Table S1. Sensitivity analysis of different cutoff values for the definition of low gestational weight gain in the second and third trimesters

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| Cutoff values for low GWG1, GWG2, GWG3, and those direct effects on birthweight, g [95%Confidence Interval] |
| Cutoff values | Direct effects on birthweight, g |  | Cutoff values | Direct effects on birthweight, g |  | Cutoff values | Direct effects on birthweight, g |  | Cutoff values | Direct effects on birthweight, g |  | Cutoff values | Direct effects on birthweight, g |
| 0 kg3 kg7 kg | 66.6 [5.6, 127.6]-203.2 [-286, -120.5]-169.1 [-275.4, -62.7] |  | 0 kg3 kg8 kg | 107.9 [46.2, 169.6]-229.3 [-298.5, -160.1]-133.2 [-207.8, -58.6] |  | 0 kg3 kg9 kg | 159.6 [98.6, 220.6]-250.9 [-320.1, -181.6]-163.2 [-227.7, -98.7] |  | 0 kg3 kg10 kg | 22.2 [-40.8, 85.3]-287.5 [-355.2, -219.7]-26.5 [-86.9, 34] |  | 0 kg3 kg11 kg | 23.8 [-39.2, 86.9]-219.5 [-297.2, -141.8]-83.7 [-140.7, -26.7] |
| **(i)0 kg****3.6 kg****7 kg** | **65.9 [11.4, 120.5]-195.4 [-263.4, -127.4]-188.8 [-292, -85.5]** |  | 0 kg3.6 kg8 kg | 69.3 [13.8, 124.8]-202 [-262.3, -141.7]-104.7 [-179.3, -30.1] |  | 0 kg3.6 kg9 kg | 101.7 [47.6, 155.7]-226.3 [-286.4, -166.3]-82.2 [-138.5, -26] |  | 0 kg3.6 kg10 kg | 41.6 [-18.3, 101.4]-273.2 [-338.2, -208.1]0.1 [-57.3, 57.6] |  | 0 kg3.6 kg11 kg | 33.5 [-25.5, 92.5]-217.5 [-288.4, -146.6]-50.1 [-103.5, 3.4] |
| 0 kg4 kg7 kg | 38.6 [-18.7, 96]-62.4 [-127.2, 2.3]-240.9 [-347.5, -134.3] |  | 0 kg4 kg8 kg | 66.6 [9.7, 123.5]-145.1 [-207.5, -82.7]-80.6 [-155.1, -6] |  | 0 kg4 kg9 kg | 88.8 [33.4, 144.1]-156.8 [-218.9, -94.6]-72.2 [-129.9, -14.5] |  | 0 kg4 kg10 kg | 34.9 [-26.5, 96.3]-193.8 [-259.3, -128.2]11.7 [-47.2, 70.5] |  | 0 kg4 kg11 kg | 20.1 [-40, 80.3]-110.8 [-178.1, -43.5]-37.2 [-92.2, 17.8] |
| 0 kg5 kg7 kg | 18.4 [-41.8, 78.7]-56.2 [-115.1, 2.7]-237.4 [-349.7, -125.1] |  | 0 kg5 kg8 kg | 64.9 [4.9, 124.9]-128.6 [-185.5, -71.6]-68.5 [-145.2, 8.2] |  | 0 kg5 kg9 kg | 66.6 [9.3, 124]-107.7 [-163.6, -51.7]-135.3 [-194.7, -75.9] |  | 0 kg5 kg10 kg | 18.5 [-43.6, 80.5]-146.7 [-206, -87.3]-47.5 [-107.1, 12] |  | 0 kg5 kg11 kg | -0.5 [-60.9, 60]-49.8 [-109.4, 9.8]-101.3 [-157.4, -45.2] |
| 0 kg6 kg7 kg | Not estimable |  | 0 kg6 kg8 kg | 97.2 [36.1, 158.3]-127.9 [-183.1, -72.8]-145.9 [-220.7, -71.2] |  | 0 kg6 kg9 kg | 109.1 [52.2, 165.9]-122.3 [-175, -69.5]-110 [-166.2, -53.8] |  | 0 kg6 kg10 kg | 53.7 [-8.2, 115.7]-155.1 [-212, -98.2]-51.4 [-109.8, 7.1] |  | (ii)0 kg6 kg11 kg | 38.2 [-22.4, 98.7]-104.3 [-160.2, -48.5]-85.5 [-141.3, -29.8] |

The analytical model included the mother’s pre-pregnancy body mass index, age, smoking during pregnancy, primipara, height, partners height, and infant’s sex. The results using a same cutoff value for GWG2 were placed in a row of the table and the results using a same cutoff value for GWG3 were placed in a line of the table. The result (i) was base case analysis using the recommended range by Japanese Ministry of Health, Labour and Welfare. The result (ii) was analysis using the cutoff values based on the recommended range by the US Institute of Medicine. Abbreviations: GWG1, gestational weight gain in trimester 1; GWG2, gestational weight gain in trimester 2; GWG3. gestational weight gain in trimester 3.

Supplementary Table 2. Direct effects of trimester-specific gestational weight gain on birthweight among women with normal pre-pregnant weight (body mass index was greater or equal than 18.5 kg/m2)”

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|  | Direct effect on birthweight, g[95% Confidence Intervals] |
| Low GWG1 (<0kg) | 69.6 [13.0, 126.1]  |
| Low GWG2 (<3.6kg) | -206.6 [-275.0, -138.3] |
| Low GWG3 (<7kg) | -157.1 [-263.8, -50.3] |

The analytical model included the mother’s pre-pregnancy body mass index, age, smoking during pregnancy, primipara, height, partners height, and infant’s sex. Abbreviations: GWG1, gestational weight gain in trimester 1; GWG2, gestational weight gain in trimester 2; GWG3. gestational weight gain in trimester 3.