Supplementary Material

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## Table S1. Bias from Bland-Altman and linear correlation parameters of venous blood hemoglobin measurements using each HemoCue apparatus *versus* the cyanmethemoglobin method

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number of HemoCue apparatus\*** | **Bland-Altman bias** | **Intercept** | **Slope** | **n** |
| **1** | 0.345 | .0025454 | 1.027402 | 80 |
| **2** | 0.365 | 0.8078831 |  0.9651042 | 34 |
| **3** | 0.332 | 0.0229337 | 1.023791 | 68 |
| **4** | 0.423 | -0.3411198 | 1.06057 | 26 |
| **5** | 0.400 | -2.380941 | 1.227373 | 26 |
| **6** | 0.148 | -0.1218974 | 1.021328 | 64 |
| **All** | 0.314 | 0.024098 | 1.022877 | 298 |

*\*Each HemoCue was used for only one person; these results represent the combined effect of apparatus and personnel skills.*

## Figure S1. Bland Altman plot and box plot of hemoglobin (Hb) measurement difference (g/dL) in capillary *versus* venous blood samples as analyzed using the cyanmethemoglobin method.

|  |  |
| --- | --- |
| 1. Bland Altman Plot
 | 1. Box plot
 |
| Mean ∂ Hb= 0.097 ±0.426, 95%CI (-0.737,0.931) |  |

## Table S2. Bland-Altman plots of hemoglobin concentration determined using the HemoCue in different blood sample sources versus using the cyanmethemoglobin method with venous blood by age group.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Age group** | **Sampling method using HemoCue**  | **Concordance** | **Pearson correlation** | **Relative bias** | **Hb mean difference (g/dL)** | **SD** |
| *Children* | Venous  | 0.943 | 0.948 | 0.994 | -0.007 | 0.311 |
| Pool (first and second lecture) | 0.867 | 0.87 | 0.997 | -0.064 | 0.395 |
| Drop (second and third drop) | 0.557 | 0.612 | 0.942 | 0.096 | 1.052 |
| *Women* | Venous  | 0.978 | 0.98 | 0.998 | -0.02 | 0.307 |
| Pool (first and second lecture) | 0.971 | 0.972 | 0.999 | -0.04 | 0.337 |
| Drop (second and third drop) | 0.886 | 0.968 | 0.916 | 0.624 | 0.483 |
| *Older Adults* | Venous  | 0.973 | 0.973 | 1.0 | 0.026 | 0.373 |
| Pool (first and second lecture) | 0.958 | 0.959 | 0.999 | 0.036 | 0.371 |
| Drop (second and third drop) | 0.864 | 0.915 | 0.944 | 0.554 | 0.722 |

## Figure S2. Concordance plots by age group and sampling method

|  |  |  |  |
| --- | --- | --- | --- |
|  | Preschoolers | Women | Elderly |
| Venous |  |  |  |
| Pooled capillary blood |  |  |  |
| Drops of capillary blood blood |  |  |  |

## Figure S3. Frequency distributions of the difference between adjusted\* hemoglobin measurement results using the HemoCue in three types of blood sample sources, against the cyanmethemeglobin method in venous blood

1. Before adjustment

|  |  |  |
| --- | --- | --- |
| Venous blood | Pooled capillary blood | Drops of capillary blood |
| Mean ∂ Hb= 0.31 ± 0.31 | Mean ∂ Hb= 0.29± 0.36 | Mean ∂ Hb= 0.73± 0.81 |

1. After adjustment

|  |  |  |
| --- | --- | --- |
| Venous blood | Pooled capillary blood | Drops of capillary blood |
| Mean ∂ Hb= -0.0002 ± 0.31 | Mean ∂ Hb=-0.02 ± 0.36 | Mean ∂ Hb=0.42 ± 0.81 |

*\* The hemoglobin values from the HemoCue were adjusted by subtracting the average bias of 0.314 g/dL*

## Table S3. Mixed linear regression model\* for differences in hemoglobin (Hb) sampling methods

**\*Before adjustment**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | All |  | Children |  | Women |  | Older Adults |
|   | **Coef** | ***p*-value** | **95%CI** |   | **Coef** | ***p*-value** | **95%CI** |   | **Coef** | ***p*-value** | **95%CI** |   | **Coef** | ***p*-value** | **95%CI** |
| **Sampling method (ref: venous cyanmeth.)** |  |  |  |  |  |  |  |  |  |  |  |  |
| Venous ABX hemocounter  | 0.08 | 0.059 | (-0.003 0.15) |  | 0.06 | 0.506 | (-0.11, 0.22) |  | 0.1 | 0.065 | (-0.01, 0.21) |  | 0.07 | 0.274 | (-0.06, 0.2) |
| Capillary cyanmethemoglobin | 0.09 | 0.09 | (-0.01, 0.19) |  | -0.05 | 0.621 | (-0.27, 0.16) |  | 0.18 | 0.018 | (0.03, 0.33) |  | 0.14 | 0.096 | (-0.03, 0.32) |
| Venous HemoCue | 0.26 | <0.001 | (0.17, 0.35) |  | 0.24 | 0.009 | (0.06, 0.42) |  | 0.22 | <0.001 | (0.09, 0.34) |  | 0.3 | <0.001 | (0.16, 0.45) |
| Pooled capillary HemoCue | 0.28 | <0.001 | (0.19, 0.37) |  | 0.23 | 0.012 | (0.05, 0.41) |  | 0.26 | <0.001 | (0.13, 0.38) |  | 0.35 | <0.001 | (0.21, 0.5) |
| Drop capillary HemoCue | 0.74 | <0.001 | (0.65, 0.83) |  | 0.43 | <0.001 | (0.25, 0.6) |  | 0.95 | <0.001 | (0.83, 1.07) |  | 0.86 | <0.001 | (0.72, 1.01) |
| **Intercept** | 12.2 | <0.001 | (11.67, 12.7) |   | 12.28 | <0.001 | (11.9, 12.66) |   | 12.7 | <0.001 | (12.15, 12.99) |   | 14.7 | <0.001 | (13.42, 15.92) |

**\*After adjustment**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | All |  | Children |  | Women |  | Older Adults |
|   | **Coef** | ***p*-value** | **95%CI** |   | **Coef** | ***p*-value** | **95%CI** |   | **Coef** | ***p*-value** | **95%CI** |   | **Coef** | ***p*-value** | **95%CI** |
| **Sampling Method (ref: venous cyanmeth)** |  |  |  |  |  |  |  |  |  |  |  |  |
| Venous ABX hemocounter  | 0.08 | 0.059 | (0, 0.16) |  | 0.06 | 0.506 | (-0.11, 0.22) |  | 0.10 | 0.065 | (-0.01, 0.21) |  | 0.07 | 0.274 | (-0.06, 0.2) |
| Capillary cyanmethemoglobin | 0.09 | 0.09 | (-0.01, 0.2) |  | -0.05 | 0.621 | (-0.27, 0.16) |  | 0.18 | 0.018 | (0.03, 0.33) |  | 0.14 | 0.096 | (-0.03, 0.32) |
| Venous HemoCue | -0.06 | 0.219 | (-0.15, 0.03) |  | -0.07 | 0.434 | (-0.25, 0.11) |  | -0.09 | 0.135 | (-0.22, 0.03) |  | -0.01 | 0.923 | (-0.15, 0.14) |
| Pooled Capillary HemoCue | -0.03 | 0.534 | (-0.12, 0.06) |  | -0.08 | 0.383 | (-0.26, 0.1) |  | -0.05 | 0.409 | (-0.18, 0.07) |  | 0.04 | 0.577 | (-0.1, 0.18) |
| Drop capillary HemoCue | 0.43 | <0.001 | (0.34, 0.52) |  | 0.11 | 0.218 | (-0.07, 0.29) |  | 0.64 | <0.001 | (0.51, 0.76) |  | 0.55 | <0.001 | (0.41, 0.69) |
| **Intercept** | 12.2 | <0.001 | (11.67, 12.7) |   | 12.28 | <0.001 | (11.9, 12.66) |  | 12.58 | <0.001 | (12.15, 13) |  | 14.7 | <0.001 | (13.42, 15.92) |

*\*Adjusted by age and sex*

## Table S4. Bland Alman of the Hb mean differences to venous blood in the reference method\*, by number of measurement using HemoCue

|  |  |  |  |
| --- | --- | --- | --- |
| Number of Hb measurement in HemoCue | Venous∂ ± SD, (95%CI) | Pooled capillary∂ ± SD, (95%CI) | Drop capillary∂ ± SD, (95%CI) |
| First | -0.044±0.30, (-0.636, 0.549) | -0.034± 0.33, (-0.687, 0.619) | 0.350±0.81, (-1.128, 1.98) |
| Second | 0.043±0.35, (-0.650, 0.736) | -0.010± 0.40, (-0.798, 0.778) | 0.49±0.82, (-1.121, 2.120) |
| Mean  | 0.000±0.30, (-0.599, 0.598) | -0.034±0.33, (-0.687, 0.619) | 0.35±0.80, (-1.228, 1.928) |

***\**** *Venous blood samples analyzed using the cyanmethemoglobin method.*

## Table S5. Random effects of the mixed linear regression model on differences in hemoglobin measurement

|  |  |  |
| --- | --- | --- |
|  | **σ²**  | **% of Total variance** |
| **Group of population** | **Subject** | **Residual** | **Subject** | **Residual** |
| All | 1.67 | 0.12 | 93.3% | 6.7% |
| Children | 0.79 | 0.16 | 82.5% | 17.5% |
| Women | 2.25 | 0.07 | 97.0% | 3.0% |
| Older adults | 1.95 | 0.10 | 92.7% | 7.3% |