# Supplementary Information

Figure S1: Weight measurements in grams by NBW and LBW babies over 24 month follow up period.



Figure S2: Weight gain (g per day per kg from previous visit) in the NBW and LBW babies over 24 month follow up period.

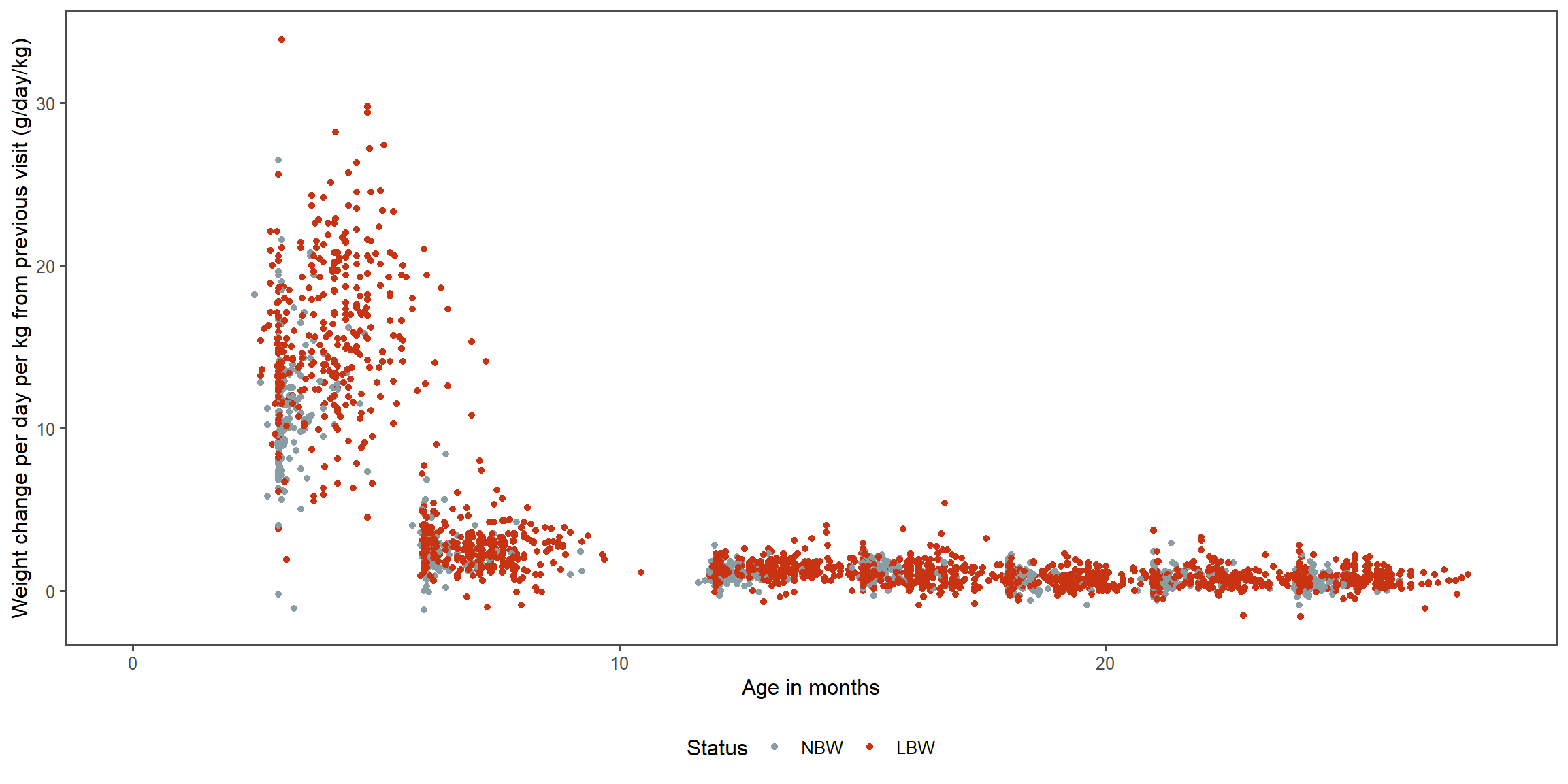


Table S 1 Weight change per day (in g) from the previous visit by group (NBW vs LBW).

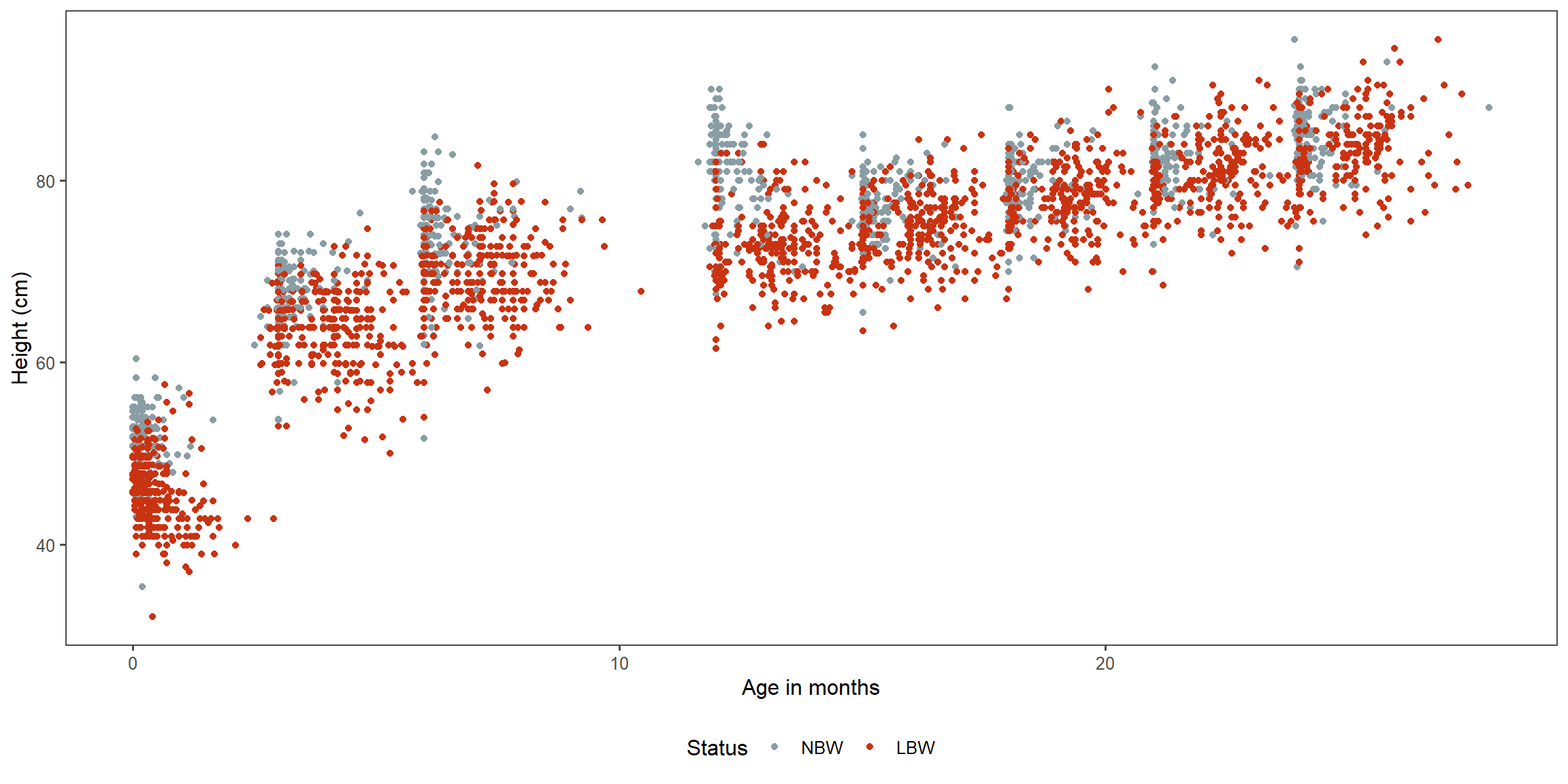
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Weight change per day from the previous visit (g)** | | | |
|  | **NBW** | | **LBW** | |
| **visit** | **n** | **Mean (sd)** | **n** | **Mean (sd)** |
| **3** | **197** | 33.3 (8.2) | **376** | 30.2 (7.5) |
| **6** | **179** | 14.7 (6.3) | **332** | 13.7 (6.1) |
| **12** | **164** | 7 (3.4) | **312** | 8.6 (3.6) |
| **15** | **151** | 10.2 (4.3) | **273** | 8.4 (5.8) |
| **18** | **143** | 6.2 (4.9) | **251** | 6.2 (4.4) |
| **21** | **135** | 6.8 (5.2) | **236** | 7.2 (5.4) |
| **24** | **127** | 5.8 (5.5) | **218** | 7.8 (5.5) |
|  |  |  |  |  |
| **visit** | **n** | **Median [range]** | **n** | **Median [range]** |
| **3** | **197** | 32.6 [-3.7-56.2] | **376** | 30.5 [3.9-49.9] |
| **6** | **179** | 14.1 [-6.8-33.1] | **332** | 13.5 [-6.7-36.8] |
| **12** | **164** | 6.5 [-1.8-14.9] | **312** | 8.5 [-4.6-24.7] |
| **15** | **151** | 10.3 [-2.7-20] | **273** | 8 [-7.4-40.7] |
| **18** | **143** | 5.9 [-7.7-21.6] | **251** | 6.1 [-5.4-20.5] |
| **21** | **135** | 6.1 [-7.1-23.5] | **236** | 6.6 [-17.8-31.5] |
| **24** | **127** | 5.3 [-11.1-24] | **218** | 7.5 [-14.6-29.7] |

*Table S2 Estimated weight from linear mixed models and 95% confidence intervals (in grams) at birth, 6, 12, 18 and 24 months for NBW and LBW infants adjusted by age and sex.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **NBW** | | **LBW** | |
| **Age (months)** | **Estimated weight (g)** | **95%CI** | **Estimated weight (g)** | **95%CI** |
| **Females** | **0** | 2679.3 | 2607.4- 2751.1 | 1507.0 | 1400.5-1613.6 |
| **6** | 6946.4 | 6803.5- 7089.2 | 5893.2 | 5744.9-6041.5 |
| **12** | 8772.2 | 8623.9- 8920.5 | 7929.5 |  |
| **18** | 10016.7 |  | 9183.8 |  |
| **24** | 11261.1 |  | 10438.0 |  |
|  | | | | | |
| **Males** | **0** | 2851.3 | 2754.9-2947.7 | 1679.07 | 1532.4-1825.8 |
| **6** | 7118.4 | 6922.4-7314.5 | 6065.24 | 5861.1-6269.4 |
| **12** | 8944.2 | 8712.3-9176.2 | 8101.58 |  |
| **18** | 10188.7 |  | 9355.80 |  |
| **24** | 11433.1 |  | 10610.02 |  |

**NBW = normal birth weight, LBW = low birth weight**

Figure S3: Height measurements in cm for NBW and LBW babies over 24 month follow up period.



*Table S3 Estimated length from linear mixed models and 95% confidence intervals (in grams) at birth, 6, 12, 18 and 24 months for NBW and LBW infants adjusted by sex.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **NBW** | | **LBW** | |
| **Age (months)** | **Estimated length (cm)** | **95%CI** | **Estimated length (cm)** | **95%CI** |
| **Females** | **0** | 49.5 | 49.0- 50.0 | 43.06 | 42.6- 43.5 |
| **6** | 70.6 | 70.1- 71.1 | 65.81 | 65.4- 66.3 |
| **12** | 78.0 | 77.5- 78.5 | 72.03 |  |
| **18** | 80.2 |  | 76.70 |  |
| **24** | 82.5 |  | 81.36 |  |
|  | | | | | |
| **Males** | **0** | 50.6 | 49.9- 51.2 | 44.17 | 43.6- 44.8 |
| **6** | 71.7 | 71.0- 72.4 | 66.92 | 66.3- 67.6 |
| **12** | 79.1 | 78.4- 79.8 | 73.14 |  |
| **18** | 81.3 |  | 77.81 |  |
| **24** | 83.6 |  | 82.47 |  |

**NBW = normal birth weight, LBW = low birth weight**

Table S4 Estimated Bayley Scales III raw scores from linear mixed models and 95% confidence intervals for gross motor skills, fine motor skills, cognitive skills, receptive communication skills and expressive communication skills in female infants.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Bayley scale** |  | **NBW** |  | **LBW** |  |
|  | **Age (months)** | **Estimated score** | **95%CI** | **Estimated score** | **95%CI** |
| **Gross Motor skills** | **6** | 25.4 | 24.5-26.3 | 21.0 | 20.1-21.9 |
| **12** | 40.4 | 39.6-41.1 | 37.2 | 36.3-38.0 |
| **18** | 47.4 |  | 44.7 |  |
| **24** | 54.4 |  | 52.2 |  |
|  | | | | | |
| **Fine motor skills** | **6** | 19.3 | 18.8-19.9 | 17.4 | 16.9-17.9 |
| **12** | 28.9 | 24.5-29.3 | 28.8 | 28.3-29.2 |
| **18** | 32.8 |  | 32.3 |  |
| **24** | 36.8 |  | 35.8 |  |
|  | | | | | |
| **Cognitive skills** | **12** | 38.4 | 37.2-39.5 | 37.6 | 36.4-38.8 |
| **18** | 49.6 | 48.5-50.7 | 47.6 |  |
| **24** | 55.4 |  | 55.4 |  |
|  | | | | | |
| **Receptive communication skills** | **12** | 12.8 | 12.3-13.4 | 11.7 | 11.1-12.2 |
| **18** | 18.2 | 17.7-18.6 | 17.4 |  |
| **24** | 23.8 |  | 22.4 |  |
|  | | | | | |
| **Expressive communication skills** | **12** | 12.3 | 11.5-13.1 | 11.9 | 11.1-12.7 |
| **18** | 18.2 | 17.5-18.9 | 16.2 |  |
| **24** | 24.9 |  | 22.6 |  |

Table S5 Estimated Bayley Scales III raw scores from linear mixed models and 95% confidence intervals for gross motor skills, fine motor skills, cognitive skills, receptive communication skills and expressive communication skills in male infants.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Bayley scale** |  | **NBW** |  | **LBW** |  |
|  | **Age (months)** | **Estimated score** | **95%CI** | **Estimated score** | **95%CI** |
| **Gross Motor skills** | **6** | 25.9 | 24.7-27.1 | 21.4 | 20.3-22.6 |
| **12** | 40.8 | 39.7-41.9 | 37.6 | 36.4-38.8 |
| **18** | 47.8 |  | 45.1 |  |
| **24** | 54.9 |  | 52.6 |  |
|  | | | | | |
| **Fine motor skills** | **6** | 19.4 | 18.7-20.1 | 17.5 | 16.8-18.1 |
| **12** | 29.0 | 28.4-29.5 | 28.8 | 28.1-29.5 |
| **18** | 32.9 |  | 32.4 |  |
| **24** | 36.9 |  | 35.9 |  |
|  | | | | | |
| **Cognitive skills** | **12** | 39.7 | 38.2-41.2 | 39.0 | 37.4-40.5 |
| **18** | 50.9 | 49.4-52.4 | 48.6 |  |
| **24** | 56.8 |  | 54.7 |  |
|  | | | | | |
| **Receptive communication skills** | **12** | 12.9 | 12.2-13.6 | 11.7 | 11.0-12.4 |
| **18** | 18.2 | 17.6-18.9 | 17.5 |  |
| **24** | 23.8 |  | 22.4 |  |
|  | | | | | |
| **Expressive communication skills** | **12** | 12.6 | 11.6-13.6 | 12.2 | 11.2-13.3 |
| **18** | 18.6 | 17.6-19.6 | 16.5 |  |
| **24** | 25.2 |  | 23.0 |  |

Table S6 Prediction models for outcome weight and length with predictor of age

| TermMeaning | Value | Estimate.weight | Pval.weight | Estimate.length | Pval.length |
| --- | --- | --- | --- | --- | --- |
| Intercept | NA | 2777.4 | 0.000 | 50.1 | 0 |
| Change LBW vs NBW | 1 if LBW | -1199.3 | 0.000 | -6.6 | 0 |
| Monthly change m0-3 | x (x<3); 3 (x>3) | 1117.8 | 0.000 | 5.8 | 0 |
| Monthly change after m3 until m12 | x-3 (x>3 and x=<12) or 12-3 (x>12) | 304.6 | 0.000 | 1.2 | 0 |
| Monthly change after m12 | x-12 (x>12) | 207.3 | 0.000 | 0.4 | 0 |
| if LBW: Monthly change m0-3 | 1 if LBW AND x (x<3); 3 (x>3) | 4.6 | 0.874 | 0.7 | 0 |
| if LBW: Monthly change after m3 until m12 | 1 if LBW AND x-3 (x>3 and x=<12) or 12-3 (x>12) | 34.7 | 0.002 | -0.2 | 0 |
| if LBW: Monthly change after m12 | 1 if LBW AND x-12 (x>12) | 1.7 | 0.815 | 0.4 | 0 |

Table S7: Prediction models for outcome weight and length with predictor of age and sex

| TermMeaning | Value | Estimate.weight | Pval.weight | Estimate.length | Pval.length |
| --- | --- | --- | --- | --- | --- |
| Intercept | NA | 2679.2 | 0.000 | 49.5 | 0 |
| Change LBW vs NBW | 1 if LBW | -1172.2 | 0.000 | -6.4 | 0 |
| Monthly change m0-3 | x (x<3); 3 (x>3) | 1118.1 | 0.000 | 5.8 | 0 |
| Monthly change after m3 until m12 | x-3 (x>3 and x=<12) or 12-3 (x>12) | 304.3 | 0.000 | 1.2 | 0 |
| Monthly change after m12 | x-12 (x>12) | 207.4 | 0.000 | 0.4 | 0 |
| Male vs Female | 1 if male | 172.0 | 0.000 | 1.1 | 0 |
| if LBW: Monthly change m0-3 | 1 if LBW AND x (x<3); 3 (x>3) | 4.6 | 0.873 | 0.7 | 0 |
| if LBW: Monthly change after m3 until m12 | 1 if LBW AND x-3 (x>3 and x=<12) or 12-3 (x>12) | 35.1 | 0.002 | -0.2 | 0 |
| if LBW: Monthly change after m12 | 1 if LBW AND x-12 (x>12) | 1.6 | 0.819 | 0.4 | 0 |

Table S8: Prediction models for outcome weight and length with predictor of age, sex and prematurity

| TermMeaning | Value | Estimate.weight | Pval.weight | Estimate.length | Pval.length |
| --- | --- | --- | --- | --- | --- |
| Intercept | NA | 2763.9 | 0.000 | 49.8 | 0 |
| Change LBW vs NBW | 1 if LBW | -855.5 | 0.000 | -5.1 | 0 |
| Monthly change m0-3 | x (x<3); 3 (x>3) | 1116.8 | 0.000 | 5.8 | 0 |
| Monthly change after m3 until m12 | x-3 (x>3 and x=<12) or 12-3 (x>12) | 304.0 | 0.000 | 1.2 | 0 |
| Monthly change after m12 | x-12 (x>12) | 207.5 | 0.000 | 0.4 | 0 |
| Male vs Female | 1 if male | 118.1 | 0.004 | 1.0 | 0 |
| Change preterm vs fullterm | 1 if preterm | -620.7 | 0.000 | -2.5 | 0 |
| if LBW: Monthly change m0-3 | 1 if LBW AND x (x<3); 3 (x>3) | 5.6 | 0.846 | 0.7 | 0 |
| if LBW: Monthly change after m3 until m12 | 1 if LBW AND x-3 (x>3 and x=<12) or 12-3 (x>12) | 35.4 | 0.002 | -0.2 | 0 |
| if LBW: Monthly change after m12 | 1 if LBW AND x-12 (x>12) | 1.5 | 0.831 | 0.4 | 0 |

Table S9: Prediction models for cognitive, receptive communication and expressive communication skills with predictor of age

| TermMeaning | Value | Estimate.CS | Pval.CS | Estimate.RC | Pval.RS | Estimate.EC | Pval.EC |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Intercept | NA | 16.7 | 0.000 | 2.2 | 0.016 | 0.5 | 0.675 |
| Change LBW vs NBW | 1 if LBW | 2.1 | 0.431 | -2.1 | 0.100 | 2.9 | 0.108 |
| Monthly change m12-18 | x (x<18); 18 (x>18) | 1.9 | 0.000 | 0.9 | 0.000 | 1.0 | 0.000 |
| Monthly change after m18 | x-18 (x>18) | 1.0 | 0.000 | 0.9 | 0.000 | 1.1 | 0.000 |
| if LBW: Monthly change m12-18 | 1 if LBW AND x (x<18); 18 (x>18) | -0.3 | 0.132 | 0.1 | 0.370 | -0.3 | 0.017 |
| if LBW: Monthly change after m18 | 1 if LBW AND x-18 (x>18) | 0.0 | 0.771 | -0.1 | 0.118 | 0.0 | 0.703 |

Table S10: Prediction models for cognitive, receptive communication and expressive communication skills with predictor of age and sex

| TermMeaning | Value | Estimate.CS | Pval.CS | Estimate.RC | Pval.RS | Estimate.EC | Pval.EC |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Intercept | NA | 15.9 | 0.000 | 2.1 | 0.020 | 0.3 | 0.792 |
| Change LBW vs NBW | 1 if LBW | 2.4 | 0.369 | -2.0 | 0.103 | 2.9 | 0.100 |
| Monthly change m12-18 | x (x<18); 18 (x>18) | 1.9 | 0.000 | 0.9 | 0.000 | 1.0 | 0.000 |
| Monthly change after m18 | x-18 (x>18) | 1.0 | 0.000 | 0.9 | 0.000 | 1.1 | 0.000 |
| Male vs Female | 1 if male | 1.3 | 0.037 | 0.1 | 0.806 | 0.3 | 0.423 |
| if LBW: Monthly change m12-18 | 1 if LBW AND x (x<18); 18 (x>18) | -0.3 | 0.131 | 0.1 | 0.369 | -0.3 | 0.017 |
| if LBW: Monthly change after m18 | 1 if LBW AND x-18 (x>18) | 0.0 | 0.770 | -0.1 | 0.118 | 0.0 | 0.703 |

Table S10: Prediction models for cognitive, receptive communication and expressive communication skills with predictor of age, sex and prematurity

| TermMeaning | Value | Estimate.CS | Pval.CS | Estimate.RC | Pval.RS | Estimate.EC | Pval.EC |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Intercept | NA | 16.0 | 0.000 | 2.2 | 0.015 | 0.5 | 0.710 |
| Change LBW vs NBW | 1 if LBW | 3.0 | 0.268 | -1.5 | 0.239 | 3.7 | 0.040 |
| Monthly change m12-18 | x (x<18); 18 (x>18) | 1.9 | 0.000 | 0.9 | 0.000 | 1.0 | 0.000 |
| Monthly change after m18 | x-18 (x>18) | 1.0 | 0.000 | 0.9 | 0.000 | 1.1 | 0.000 |
| Change male vs female | 1 if male | 1.3 | 0.043 | 0.0 | 0.911 | 0.3 | 0.495 |
| Change preterm vs fullterm | 1 if preterm | -1.3 | 0.096 | -1.2 | 0.000 | -1.6 | 0.001 |
| if LBW: Monthly change m12-18 | 1 if LBW AND x (x<18); 18 (x>18) | -0.3 | 0.143 | 0.1 | 0.323 | -0.3 | 0.021 |
| if LBW: Monthly change after m18 | 1 if LBW AND x-18 (x>18) | 0.0 | 0.746 | -0.1 | 0.137 | 0.0 | 0.750 |

Table S11: Prediction models for gross and fine motor skills with predictor of age

| TermMeaning | Value | Estimate.fm | Pval.fm | Estimate.gm | Pval.gm |
| --- | --- | --- | --- | --- | --- |
| Intercept | NA | 9.8 | 0.000 | 10.8 | 0.000 |
| Change LBW vs NBW | 1 if LBW | -3.7 | 0.000 | -5.7 | 0.000 |
| Monthly change m6-12 | x (x<12); 12 (x>12) | 1.6 | 0.000 | 2.5 | 0.000 |
| Monthly change after m12 | x-12 (x>12) | 0.7 | 0.000 | 1.2 | 0.000 |
| if LBW: Monthly change m6-12 | 1 if LBW AND x (x<12); 12 (x>12) | 0.3 | 0.000 | 0.2 | 0.041 |
| if LBW: Monthly change after m12 | 1 if LBW AND x-12 (x>12) | -0.1 | 0.049 | 0.1 | 0.116 |

Table S12: Prediction models for gross and fine motor skills with predictor of age and sex

| TermMeaning | Value | Estimate.fm | Pval.fm | Estimate.gm | Pval.gm |
| --- | --- | --- | --- | --- | --- |
| Intercept | NA | 9.8 | 0.000 | 10.5 | 0.000 |
| Change LBW vs NBW | 1 if LBW | -3.7 | 0.000 | -5.7 | 0.000 |
| Monthly change m6-12 | x (x<12); 12 (x>12) | 1.6 | 0.000 | 2.5 | 0.000 |
| Monthly change after m12 | x-12 (x>12) | 0.7 | 0.000 | 1.2 | 0.000 |
| Male vs Female | 1 if male | 0.1 | 0.785 | 0.4 | 0.397 |
| if LBW: Monthly change m6-12 | 1 if LBW AND x (x<12); 12 (x>12) | 0.3 | 0.000 | 0.2 | 0.039 |
| if LBW: Monthly change after m12 | 1 if LBW AND x-12 (x>12) | -0.1 | 0.049 | 0.1 | 0.116 |

Table S13: Prediction models for gross and fine motor skills with predictor of age, sex and prematurity

| TermMeaning | Value | Estimate.fm | Pval.fm | Estimate.gm | Pval.gm |
| --- | --- | --- | --- | --- | --- |
| Intercept | NA | 13.1 | 0.000 | 14.1 | 0.000 |
| Change LBW vs NBW | 1 if LBW | -1.9 | 0.001 | -3.7 | 0.000 |
| Monthly change m12-18 | x (x<18); 18 (x>18) | 1.2 | 0.000 | 2.0 | 0.000 |
| Monthly change after m18 | x-18 (x>18) | 0.4 | 0.000 | 0.5 | 0.000 |
| Change male vs female | 1 if male | 0.0 | 0.953 | 0.3 | 0.620 |
| Change preterm vs fullterm | 1 if preterm | -0.3 | 0.340 | -1.8 | 0.005 |
| if LBW: Monthly change m12-18 | 1 if LBW AND x (x<18); 18 (x>18) | 0.1 | 0.010 | 0.1 | 0.067 |
| if LBW: Monthly change after m18 | 1 if LBW AND x-18 (x>18) | -0.1 | 0.140 | 0.2 | 0.018 |

Table S14: Reference list of the R packages used in the data analysis

|  |
| --- |
| 1. Douglas Bates, Martin Maechler, Ben Bolker, Steve Walker (2015).  Fitting Linear Mixed-Effects Models Using lme4. Journal of Statistical Software, 67(1), 1-48. doi:10.18637/jss.v067.i01. 2. Lüdecke D (2021). \_sjPlot: Data Visualization for Statistics in Social Science\_. R package version 2.8.7, <URL: <https://CRAN.R-project.org/package=sjPlot>>. 3. Lüdecke D (2018). "ggeffects: Tidy Data Frames of Marginal Effects from Regression Models." \_Journal of Open Source Software\_, \*3\*(26), 772. doi: 10.21105/joss.00772 (URL: <https://doi.org/10.21105/joss.00772>). 4. Kuznetsova A, Brockhoff PB, Christensen RHB (2017). "lmerTest Package: Tests in Linear Mixed Effects Models." \_Journal of Statistical Software\_, \*82\*(13), 1-26. doi: 10.18637/jss.v082.i13 (URL: <https://doi.org/10.18637/jss.v082.i13>). 5. Wickham et al., (2019). Welcome to the tidyverse. Journal of Open Source Software, 4(43), 1686, <https://doi.org/10.21105/joss.01686> 6. Russell V. Lenth (2020). emmeans: Estimated Marginal Means, aka Least-Squares Means. R package version 1.5.3.  <https://CRAN.R-project.org/package=emmeans> 7. Michal Bojanowski (2017). lspline: Linear Splines with Convenient Parametrisations. R package version 1.0-0. <https://CRAN.R-project.org/package=lspline> 8. Jeffrey B. Arnold (2021). ggthemes: Extra Themes, Scales and Geoms for 'ggplot2'. R package version 4.2.4.  <https://CRAN.R-project.org/package=ggthemes> 9. Karthik Ram and Hadley Wickham (2018). wesanderson: A Wes Anderson Palette Generator. R package version 0.3.6. <https://CRAN.R-project.org/package=wesanderson> 10. Yihui Xie (2021). knitr: A General-Purpose Package for Dynamic Report Generation in R. R package version 1.31. 11. Yihui Xie (2015) Dynamic Documents with R and knitr. 2nd edition. Chapman and Hall/CRC. ISBN 978-1498716963 12. Yihui Xie (2014) knitr: A Comprehensive Tool for Reproducible   Research in R. In Victoria Stodden, Friedrich Leisch and Roger D.  Peng, editors, Implementing Reproducible Computational Research.  Chapman and Hall/CRC. ISBN 978-1466561595 |