0.949 | 1.042 | 1.609 | 1.165 | 1.987 |
| B-0.001 | 1000 | 0.509 | 1.222 | 1.324 | 2.571 | 1.820 | 3.149 |
| B-0.0001 | 631 | 0.590 | 1.482 | 1.595 | 3.981 | 2.808 | 4.872 |
| n=25 | | | | | | | |
| B-1 | 3985 | 0.300 | 0.287 | 0.415 | 0.464 | 0.307 | 0.556 |
| B-0.1 | 2512 | 0.329 | 0.461 | 0.566 | 0.850 | 0.533 | 1.003 |
| B-0.01 | 1585 | 0.361 | 0.646 | 0.740 | 1.436 | 0.846 | 1.666 |
| B-0.001 | 1000 | 0.396 | 0.814 | 0.905 | 2.287 | 1.317 | 2.639 |
| B-0.0001 | 631 | 0.435 | 1.001 | 1.091 | 3.492 | 2.023 | 4.036 |
| n=50 | | | | | | | |
| B-1 | 3985 | 0.274 | 0.198 | 0.338 | 0.417 | 0.218 | 0.471 |
| B-0.1 | 2512 | 0.288 | 0.314 | 0.426 | 0.767 | 0.376 | 0.855 |
| B-0.01 | 1585 | 0.300 | 0.432 | 0.525 | 1.294 | 0.597 | 1.425 |
| B-0.001 | 1000 | 0.316 | 0.556 | 0.639 | 2.051 | 0.913 | 2.245 |
| B-0.0001 | 631 | 0.328 | 0.681 | 0.756 | 3.123 | 1.388 | 3.418 |
| n=100 | | | | | | | |
| B-1 | 3985 | 0.278 | 0.136 | 0.309 | 0.415 | 0.147 | 0.440 |
| B-0.1 | 2512 | 0.287 | 0.214 | 0.358 | 0.754 | 0.255 | 0.796 |
| B-0.01 | 1585 | 0.296 | 0.297 | 0.419 | 1.272 | 0.406 | 1.335 |
| B-0.001 | 1000 | 0.304 | 0.377 | 0.485 | 2.017 | 0.635 | 2.115 |
| B-0.0001 | 631 | 0.313 | 0.459 | 0.556 | 3.066 | 0.967 | 3.215 |