103,099 Pregnancies

- 2,349 Those with unknown gestational age at term
- 1,544 Stillbirth or unknown outcome
- 2,575 Those with less than 3 weight measures or measurement errors

96,631 Live birth with valid data

- 41,423 Not a spontaneous vaginal delivery
- 74 Multiple births and births missing record on multiplicity
- 1,865 Preterm pregnancies
- 24,735 Either pregnancy or obstetric complications
- 5,281 Problem of placenta
- 1,792 Congenital disease of child
- 1,830 Problem with baby at 1 month
- 1,681 Problem with mother at 1 month

17,950 Women with a low risk outcome for the child and mother

eFigure 1. Flow chart
**eFigure 2.** Distributions based on training dataset of logarithm gestational weight gain observed (y) and estimated (yrep) using a sample of 10 posterior distributions; models adjusted for maternal characteristics for underweight (A), normal weight (B), overweight (C) and obese (D) populations. Underweight, normal weight, overweight, and obese population followed a Student distribution.
*Figure 3.* Residuals versus estimated logarithm gestational weight gain based on the training datasets; models adjusted for maternal characteristics for underweight (A), normal weight (B), overweight (C) and obese (D) populations. Underweight, normal weight, overweight, and obese populations followed a Student distribution.
Figure 4. Q-Q plot of Studentized residuals based on the training datasets, models adjusted for maternal characteristics for underweight (A), normal weight (B), overweight (C) and obese (D) populations. Underweight, normal weight, overweight, and obese population followed a Student distribution.
**Figure 5**: Individual trajectories of gestational weight gain of the validation set overlaid with estimated gestational weight gain percentiles curves for underweight (A), normal weight (B), overweight (C) and obese (D) populations.
eFigure 6. Range of gestational weight gain of trajectories that will meet the JSOG recommendation (2021) at 40 weeks of gestation for underweight (A), normal weight (B), overweight (C) and obese (D) populations based on GWG curves calculated from the live-born population (dashed line) and the low-risk population (solid line)
**eTable 1.** Percentiles of gestational weight gain in kilograms among live births

### A. Underweight women

| Gestational week | 1%     | 2.3%    | 10%     | 25%     | 50%     | 75%     | 90%     | 97.7%    | 99%     |
|------------------|--------|---------|---------|---------|---------|---------|---------|----------|---------|
| 5                | -3.764 | -3.024  | -1.581  | -0.418  | 0.885   | 2.268   | 3.648   | 5.554    | 6.621   |
| 6                | -3.771 | -3.031  | -1.588  | -0.426  | 0.877   | 2.259   | 3.638   | 5.543    | 6.610   |
| 7                | -3.763 | -3.022  | -1.579  | -0.416  | 0.887   | 2.269   | 3.649   | 5.555    | 6.622   |
| 8                | -3.736 | -2.995  | -1.550  | -0.385  | 0.920   | 2.304   | 3.686   | 5.595    | 6.662   |
| 9                | -3.688 | -2.945  | -1.496  | -0.327  | 0.981   | 2.369   | 3.755   | 5.670    | 6.738   |
| 10               | -3.614 | -2.868  | -1.413  | -0.238  | 1.076   | 2.469   | 3.862   | 5.786    | 6.856   |
| 11               | -3.510 | -2.759  | -1.296  | -0.114  | 1.208   | 2.610   | 4.011   | 5.948    | 7.024   |
| 12               | -3.373 | -2.615  | -1.140  | 0.051   | 1.384   | 2.798   | 4.211   | 6.163    | 7.248   |
| 13               | -3.197 | -2.432  | -0.942  | 0.262   | 1.609   | 3.037   | 4.465   | 6.438    | 7.535   |
| 14               | -2.984 | -2.209  | -0.701  | 0.518   | 1.882   | 3.330   | 4.775   | 6.773    | 7.885   |
| 15               | -2.735 | -1.949  | -0.420  | 0.817   | 2.201   | 3.669   | 5.135   | 7.162    | 8.293   |
| 16               | -2.456 | -1.657  | -0.104  | 1.153   | 2.559   | 4.052   | 5.541   | 7.601    | 8.752   |
| 17               | -2.150 | -1.337  | 0.243   | 1.521   | 2.952   | 4.472   | 5.987   | 8.082    | 9.256   |
| 18               | -1.820 | -0.993  | 0.617   | 1.919   | 3.376   | 4.924   | 6.467   | 8.600    | 9.798   |
| 19               | -1.470 | -0.628  | 1.013   | 2.340   | 3.825   | 5.403   | 6.975   | 9.150    | 10.372  |
| 20               | -1.105 | -0.247  | 1.427   | 2.779   | 4.294   | 5.902   | 7.506   | 9.724    | 10.970  |
| 21               | -0.733 | 0.141   | 1.849   | 3.228   | 4.773   | 6.412   | 8.048   | 10.310   | 11.581  |
| 22               | -0.360 | 0.530   | 2.271   | 3.677   | 5.252   | 6.923   | 8.590   | 10.896   | 12.190  |
| 23               | 0.005  | 0.911   | 2.685   | 4.117   | 5.721   | 7.423   | 9.121   | 11.470   | 12.787  |
| 24               | 0.355  | 1.276   | 3.082   | 4.539   | 6.171   | 7.902   | 9.630   | 12.019   | 13.359  |
| 25               | 0.681  | 1.617   | 3.452   | 4.933   | 6.591   | 8.349   | 10.105  | 12.533   | 13.893  |
| 26               | 0.979  | 1.928   | 3.790   | 5.292   | 6.973   | 8.757   | 10.538  | 13.000   | 14.380  |
| 27               | 1.251  | 2.214   | 4.099   | 5.621   | 7.324   | 9.131   | 10.935  | 13.429   | 14.827  |
| 28               | 1.508  | 2.483   | 4.390   | 5.930   | 7.654   | 9.483   | 11.308  | 13.832   | 15.246  |
| 29               | 1.756  | 2.743   | 4.672   | 6.230   | 7.973   | 9.824   | 11.670  | 14.222   | 15.653  |
| 30               | 2.004  | 3.004   | 4.955   | 6.530   | 8.293   | 10.165  | 12.033  | 14.613   | 16.061  |
| 31               | 2.261  | 3.274   | 5.247   | 6.840   | 8.624   | 10.519  | 12.408  | 15.018   | 16.483  |
| 32               | 2.535  | 3.560   | 5.558   | 7.171   | 8.977   | 10.895  | 12.807  | 15.449   | 16.932  |
| 33               | 2.825  | 3.864   | 5.888   | 7.522   | 9.351   | 11.294  | 13.231  | 15.906   | 17.408  |
| 34               | 3.124  | 4.178   | 6.229   | 7.884   | 9.738   | 11.706  | 13.669  | 16.380   | 17.901  |
| 35               | 3.427  | 4.495   | 6.574   | 8.251   | 10.129  | 12.123  | 14.112  | 16.859   | 18.400  |
| 36               | 3.727  | 4.808   | 6.914   | 8.614   | 10.516  | 12.535  | 14.550  | 17.333   | 18.893  |
| Gestational week | 1%  | 2.3% | 10%  | 25%  | 50%  | 75%  | 90%  | 97.7% | 99%  |
|------------------|-----|------|------|------|------|------|------|-------|------|
| 5                | -4.505 | -3.601 | -1.824 | -0.470 | 0.988 | 2.494 | 3.999 | 6.116 | 7.330 |
| 6                | -4.570 | -3.670 | -1.900 | -0.552 | 0.900 | 2.400 | 3.898 | 6.006 | 7.216 |
| 7                | -4.617 | -3.720 | -1.956 | -0.611 | 0.836 | 2.332 | 3.824 | 5.926 | 7.131 |
| 8                | -4.643 | -3.747 | -1.987 | -0.644 | 0.800 | 2.294 | 3.784 | 5.881 | 7.083 |
| 9                | -4.645 | -3.749 | -1.989 | -0.646 | 0.798 | 2.292 | 3.781 | 5.878 | 7.078 |
| 10               | -4.618 | -3.720 | -1.958 | -0.612 | 0.835 | 2.331 | 3.823 | 5.922 | 7.123 |
| 11               | -4.560 | -3.658 | -1.890 | -0.539 | 0.914 | 2.416 | 3.913 | 6.020 | 7.224 |
| 12               | -4.467 | -3.559 | -1.781 | -0.421 | 1.040 | 2.552 | 4.057 | 6.176 | 7.387 |
| 13               | -4.336 | -3.419 | -1.626 | -0.255 | 1.218 | 2.743 | 4.261 | 6.398 | 7.619 |
| 14               | -4.163 | -3.237 | -1.424 | -0.038 | 1.452 | 2.993 | 4.529 | 6.689 | 7.925 |
| 15               | -3.952 | -3.014 | -1.176 | 0.227 | 1.737 | 3.299 | 4.855 | 7.045 | 8.299 |
| 16               | -3.706 | -2.755 | -0.889 | 0.535 | 2.069 | 3.654 | 5.235 | 7.459 | 8.734 |
| 17               | -3.430 | -2.464 | -0.566 | 0.882 | 2.441 | 4.053 | 5.661 | 7.924 | 9.223 |
| 18               | -3.128 | -2.144 | -0.212 | 1.262 | 2.850 | 4.491 | 6.129 | 8.433 | 9.759 |
| 19               | -2.803 | -1.800 | 0.169 | 1.671 | 3.290 | 4.962 | 6.631 | 8.980 | 10.334 |
| 20               | -2.460 | -1.437 | 0.571 | 2.103 | 3.754 | 5.459 | 7.162 | 9.557 | 10.940 |
| 21               | -2.106 | -1.062 | 0.985 | 2.548 | 4.232 | 5.972 | 7.709 | 10.152 | 11.563 |
| 22               | -1.751 | -0.685 | 1.402 | 2.996 | 4.714 | 6.488 | 8.259 | 10.750 | 12.190 |
| 23               | -1.402 | -0.314 | 1.812 | 3.437 | 5.187 | 6.995 | 8.799 | 11.337 | 12.805 |
| 24               | -1.067 | 0.041 | 2.204 | 3.859 | 5.640 | 7.481 | 9.318 | 11.901 | 13.394 |
| 25               | -0.756 | 0.371 | 2.570 | 4.253 | 6.063 | 7.934 | 9.801 | 12.426 | 13.942 |
| 26               | -0.473 | 0.670 | 2.903 | 4.610 | 6.448 | 8.346 | 10.240 | 12.905 | 14.441 |
| 27               | -0.213 | 0.945 | 3.209 | 4.939 | 6.802 | 8.725 | 10.645 | 13.345 | 14.900 |
| 28               | 0.033 | 1.205 | 3.498 | 5.250 | 7.136 | 9.083 | 11.027 | 13.762 | 15.334 |
| 29               | 0.273 | 1.458 | 3.781 | 5.554 | 7.463 | 9.433 | 11.401 | 14.170 | 15.758 |
| 30               | 0.516 | 1.715 | 4.067 | 5.862 | 7.793 | 9.787 | 11.779 | 14.582 | 16.188 |
| 31               | 0.770 | 1.985 | 4.366 | 6.183 | 8.139 | 10.157 | 12.175 | 15.013 | 16.639 |
| 32               | 1.043 | 2.273 | 4.686 | 6.526 | 8.507 | 10.552 | 12.597 | 15.472 | 17.121 |

B. Normal weight women
C. Overweight women

| Gestational week | 1%  | 2.3% | 10%  | 25%  | 50%  | 75%  | 90%  | 97.7% | 99%  |
|------------------|-----|------|------|------|------|------|------|-------|------|
| 5                | -6.436 | -5.278 | -2.833 | -0.880 | 1.162 | 3.238 | 5.318 | 8.415 | 10.285 |
| 6                | -6.584 | -5.437 | -3.020 | -1.088 | 0.931 | 2.984 | 5.040 | 8.102 | 9.950  |
| 7                | -6.710 | -5.574 | -3.180 | -1.267 | 0.732 | 2.766 | 4.801 | 7.833 | 9.662  |
| 8                | -6.813 | -5.685 | -3.310 | -1.412 | 0.572 | 2.589 | 4.608 | 7.614 | 9.429  |
| 9                | -6.888 | -5.766 | -3.406 | -1.518 | 0.454 | 2.459 | 4.466 | 7.454 | 9.258  |
| 10               | -6.934 | -5.816 | -3.465 | -1.584 | 0.381 | 2.379 | 4.378 | 7.355 | 9.152  |
| 11               | -6.951 | -5.835 | -3.487 | -1.609 | 0.354 | 2.349 | 4.345 | 7.318 | 9.112  |
| 12               | -6.939 | -5.821 | -3.472 | -1.592 | 0.372 | 2.369 | 4.367 | 7.342 | 9.138  |
| 13               | -6.897 | -5.776 | -3.420 | -1.534 | 0.436 | 2.440 | 4.444 | 7.428 | 9.230  |
| 14               | -6.826 | -5.699 | -3.330 | -1.435 | 0.547 | 2.561 | 4.576 | 7.577 | 9.389  |
| 15               | -6.725 | -5.590 | -3.203 | -1.293 | 0.703 | 2.733 | 4.764 | 7.787 | 9.614  |
| 16               | -6.595 | -5.449 | -3.039 | -1.110 | 0.907 | 2.956 | 5.007 | 8.060 | 9.905  |
| 17               | -6.435 | -5.275 | -2.836 | -0.884 | 1.156 | 3.230 | 5.306 | 8.396 | 10.263 |
| 18               | -6.247 | -5.070 | -2.597 | -0.618 | 1.450 | 3.554 | 5.658 | 8.791 | 10.684 |
| 19               | -6.035 | -4.840 | -2.329 | -0.319 | 1.781 | 3.917 | 6.054 | 9.236 | 11.158 |
| 20               | -5.805 | -4.590 | -2.037 | 0.006 | 2.141 | 4.312 | 6.485 | 9.719 | 11.672 |
| 21               | -5.562 | -4.326 | -1.728 | 0.349 | 2.521 | 4.729 | 6.939 | 10.230 | 12.216 |
| 22               | -5.311 | -4.053 | -1.410 | 0.703 | 2.913 | 5.159 | 7.408 | 10.756 | 12.776 |
| 23               | -5.058 | -3.778 | -1.089 | 1.061 | 3.308 | 5.594 | 7.881 | 11.287 | 13.342 |
| 24               | -4.807 | -3.506 | -0.772 | 1.414 | 3.699 | 6.023 | 8.349 | 11.812 | 13.901 |
| 25               | -4.565 | -3.243 | -0.465 | 1.756 | 4.077 | 6.438 | 8.801 | 12.320 | 14.441 |
| 26               | -4.335 | -2.994 | -0.174 | 2.080 | 4.435 | 6.831 | 9.229 | 12.800 | 14.953 |
| 27               | -4.118 | -2.758 | 0.100 | 2.386 | 4.774 | 7.203 | 9.634 | 13.255 | 15.437 |
| 28               | -3.910 | -2.533 | 0.363 | 2.679 | 5.098 | 7.558 | 10.021 | 13.689 | 15.899 |
| Gestational week | 1%     | 2.3%     | 10%     | 25%     | 50%     | 75%     | 90%     | 97.7%   | 99%     |
|------------------|--------|----------|---------|---------|---------|---------|---------|---------|---------|
| 5                | -8.097 | -6.805   | -3.888  | -1.435  | 1.171   | 3.827   | 6.523   | 10.60028 | 13.206  |
| 6                | -8.253 | -6.978   | -4.101  | -1.681  | 0.888   | 3.505   | 6.162   | 10.18046 | 12.748  |
| 7                | -8.401 | -7.142   | -4.302  | -1.914  | 0.621   | 3.202   | 5.822   | 9.78562  | 12.319  |
| 8                | -8.538 | -7.295   | -4.489  | -2.129  | 0.374   | 2.922   | 5.508   | 9.421545 | 11.923  |
| 9                | -8.661 | -7.432   | -4.657  | -2.323  | 0.152   | 2.671   | 5.228   | 9.096904 | 11.571  |
| 10               | -8.766 | -7.549   | -4.800  | -2.488  | -0.037  | 2.458   | 4.990   | 8.820653 | 11.271  |
| 11               | -8.849 | -7.642   | -4.915  | -2.619  | -0.187  | 2.288   | 4.801   | 8.601749 | 11.035  |
| 12               | -8.908 | -7.708   | -4.995  | -2.711  | -0.293  | 2.170   | 4.670   | 8.449149 | 10.870  |
| 13               | -8.938 | -7.742   | -5.036  | -2.758  | -0.346  | 2.110   | 4.603   | 8.371809 | 10.787  |
| 14               | -8.935 | -7.739   | -5.033  | -2.755  | -0.342  | 2.114   | 4.608   | 8.378055 | 10.794  |
| 15               | -8.901 | -7.702   | -4.987  | -2.702  | -0.282  | 2.182   | 4.684   | 8.465603 | 10.890  |
| 16               | -8.840 | -7.634   | -4.904  | -2.607  | -0.173  | 2.304   | 4.820   | 8.623376 | 11.062  |
| 17               | -8.756 | -7.541   | -4.791  | -2.476  | -0.024  | 2.472   | 5.007   | 8.840024 | 11.297  |
| 18               | -8.653 | -7.427   | -4.652  | -2.316  | 0.158   | 2.678   | 5.236   | 9.104202 | 11.584  |
| 19               | -8.537 | -7.297   | -4.494  | -2.134  | 0.366   | 2.911   | 5.495   | 9.404561 | 11.910  |
| 20               | -8.411 | -7.157   | -4.322  | -1.936  | 0.591   | 3.164   | 5.777   | 9.729753 | 12.263  |
| 21               | -8.279 | -7.010   | -4.143  | -1.730  | 0.826   | 3.428   | 6.071   | 10.06927 | 12.632  |
| 22               | -8.143 | -6.859   | -3.959  | -1.518  | 1.068   | 3.700   | 6.372   | 10.41775 | 13.010  |
| 23               | -8.005 | -6.706   | -3.772  | -1.302  | 1.314   | 3.976   | 6.679   | 10.77181 | 13.394  |
| 24               | -7.866 | -6.552   | -3.584  | -1.086  | 1.561   | 4.254   | 6.987   | 11.12807 | 13.781  |
|   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | -7.728 | -6.398 | -3.397 | -0.870 | 1.807 | 4.530 | 7.295 | 11.483 | 12 | 14.166 |
| 26 | -7.592 | -6.247 | -3.212 | -0.657 | 2.050 | 4.804 | 7.599 | 11.833 | 13 | 14.545 |
| 27 | -7.459 | -6.100 | -3.032 | -0.450 | 2.286 | 5.070 | 7.895 | 12.176 | 14 | 14.917 |
| 28 | -7.329 | -5.956 | -2.857 | -0.248 | 2.517 | 5.330 | 8.185 | 12.509 | 15 | 15.278 |
| 29 | -7.201 | -5.814 | -2.683 | -0.048 | 2.745 | 5.588 | 8.471 | 12.841 | 16 | 15.636 |
| 30 | -7.071 | -5.670 | -2.507 | 0.155 | 2.977 | 5.849 | 8.762 | 13.177 | 17 | 16.000 |
| 31 | -6.936 | -5.520 | -2.325 | 0.365 | 3.216 | 6.120 | 9.064 | 13.524 | 18 | 16.376 |
| 32 | -6.794 | -5.362 | -2.132 | 0.588 | 3.470 | 6.405 | 9.382 | 13.890 | 19 | 16.773 |
| 33 | -6.640 | -5.192 | -1.925 | 0.827 | 3.742 | 6.711 | 9.723 | 14.283 | 20 | 17.199 |
| 34 | -6.473 | -5.007 | -1.699 | 1.087 | 4.038 | 7.044 | 10.093 | 14.709 | 21 | 17.661 |
| 35 | -6.292 | -4.806 | -1.454 | 1.369 | 4.359 | 7.404 | 10.493 | 15.169 | 22 | 18.161 |
| 36 | -6.099 | -4.592 | -1.192 | 1.670 | 4.702 | 7.787 | 10.920 | 15.661 | 23 | 18.695 |
| 37 | -5.896 | -4.367 | -0.917 | 1.985 | 5.061 | 8.190 | 11.368 | 16.177 | 24 | 19.257 |
| 38 | -5.686 | -4.135 | -0.633 | 2.312 | 5.434 | 8.608 | 11.834 | 16.714 | 25 | 19.840 |
| 39 | -5.471 | -3.896 | -0.342 | 2.647 | 5.815 | 9.037 | 12.312 | 17.266 | 26 | 20.440 |
| 40 | -5.254 | -3.656 | -0.048 | 2.986 | 6.202 | 9.473 | 12.799 | 17.828 | 27 | 21.051 |
**Table 2.** Range of gestational weight gain in kilograms to meet current guidelines (based on GWG curves based on the live-born population)

| Gestational week | Under weight Lower limit | Under weight Upper limit | Normal weight Lower limit | Normal weight Upper limit | Over weight Lower limit | Over weight Upper limit | Obese Lower limit | Obese Upper limit |
|------------------|--------------------------|--------------------------|---------------------------|---------------------------|-------------------------|------------------------|-------------------|-------------------|
| 5                | 0.983                    | 2.945                    | -0.044                    | 1.971                     | -0.456                  | 1.736                  | 0.227             |                   |
| 6                | 0.975                    | 2.935                    | -0.126                    | 1.881                     | -0.671                  | 1.496                  | -0.043            |                   |
| 7                | 0.985                    | 2.946                    | -0.186                    | 1.814                     | -0.854                  | 1.291                  | -0.298            |                   |
| 8                | 1.018                    | 2.983                    | -0.220                    | 1.778                     | -1.002                  | 1.127                  | -0.535            |                   |
| 9                | 1.080                    | 3.050                    | -0.222                    | 1.775                     | -1.109                  | 1.008                  | -0.746            |                   |
| 10               | 1.175                    | 3.153                    | -0.189                    | 1.813                     | -1.172                  | 0.938                  | -0.926            |                   |
| 11               | 1.308                    | 3.299                    | -0.114                    | 1.896                     | -1.191                  | 0.916                  | -1.068            |                   |
| 12               | 1.485                    | 3.492                    | 0.008                     | 2.029                     | -1.168                  | 0.942                  | -1.166            |                   |
| 13               | 1.711                    | 3.739                    | 0.179                     | 2.217                     | -1.102                  | 1.015                  | -1.214            |                   |
| 14               | 1.986                    | 4.040                    | 0.399                     | 2.459                     | -0.996                  | 1.134                  | -1.208            |                   |
| 15               | 2.305                    | 4.389                    | 0.665                     | 2.752                     | -0.849                  | 1.298                  | -1.152            |                   |
| 16               | 2.665                    | 4.783                    | 0.975                     | 3.093                     | -0.662                  | 1.506                  | -1.053            |                   |
| 17               | 3.061                    | 5.215                    | 1.328                     | 3.480                     | -0.435                  | 1.758                  | -0.916            |                   |
| 18               | 3.486                    | 5.681                    | 1.719                     | 3.911                     | -0.171                  | 2.052                  | -0.747            |                   |
| 19               | 3.937                    | 6.174                    | 2.146                     | 4.380                     | 0.126                   | 2.382                  | -0.552            |                   |
| 20               | 4.408                    | 6.689                    | 2.597                     | 4.877                     | 0.450                   | 2.742                  | -0.337            |                   |
| 21               | 4.889                    | 7.215                    | 3.059                     | 5.386                     | 0.793                   | 3.124                  | -0.107            |                   |
| 22               | 5.370                    | 7.741                    | 3.520                     | 5.894                     | 1.150                   | 3.520                  | 0.133             |                   |
| 23               | 5.842                    | 8.256                    | 3.967                     | 6.386                     | 1.512                   | 3.923                  | 0.378             |                   |
| 24               | 6.293                    | 8.750                    | 4.387                     | 6.849                     | 1.874                   | 4.325                  | 0.622             |                   |
| 25               | 6.715                    | 9.211                    | 4.771                     | 7.271                     | 2.229                   | 4.720                  | 0.860             |                   |
| 26               | 7.100                    | 9.632                    | 5.125                     | 7.660                     | 2.569                   | 5.099                  | 1.087             |                   |
| 27               | 7.452                    | 10.018                   | 5.458                     | 8.027                     | 2.893                   | 5.458                  | 1.302             |                   |
| 28               | 7.784                    | 10.380                   | 5.781                     | 8.381                     | 3.201                   | 5.801                  | 1.511             |                   |
| 29               | 8.105                    | 10.732                   | 6.102                     | 8.735                     | 3.498                   | 6.131                  | 1.719             |                   |
| 30               | 8.427                    | 11.084                   | 6.432                     | 9.098                     | 3.787                   | 6.453                  | 1.934             |                   |
| 31               | 8.760                    | 11.448                   | 6.778                     | 9.479                     | 4.073                   | 6.771                  | 2.162             |                   |
| 32               | 9.114                    | 11.835                   | 7.137                     | 9.874                     | 4.358                   | 7.088                  | 2.409             |                   |
| 33               | 9.490                    | 12.246                   | 7.503                     | 10.278                    | 4.647                   | 7.410                  | 2.681             |                   |
| 34               | 9.878                    | 12.670                   | 7.871                     | 10.684                    | 4.943                   | 7.739                  | 2.976             |                   |
| 35               | 10.271                   | 13.100                   | 8.236                     | 11.087                    | 5.250                   | 8.080                  | 3.292             |                   |
|   |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|
| 36| 10.659 | 13.524 | 8.592 | 11.480 | 5.568 | 8.434 | 3.623 |
| 37| 11.034 | 13.934 | 8.936 | 11.858 | 5.896 | 8.798 | 3.967 |
| 38| 11.387 | 14.320 | 9.268 | 12.224 | 6.232 | 9.173 | 4.320 |
| 39| 11.714 | 14.678 | 9.591 | 12.580 | 6.576 | 9.555 | 4.678 |
| 40| 12.019 | 15.011 | 9.907 | 12.928 | 6.925 | 9.944 | 5.040 |

GWG, gestational weight gain.
**eTable 3.** Description of gestational weight gain by maternal characteristics; mean and standard deviation in low-risk population

| Number of data available | Number of woman | 0–15 weeks | 16–27 weeks | 28–37 weeks | 38–43 weeks |
|--------------------------|----------------|------------|-------------|-------------|-------------|
| Pre-pregnancy BMI <18.5 kg/m² | 3,018 | 0.9 (1.8) | 5.5 (2.5) | 9.0 (2.9) | 11.1 (3.3) |
| Maternal age, years | | | | | |
| ≤25 | 586 | 1.2 (2.0) | 5.9 (2.8) | 9.7 (3.1) | 12.1 (3.3) |
| 26 to 34 | 1,877 | 0.8 (1.7) | 5.5 (2.5) | 8.9 (2.9) | 10.9 (3.2) |
| ≥35 | 555 | 0.8 (1.9) | 5.4 (2.5) | 8.6 (2.8) | 10.5 (3.2) |
| Maternal height, cm | | | | | |
| ≤155 | 672 | 0.8 (1.8) | 5.3 (2.3) | 8.7 (2.8) | 10.7 (3.0) |
| 156 to 161 | 1,435 | 0.9 (1.8) | 5.6 (2.5) | 9.0 (2.9) | 11.1 (3.2) |
| ≥162 | 911 | 0.9 (1.9) | 5.6 (2.7) | 9.3 (3.2) | 11.3 (3.5) |
| Parity | | | | | |
| Multipara | 1,933 | 0.8 (1.8) | 5.5 (2.5) | 9.0 (2.9) | 11.0 (3.2) |
| Primipara | 1,085 | 0.9 (1.9) | 5.6 (2.6) | 9.1 (3.0) | 11.3 (3.4) |
| Smoking status | | | | | |
| Never smoke | 1,740 | 0.6 (1.6) | 5.1 (2.3) | 8.5 (2.8) | 10.5 (3.0) |
| Quit before realizing pregnancy | 640 | 0.9 (1.8) | 5.5 (2.4) | 9.0 (2.7) | 11.2 (3.0) |
| Quit after realizing pregnancy | 416 | 1.7 (2.0) | 6.9 (2.8) | 10.6 (3.2) | 12.9 (3.5) |
| Smoke during pregnancy | 146 | 2.0 (2.0) | 6.4 (2.9) | 10.0 (3.2) | 12.1 (3.8) |
| Missing | 76 | 1.2 (1.7) | 5.9 (2.5) | 9.6 (3.1) | 11.6 (3.9) |
| Previous diseases | | | | | |
| No | 2,363 | 0.9 (1.8) | 5.5 (2.5) | 9.1 (2.9) | 11.1 (3.2) |
| Yes | 607 | 0.8 (1.8) | 5.5 (2.5) | 8.6 (3.0) | 10.8 (3.3) |
| Missing | 48 | 1.1 (2.1) | 5.8 (2.6) | 9.7 (2.8) | 10.9 (3.8) |
| Pre-pregnancy BMI 18.5–24.9 kg/m² | 13,529 | 0.5 (2.0) | 5.0 (2.8) | 8.5 (3.3) | 10.7 (3.5) |
| Maternal age, years | | | | | |
| ≤25 | 1,910 | 0.6 (2.1) | 5.2 (3.0) | 9.0 (3.5) | 11.6 (3.8) |
| 26 to 34 | 8,412 | 0.5 (2.0) | 5.0 (2.8) | 8.5 (3.2) | 10.7 (3.4) |
| ≥35 | 3,207 | 0.6 (2.1) | 4.9 (2.7) | 8.2 (3.1) | 10.2 (3.4) |
| Maternal height, cm | | | | | |
| ≤155 | 3,182 | 0.5 (2.0) | 4.8 (2.7) | 8.2 (3.2) | 10.2 (3.4) |
| 156 to 161 | 6,635 | 0.5 (2.0) | 5.0 (2.8) | 8.5 (3.2) | 10.7 (3.5) |
| ≥162 | 3,712 | 0.6 (2.1) | 5.2 (2.9) | 8.8 (3.3) | 11.1 (3.6) |
| Parity | | | | | |
| Multipara | 9,119 | 0.5 (2.0) | 5.0 (2.8) | 8.4 (3.2) | 10.5 (3.4) |
| Primipara | 4,410 | 0.6 (2.1) | 5.1 (2.9) | 8.7 (3.4) | 11.0 (3.7) |
| Smoking status | | | | | |
| Never smoke | 7,825 | 0.4 (1.9) | 4.8 (2.7) | 8.1 (3.1) | 10.2 (3.3) |
| Quit before realizing pregnancy | 3,271 | 0.5 (2.1) | 5.0 (2.7) | 8.5 (3.2) | 10.7 (3.4) |
| Quit after realizing pregnancy | 1,652 | 1.2 (2.2) | 6.1 (3.1) | 9.9 (3.6) | 12.2 (3.9) |
| Smoke during pregnancy | 534 | 1.5 (2.1) | 5.9 (3.2) | 9.5 (3.7) | 11.9 (4.1) |
| Missing | 247 | 0.6 (2.0) | 5.5 (2.9) | 9.4 (3.2) | 11.8 (3.5) |
| Previous diseases | | | | | |
| No | 10,438 | 0.6 (2.0) | 5.0 (2.8) | 8.5 (3.2) | 10.7 (3.5) |
| Yes | 2,948 | 0.5 (2.1) | 4.9 (2.8) | 8.3 (3.3) | 10.5 (3.5) |
| Missing | 143 | 0.7 (1.8) | 5.5 (3.1) | 9.2 (3.4) | 11.5 (3.6) |
| Pre-pregnancy BMI 25.0–29.9 kg/m² | 1,153 | 0.2 (2.5) | 3.3 (3.6) | 6.5 (4.2) | 8.6 (4.6) |
| Maternal age, years | | | | | |
| ≤25 | 177 | 0.5 (2.5) | 4.1 (3.9) | 7.6 (4.5) | 9.7 (4.8) |
| 26 to 34 | 688 | 0.1 (2.4) | 3.2 (3.4) | 6.3 (4.0) | 8.5 (4.4) |
| ≥35 | 288 | 0.1 (2.6) | 3.3 (3.7) | 6.1 (4.4) | 8.0 (4.8) |
| Maternal height, cm | | | | | |
| ≤155 | 282 | 0.4 (2.6) | 3.5 (3.5) | 6.5 (4.3) | 8.6 (4.7) |
| 156 to 161 | 575 | 0.2 (2.3) | 3.4 (3.4) | 6.6 (4.0) | 8.7 (4.2) |
| ≥162 | 296 | 0.0 (2.7) | 3.2 (3.8) | 6.3 (4.5) | 8.4 (5.1) |
| Parity | | | | | |
| Multipara | 869 | 0.2 (2.5) | 3.2 (3.4) | 6.4 (4.1) | 8.4 (4.4) |
| Primipara | 284 | 0.3 (2.6) | 3.6 (3.9) | 6.7 (4.6) | 9.2 (5.0) |
| Smoking status                  | Never smoke | Quit before realizing pregnancy | Quit after realizing pregnancy | Smoke during pregnancy | Missing |
|--------------------------------|-------------|----------------------------------|-------------------------------|------------------------|---------|
|                               | 582         | 319                              | 154                           | 63                     | 35      |
|                               | -0.1 (2.3)  | 0.1 (2.4)                        | 1.2 (2.8)                     | 0.7 (3.2)              | 0.5 (2.2) |
| Previous diseases              | No          | Yes                              | Missing                       |                        |         |
|                               | 858         | 280                              |                               |                        |         |
|                               | 0.2 (2.4)   | 0.2 (2.7)                        | -0.3 (1.5)                    | 2.5 (2.2)              |         |
| Maternal age, years            | ≤25         | 26 to 34                         | ≥35                           |                        |         |
|                               | 41          | 149                              | 60                            |                        |         |
|                               | -0.2 (3.0)  | -0.4 (2.6)                       | -0.7 (2.8)                    | 1.0 (4.4)              |         |
| Maternal height, cm            | ≤155        | 156 to 161                       | ≥162                          |                        |         |
|                               | 62          | 110                              | 78                            |                        |         |
|                               | 0.0 (2.2)   | -0.6 (3.0)                       | -0.6 (2.7)                    | 2.2 (3.1)              |         |
| Parity                         | Multipara   | Primipara                        |                               |                        |         |
|                               | 195         | 55                               |                               |                        |         |
|                               | -0.5 (2.8)  | -0.2 (2.4)                       | -0.2 (2.4)                    | 1.3 (3.8)              |         |
| Maternal age, years            | ≤25         | 26 to 34                         | ≥35                           |                        |         |
|                               | 41          | 149                              | 60                            |                        |         |
|                               | -0.2 (3.0)  | -0.4 (2.6)                       | -0.7 (2.8)                    | 1.0 (4.4)              |         |
| Maternal height, cm            | ≤155        | 156 to 161                       | ≥162                          |                        |         |
|                               | 62          | 110                              | 78                            |                        |         |
|                               | 0.0 (2.2)   | -0.6 (3.0)                       | -0.6 (2.7)                    | 2.2 (3.1)              |         |
| Parity                         | Multipara   | Primipara                        |                               |                        |         |
|                               | 195         | 55                               |                               |                        |         |
|                               | -0.5 (2.8)  | -0.2 (2.4)                       | -0.2 (2.4)                    | 1.3 (3.8)              |         |
| Smoking status                 | Never smoke | Quit before realizing pregnancy | Quit after realizing pregnancy | Smoke during pregnancy | Missing |
|                               | 109         | 65                               | 36                            | 25                     | 15      |
|                               | -0.4 (2.5)  | -0.5 (2.7)                       | -0.1 (3.0)                    | -0.4 (2.5)             | -2.3 (3.8) |
| Pre-pregnancy BMI ≥30 kg/m²   | 250         | 250                              | 250                           | 250                    | 250     |
|                               | -0.5 (2.7)  | 1.3 (3.8)                        | 3.6 (4.3)                     | 5.7 (4.9)              |         |
| Maternal age, years            | ≤25         | 26 to 34                         | ≥35                           |                        |         |
|                               | 41          | 149                              | 60                            |                        |         |
|                               | -0.2 (3.0)  | -0.4 (2.6)                       | -0.7 (2.8)                    | 1.0 (4.4)              |         |
| Maternal height, cm            | ≤155        | 156 to 161                       | ≥162                          |                        |         |
|                               | 62          | 110                              | 78                            |                        |         |
|                               | 0.0 (2.2)   | -0.6 (3.0)                       | -0.6 (2.7)                    | 2.2 (3.1)              |         |
| Parity                         | Multipara   | Primipara                        |                               |                        |         |
|                               | 195         | 55                               |                               |                        |         |
|                               | -0.5 (2.8)  | -0.2 (2.4)                       | -0.2 (2.4)                    | 1.3 (3.8)              |         |
| Smoking status                 | Never smoke | Quit before realizing pregnancy | Quit after realizing pregnancy | Smoke during pregnancy | Missing |
|                               | 109         | 65                               | 36                            | 25                     | 15      |
|                               | -0.4 (2.5)  | -0.5 (2.7)                       | -0.1 (3.0)                    | -0.4 (2.5)             | -2.3 (3.8) |
| Previous diseases              | No          | Yes                              | Missing                       |                        |         |
|                               | 184         | 59                               | 7                             |                        |         |
|                               | -0.4 (2.7)  | -0.3 (2.4)                       | -3.7 (4.6)                    | 1.6 (3.6)              |         |

BMI, body mass index.
**Table 4.** Main effects of Bayesian mixed models (splines excluded) in low-risk population

| Number of post-warmup samples (52,000) | Pre-pregnancy BMI <18.5 kg/m² | Pre-pregnancy BMI 18.5–24.9 kg/m² |
|---------------------------------------|-------------------------------|-----------------------------------|
| **Maternal age, years**               |                               |                                   |
| ≤25                                   | 0.015                         | 0.011                             |
| 26 to 34                              | 0.007                         | 0.003                             |
| ≥35                                   | ref.                          | ref.                              |
| **Maternal height, cm**               |                               |                                   |
| ≤155                                  | -0.013                        | -0.020                            |
| 156 to 161                            | -0.005                        | -0.008                            |
| ≥162                                  | ref.                          | ref.                              |
| **Parity**                            |                               |                                   |
| Multipara                             | -0.003                        | 0.005                             |
| Primipara                             | ref.                          | ref.                              |
| **Smoking status**                    |                               |                                   |
| Never smoke                           | ref.                          | ref.                              |
| Quit before realizing pregnancy       | 0.018                         | 0.012                             |
| Quit after realizing pregnancy        | 0.064                         | 0.055                             |
| Smoke during pregnancy                | 0.05                          | 0.053                             |
| **Previous diseases**                 |                               |                                   |
| No                                    | -0.008                        | -0.005                            |
| Yes                                   | 0.076                         | 0.065                             |
| **sd(Intercept)**                     |                               |                                   |
|                                       | 0.076                         | 0.076                             |

[Number of post-warmup samples (12,000)]
| sd(Intercept) | 0.091 | 0.001 | [0.09 ; 0.092] | 18,978 |
|----------------|--------|--------|----------------|--------|
| **Number of post-warmup samples (60,000)** |        |        |                |        |
| Pre-pregnancy BMI 25.0–29.9 kg/m² |        |        |                |        |
| Maternal age, years |        |        |                |        |
| ≤25 | 0.03 | 1.030 | 0.016 | [-0.001 ; 0.061] | 12,141 |
| 26 to 34 | 0.000 | 1.000 | 0.011 | [-0.022 ; 0.022] | 11,033 |
| ≥35 | ref. |        |        |                |        |
| Maternal height, cm |        |        |                |        |
| ≤155 | 0.011 | 1.011 | 0.013 | [-0.016 ; 0.037] | 11,718 |
| 156 to 161 | 0.010 | 1.010 | 0.011 | [-0.012 ; 0.033] | 10,879 |
| ≥162 | ref. |        |        |                |        |
| Parity |        |        |                |        |
| Multipara | 0.011 | 1.011 | 0.011 | [-0.011 ; 0.033] | 11,345 |
| Primipara | ref. |        |        |                |        |
| Smoking status |        |        |                |        |
| Never smoke | ref. |        |        |                |        |
| Quit before realizing pregnancy | 0.015 | 1.015 | 0.011 | [-0.007 ; 0.036] | 10,649 |
| Quit after realizing pregnancy | 0.062 | 1.064 | 0.015 | [0.033 ; 0.092] | 11,311 |
| Smoke during pregnancy | 0.019 | 1.019 | 0.021 | [-0.022 ; 0.059] | 13,447 |
| Previous diseases |        |        |                |        |
| No | ref. |        |        |                |        |
| Yes | -0.007 | 0.993 | 0.011 | [-0.029 ; 0.014] | 11,333 |
| sd(Intercept) | 0.137 | 0.004 | [0.13 ; 0.144] | 16,751 |
| **Number of post-warmup samples (60,000)** |        |        |                |        |
| Pre-pregnancy BMI ≥30.0 kg/m² |        |        |                |        |
| Maternal age, years |        |        |                |        |
| ≤25 | 0.022 | 1.022 | 0.038 | [-0.052 ; 0.097] | 14,917 |
| 26 to 34 | 0.051 | 1.052 | 0.030 | [-0.007 ; 0.109] | 12,782 |
| ≥35 | ref. |        |        |                |        |
| Maternal height, cm |        |        |                |        |
| ≤155 | 0.038 | 1.039 | 0.031 | [-0.022 ; 0.099] | 11,494 |
| 156 to 161 | -0.052 | 0.949 | 0.028 | [-0.107 ; 0.003] | 12,954 |
| ≥162 | ref. |        |        |                |        |
| Parity |        |        |                |        |
| Multipara | 0.013 | 1.013 | 0.028 | [-0.042 ; 0.068] | 12,902 |
| Primipara | ref. |        |        |                |        |
| Smoking status |        |        |                |        |
| Never smoke | ref. |        |        |                |        |
| Quit before realizing pregnancy | -0.065 | 0.937 | 0.028 | [-0.121 ; -0.01] | 12,860 |
| Quit after realizing pregnancy | 0.011 | 1.011 | 0.034 | [-0.055 ; 0.076] | 14,746 |
| Smoke during pregnancy | -0.024 | 0.976 | 0.04 | [-0.102 ; 0.055] | 15,178 |
| Previous diseases |        |        |                |        |
| No | ref. |        |        |                |        |
| Yes | -0.014 | 0.986 | 0.026 | [-0.065 ; 0.037] | 14,189 |
| sd(Intercept) | 0.149 | 0.009 | [0.133 ; 0.168] | 20,758 |

BMI, body mass index; HDI, highest probability density (indicating which points of a distribution are most credible); ESS, Effective sample size (10,000 independent steps are recommended for an accurate 95% HDI).

Outcome of model is log-transformed weight gain (kg)
### Table 5. Range of gestational weight gain in kilograms to meet current guidelines (based on GWG curves based on the low risk population)

| Gestational week | Under weight | Normal weight | Over weight | Obese |
|------------------|--------------|---------------|-------------|-------|
|                  | Lower limit  | Upper limit   | Lower limit | Upper limit |
| 5                | 0.831        | 2.785         | -0.109      | 1.872  | -0.421 | 1.762  | -0.869 |
| 6                | 0.861        | 2.816         | -0.175      | 1.800  | -0.636 | 1.523  | -0.906 |
| 7                | 0.899        | 2.857         | -0.211      | 1.760  | -0.820 | 1.317  | -0.938 |
| 8                | 0.952        | 2.914         | -0.213      | 1.758  | -0.968 | 1.152  | -0.962 |
| 9                | 1.025        | 2.994         | -0.175      | 1.799  | -1.075 | 1.033  | -0.979 |
| 10               | 1.126        | 3.104         | -0.096      | 1.885  | -1.138 | 0.963  | -0.985 |
| 11               | 1.263        | 3.254         | 0.023       | 2.016  | -1.157 | 0.941  | -0.979 |
| 12               | 1.442        | 3.450         | 0.182       | 2.191  | -1.134 | 0.967  | -0.958 |
| 13               | 1.670        | 3.699         | 0.379       | 2.407  | -1.069 | 1.040  | -0.921 |
| 14               | 1.948        | 4.002         | 0.612       | 2.664  | -0.962 | 1.159  | -0.865 |
| 15               | 2.270        | 4.355         | 0.882       | 2.960  | -0.815 | 1.323  | -0.789 |
| 16               | 2.635        | 4.753         | 1.185       | 3.294  | -0.627 | 1.531  | -0.689 |
| 17               | 3.037        | 5.193         | 1.522       | 3.664  | -0.401 | 1.783  | -0.566 |
| 18               | 3.473        | 5.669         | 1.891       | 4.069  | -0.136 | 2.077  | -0.419 |
| 19               | 3.939        | 6.179         | 2.286       | 4.504  | 0.162  | 2.409  | -0.252 |
| 20               | 4.427        | 6.713         | 2.702       | 4.961  | 0.486  | 2.769  | -0.067 |
| 21               | 4.925        | 7.258         | 3.132       | 5.435  | 0.830  | 3.151  | 0.134  |
| 22               | 5.422        | 7.802         | 3.571       | 5.917  | 1.187  | 3.548  | 0.347  |
| 23               | 5.905        | 8.330         | 4.012       | 6.402  | 1.550  | 3.951  | 0.572  |
| 24               | 6.363        | 8.831         | 4.448       | 6.882  | 1.913  | 4.354  | 0.805  |
| 25               | 6.784        | 9.292         | 4.875       | 7.351  | 2.268  | 4.749  | 1.045  |
| 26               | 7.167        | 9.711         | 5.285       | 7.801  | 2.610  | 5.129  | 1.291  |
| 27               | 7.521        | 10.098        | 5.675       | 8.230  | 2.934  | 5.489  | 1.541  |
| 28               | 7.856        | 10.464        | 6.046       | 8.639  | 3.243  | 5.832  | 1.797  |
| 29               | 8.182        | 10.820        | 6.401       | 9.029  | 3.540  | 6.162  | 2.058  |
| 30               | 8.509        | 11.178        | 6.743       | 9.405  | 3.831  | 6.485  | 2.322  |
| 31               | 8.848        | 11.548        | 7.073       | 9.768  | 4.117  | 6.803  | 2.590  |
| 32               | 9.203        | 11.936        | 7.395       | 10.122 | 4.403  | 7.121  | 2.862  |
| 33               | 9.569        | 12.336        | 7.710       | 10.469 | 4.692  | 7.442  | 3.136  |
| 34               | 9.940        | 12.742        | 8.021       | 10.811 | 4.989  | 7.772  | 3.413  |
| 35               | 10.309       | 13.145        | 8.331       | 11.151 | 5.296  | 8.113  | 3.693  |
|   |        |        |        |        |        |        |        |
|---|--------|--------|--------|--------|--------|--------|--------|
| 36| 10.670 | 13.540 | 8.640  | 11.491 | 5.615  | 8.467  | 3.974  |
| 37| 11.017 | 13.920 | 8.948  | 11.830 | 5.944  | 8.833  | 4.256  |
| 38| 11.346 | 14.280 | 9.256  | 12.169 | 6.281  | 9.207  | 4.540  |
| 39| 11.659 | 14.623 | 9.564  | 12.507 | 6.625  | 9.590  | 4.824  |
| 40| 11.959 | 14.952 | 9.871  | 12.845 | 6.975  | 9.979  | 5.109  |

GWG, gestational weight gain.