Supplementary Online Content

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eTable 1. Baseline Characteristics, Lung Mechanics on the Day of Intubation, Vaccination Status and Outcomes of Included Patients Across the Three Participating Study Sites

eTable 2. Cox Proportional Hazards Regression Model to Isolate the Contribution of Vaccination Status, Age, Comorbidity and SOFA Score on the Day of Intubation (Independent Variables) to All-Cause Intensive Care Unit Mortality (Dependent Variable) in the Sensitivity Analysis by Including Only Patients Receiving mRNA Vaccine

eTable 3. Cox Proportional Hazards Regression Model to Isolate the Contribution of Vaccination Status, Age, Comorbidity and SOFA Score on the Day of Intubation (Independent Variables) to All-Cause Intensive Care Unit Mortality (Dependent Variable) in the Sensitivity Analysis by Including Only Unvaccinated Patients in the Control Group

eTable 4. Cox Proportional Hazards Regression Model to Isolate the Contribution of Vaccination Status, Age, Comorbidity and SOFA Score on the Day of Intubation (Independent Variables) to All-Cause Intensive Care Unit Mortality (Dependent Variable) in the Sensitivity Analysis by Separating the Control Group Into Unvaccinated and Remotely Vaccinated Patients (i.e., Those Vaccinated More Than Five Months Before Intubation)

eFigure 1. Survival Curves in the Sensitivity Analysis by Separating the Control Group Into Unvaccinated and Remotely Vaccinated Patients (i.e., Those Vaccinated More Than Five Months Before Intubation)

eTable 5. Cox Proportional Hazards Regression Model to Isolate the Contribution of Vaccination Status, Age, Comorbidity, SOFA Score, and Presence of Severe ARDS on the Day of Intubation (Independent Variables) to All-Cause Intensive Care Unit Mortality (Dependent Variable)

eTable 6. Cox Proportional Hazards Regression Model to Isolate the Contribution of Vaccination Status, Age, Comorbidity, and SOFA Score on the Day of Intubation (Independent Variables) to All-Cause Mortality by Day 28 Following Intubation (Dependent Variable)

eTable 7. Cox Proportional Hazards Regression Model to Isolate the Contribution of Vaccination Status, Age, Comorbidity, and SOFA Score on the Day of Intubation (Independent Variables) to All-Cause In-Hospital Mortality (Dependent Variable)

eFigure 2. Survival Curves of Patients Included in the Full Vaccination vs Control Group

This supplementary material has been provided by the authors to give readers additional information about their work.
| Characteristic | Total (n=265) | Athens (n=103) | Ioannina (n=42) | Larissa (n=120) | p value |
|---------------|---------------|----------------|-----------------|-----------------|---------|
| Age, years    | 66.0 (58.0-76.0) | 69.0 (57.0-77.0) | 69.5 (60.0-75.3) | 64.5 (56.0-74.8) | 0.28    |
| Sex           |               |                |                 |                 | 0.29    |
| Female        | 95 (35.8)     | 31 (30.1)      | 16 (38.1)       | 48 (40.0)       |
| Male          | 170 (64.2)    | 72 (69.9)      | 26 (61.9)       | 72 (60.0)       |
| Race          |               |                |                 |                 | 0.55    |
| Caucasian     | 264 (99.6)    | 102 (99.0)     | 42 (100.0)      | 120 (100.0)     |
| Other         | 1 (0.4)       | 1 (1.0)        | 0 (0.0)         | 0 (0.0)         |
| Comorbidity   | 184 (69.4)    | 73 (70.9)      | 26 (61.9)       | 85 (70.8)       | 0.51    |
| Chronic kidney disease | 18 (6.8) | 10 (9.7) | 2 (4.8) | 6 (5.0) | 0.32 |
| Chronic lung disease | 22 (8.3) | 10 (9.7) | 4 (9.5) | 8 (6.7) | 0.68 |
| Heart condition | 50 (18.9) | 30 (29.1) | 3 (7.1) | 17 (14.2) | 0.002 |
| Hypertension  | 135 (50.9)    | 49 (47.6)      | 20 (47.6)       | 66 (55.0)       | 0.49    |
| Liver disease | 2 (0.8)       | 2 (1.9)        | 0 (0.0)         | 0 (0.0)         | 0.44    |
| Diabetes mellitus | 57 (21.5) | 22 (21.4) | 9 (21.4) | 26 (21.7) | 1.0     |
|                          | Usage | Duration | SOFA score on the day of intubation | Respiratory | Coagulation | Hepatic |
|--------------------------|-------|----------|-------------------------------------|-------------|-------------|---------|
| Malignancy               | 24 (9.1) | 16 (15.5) | 1 (2.4) | 7 (5.8) | 0.01 |
| Autoimmune               | 17 (6.4) | 9 (8.7) | 1 (2.4) | 7 (5.8) | 0.34 |
| Duration from symptom onset to intubation, days | 12.0 (9.0-15.0) | 10.0 (6.0-14.0) | 13.0 (7.0-16.0) | 13.0 (11.0-16.0) | <0.001 |
| Usage of high-flow nasal oxygen prior to intubation | 206 (78.6) | 85 (83.3) | 25 (62.5) | 96 (80.0) | 0.02 |
| Duration of high-flow nasal oxygen prior to intubation, days | 4.0 (2.0-6.0) | 2.0 (1.0-5.0) | 4.0 (1.0-8.0) | 4.0 (2.0-7.8) | 0.001 |
| Usage of non-rebreather mask prior to intubation | 125 (47.5) | 58 (56.3) | 22 (55.0) | 45 (37.5) | 0.01 |
| Duration of non-rebreather mask prior to intubation, days | 2.0 (1.0-4.0) | 1.0 (1.0-2.0) | 3.0 (1.0-5.5) | 3.0 (2.0-4.0) | <0.001 |
| SOFA score on the day of intubation | 5.0 (4.0-7.0) | 6.0 (4.0-8.0) | 4.0 (4.0-5.3) | 5.0 (5.0-7.0) | <0.001 |
| Respiratory              | 4.0 (3.0-4.0) | 3.0 (3.0-4.0) | 4.0 (3.0-4.0) | 4.0 (4.0-4.0) | <0.001 |
| Coagulation              | 0.0 (0.0-0.0) | 0.0 (0.0-0.0) | 0.0 (0.0-0.0) | 0.0 (0.0-0.0) | 0.44 |
| Hepatic                  | 0.0 (0.0-0.0) | 0.0 (0.0-0.0) | 0.0 (0.0-0.0) | 0.0 (0.0-0.0) | 0.05 |
|                               | Value 1 (Range) | Value 2 (Range) | Value 3 (Range) | Value 4 (Range) | p-value  |
|-------------------------------|----------------|----------------|----------------|----------------|----------|
| **Cardiovascular**            | 1.0 (0.0-2.0)  | 0.0 (0.0-3.0)  | 0.0 (0.0-0.0)  | 1.0 (1.0-1.0)  | <0.001   |
| **Neurologic**                | 0.0 (0.0-1.0)  | 1.0 (0.0-1.0)  | 0.0 (0.0-0.0)  | 0.0 (0.0-0.0)  | <0.001   |
| **Renal**                     | 0.0 (0.0-1.0)  | 0.0 (0.0-1.0)  | 0.0 (0.0-1.0)  | 0.0 (0.0-1.0)  | 0.38     |

**Lung mechanics on the day of intubation**

|                                | Value 1   | Value 2   | Value 3   | Value 4   | p-value  |
|--------------------------------|-----------|-----------|-----------|-----------|----------|
| Volume-controlled ventilation  | 265 (100.0) | 103 (100.0) | 42 (100.0) | 120 (100.0) | -        |
| Respiratory rate, bpm          | 24.0 (21.0-26.0) | 25.0 (22.0-26.3) | 20.0 (17.0-24.3) | 25.0 (22.0-27.0) | <0.001   |
| Tidal volume, mL              | 440.0     | 450.0     | 465.0     | 410.0     | <0.001   |
|                               | (400.0-470.0) | (420.0-480.0) | (440.0-502.5) | (352.5-450.0) |          |
| PEEPext, cmH2O                | 12.0 (10.0-13.0) | 12.0 (10.0-14.0) | 11.5 (10.0-13.0) | 11.0 (10.0-12.0) | 0.30     |
| PEEPtotal, cmH2O              | 12.0 (10.0-13.0) | 12.0 (10.0-14.0) | 11.5 (10.0-13.0) | 11.0 (10.0-12.0) | 0.16     |
| Pplateau, cmH2O               | 26.0 (24.0-29.0) | 25.0 (22.0-28.0) | 28.0 (25.0-30.3) | 27.0 (24.0-29.0) | 0.001    |
| Pdriving, cmH2O               | 14.0 (11.0-17.0) | 12.0 (10.0-15.0) | 17.0 (13.5-19.0) | 14.0 (12.0-17.8) | <0.001   |
| FiO2                          | 1.0 (0.9-1.0)  | 1.0 (0.9-1.0)  | 1.0 (0.8-1.0)  | 1.0 (1.0-1.0)  | 0.23     |
| PaO₂, mmHg                    | 85.0 (65.0-114.5) | 117.0 (91.0-150.0) | 75.5 (62.0-94.3) | 72.0 (56.0-87.0) | <0.001   |
| PaO₂:FiO₂                     | 88.0 (66.5-139.5) | 133.0 (97.0-180.0) | 80.0 (65.8-137.8) | 75.5 (56.0-90.0) | <0.001   |
| PaCO₂, mmHg                   | 49.0 (42.0-60.5) | 45.0 (38.0-52.0)  | 43.0 (36.8-52.0) | 56.0 (47.3-67.0) | <0.001   |
| Vaccination Status |   |   |   |   |
|--------------------|---|---|---|---|
| Full               | 26 (9.8) | 16 (15.5) | 2 (4.8) | 8 (6.7) | 0.04 |

| Outcomes<sup>d,e</sup> |   |   |   |   |
|-------------------------|---|---|---|---|
| ICU-mortality           | 163 (61.5) | 45 (43.7) | 35 (83.3) | 83 (69.2) | <0.001 |
| Usage of vasopressors   | 262 (98.9) | 100 (97.0) | 42 (100.0) | 120 (100.0) | 0.54 |
| Vasopressor-free days, days | 0.0 (0.0-8.0) | 2.0 (0.0-14.0) | 0.0 (0.0-3.3) | 0.0 (0.0-7.8) | 0.002 |
| Usage of continuous renal replacement therapy | 97 (36.6) | 34 (33.0) | 6 (14.3) | 57 (47.5) | <0.001 |
| Continuous renal replacement therapy-free days, days | 14.0 (5.0-28.0) | 21.0 (5.5-28.0) | 15.0 (8.0-23.0) | 10.0 (3.0-27.5) | 0.03 |
| Ventilator-free days, days | 0.0 (0.0-0.0) | 0.0 (0.0-7.0) | 0.0 (0.0-0.0) | 0.0 (0.0-0.0) | 0.003 |
| ICU-free days, days     | 0.0 (0.0-0.0) | 0.0 (0.0-0.0) | 0.0 (0.0-0.0) | 0.0 (0.0-0.0) | 0.01 |

*Abbreviations:* n, number; SOFA, sequential organ failure assessment; bpm, breaths per minute; PEEP, positive end expiratory pressure; Pplateau, plateau pressure; Pdriving, driving pressure; PaO<sub>2</sub>, partial pressure of arterial oxygen; FiO<sub>2</sub>, fraction of inspired oxygen; PaCO<sub>2</sub>, partial pressure of arterial carbon dioxide; ICU, intensive care unit.
a Data are presented as median (interquartile range) or number of patients (%).

b Other race included self-defined Roma.

c Heart condition included congestive heart failure, coronary artery disease, and cardiomyopathies.

d For two patients in Athens, data on secondary outcomes were missing.

e Outcomes were censored at day 28 following intubation. Patients discharged from ICU with unassisted breathing before 28 days were considered to be alive at 28 days without needing vasopressors or continuous renal replacement therapy. Vasopressor-free days, continuous renal replacement therapy-free days, ventilator-free days and ICU-free days were calculated by the number of days in the first 28 days following intubation that a patient was alive and not receiving vasopressors, not receiving continuous renal replacement therapy, not on a ventilator or not in the ICU, respectively.
**eTable 2.** Cox Proportional Hazards Regression Model to Isolate the Contribution of Vaccination Status, Age, Comorbidity and SOFA Score on the Day of Intubation (Independent Variables) to All-Cause Intensive Care Unit Mortality (Dependent Variable) in the Sensitivity Analysis by Including Only Patients Receiving mRNA Vaccine

|                                | Hazard ratio | 95% confidence intervals | p value |
|--------------------------------|--------------|--------------------------|---------|
| Full vaccination status (versus control) | 0.47         | 0.25-0.87                | 0.02    |
| Age (increments of 1)           | 1.02         | 1.01-1.03                | 0.007   |
| Comorbidity (any versus none)   | 1.34         | 0.91-1.97                | 0.13    |
| SOFA score (increments of 1)    | 1.21         | 1.14-1.29                | <0.001  |

*Abbreviations:* SOFA, sequential organ failure assessment.
### eTable 3. Cox Proportional Hazards Regression Model to Isolate the Contribution of Vaccination Status, Age, Comorbidity and SOFA Score on the Day of Intubation (Independent Variables) to All-Cause Intensive Care Unit Mortality (Dependent Variable) in the Sensitivity Analysis by Including Only Unvaccinated Patients in the Control Group

|                       | Hazard ratio | 95% confidence intervals | p value |
|-----------------------|--------------|---------------------------|---------|
| Full vaccination status (versus control) | 0.54         | 0.31-0.94                 | 0.03    |
| Age (increments of 1)  | 1.02         | 1.01-1.04                 | 0.009   |
| Comorbidity (any versus none) | 1.31         | 0.89-1.93                 | 0.17    |
| SOFA score (increments of 1) | 1.21         | 1.13-1.29                 | <0.001  |

*Abbreviations: SOFA, sequential organ failure assessment.*
eTable 4. Cox Proportional Hazards Regression Model to Isolate the Contribution of Vaccination Status, Age, Comorbidity and SOFA Score on the Day of Intubation (Independent Variables) to All-Cause Intensive Care Unit Mortality (Dependent Variable) in the Sensitivity Analysis by Separating the Control Group Into Unvaccinated and Remotely Vaccinated Patients (i.e., Those Vaccinated More Than Five Months Before Intubation)

|                          | Hazard ratio | 95% confidence intervals | p value |
|--------------------------|--------------|--------------------------|---------|
| Vaccination statusa      |              |                          |         |
| Unvaccinated             | Reference    | Reference                | Reference |
| Remotely vaccinated      | 0.89         | 0.56-1.40                | 0.61    |
| Fully vaccinated         | 0.54         | 0.31-0.93                | 0.03    |
| Age (increments of 1)    | 1.02         | 1.01-1.03                | 0.007   |
| Comorbidity (any versus none) | 1.33     | 0.90-1.95                | 0.15    |
| SOFA score (increments of 1) | 1.22   | 1.14-1.29                | <0.001  |

Abbreviations: SOFA, sequential organ failure assessment.

aOne patient was vaccinated less than 14 days before intubation and was excluded from this sensitivity analysis.
eFigure 1. Survival Curves in the Sensitivity Analysis by Separating the Control Group Into Unvaccinated and Remotely Vaccinated Patients (i.e., Those Vaccinated More Than Five Months Before Intubation). For time-to-event analysis from intubation to all-cause intensive care unit-mortality, we used a Cox proportional-hazards regression model including vaccination status, age, comorbidity and baseline Sequential Organ Failure Assessment score on the day of intubation and we plotted the corresponding Cox-generated estimated survival curves. The hazard ratio for the association between status of fully vaccinated patients, as opposed to unvaccinated, and intensive care unit-mortality was 0.53 (95% confidence intervals 0.31-0.93); p=0.03. One patient was vaccinated less than 14 days before intubation and was excluded from this sensitivity analysis.
**eTable 5.** Cox Proportional Hazards Regression Model to Isolate the Contribution of Vaccination Status, Age, Comorbidity, SOFA Score, and Presence of Severe ARDS on the Day of Intubation (Independent Variables) to All-Cause Intensive Care Unit Mortality (Dependent Variable)

|                                | Hazard ratio | 95% confidence intervals | p value |
|--------------------------------|--------------|---------------------------|---------|
| Full vaccination status (versus control) | 0.58         | 0.34-1.00                 | 0.05    |
| Age (increments of 1)           | 1.02         | 1.01-1.04                 | 0.002   |
| Comorbidity (any versus none)   | 1.19         | 0.80-1.75                 | 0.39    |
| SOFA score (increments of 1)    | 1.23         | 1.16-1.32                 | <0.001  |
| Severe ARDS (versus non-severe ARDS)<sup>a</sup> | 1.52         | 1.11-2.09                 | 0.01    |

**Abbreviations:** SOFA, sequential organ failure assessment; ARDS, acute respiratory distress syndrome.

<sup>a</sup>Severe ARDS was defined according to the Berlin definition.⁷
### eTable 6

Cox Proportional Hazards Regression Model to Isolate the Contribution of Vaccination Status, Age, Comorbidity, and SOFA Score on the Day of Intubation (Independent Variables) to All-Cause Mortality by Day 28 Following Intubation (Dependent Variable)

|                                | Hazard ratio | 95% confidence intervals | p value |
|--------------------------------|--------------|--------------------------|---------|
| Full vaccination status (versus control) | 0.40         | 0.21-0.75                | 0.004   |
| Age (increments of 1)          | 1.02         | 1.01-1.03                | 0.008   |
| Comorbidity (any versus none) | 1.58         | 1.04-2.40                | 0.03    |
| SOFA score (increments of 1)   | 1.28         | 1.20-1.37                | <0.001  |

*Abbreviations:* SOFA, sequential organ failure assessment.
**Table 7.** Cox Proportional Hazards Regression Model to Isolate the Contribution of Vaccination Status, Age, Comorbidity, and SOFA Score on the Day of Intubation (Independent Variables) to All-Cause In-Hospital Mortality (Dependent Variable)

|                                | Hazard ratio | 95% confidence intervals | p value |
|--------------------------------|--------------|---------------------------|---------|
| Full vaccination status (versus control) | 0.63         | 0.38-1.03                 | 0.07    |
| Age (increments of 1)           | 1.02         | 1.00-1.03                 | 0.02    |
| Comorbidity (any versus none)   | 1.31         | 0.90-1.90                 | 0.16    |
| SOFA score (increments of 1)    | 1.21         | 1.14-1.29                 | <0.001  |

*Abbreviations: SOFA, sequential organ failure assessment.*
**eFigure 2.** Survival Curves of Patients Included in the Full Vaccination vs Control Group. For time-to-event analysis from intubation to all-cause in-hospital mortality, we used a Cox proportional-hazards regression model including vaccination status (full versus control), age, comorbidity and baseline Sequential Organ Failure Assessment score on the day of intubation and we plotted the corresponding Cox-generated estimated survival curves. The hazard ratio for the association between full vaccination, as opposed to control, and in-hospital mortality was 0.63 (95% confidence intervals 0.38-1.03); p=0.07.