**Supplementary Material**

**Table 1:** Predicted Pediatric Minute Ventilation

|  |  |  |
| --- | --- | --- |
| **Age**  | **Respiratory Rate** | **Predicted Minute Ventilation (ml/min/kg)** |
|  | 10th Percentile | 50th Percentile | 90th Percentile | 10th Percentilea | 50th Percentileb | 90th Percentilec |
| 0-3 mth | 34 | 43 | 57 | 204 | 301 | 456 |
| 3-6 mth | 33 | 41 | 55 | 198 | 287 | 440 |
| 6-9 mth | 31 | 39 | 52 | 186 | 273 | 416 |
| 9-12 mth | 30 | 37 | 50 | 180 | 259 | 400 |
| 12-18 mth | 28 | 35 | 46 | 168 | 245 | 368 |
| 18-24 mth | 25 | 31 | 40 | 150 | 217 | 320 |
| 2-3 y | 22 | 28 | 34 | 132 | 196 | 272 |
| 3-4 y | 21 | 25 | 29 | 126 | 175 | 232 |
| 4-6 y | 20 | 23 | 27 | 120 | 161 | 216 |
| 6-8 y | 18 | 21 | 24 | 108 | 147 | 192 |
| 8-12 y | 16 | 19 | 22 | 100 | 133 | 176 |
| 12-15 y | 15 | 18 | 21 | 100 | 126 | 168 |
| 15-18 y | 13 | 16 | 19 | 100 | 112 | 152 |

a using Tidal Volume estimate of 6 m/kg

b using Tidal Volume estimate of 7 ml/kg

c using Tidal Volume estimate of 8 ml/kg

\* Predicted minute ventilation was limited to no less than 100 ml/min/kg. All young adults >18 years were assigned a predicted minute ventilation of 100 ml/min/kg.

Secondary Analyses

**Table 2:** Association between Ventilatory Ratio and Mortality using Predicted Minute Ventilation from 10th percentile age-based Respiratory Rates and estimated tidal volume of 6 ml/kg.

|  |  |  |  |
| --- | --- | --- | --- |
| **Univariable Model** | **OR (95% CI)** | **AUC** | **p value** |
| VR Model  | <1.3≥1.3-1.7≥1.7-2.1≥2.1 | Ref0.38 (0.14, 1.07)0.63 (0.24, 1.63)1.14 (0.48, 2.75) | 0.61 | 0.070.340.77 |

\*VR: Ventilatory Ratio; AVDSf: End tidal alveolar dead space fraction; OI: Oxygenation Index; PRISM III: Pediatric Risk of Mortality III

**Table 3:** Association between Ventilatory Ratio and Mortality using Predicted Minute Ventilation from 90th percentile age-based Respiratory Rates and estimated tidal volume of 8 ml/kg.

|  |  |  |  |
| --- | --- | --- | --- |
| **Univariable Model** | **OR (95% CI)** | **AUC** | **p value** |
| VR Model  | <0.7≥0.7-0.9≥0.9-1.2≥1.2 | Ref0.94 (0.35, 2.49)0.82 (0.30, 2.22)1.87 (0.76, 4.61) | 0.58 | 0.890.690.76 |

\*VR: Ventilatory Ratio; AVDSf: End tidal alveolar dead space fraction; OI: Oxygenation Index; PRISM III: Pediatric Risk of Mortality III

**Table 4:** Association between Ventilatory Ratio and Mortality using Predicted Minute Ventilation from 50th percentile age-based Respiratory Rates and predicted tidal volume (VTest = 4.19 x Height (cm) - 206.6).

|  |  |  |  |
| --- | --- | --- | --- |
| **Univariable Model** | **OR (95% CI)** | **AUC** | **p value** |
| VR Model  | <0.66≥0.66-0.85≥0.85-1.11≥1.11 | Ref0.51 (0.17, 1.55)1.54 (0.60, 3.96)2.06 (0.82, 5.22) | 0.63 | 0.240.370.13 |

\*VR: Ventilatory Ratio; AVDSf: End tidal alveolar dead space fraction; OI: Oxygenation Index; PRISM III: Pediatric Risk of Mortality III

Sensitivity Analyses

**Table 5:** Association between Dead Space Markers and Mortality Limited to Non-Neurologic Death

|  |  |  |  |
| --- | --- | --- | --- |
| **Univariable and Multivariable Models** | **OR (95% CI)** | **AUC** | **p value** |
| **Base Model 1**: VR  | <1≥1-1.25≥1.25-1.63≥1.63 | Ref0.7 (0.2, 2.7)1.2 (0.4, 3.8)2.4 (0.8, 7.1) | 0.62 | 0.650.770.12 |
| **Base Model 2**: AVDSf  | <0.06≥0.06-0.15≥0.15-0.26≥0.26 | Ref6.7 (0.8, 58.1)15.5 (1.9, 125.6)20 (2.5, 162.2) | 0.71 | 0.090.010.005 |
| **Multivariable Analyses** |
|  | AVDSf Model 1:  | AVDSf OI | <0.06≥0.06-0.15≥0.15-0.26≥0.26 | Ref5.8 (0.7, 50.9)11.8 (1.4, 98.2)11.7 (1.3, 103.9)1.04 (0.996, 1.08) | 0.75 | 0.110.020.0270.073 |
|  | AVDSf Model 2:  | AVDSf PRISM III | <0.06≥0.06-0.15≥0.15-0.26≥0.26 | Ref6.7 (0.8, 57.6)13.2 (1.6, 108.8)15.7 (1.9, 129.8)1.06 (1.01, 1.12) | 0.76 | 0.090.0160.010.016 |
|  | AVDSf Model 3:  | AVDSfOIPRISM III  | <0.06≥0.06-0.15≥0.15-0.26≥0.26 | Ref5.7 (0.6, 50.2)10.1 (1.2, 85.4)9.3 (1.02, 84.3)1.04 (0.995, 1.08)1.06 (1.01, 1.11)  | 0.78 | 0.120.0340.0470.0850.018 |

\*VR: Ventilatory Ratio; AVDSf: End tidal alveolar dead space fraction; OI: Oxygenation Index; PRISM III: Pediatric Risk of Mortality III

**Table 6:** Association between Dead Space Markers calculated with an arterial PCO2 and Mortality

|  |  |  |  |
| --- | --- | --- | --- |
| **Univariable and Multivariable Models** | **OR (95% CI)** | **AUC** | **p value** |
| **Base Model 1**: VR  | <1≥1-1.25≥1.25-1.63≥1.63 | Ref0.7 (0.2, 2.0)0.6 (0.2, 1.8)1.4 (0.5, 3.8) | 0.59 | 0.490.370.50 |
| **Base Model 2**: AVDSf  | <0.06≥0.06-0.15≥0.15-0.26≥0.26 | Ref2.1 (0.6, 8.1)5.0 (1.5, 17.2)6.1 (1.8, 21.1) | 0.68 | 0.260.010.005 |
| **Multivariable Analyses** |
|  | AVDSf Model 1:  | AVDSf OI | <0.06≥0.06-0.15≥0.15-0.26≥0.26 | Ref2.1 (0.6, 8.0)4.9 (1.4, 17.2)5.8 (1.6, 21.6)1.00 (0.96, 1.05) | 0.68 | 0.270.0140.0090.83 |
|  | AVDSf Model 2:  | AVDSf PRISM III | <0.06≥0.06-0.15≥0.15-0.26≥0.26 | Ref1.9 (0.5, 7.5)4.0 (1.1, 14.1)4.3 (1.2, 15.8)1.08 (1.03, 1.13) | 0.76 | 0.360.0330.0270.001 |
|  | AVDSf Model 3:  | AVDSfOIPRISM III  | <0.06≥0.06-0.15≥0.15-0.26≥0.26 | Ref1.9 (0.5, 7.4)3.7 (1.0, 13.7)3.9 (0.98, 15.4)1.01 (0.97, 1.06)1.08 (1.03, 1.13)  | 0.78 | 0.380.0490.0530.660.001 |

\*VR: Ventilatory Ratio; AVDSf: End tidal alveolar dead space fraction; OI: Oxygenation Index; PRISM III: Pediatric Risk of Mortality III

**Table 7:** Association between Ventilatory Ratio and Mortality Stratified by Median Age

|  |  |  |
| --- | --- | --- |
| **Univariable Models** | **OR (95% CI)** | **p value** |
| **Age ≤ 7 years (n=89): VR**  | <1≥1-1.25≥1.25-1.63≥1.63 | Ref1.0 (0.3, 3.5)0.4 (0.07, 2.2)2.1 (0.6, 7.7) | 0.940.290.28 |
| **Age > 7 years (n=91): VR**  | <1≥1-1.25≥1.25-1.63≥1.63 | Ref0.3 (0.07, 1.3)0.5 (0.1, 1.9)0.7 (0.2, 2.6) | 0.120.310.60 |

\*VR: Ventilatory Ratio