**Suppl 2.** Calcium Data

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Pre-flight** | **In-flight** | **R+0** | **R+1** | **R+2-7** | **>R+7** |
| # | Author(s), year (units) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | (n) Condition | Mean | **±** σ | Mean | **±** σ | Mean | **±** σ | Mean | **±** σ | Mean | **±** σ | Mean | **±** σ |
|  |  | *d* | Trend | *d* | Trend | *d* | Trend | *d* | Trend | *d* | Trend | *d* | Trend |

Trend legend:

(↓) authors found significant decrease from pre-flight (p < 0.05)

(▼) authors found trend to significant decrease from pre-flight (0.05 < p ≤ 0.1)

(↑) authors found significant increase from pre-flight (p < 0.05)

(▲) authors found trend to significant increase from pre-flight (0.05 < p < 0.1)

(-) authors found nonsignificant change from pre-flight

(U) p-values unreported by authors.

**Table S1.** Data table with mean serum calcium data, standard deviation, sample size, experimental condition, and significance of results extracted from all studies.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Pre-Flight** | **In-Flight** | **R+0** | **R+1** | **R+2-7** | **>R+7** |
| 1 | Smith et al. 2005 (mmol/L) |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  (6) Real | 2.4 | 0.17 | 2.32 | 0.20 | 2.41 | 0.12 | 2.41 | 0.12 | 2.35 | 0.17 | 2.36 | 0.12 |
|  |  |  |  | -0.43 | -- | 0.07 | -- | 0.07 | -- | -0.29 | -- | -0.27 | -- |
|  |  (16) Real  | 2.41 | 0.24 |  |  | 2.44 | 0.36 | 2.44 | 0.04 | 2.37 | 0.44 | 2.36 | 0.24 |
|  |  |  |  |  |  | 0.10 | -- | 0.17 | -- | 0.11 | -- | -0.21 | -- |
| 2 | Shackelford et al. 2004 (mg/dL) |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  (18) Simulated | 9.6 | 1.06 | 9.7 | 0.89 |  |  |  |  |  |  |  |  |
|  |  |  |  | 0.10 | -- |  |  |  |  |  |  |  |  |
| 3 | Linossier et al.[[1]](#footnote-1) 2022 (mg/L) | 96.0 | 4.74 | 99.6 | 6.81 |  |  |  |  | 96.4 | 7.11 |  |  |
|  |  (9) Simulated |  |  | 0.61 | ↑ |  |  |  |  | 0.07 | ▲ |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 | Smith et al. 2015 (mmol/L) |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  (7) Real | 2.34 | 0.1 | 2.28 | 0.14 |  |  |  |  |  |  |  |  |
|  |  |  |  | -0.49 | -- |  |  |  |  |  |  |  |  |
| 6 | Armbrecht et al. 2010 (per cent change from baseline) |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  (10) Simulated | 0 | N/A | -0.89 | 0.94 |  |  | -3.4 | 1.3 | -1.7 | 1.0 | -0.9 | 1.1 |
|  |  |  |  | -0.43 | -- |  |  | -2.93 | ↓ | -1.70 | -- | -0.86 | -- |
| 7 | Smith et al. 2012 (mmol/L) |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  (6) Real | 2.3 | 0.1 | 2.3 | 0.1 | 2.3 | 0.2 |  |  |  |  | 2.3 | 0.1 |
|  |  |  |  | 0.00 | -- | 0.00 | -- |  |  |  |  | 0.00 | -- |
| 8 | Zerwekh et al. 2007 (mmol/L) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | (10) Simulated | 2.35 | 0.09 | 2.38 | 0.10 |  |  |  |  |  |  |  |  |
|  |  |  |  | 0.32 | -- |  |  |  |  |  |  |  |  |
| 9 | Smith et al. 2003 (mmol/L) |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  (8) Simulated | 2.34 | 0.07 | 2.38 | 0.08 |  |  | 2.36 | 0.07 | 2.35 | 0.12 |  |  |
|  |  |  |  | 0.53 | ↑ |  |  | 0.29 | -- | 0.10 | -- |  |  |
| 10 | Zwart et al. 2007 (mmol/L) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | (7) Simulated | 2.34 | 0.10 | 2.37 | 0.14 | 2.40 | 0.13 | 2.34 | 0.14 | 2.32 | 0.15 |  |  |
|  |  |  |  | 0.25 | -- | 0.52 | -- | 0.00 | -- | -0.16 | ↓ |  |  |
| 11 | Morgan et al. 2012 (mmol/L) |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  (12) Simulated | 2.32 | 0.07 | 2.38 | 0.08 |  |  |  |  | 2.29 | 0.07 |  |  |
|  |  |  |  | 0.80 | ↑ |  |  |  |  | -0.43 | -- |  |  |
| 12 | Rittweger et al. 2005 (mmol/L)  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  (25) Simulated | 2.58 | 0.06 | 2.62 | 0.01 |  |  | 2.47 | 0.03 | 2.48 | 0.02 | 2.51 | 0.04 |
|  |  |  |  | 0.93 | -- |  |  | -2.32 | ↓ | -2.24 | ↓ | -1.37 | -- |

**Table S2.** Data table with mean urinary calcium data, standard deviation, sample size, experimental condition, and significance of results extracted from all studies.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Pre-Flight** | **In-Flight** | **R+0** | **R+1** | **R+2-7** | **>R+7** |
| 1 | Smith et al. 2005 (mmol/day) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | (6) Real | 5.3 | 1.4 | 7.9 | 3.8 | 2.7 | 1.7 | 6.5 | 1.4 | 4.7 | 1.7 | 5.3 | 1.0 |
|  |  |  |  | 0.91 | ▲ | -1.67 | -- | 0.86 | -- | -0.39 | -- | 0.00 | -- |
|  | (16) Real | 4.8 | 1.7 |  |  | 2.7 | 1.7 | 5.4 | 1.6 | 5.4 | 1.9 | 4.2 | 1.5 |
|  |  |  |  |  |  | -1.24 | ↓ | 0.36 | -- | 0.36 | -- | -0.37 | -- |
| 2 | Smith et al. 2015 (mmol/day)  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | (7) Real | 4.5 | 2.5 | 6.8 | 3.9 |  |  |  |  |  |  |  |  |
|  |  |  |  | 0.70 | ↑ |  |  |  |  |  |  |  |  |
| 3 | Zerwekh et al. 2007 (mg/kg/day) |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  (10) Simulated  | 116 | 65 | 180 | 87 |  |  |  |  |  |  |  |  |
|  |  |  |  | 0.83 | ↑ |  |  |  |  |  |  |  |  |
| 4 | Smith et al. 2003 (mmol/day) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | (8) Simulated  | 5.67 | 3.19 | 7.48 | 3.35 |  |  | 5.66 | 2.76 |  |  |  |  |
|  |  |  |  | 0.55 | ↑ |  |  | 0.00 | -- |  |  |  |  |
| 5 | Zwart et al. 2007 (mmol/day) |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  (7) Simulated  | 3.95 | 1.32 | 6.64 | 2.54 |  |  | 5.22 | 2.83 |  |  |  |  |
|  |  |  |  | 1.33 | ↑ |  |  | 0.58 | -- |  |  |  |  |
| 6 | Morgan et al. 2012 (mmol/day) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | (12) Simulated  | 5.5 | 2.1 | 7.0 | 2.5 |  |  | 6.3 | 2.0 | 5.7 | 1.8 |  |  |
|  |  |  |  | 0.65 | ↑ |  |  | 0.39 | ↑ | 0.10 | -- |  |  |

**Table S3.** Data table with mean ionized calcium data, standard deviation, sample size, experimental condition, and significance of results from all studies.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Pre-Flight** | **In-Flight** | **R+0** | **R+1** | **R+2-7** | **>R+7** |
| 1 | Shackelford et al. 2004 (mmol/L) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | (18) Simulated | 1.2 | 0.01 | 1.3 | 0.01 |  |  |  |  |  |  |  |  |
|  |  |  |  | 1.0 | ↑ |  |  |  |  |  |  |  |  |
| 2 | Smith et al. 2012 (mmol/L) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | (6) Real | 1.24 | 0.04 |  |  | 1.17 | 0.06 |  |  |  |  | 1.21 | 0.04 |
|  |  |  |  |  |  | -1.37 | ↓ |  |  |  |  | -0.75 | -- |
| 3 | Morgan et al. 2012 (mmol/L) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | (12) Simulated | 1.23 | 0.04 | 1.23 | 0.04 |  |  |  |  | 1.23 | 0.03 |  |  |
|  |  |  |  | 0.00 | -- |  |  |  |  | 0.00 | -- |  |  |

1. 1 Results are reported as medians with IQRs. Standard deviations are approximated from IQRs using the formula SD = IQR/1.35 as given by the Cochrane Handbook for Systematic Reviews. [↑](#footnote-ref-1)