**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 | Ref  0.38 (0.14, 1.07)  0.63 (0.24, 1.63)  1.14 (0.48, 2.75) | 0.61 | 0.07  0.34  0.77 |

\*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 | Ref  0.94 (0.35, 2.49)  0.82 (0.30, 2.22)  1.87 (0.76, 4.61) | 0.58 | 0.89  0.69  0.76 |

\*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 | Ref  0.51 (0.17, 1.55)  1.54 (0.60, 3.96)  2.06 (0.82, 5.22) | 0.63 | 0.24  0.37  0.13 |

\*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 | | Ref  0.7 (0.2, 2.7)  1.2 (0.4, 3.8)  2.4 (0.8, 7.1) | | 0.62 | | 0.65  0.77  0.12 |
| **Base Model 2**: AVDSf | | | <0.06  ≥0.06-0.15  ≥0.15-0.26  ≥0.26 | | Ref  6.7 (0.8, 58.1)  15.5 (1.9, 125.6)  20 (2.5, 162.2) | | 0.71 | | 0.09  0.01  0.005 |
| **Multivariable Analyses** | | | | | | | | | |
|  | AVDSf Model 1: | AVDSf  OI | | <0.06  ≥0.06-0.15  ≥0.15-0.26  ≥0.26 | | Ref  5.8 (0.7, 50.9)  11.8 (1.4, 98.2)  11.7 (1.3, 103.9)  1.04 (0.996, 1.08) | | 0.75 | 0.11  0.02  0.027  0.073 |
|  | AVDSf Model 2: | AVDSf  PRISM III | | <0.06  ≥0.06-0.15  ≥0.15-0.26  ≥0.26 | | Ref  6.7 (0.8, 57.6)  13.2 (1.6, 108.8)  15.7 (1.9, 129.8)  1.06 (1.01, 1.12) | | 0.76 | 0.09  0.016  0.01  0.016 |
|  | AVDSf Model 3: | AVDSf  OI  PRISM III | | <0.06  ≥0.06-0.15  ≥0.15-0.26  ≥0.26 | | Ref  5.7 (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 | 0.12  0.034  0.047  0.085  0.018 |

\*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 | | Ref  0.7 (0.2, 2.0)  0.6 (0.2, 1.8)  1.4 (0.5, 3.8) | 0.59 | | 0.49  0.37  0.50 |
| **Base Model 2**: AVDSf | | | <0.06  ≥0.06-0.15  ≥0.15-0.26  ≥0.26 | | Ref  2.1 (0.6, 8.1)  5.0 (1.5, 17.2)  6.1 (1.8, 21.1) | 0.68 | | 0.26  0.01  0.005 |
| **Multivariable Analyses** | | | | | | | | |
|  | AVDSf Model 1: | AVDSf  OI | | <0.06  ≥0.06-0.15  ≥0.15-0.26  ≥0.26 | Ref  2.1 (0.6, 8.0)  4.9 (1.4, 17.2)  5.8 (1.6, 21.6)  1.00 (0.96, 1.05) | | 0.68 | 0.27  0.014  0.009  0.83 |
|  | AVDSf Model 2: | AVDSf  PRISM III | | <0.06  ≥0.06-0.15  ≥0.15-0.26  ≥0.26 | Ref  1.9 (0.5, 7.5)  4.0 (1.1, 14.1)  4.3 (1.2, 15.8)  1.08 (1.03, 1.13) | | 0.76 | 0.36  0.033  0.027  0.001 |
|  | AVDSf Model 3: | AVDSf  OI  PRISM III | | <0.06  ≥0.06-0.15  ≥0.15-0.26  ≥0.26 | Ref  1.9 (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 | 0.38  0.049  0.053  0.66  0.001 |

\*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 | Ref  1.0 (0.3, 3.5)  0.4 (0.07, 2.2)  2.1 (0.6, 7.7) | 0.94  0.29  0.28 |
| **Age > 7 years (n=91): VR** | <1  ≥1-1.25  ≥1.25-1.63  ≥1.63 | Ref  0.3 (0.07, 1.3)  0.5 (0.1, 1.9)  0.7 (0.2, 2.6) | 0.12  0.31  0.60 |

\*VR: Ventilatory Ratio