**Supplementary 1 Table A: Bias and Precision of ACR and eAER compared to mAER in Males**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **N= 119** | **Median (IQR) Value [mg/day]** | **Median Bias [mg/24h]** | **% Median Bias** | **Precision****[mg/24h]** | **P Value** |
| mAER |  40 (16, 204)  | -- | - | -- | -- |
| ACR |  30.9 (10-120) |  -10.4  | -33.7%  | 34.0  |  **<0.01\***  |
| **eAER by:** |  |  |  |  |  |
|  Fotheringham([9](#_ENREF_9)) | 49.7 (17,193)  |  0.6  | 2.6%  | 36.4  |  0.32 |
|  CKD-EPI([13](#_ENREF_13)) |  47.9 (15, 204)  | 0.5  | 5.0%  | 37.7  | 0.23  |
|  Cockcroft-Gault([14](#_ENREF_14)) |  45.6 (13, 179) |  -3.5  | -15.5%  |  29.6 |  0.07  |
|  Walser([15](#_ENREF_15)) |  49.3 (14, 199) |  -1.8 | -3.9%  | 35.0  |  0.94 |
|  Goldwasser([16](#_ENREF_16)) | 44.0 (14, 187  |  -2.6 | -10.9%  |  33.0 |  0.21  |
|  Rule([17](#_ENREF_17)) | 49.3 (14, 182)  |  -0.4 | -1.4%  | 32.7  | 0.63  |

Median Bias: estimated value (either ACR or eAER) - measured value (mAER).

% Median Bias: ((estimated value (either ACR or eAER) – measured value (mAER)/ measured value (mAER))\*100

Precision: Interquartile range (IQR) of median bias.

ACR: Albumin excretion rate calculated from albumin-creatinine ratio.

eAER: Expected albumin excretion rate.

mAER: Measured albumin excretion rate (24-hour urine albumin).

P-value is for comparison between eAER or ACR and mAER.

\*Indicates statistically significant result (P<0.007 considered statistically significant with Bonferroni correction for multiple comparisons; See Methods).

**Supplementary 1 Table B: Bias and Precision of ACR and eAER compared to mAER in Females**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **N= 62** | **Median (IQR) Value [mg/day]** | **Median Bias [mg/24h]** | **% Median Bias** | **Precision****[mg/24h]** | **P Value** |
| mAER |  23 (13, 82) | -- | - | -- | -- |
| ACR | 22.5 (12, 88)  |  -1.1 |  -9.8% | 21.6  | 0.30  |
| **eAER by:** |  |  |  |  |  |
|  Fotheringham([9](#_ENREF_9)) | 23.1 (13, 82)  | -1.6  | -9.2%  |  22.3 | 0.22  |
|  CKD-EPI([13](#_ENREF_13)) | 24.8 (13, 95)  | -1.2  |  -4.3% |  25.4 |  0.57 |
|  Cockcroft-Gault([14](#_ENREF_14)) | 24.3 (13, 84)  | -2.8  |  -11.8%  |  23.4 | 0.28  |
|  Walser([15](#_ENREF_15)) | 26.3 (14, 98)  | -0.8  |  -3.7% |  24.7 | 0.88  |
|  Goldwasser([16](#_ENREF_16)) | 28.7 (15, 114)  |  0.4 |  5.0% |  18.3 | 0.53  |
|  Rule([17](#_ENREF_17)) | 22.9 (13, 77)  |  -1.7 |  -5.8%  |  25.1  | 0.36  |

Median Bias: estimated value (either ACR or eAER) - measured value (mAER).

% Median Bias: ((estimated value (either ACR or eAER) – measured value (mAER)/ measured value (mAER))\*100

Precision: Interquartile range (IQR) of median bias.

ACR: Albumin excretion rate calculated from albumin-creatinine ratio.

eAER: Expected albumin excretion rate.

mAER: Measured albumin excretion rate (24-hour urine albumin).

P-value is for comparison between eAER or ACR and mAER.

No result was statistically significant (P<0.007 considered statistically significant with Bonferroni correction for multiple comparisons; See Methods).

**Supplementary 1 Table C: Accuracy of ACR and eAER compared to mAER in Males**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **N= 119** | **P15%** | **P-valueα** | **P30%** | **P-valueβ** | **P50%** | **P-valueµ** |
| ACR |  16 (10, 24)  | - | 36 (28, 46)  | - | 65 (55, 73)   | - |
| **eAER by:** |  |  |  |  |  |  |
|  Fotheringham([9](#_ENREF_9)) | 26 (18, 35)  | 0.08  | 47 (38, 56)  | 0.03  | 66 (57, 75)  | 0.73  |
|  CKD-EPI([13](#_ENREF_13)) |  29 (21, 39)   | 0.03  | 50 (40, 59)  | 0.04  | 71 (62, 79)  | 0.18  |
|  Cockcroft-Gault([14](#_ENREF_14)) | 20 (13, 29) |  0.35 | 47 (38, 56)  |  0.04 | 71 (63, 80)  | 0.09 |
|  Walser([15](#_ENREF_15)) | 27 (19, 36) |  0.04 | 52 (43, 61)  | **<0.01\***  | 70 (61, 78) | 0.24  |
|  Goldwasser([16](#_ENREF_16)) |  26 (18, 35) | 0.05  | 52 (43, 61) | **<0.01\***  | 73 (64, 81)  | 0.03  |
|  Rule([17](#_ENREF_17)) |  26 (18, 35) | 0.06  | 51 (42, 61)  |  0.02 | 69 (60, 77) | 0.37 |

P1 5%, P30%, P50%: Proportion of ACR or eAER within 15%, 30% and 50% of reference standard (measured 24-hour urine albumin) respectively.

αP, βP, µP: P-value for comparison between accuracy of eAER vs accuracy of ACR for P15%, P30% and P50% respectively.

ACR: Albumin excretion rate calculated from albumin-creatinine ratio.

eAER: Expected albumin excretion rate.

 \*Indicates statistically significant result (P<0.008 considered statistically significant with Bonferroni correction for multiple comparisons; See Methods).

**Supplementary 1 Table D: Accuracy of ACR and eAER compared to mAER in Females**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **N= 62** | **P15%** | **P-valueα** | **P30%** | **P-valueβ** | **P50%** | **P-valueµ** |
| ACR | 21 (12, 33)   | - | 42 (30, 55)  | - | 61 (48, 73)   | - |
| **eAER by:** |  |  |  |  |  |  |
|  Fotheringham([9](#_ENREF_9)) | 19 (10, 31)  | 0.74  | 44 (31, 57)  | 0.97 | 60 (47, 72)  |  0.56 |
|  CKD-EPI([13](#_ENREF_13)) | 13 (6, 24)   |  0.13 |  45 (33, 58) | 0.59  | 68 (55, 79)  |  0.10 |
|  Cockcroft-Gault([14](#_ENREF_14)) | 19 (10, 31) | 0.81  | 50 (37, 63)  |  0.23 | 65 (51, 76)  | 0.48 |
|  Walser([15](#_ENREF_15)) | 18 (9, 30) | 0.62 | 44 (31, 57)  | 0.81  | 68 (55, 79) | 0.10  |
|  Goldwasser([16](#_ENREF_16)) |  24 (14, 37) | 0.59  | 36 (24, 49) |  0.39 | 58 (45, 71)  | 0.53  |
|  Rule([17](#_ENREF_17)) |  23 (13, 35) |  0.76 | 45 (33, 58)  |  0.53 | 65 (51, 76) | 0.32 |

P1 5%, P30%, P50%: Proportion of ACR or eAER within 15%, 30% and 50% of reference standard (measured 24-hour urine albumin) respectively.

αP, βP, µP: P-value for comparison between accuracy of eAER vs accuracy of ACR for P15%, P30% and P50% respectively.

ACR: Albumin excretion rate calculated from albumin-creatinine ratio.

eAER: Expected albumin excretion rate.

No result was statistically significant (P<0.008 considered statistically significant with Bonferroni correction for multiple comparisons; See Methods).

**Supplementary 1 Table E:** **Bias and Precision of PCR and ePER compared to mPER in Males**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **N=119** | **Median (IQR) Value [mg/day]** | **Median Bias [mg/24h]** | **% Median Bias** | **Precision****[mg/24h]** | **P Value** |
| mPER |  240 (100, 480)  | - |  | - | - |
| PCR | 151 (85, 326)  | -62.5  |  -28.5% | 153  | **<0.01\***  |
| **ePER by:** |  |  |  |  |  |
|  Fotheringham([9](#_ENREF_9)) | 238 (122, 528)  | 16.4  | 9.9%  |  162 | 0.20  |
|  CKD-EPI([13](#_ENREF_13)) | 238 (132, 484)  | 15.6  | 11.4%  | 146  | 0.22  |
|  Cockcroft-Gault([14](#_ENREF_14)) |  194 (109, 410) |  -15.5 | -10.3%  | 150  | 0.01  |
|  Walser([15](#_ENREF_15)) |  216 (124, 452) | 3.1  |  2.1% |  151 |  0.92  |
|  Goldwasser([16](#_ENREF_16)) | 202 (114, 406)  | -9.7  |  -5.9% |  153 |  0.08  |
|  Rule([17](#_ENREF_17)) | 220 (119, 469)  |  12.2 | 5.5%  |  130 |  0.82  |

Median Bias: estimated value (either PCR or ePER) - measured value (mPER).

% Median Bias: ((estimated value (either PCR or ePER) – measured value (mPER)/ measured value (mPER))\*100

Precision: Interquartile range (IQR) of median bias.

PCR: Protein excretion rate calculated from protein-creatinine ratio.

ePER: Expected protein excretion rate.

mPER: Measured protein excretion rate (24-hour urine protein).

P-value is for comparison between ePER or PCR and mPER.

\*Indicates statistically significant result (P<0.007 considered statistically significant with Bonferroni correction for multiple comparisons; See Methods).

**Supplementary 1 Table F:** **Bias and Precision of PCR and ePER compared to mPER in Females**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **N=62** | **Median (IQR) Value [mg/day]** | **Median Bias [mg/24h]** | **% Median Bias** | **Precision****[mg/24h]** | **P Value** |
| mPER | 150 (70, 360)  | - |  | - | - |
| PCR | 149 (88, 239) |  -0.6 |  -0.7% | 91  | 0.72 |
| **ePER by:** |  |  |  |  |  |
|  Fotheringham([9](#_ENREF_9)) | 144 (87, 257)  |  -7.7 |  -5.8% | 93  | 0.54  |
|  CKD-EPI([13](#_ENREF_13)) |  161 (90, 250) |  0.4 |  0.5% |  98 | 0.89  |
|  Cockcroft-Gault([14](#_ENREF_14)) | 148 (86, 281)  |  -9.9 |  -8.7% | 107  | 0.38  |
|  Walser([15](#_ENREF_15)) |  166 (94, 281) |  2.2 |  2.4% | 103  | 0.74  |
|  Goldwasser([16](#_ENREF_16)) | 182 (103, 305)  | 16.4  |  15.1% | 112  |  0.10 |
|  Rule([17](#_ENREF_17)) | 148 (91, 238)  |  -5.5 |  -5.7% |  113 |  0.58 |

Median Bias: estimated value (either PCR or ePER) - measured value (mPER).

% Median Bias: ((estimated value (either PCR or ePER) – measured value (mPER)/ measured value (mPER))\*100

Precision: Interquartile range (IQR) of median bias.

PCR: Protein excretion rate calculated from protein-creatinine ratio.

ePER: Expected protein excretion rate.

mPER: Measured protein excretion rate (24-hour urine protein).

P-value is for comparison between ePER or PCR and mPER.

No result was statistically significant (P<0.007 considered statistically significant with Bonferroni correction for multiple comparisons; See Methods).

**Supplementary 1 Table G: Accuracy of PCR and ePER compared to mPER in Males**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **N= 119** | **P15%** | **P-valueα** | **P30%** | **P-valueβ** | **P50%** | **P-valueµ** |
| PCR |  18 (11, 26) | - |  43 (34, 52) | - | 47 (38, 56)  | - |
| **ePER by:** |  |  |  |  |  |  |
|  Fotheringham([9](#_ENREF_9)) | 21 (14, 29)  |  0.55 |  45 (36, 55) | 0.72 | 61 (51, 69)  | 0.03  |
|  CKD-EPI([13](#_ENREF_13)) | 27 (19, 36)  | 0.12  |  55 (45, 64) | 0.07 | 62 (54, 71)  |  0.02  |
|  Cockcroft-Gault([14](#_ENREF_14)) | 24 (17, 33)  | 0.18  |  50 (40, 59) | 0.18 | 56 (46, 65)  | 0.09  |
|  Walser([15](#_ENREF_15)) |  28 (20, 37) |  0.05 |  52 (43, 61)  | 0.12 |  62 (53, 71)  |  0.01  |
|  Goldwasser([16](#_ENREF_16)) |  28 (20, 37) |  0.05  | 50 (41, 60)  | 0.14 |  56 (47, 65) | 0.07  |
|  Rule([17](#_ENREF_17)) | 27 (19, 36)  | 0.09  | 55 (45, 64)  | 0.07 |  73 (64, 81)  | **<0.01\***  |

P15%, P30%, P50%: Proportion of PCR or ePER within 15%, 30% and 50% of reference standard (measured 24-hour urine protein) respectively.

αP, βP, µP: P-value for comparison between accuracy of ePER vs accuracy of PCR for P15%, P30% and P50% respectively.

PCR: Protein excretion rate calculated from protein-creatinine ratio.

ePER: Expected protein excretion rate.

\*Indicates statistically significant result (P<0.008 considered statistically significant with Bonferroni correction for multiple comparisons; See Methods).

**Supplementary 1 Table H: Accuracy of PCR and ePER compared to mPER in Females**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **N= 62** | **P15%** | **P-valueα** | **P30%** | **P-valueβ** | **P50%** | **P-valueµ** |
| PCR | 31 (20, 44)  | - | 42 (30, 55)  | - | 48 (36, 61)  | - |
| **ePER by:** |  |  |  |  |   |  |
|  Fotheringham([9](#_ENREF_9)) | 27 (17, 40)  | 0.32  |  48 (36, 61)  | 0.16  | 53 (40, 66)  | 0.08  |
|  CKD-EPI([13](#_ENREF_13)) | 23 (13, 35)  |  0.20 |  52 (39, 65) |  0.11  | 57 (43, 69)  | 0.10  |
|  Cockcroft-Gault([14](#_ENREF_14)) | 26 (16, 39)  |  0.51  |  45 (33, 58) | 0.62  | 50 (37, 63)  | 0.78  |
|  Walser([15](#_ENREF_15)) | 21 (12, 33)  |  0.13 |  52 (39, 65) | 0.13  | 55 (42, 68)  | 0.25  |
|  Goldwasser([16](#_ENREF_16)) | 23 (13, 35)  | 0.28  |  40 (28, 54) | 0.82  | 57 (43, 69)  | 0.20  |
|  Rule([17](#_ENREF_17)) |  26 (16, 39) |  0.37 |  48 (36, 61) | 0.21  | 73 (60, 83)  | **<0.01\***  |

P15%, P30%, P50%: Proportion of PCR or ePER within 15%, 30% and 50% of reference standard (measured 24-hour urine protein) respectively.

αP, βP, µP: P-value for comparison between accuracy of ePER vs accuracy of PCR for P15%, P30% and P50% respectively.

PCR: Protein excretion rate calculated from protein-creatinine ratio.

ePER: Expected protein excretion rate.

\*Indicates statistically significant result (P<0.008 considered statistically significant with Bonferroni correction for multiple comparisons; See Methods).