**Body mass index and mortality in COVID-19 and other diseases: a cohort study in 35,506 ICU patients**Emma J. Kooistra1,2, Sylvia Brinkman3, 4, Peter H.J. van der Voort5, Nicolette F. de Keizer3, 4, Dave A. Dongelmans3, Matthijs Kox1,2, and Peter Pickkers1,2

1Department of Critical Care, Radboud university medical center, 6500HB Nijmegen, The Netherlands

2Radboud Center for Infectious Diseases, Radboud university medical center, 6500HB Nijmegen, The Netherlands

3National Intensive Care Evaluation (NICE) Foundation, Amsterdam, The Net

herlands

4Department of Medical Informatics, Amsterdam UMC, Amsterdam Public Health, Amsterdam, The Netherlands

5Department of Critical Care, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands.

**Correspondence**

Peter Pickkers, MD, PhD

Radboud university medical center, 6500HB Nijmegen, The Netherlands

E-mail: peter.pickkers@radboudumc.nl

**Supplemental Digital Content 1-9**

Journal: Critical Care Medicine

**Supplemental Digital Content 1. Patient characteristics of different BMI categories in the non-SARS-CoV-2 viral pneumonia cohort.** Data presented as median [interquartile range] or n (%). P-values calculated using chi-square tests or Kruskal Wallis tests across all five categories. \* p<0.001 compared with BMI 18.5-25 kg/m2 using pairwise chi-square or Wilcoxon tests.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | BMI < 18.5 kg/m2 (n=129) | BMI 18.5-25 kg/m2 (n=1206) | BMI 25-30 kg/m2 (n=864) | BMI 30-35 kg/m2 (n=425) | BMI ≥35 kg/m2 (n=316) | p-value |
| Age, years | 63 [56-71] | 66 [58-74] | 67 [57-75] | 66 [56-74] | 61 [53-70] | 0.002 |
| Male sex, % | 52 (40.3) | 619 (51.3) | 490 (56.7) | 199 (46.8) | 124 (39.2)\* | <0.001 |
| Lowest PaO2/FiO2 ratio of the first 24 hours in the ICU, mmHg | 195 [137-264] | 176 [114-240] | 170 [113-229] | 152 [104-219] | 155 [107-233] | 0.42 |
| Mechanical ventilation on ICU admission | 71 (55.0) | 623 (51.7) | 468 (54.2) | 220 (51.8) | 173 (54.7) | 0.69 |
| Mechanical ventilation in first 24 hours in the ICU | 89 (69.0) | 837 (69.4) | 586 (67.8) | 298 (70.1) | 233 (73.7) | 0.40 |
| Use of vasoactive medication in first 24 hours in the ICU | 44 (34.1) | 523 (43.4) | 369 (42.7) | 174 (40.9) | 117 (37.0) | 0.10 |
| APACHE III APS | 52 [40-62] | 49 [37-64] | 48.5 [37-61] | 47 [36-59] | 47 [35-61] | 0.08 |
| APACHE III Score | 65.5 [50-79] | 63 [50-79] | 62 [50-78] | 60 [48-73] | 57 [45-76] | 0.15 |
| SAPS II score | 37 [31-46] | 38 [30-47] | 38 [30-47] | 37 [30-45] | 34 [28-44] | 0.02 |
| **Medical history** |  |  |  |  |  |  |
| Malignancy | 6 (4.7) | 66 (5.5) | 60 (6.9) | 19 (4.5) | 7 (2.2) | 0.03 |
| Immunological insufficiency | 23 (17.8) | 185 (15.3) | 139 (16.1) | 66 (15.5) | 29 (9.2) | 0.03 |
| COPD | 76 (58.9) | 572 (47.4) | 390 (45.1) | 200 (47.1) | 144 (45.6) | 0.06 |
| Chronic respiratory insufficiency | 41 (31.8)\* | 205 (17.0) | 127 (14.7) | 71 (16.7) | 59 (18.7) | <0.001 |
| Chronic renal failure | 8 (6.2) | 62 (5.1) | 52 (6.0) | 31 (7.3) | 35 (11.1) | 0.01 |
| Chronic cardiovascular insufficiency | 3 (2.3) | 38 (3.2) | 34 (3.9) | 17 (4.0) | 9 (2.8) | 0.71 |
| Diabetes mellitus | 10 (7.8) | 165 (13.7) | 160 (18.5) | 131 (30.8)\* | 123 (38.9)\* | <0.001 |

**Supplemental Digital Content 2. Patient characteristics of different BMI categories in the bacterial pneumonia cohort.** Data presented as median [interquartile range] or n (%). P-values calculated using chi-square tests or Kruskal Wallis tests across all five categories. \* p<0.001 compared with BMI 18.5-25 kg/m2 using pairwise chi-square or Wilcoxon tests.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | BMI < 18.5 kg/m2 (n=810) | BMI 18.5-25 kg/m2 (n=6024) | BMI 25-30 kg/m2 (n=4391) | BMI 30-35 kg/m2 (n=1815) | BMI ≥35 kg/m2 (n=1210) | p-value |
| Age, years | 64 [54-72]\* | 69 [60-77] | 70 [62-78] | 68 [60-76] | 66 [57-73]\* | <0.001 |
| Male sex, % | 371 (45.8)\* | 3656 (60.7) | 2831 (64.5) | 1024 (56.4) | 532 (44.0)\* | <0.001 |
| Lowest PaO2/FiO2 ratio of the first 24 hours in the ICU, mmHg | 154 (99-220) | 150 (97-223) | 144 (97-215) | 147 (98-215) | 138 (93-204) | 0.62 |
| Mechanical ventilation on ICU admission | 305 (37.7) | 2224 (36.9) | 1618 (36.8) | 686 (37.8) | 563 (46.5)\* | <0.001 |
| Mechanical ventilation in first 24 hours in the ICU | 420 (51.9) | 3248 (53.9) | 2320 (52.8) | 1005 (55.4) | 775 (64.0)\* | <0.001 |
| Use of vasoactive medication in first 24 hours in the ICU | 316 (39.0) | 2597 (43.1) | 1822 (41.5) | 730 (40.2) | 526 (43.5) | 0.03 |
| APACHE III APS | 55 [41-70] | 54 [41-69] | 52 [39-66] | 51 [39-66] | 52 [40-67] | 0.05 |
| APACHE III Score | 68 [54-84] | 69 [55-86] | 68 [53-84] | 66 [52-83] | 65 [52-81] | 0.12 |
| SAPS II score | 38 [30-48] | 39 [31-49] | 39 [30-48] | 38 [30-48] | 38 [30-48] | 0.097 |
| **Medical history** |  |  |  |  |  |  |
| Malignancy | 61 (7.5) | 547 (9.1) | 333 (7.6) | 130 (7.2) | 45 (3.7)\* | <0.001 |
| Immunological insufficiency | 157 (19.4) | 1068 (17.7) | 707 (16.1) | 249 (13.7)\* | 145 (12.0)\* | <0.001 |
| COPD | 362 (44.7)\* | 2149 (35.7) | 1478 (33.7) | 644 (35.5) | 477 (39.4) | <0.001 |
| Chronic respiratory insufficiency | 160 (19.8)\* | 770 (12.8) | 495 (11.3) | 208 (11.5) | 213 (17.6)\* | <0.001 |
| Chronic renal failure | 52 (6.4) | 452 (7.5) | 392 (8.9) | 171 (9.4) | 119 (9.8) | 0.002 |
| Chronic cardiovascular insufficiency | 14 (1.7) | 207 (3.4) | 195 (4.4) | 74 (4.1) | 59 (4.9) | 0.001 |
| Diabetes mellitus | 56 (6.9)\* | 908 (15.1) | 931 (21.2)\* | 610 (33.6)\* | 493 (40.7)\* | <0.001 |

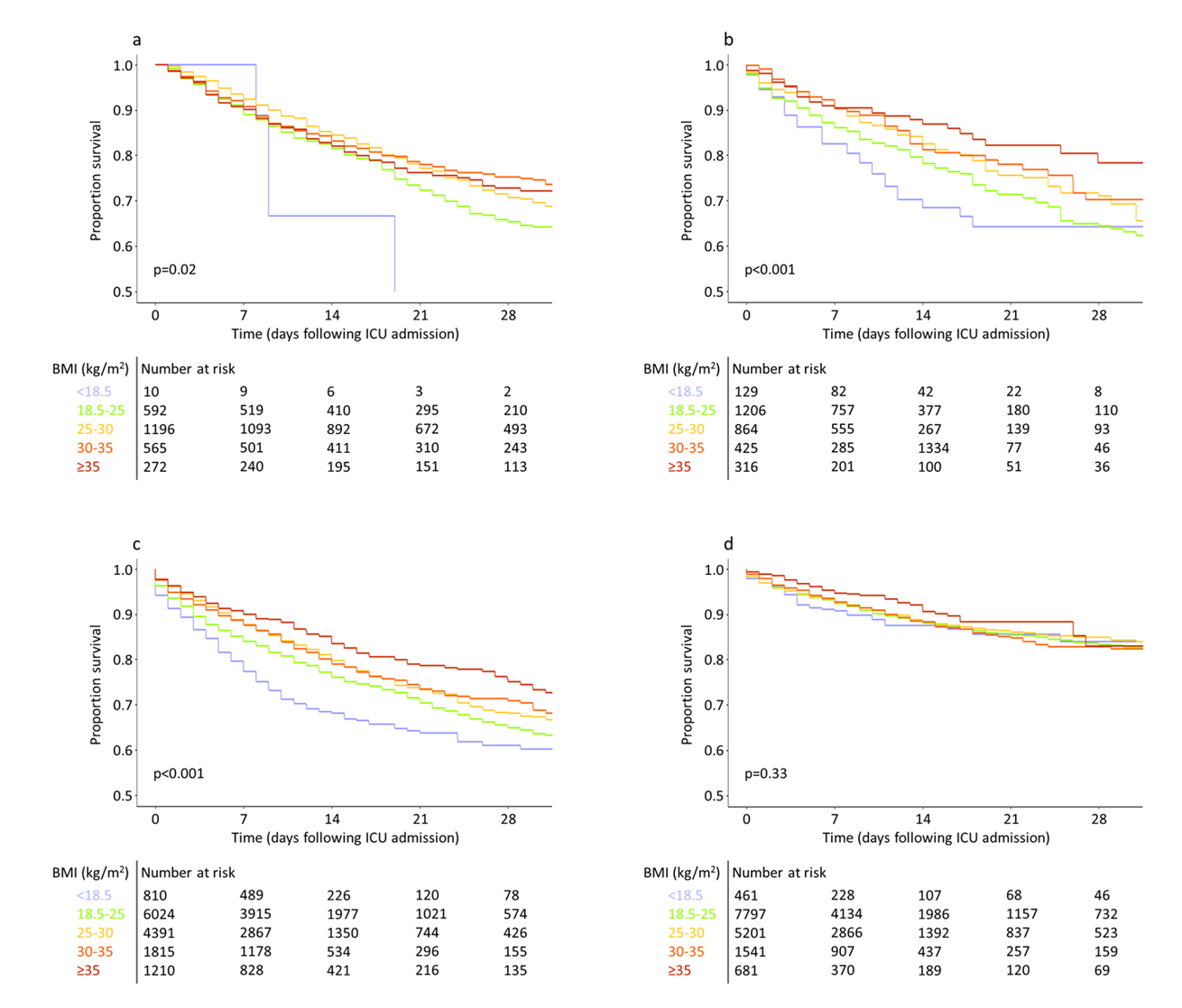
**Supplemental Digital Content 3. Patient characteristics of different BMI categories in the trauma cohort.** Data presented as median [interquartile range] or n (%). P-values calculated using chi-square tests or Kruskal Wallis tests across all five categories. \* p<0.001 compared with BMI 18.5-25 kg/m2 using pairwise chi-square or Wilcoxon tests.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | BMI < 18.5 kg/m2 (n=461) | BMI 18.5-25 kg/m2 (n=7797) | BMI 25-30 kg/m2 (n=5201) | BMI 30-35 kg/m2 (n=1541) | BMI ≥35 kg/m2 (n=681) | p-value |
| Age, years | 59 [26-80] | 57 [34-76] | 62 [48-77]\* | 63 [50-74]\* | 60 [48-72]\* | <0.001 |
| Male sex, % | 169 (36.7)\* | 5042 (64.7) | 3630 (69.8)\* | 1052 (68.3) | 389 (57.1) | <0.001 |
| Lowest PaO2/FiO2 ratio of the first 24 hours in the ICU, mmHg | 352 [252-450] | 317 [226-404] | 290 [203-364] | 258 [182-342] | 250 [174-324] | 0.02 |
| Mechanical ventilation on ICU admission | 124 (26.9) | 2528 (32.4) | 1644 (31.6) | 440 (28.6) | 168 (24.7)\* | <0.001 |
| Mechanical ventilation in first 24 hours in the ICU | 133 (28.9) | 2744 (35.2) | 1790 (34.4) | 492 (31.9) | 204 (30.0) | 0.001 |
| Use of vasoactive medication in first 24 hours in the ICU | 126 (27.3) | 2216 (28.4) | 1473 (28.3) | 415 (26.9) | 179 (26.3) | 0.59 |
| APACHE III APS | 36 [26-48] | 34 [24-50] | 33 [23-48] | 32 [23-47] | 31 [22-46] | 0.30 |
| APACHE III Score | 48 [34-64] | 45 [31-64] | 46 [32-63] | 44 [32-62] | 42 [30-59] | 0.10 |
| SAPS II score | 28 [20-37] | 28 [20-39] | 28 [20-39] | 27 [20-37] | 25.5 [17-36]\* | <0.001 |
| **Medical history** |  |  |  |  |  |  |
| Malignancy | 6 (1.3) | 94 (1.2) | 66 (1.3) | 25 (1.6) | 10 (1.5) | 0.75 |
| Immunological insufficiency | 18 (3.9) | 159 (2.0) | 133 (2.6) | 40 (2.6) | 14 (2.1) | 0.04 |
| COPD | 48 (10.4) | 512 (6.6) | 329 (6.3) | 178 (11.6)\* | 85 (12.5)\* | <0.001 |
| Chronic respiratory insufficiency | 11 (2.4) | 82 (1.1) | 65 (1.2) | 42 (2.7)\* | 35 (5.1)\* | <0.001 |
| Chronic renal failure | 20 (4.3) | 237 (3.0) | 160 (3.1) | 70 (4.5) | 44 (6.5)\* | <0.001 |
| Chronic cardiovascular insufficiency | 14 (3.0) | 184 (2.4) | 95 (1.8) | 44 (2.9) | 20 (2.9) | 0.05 |
| Diabetes mellitus | 19 (4.1) | 462 (5.9) | 543 (10.4)\* | 236 (15.3)\* | 190 (27.9)\* | <0.001 |

**Supplemental Digital Content 4. Clinical outcomes of different BMI categories in all four cohorts.** Data presented as median [interquartile range] or n (%). P-values calculated using chi-square tests or Kruskal Wallis tests across all five categories. \* p<0.001 compared with BMI 18.5-25 kg/m2 using pairwise chi-square or Wilcoxon tests.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | BMI < 18.5 kg/m2 | BMI 18.5-25 kg/m2 | BMI 25-30 kg/m2 | BMI 30-35 kg/m2 | BMI ≥35 kg/m2 | p-value |
| **COVID-19** | **n=10** | **n=592** | **n=1196** | **n=565** | **n=272** |  |
| Number of readmissions | 0 (0) | 0 (0) | 6 (0.5) | 4 (0.7) | 1 (0.4) | 0.35 |
| LOS ICU of survived patients, days | 13 [8-41] | 16 [8-31] | 17 [10-32] | 18 [10-31] | 19 [12-32] | 0.39 |
| LOS ICU deceased patients, days | 9 [9-19] | 11 [5-21] | 14 [7-23] | 10 [5-20] | 9 [4-15] | 0.63 |
| LOS hospital of survived patients, days | 18 [18-46] | 28 [18-47] | 30 [19-46] | 31 [19-46] | 31 [20-46] | 0.34 |
| LOS hospital of deceased patients, days | 9 [9-19] | 14 [7-23] | 16 [9-25] | 12 [6-22] | 11 [6-18] | 0.96 |
| 28-day mortality, n (%) | 5 (50.0) | 170 (28.7) | 295 (24.7) | 124 (21.9) | 66 (24.3) | 0.03 |
| In-hospital mortality, n (%) | 5 (50.0) | 194 (32.8) | 353 (29.5) | 147 (26.0) | 70 (25.7) | 0.04 |
|  |  |  |  |  |  |  |
| **non-SARS-CoV-2 viral pneumonia** | **n=129** | **n=1206** | **n=864** | **n=425** | **n=316** |  |
| Number of readmissions | 2 (1.5) | 22 (1.8) | 13 (1.5) | 9 (2.1) | 2 (0.6) | 0.59 |
| LOS ICU of survived patients, days | 4 [2-9] | 4 [2-8] | 4 [2-8] | 4 [2-9] | 4 [2-9] | 0.64 |
| LOS ICU deceased patients, days | 4 [2-9] | 5 [2-10] | 6 [2-14] | 6 [3-13] | 4 [2-11] | 0.47 |
| LOS hospital of survived patients, days | 12 [8-22] | 11 [7-18] | 10 [7-17] | 11 [7-18] | 11 [7-18] | 0.31 |
| LOS hospital of deceased patients, days | 6 [4-11] | 7 [3-14] | 9 [3-17] | 8 [4-15] | 5 [3-12] | 0.74 |
| 28-day mortality, n (%) | 34 (26.4) | 237 (19.7) | 134 (15.5) | 64 (15.1) | 38 (12.0) | <0.001 |
| In-hospital mortality, n (%) | 34 (26.4) | 250 (20.7) | 152 (17.6) | 69 (16.2) | 40 (12.7) | 0.002 |
|  |  |  |  |  |  |  |
| **Bacterial pneumonia** | **n=810** | **n=6024** | **n=4391** | **n=1815** | **n=1210** |  |
| Number of readmissions | 69 (7.8) | 585 (8.9) | 439 (9.1) | 175 (8.8) | 80 (6.2) | 0.02 |
| LOS ICU of survived patients, days | 3 [2-6] | 3 [2-7] | 3 [2-7] | 3 [2-7] | 4 [2-7] | 0.52 |
| LOS ICU deceased patients, days | 3 [1-6] | 4 [1-8] | 4 [2-9] | 4 [2-9] | 5 [2-12] | 0.40 |
| LOS hospital of survived patients, days | 12 [7-19] | 12 [8-20] | 11 [7-19] | 11 [7-18] | 12 [7-19] | 0.86 |
| LOS hospital of deceased patients, days | 7 [4-12] | 7 [3-14] | 9 [4-16] | 8 [3-14] | 7 [3-16] | 0.44 |
| 28-day mortality, n (%) | 228 (28.1)\* | 1331 (22.1) | 799 (18.2)\* | 322 (17.7)\* | 178 (14.7)\* | <0.001 |
| In-hospital mortality, n (%) | 236 (29.1)\* | 1401 (23.3) | 850 (19.4)\* | 340 (18.7)\* | 192 (15.9)\* | <0.001 |
|  |  |  |  |  |  |  |
| **Trauma** | **n=461** | **n=7797** | **n=5201** | **n=1541** | **n=681** |  |
| Number of readmissions | 6 (1.3) | 108 (1.4) | 82 (1.6) | 28 (1.8) | 14 (2.0) | 0.50 |
| LOS ICU of survived patients, days | 1 [1-2] | 1 [1-3] | 1 [1-3] | 1 [1-3] | 1 [1-3] | 0.98 |
| LOS ICU deceased patients, days | 2 [1-3] | 2 [1-5] | 3 [1-7] | 3 [1-9] | 3 [1-15] | 0.48 |
| LOS hospital of survived patients, days | 8 [5-15] | 8 [5-16] | 9 [5-16] | 10 [5-17] | 9 [5-17] | 0.20 |
| LOS hospital of deceased patients, days | 5 [2-10] | 5 [2-10] | 5 [2-11] | 6 [3-13] | 7 [4-15] | 0.85 |
| 28-day mortality, n (%) | 45 (9.8) | 701 (9.0) | 458 (8.8) | 143 (9.3) | 47 (6.9) | 0.37 |
| In-hospital mortality, n (%) | 48 (10.4) | 726 (9.3) | 482 (9.3) | 150 (9.7) | 50 (7.3) | 0.40 |

**Supplemental Digital Content 5.** Twenty-eight-day survival curves of different BMI categories in (a) COVID-19 patients, (b) non-SARS-CoV-2 viral pneumonia patients, (c) bacterial pneumonia patients and (d) trauma patients. P-values were calculated using log-rank tests.



**Supplemental Digital Content 6. Estimated odds ratios of in-hospital mortality of the multivariate regression model in the COVID-19 cohort.** Covariates used for this analyses included sex, age, medical history (chronic diagnoses), APACHE III acute physiology score (APS), vasoactive medication and mechanical ventilation and PaO2/FiO2 ratio in the first 24 hours following ICU admission.

|  |  |
| --- | --- |
| **Variable** | **Odds ratio [95% CI]** |
| BMI <18.5 kg/m2 | 1.92 [0.51-7.13] |
| BMI 25-30 kg/m2 | 0.95 [0.75-1.21] |
| BMI 30-35 kg/m2 | 0.87 [0.65-1.16] |
| BMI ≥35 kg/m2 | 1.15 [0.79-1.67] |
| Female | **1.47 [1.18-1.83]** |
| Age 40-45 years | 0.79 [0.22-2.80] |
| Age 45-50 years | 1.21 [0.49-3.02] |
| Age 50-55 years | 0.78 [0.32-1.88] |
| Age 55-60 years | 1.85 [0.84-4.08] |
| Age 60-65 years | **2.61 [1.20-5.69]** |
| Age 65-70 years | **4.46 [2.07-9.61]** |
| Age 70-75 years | **5.45 [2.54-11.69]** |
| Age 75-80 years | **8.66 [3.98-18.85]** |
| Age 80-85 years | **14.79 [5.79-37.79]** |
| Age ≥85 years | **20.73 [3.62-118.54]** |
| Immunological insufficiency | 1.13 [0.79-1.63] |
| Renal insufficiency | **1.98 [1.16-3.38]** |
| Chronic respiratory insufficiency | **1.54 [1.17-2.04]** |
| Cardiovasculair insufficiency | 1.77 [0.81-3.87] |
| Cirrhosis | 1.47 [0.09-24.33] |
| Malignancy | **2.53 [1.38-4.62]** |
| Diabetes mellitus | **1.29 [1.02-1.63]** |
| APACHE IV APS 24-34 | 1.23 [0.69-2.2] |
| APACHE IV APS 34-45 | 1.37 [0.80-2.37] |
| APACHE IV APS 45-63 | 1.64 [0.96-2.82] |
| APACHE IV APS ≥63 | **3.87 [2.21-6.78]** |
| Mechanical ventilation during first 24 hours in the ICU | **1.48 [1.09-2.02]** |
| Use of vasoactive medication | 1.17 [0.90-1.51] |
| PaO2/FiO2 ratio 155-226 mmHg | 0.89 [0.69-1.15] |
| PaO2/FiO2 ratio 226-296 mmHg | 0.65 [0.42-1.00] |
| PaO2/FiO2 ratio 296-371 mmHg | 0.65 [0.34-1.25] |
| PaO2/FiO2 ratio ≥371 mmHg | 0.89 [0.43-1.83] |
| Missing PaO2/FiO2 ratio | 1.02 [0.74-1.42] |

**Supplemental Digital Content 7. Estimated odds ratios of in-hospital mortality of the multivariate regression model in the non-SARS-CoV-2 viral pneumonia cohort.** Covariates used for this analyses included BMI, sex, age, medical history (chronic diagnoses), APACHE III acute physiology score (APS), vasoactive medication and mechanical ventilation and PaO2/FiO2 ratio in the first 24 hours following ICU admission.

|  |  |
| --- | --- |
| **Variable** | **Odds ratio [95% CI]** |
| BMI <18.5 kg/m2 | 1.50 (0.95-2.37) |
| **BMI 25-30 kg/m2** | **0.78 (0.61-0.99)** |
| BMI 30-35 kg/m2 | 0.76 (0.55-1.04) |
| BMI ≥35 kg/m2 | **0.64 (0.43-0.95)** |
| Female | 0.84 (0.69-1.04) |
| Age 40-45 years | 0.67 (0.12-3.71) |
| Age 45-50 years | **3.31 (1.14-9.63)** |
| Age 50-55 years | **3.35 (1.20-9.33)** |
| Age 55-60 years | **4.69 (1.79-12.29)** |
| Age 60-65 years | **5.69 (2.21-14.65)** |
| Age 65-70 years | **6.57 (2.56-16.84)** |
| Age 70-75 years | **8.67 (3.40-22.16)** |
| Age 75-80 years | **12.64 (4.93-32.40)** |
| Age 80-85 years | **11.18 (4.29-29.17)** |
| Age ≥85 years | **15.54 (5.76-41.9)** |
| Immunological insufficiency | **1.47 (1.12-1.95)** |
| Renal insufficiency | 1.14 (0.78-1.68) |
| Chronic respiratory insufficiency | **1.63 (1.30-2.04)** |
| Cardiovasculair insufficiency | **2.42 (1.52-3.86)** |
| Cirrhosis | 1.58 (0.32-7.75) |
| Malignancy | **2.28 (1.52-3.42)** |
| Diabetes mellitus | 0.90 (0.70-1.16) |
| APACHE IV APS 24-34 | 1.97 (0.84-4.59) |
| APACHE IV APS 34-45 | 2.11 (0.93-4.79) |
| APACHE IV APS 45-63 | **3.05 (1.36-6.84)** |
| APACHE IV APS ≥63 | **6.20 (2.73-14.05)** |
| Mechanical ventilation during first 24 hours in the ICU | **1.85 (1.42-2.41)** |
| Use of vasoactive medication | 1.11 (0.89-1.38) |
| PaO2/FiO2 ratio 155-226 mmHg | **0.71 (0.55-0.93)** |
| PaO2/FiO2 ratio 226-296 mmHg | 0.72 (0.52-1.00) |
| PaO2/FiO2 ratio 296-371 mmHg | **0.60 (0.37-0.97)** |
| PaO2/FiO2 ratio ≥371 mmHg | **0.43 (0.21-0.89)** |
| Missing PaO2/FiO2 ratio | 0.76 (0.54-1.07) |

**Supplemental Digital Content 8. Estimated odds ratios of 28-day mortality of the multivariate regression model in the bacterial pneumonia cohort.** Covariates used for this analyses included sex, age, medical history (chronic diagnoses), APACHE III acute physiology score (APS), vasoactive medication and mechanical ventilation and PaO2/FiO2 ratio on ICU admission.

|  |  |
| --- | --- |
| **Variable** | **Odds ratio [95% CI]** |
| BMI <18.5 kg/m2 | **1.88 (1.57-2.25)** |
| BMI 25-30 kg/m2 | **0.78 (0.70-0.86)** |
| BMI 30-35 kg/m2 | **0.81 (0.70-0.93)** |
| BMI ≥35 kg/m2 | **0.73 (0.61-0.87)** |
| Female | 1.06 (0.97-1.16) |
| Age 40-45 years | 1.49 (0.87-2.57) |
| Age 45-50 years | **1.81 (1.15-2.85)** |
| Age 50-55 years | **2.22 (1.48-3.33)** |
| Age 55-60 years | **2.32 (1.59-3.41)** |
| Age 60-65 years | **2.88 (1.99-4.15)** |
| Age 65-70 years | **3.85 (2.69-5.52)** |
| Age 70-75 years | **5.07 (3.55-7.23)** |
| Age 75-80 years | **6.80 (4.76-9.71)** |
| Age 80-85 years | **8.67 (6.05-12.41)** |
| Age ≥85 years | **12.43 (8.56-18.06)** |
| Immunological insufficiency | **1.28 (1.14-1.45)** |
| Renal insufficiency | 1.14 (0.98-1.32) |
| Chronic respiratory insufficiency | **1.09 (1.00-1.20)** |
| Cardiovasculair insufficiency | **1.74 (1.43-2.13)** |
| Cirrhosis | **2.77 (1.99-3.86)** |
| Malignancy | **2.19 (1.88-2.55)** |
| Diabetes mellitus | 0.93 (0.83-1.03) |
| APACHE IV APS 24-34 | 1.12 (0.77-1.63) |
| APACHE IV APS 34-45 | **1.56 (1.11-2.19)** |
| APACHE IV APS 45-63 | **2.37 (1.70-3.30)** |
| APACHE IV APS ≥63 | **5.14 (3.68-7.16)** |
| Mechanical ventilation during first 24 hours in the ICU | **1.71 (1.55-1.89)** |
| Use of vasoactive medication | **1.11 (1.01-1.22)** |
| PaO2/FiO2 ratio 155-226 mmHg | **0.75 (0.67-0.84)** |
| PaO2/FiO2 ratio 226-296 mmHg | **0.56 (0.47-0.66)** |
| PaO2/FiO2 ratio 296-371 mmHg | **0.62 (0.49-0.77)** |
| PaO2/FiO2 ratio ≥371 mmHg | **0.64 (0.46-0.89)** |
| Missing PaO2/FiO2 ratio | 0.97 (0.85-1.11) |

**Supplemental Digital Content 9. Estimated odds ratios of 28-day mortality of the multivariate regression model in the multiple trauma cohort.** Covariates used for this analyses included sex, age, medical history (chronic diagnoses), APACHE III acute physiology score (APS), vasoactive medication and mechanical ventilation and PaO2/FiO2 ratio in the first 24 hours following ICU admission.

|  |  |
| --- | --- |
| **Variable** | **Odds ratio [95% CI]** |
| BMI <18.5 kg/m2 | 1.23 (0.86-1.78) |
| BMI 25-30 kg/m2 | 0.90 (0.78-1.03) |
| BMI 30-35 kg/m2 | 0.99 (0.79-1.23) |
| BMI ≥35 kg/m2 | 0.81 (0.57-1.15) |
| Female | **1.45 (1.26-1.66)** |
| Age 40-45 years | 1.41 (0.94-2.11) |
| Age 45-50 years | **1.56 (1.10-2.23)** |
| Age 50-55 years | **2.30 (1.66-3.19)** |
| Age 55-60 years | **1.85 (1.33-2.56)** |
| Age 60-65 years | **2.65 (1.95-3.60)** |
| Age 65-70 years | **3.76 (2.82-5.01)** |
| Age 70-75 years | **5.40 (4.13-7.08)** |
| Age 75-80 years | **6.56 (5.00-8.61)** |
| Age 80-85 years | **9.44 (7.20-12.37)** |
| Age ≥85 years | **12.44 (9.54-16.21)** |
| Immunological insufficiency | 1.08 (0.74-1.57) |
| Renal insufficiency | 1.00 (0.76-1.30) |
| Chronic respiratory insufficiency | **1.26 (1.03-1.54)** |
| Cardiovasculair insufficiency | **1.38 (1.00-1.89)** |
| Cirrhosis | **2.44 (1.30-4.58)** |
| Malignancy | 1.52 (0.96-2.41) |
| Diabetes mellitus | 1.11 (0.91-1.35) |
| APACHE IV APS 24-34 | **1.77 (1.22-2.57)** |
| APACHE IV APS 34-45 | **2.87 (2.01-4.09)** |
| APACHE IV APS 45-63 | **5.57 (3.93-7.91)** |
| APACHE IV APS ≥63 | **27.53 (19.43-39.02)** |
| Mechanical ventilation during first 24 hours in the ICU | **1.90 (1.59-2.26)** |
| Use of vasoactive medication | **1.97 (1.72-2.26)** |
| PaO2/FiO2 ratio 155-226 mmHg | **0.76 (0.60-0.98)** |
| PaO2/FiO2 ratio 226-296 mmHg | 0.80 (0.63-1.01) |
| PaO2/FiO2 ratio 296-371 mmHg | **0.63 (0.50-0.81)** |
| PaO2/FiO2 ratio ≥371 mmHg | **0.64 (0.50-0.82)** |
| Missing PaO2/FiO2 ratio | 0.83 (0.67-1.03) |