**Table S1** Statistical results of Kruskal-Wallis test performed to compare current CVs of different measurement systems (α=0.05)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Analytes** | **P value** | | | |
| **2014** | **2015** | **2016** | **2017** |
| **pH** | 0.247 | 0.101 | 0.078 | 0.015 |
| **pCO2** | 0.120 | 0.204 | 0.04 | 0.177 |
| **pO2** | <0.001 | <0.001 | <0.001 | <0.001 |
| **Na+** | 0.072 | 0.098 | 0.157 | 0.014 |
| **K+** | 0.044 | 0.067 | 0.106 | 0.002 |
| **Ca2+** | 0.095 | 0.196 | 0.296 | 0.069 |
| **Cl-** | 0.056 | 0.009 | 0.037 | 0.002 |

**Table S2** Median CVs and statistical results of Manny-Whitney U test performed for further comparison of current CVs of pH between any two kinds of measurement systems in 2017 (α=0.05)

|  |  |  |
| --- | --- | --- |
| **Compare Groups** | **Median CVs (%)** | **P value** |
| Radiometer and IL-GEM | 0.10 and 0.15 | 0.001 |
| Radiometer and Roche | 0.10 and 0.14 | 0.059 |
| Radiometer and Siemens | 0.10 and 0.12 | 0.984 |
| Radiometer and NOVA | 0.10 and 0.13 | 0.131 |
| IL-GEM and Roche | 0.15 and 0.14 | 0.289 |
| IL-GEM and Siemens | 0.15 and 0.12 | 0.037 |
| IL-GEM and NOVA | 0.15 and 0.13 | 0.282 |
| Roche and Siemens | 0.14 and 0.12 | 0.222 |
| Roche and NOVA | 0.14 and 0.13 | 0.910 |
| Siemens and NOVA | 0.12 and 0.13 | 0.281 |

**Table S3** Median CVs and statistical results of Manny-Whitney U test performed for further comparison of current CVs of pCO2 between any two kinds of measurement systems in 2016 (α=0.05)

|  |  |  |
| --- | --- | --- |
| **Compare Groups** | **Median CVs (%)** | **P value** |
| Radiometer and IL-GEM | 2.31 and 1.98 | 0.388 |
| Radiometer and Roche | 2.31 and 2.22 | 0.745 |
| Radiometer and Siemens | 2.31 and 2.84 | 0.006 |
| Radiometer and NOVA | 2.31 and 2.67 | 0.175 |
| IL-GEM and Roche | 1.98 and 2.22 | 0.166 |
| IL-GEM and Siemens | 1.98 and 2.84 | <0.001 |
| IL-GEM and NOVA | 1.98 and 2.67 | 0.027 |
| Roche and Siemens | 2.22 and 2.84 | 0.002 |
| Roche and NOVA | 2.22 and 2.67 | 0.137 |
| Siemens and NOVA | 2.84 and 2.67 | 0.157 |

**Table S4** Median CVs and statistical results of Manny-Whitney U test performed for further comparison of current CVs of pO2 between any two kinds of measurement systems from 2014 to 2017 (α=0.05)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Compare Groups** | **2014** | | **2015** | | **2016** | | **2017** | |
| **Median CVs (%)** | **P value** | **Median CVs (%)** | **P value** | **Median CVs (%)** | **P value** | **Median CVs (%)** | **P value** |
| Radiometer and IL-GEM | 2.72 and 2.73 | 0.446 | 2.40 and  2.71 | 0.415 | 2.37 and  2.29 | 0.541 | 2.21 and 2.86 | 0.444 |
| Radiometer and Roche | 2.72 and 4.41 | <0.001 | 2.40 and  4.16 | <0.001 | 2.37 and  3.93 | <0.001 | 2.21 and 3.50 | <0.001 |
| Radiometer and Siemens | 2.72 and 3.28 | 0.561 | 2.40 and  3.10 | 0.061 | 2.37 and  2.92 | 0.059 | 2.21 and 1.69 | 0.564 |
| Radiometer and NOVA | 2.72 and 2.17 | 0.112 | 2.40 and  2.41 | 0.887 | 2.37 and  2.13 | 0.761 | 2.21 and  2.31 | 0.799 |
| IL-GEM and Roche | 2.73 and 4.41 | <0.001 | 2.71 and  4.16 | <0.001 | 2.29 and  3.93 | <0.001 | 2.86 and 3.50 | 0.007 |
| IL-GEM and Siemens | 2.73 and 3.28 | 0.808 | 2.71 and  3.10 | 0.105 | 2.29 and  2.92 | 0.221 | 2.86 and 1.69 | 0.074 |
| IL-GEM and NOVA | 2.73 and  2.17 | 0.075 | 2.71 and  2.41 | 0.571 | 2.29 and  2.13 | 0.845 | 2.86 and 2.31 | 0.060 |
| Roche and Siemens | 4.41 and 3.28 | 0.001 | 4.16 and 3.10 | 0.037 | 3.93 and 2.92 | 0.043 | 3.50 and 1.69 | <0.001 |
| Roche and NOVA | 4.41 and  2.17 | <0.001 | 4.16 and 2.41 | <0.001 | 3.93 and 2.13 | <0.001 | 3.50 and 2.31 | <0.001 |
| Siemens and NOVA | 3.28 and 2.17 | 0.086 | 3.10 and  2.41 | 0.051 | 2.92 and 2.13 | 0.203 | 1.69 and 2.31 | 0.946 |

**Table S5** Median CVs and statistical results of Manny-Whitney U test performed for further comparison of current CVs of Na+ between any two kinds of measurement systems in 2017 (α=0.05)

|  |  |  |
| --- | --- | --- |
| **Compare Groups** | **Median CVs (%)** | **P value** |
| Radiometer and IL-GEM | 0.80 and 0.91 | 0.052 |
| Radiometer and Roche | 0.80 and 0.82 | 0.926 |
| Radiometer and Siemens | 0.80 and 0.45 | 0.038 |
| Radiometer and NOVA | 0.80 and 0.66 | 0.806 |
| IL-GEM and Roche | 0.91 and 0.82 | 0.068 |
| IL-GEM and Siemens | 0.91 and 0.45 | <0.001 |
| IL-GEM and NOVA | 0.91 and 0.66 | 0.237 |
| Roche and Siemens | 0.82 and 0.45 | 0.051 |
| Roche and NOVA | 0.82 and 0.66 | 0.910 |
| Siemens and NOVA | 0.45 and 0.66 | 0.401 |

**Table S6** Median CVs and statistical results of Manny-Whitney U test performed for further comparison of current CVs of K+ between any two kinds of measurement systems in 2014 and 2017 (α=0.05)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Compare Groups** | **2014** | | **2017** | |
| **Median CVs (%)** | **P value** | **Median CVs (%)** | **P value** |
| Radiometer and IL-GEM | 1.85 and 2.20 | 0.250 | 1.08 and 1.67 | 0.016 |
| Radiometer and Roche | 1.85 and 1.58 | 0.861 | 1.08 and 1.24 | 0.461 |
| Radiometer and Siemens | 1.85 and 1.61 | 0.763 | 1.08 and 0.59 | 0.060 |
| Radiometer and NOVA | 1.85 and 0.64 | 0.025 | 1.08 and 0.36 | 0.320 |
| IL-GEM and Roche | 2.20 and 1.58 | 0.195 | 1.67 and 1.24 | 0.101 |
| IL-GEM and Siemens | 2.20 and 1.61 | 0.276 | 1.67 and 0.59 | <0.001 |
| IL-GEM and NOVA | 2.20 and 0.64 | 0.002 | 1.67 and 0.36 | 0.011 |
| Roche and Siemens | 1.58 and 1.61 | 0.957 | 1.24 and 0.59 | 0.012 |
| Roche and NOVA | 1.58 and 0.64 | 0.030 | 1.24 and 0.36 | 0.090 |
| Siemens and NOVA | 1.61 and 0.64 | 0.022 | 0.59 and 0.36 | 0.471 |

**Table S7** Median CVs and statistical results of Manny-Whitney U test performed for further comparison of current CVs of Cl- between any two kinds of measurement systems from 2015 to 2017 (α=0.05)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Compare Groups** | **2015** | | **2016** | | **2017** | |
| **Median CVs (%)** | **P value** | **Median CVs (%)** | **P value** | **Median CVs (%)** | **P value** |
| Radiometer and IL-GEM | 1.40 and 0.94 | 0.923 | 1.12 and 0.81 | 0.124 | 1.11 and 0.99 | 0.248 |
| Radiometer and Roche | 1.40 and 1.94 | 0.207 | 1.12 and 1.34 | 0.205 | 1.11 and 1.50 | 0.183 |
| Radiometer and Siemens | 1.40 and 0.76 | 0.322 | 1.12 and 0.88 | 0.359 | 1.11 and 0.67 | 0.154 |
| Radiometer and NOVA | 1.40 and 0.77 | 0.043 | 1.12 and 0.60 | 0.045 | 1.11 and 0.55 | 0.001 |
| IL-GEM and Roche | 0.94 and 1.94 | 0.235 | 0.81 and 1.34 | 0.250 | 0.99 and 1.50 | 0.085 |
| IL-GEM and Siemens | 0.94 and 0.76 | 0.212 | 0.81 and 0.88 | 0.459 | 0.99 and 0.61 | 0.941 |
| IL-GEM and NOVA | 0.94 and 0.77 | 0.089 | 0.81 and 0.60 | 0.947 | 0.99 and 0.55 | 0.059 |
| Roche and Siemens | 1.94 and 0.76 | 0.007 | 1.34 and 0.88 | 0.008 | 1.50 and 0.67 | 0.020 |
| Roche and NOVA | 1.94 and 0.77 | 0.001 | 1.34 and 0.60 | 0.005 | 1.50 and 0.55 | 0.001 |
| Siemens and NOVA | 0.76 and 0.77 | 0.620 | 0.88 and 0.60 | 0.305 | 0.67 and 0.55 | 0.404 |