

SUPPLEMENTAL MATERIALS

TABLES	PAGE
Table S1. Association between suspected COVID-19 status and confirmed COVID-19 test results after hospital admission at 20 COVERED U.S. academic medical center emergency departments, May-December 2020	2
Table S2. Number of intubation attempts, stratified by known or suspected COVID-19 status, at 20 COVERED U.S. academic medical center emergency departments, May-December 2020	3
Table S3. Characteristics of patients who died without being intubated at 20 COVERED U.S. academic medical center emergency departments, May-December 2020	4
Table S4. Multivariable regression model beta coefficients for outcomes of first pass success and adverse events for patients intubated at 20 COVERED U.S. academic medical center emergency departments, May-December 2020	5
 FIGURES	
Figure S1. Number of intubations included from each site over the study period at 20 COVERED U.S. academic medical center emergency departments, May-December 2020	7
Figure S2. Number of endotracheal intubation (ETI) procedures performed by month during the study period at 20 COVERED U.S. academic medical center emergency departments, May-December 2020	8
Figure S3. Percentage of total intubations without components of CDC guideline-adherent full-barrier airborne precautions among intubations of patients who tested positive for SARS-CoV-2 at 20 COVERED U.S. academic medical center emergency departments, May-December 2020	9
Figure S4. Time spent in the patient care room for endotracheal intubation, stratified by COVID-19 known or suspected status at the time of intubation, at 20 COVERED U.S. academic medical center emergency departments, May-December 2020	10

SUPPLEMENTAL TABLES

Supplemental Table S1. Association between suspected COVID-19 status and confirmed COVID-19 test results after hospital admission at 20 COVERED U.S. academic medical center emergency departments, May-December 2020. Clinical gestalt predicted COVID-19 status (among those with confirmed inpatient test results) with sensitivity 54% (95% CI 37–77%), specificity 87% (95% CI 84–90%), positive likelihood ratio of 4.0 (95% CI 2.6–6.1), and negative likelihood ratio of 0.5 (95% CI 0.4–0.8).

		SARS-CoV-2 Test Result		
		SARS-CoV-2 (+)	SARS-CoV-2 (-)	Not Tested
		n (%)		
COVID-19 Status at Time of Intubation	COVID-19 (+)	111 (85.3)	16 (12.3)	3 (2.3)
	COVID-19 Suspected	66 (15.2)	339 (77.9)	30 (6.9)
	COVID-19 Not Suspected	57 (2.2)	2,189 (83.9)	362 (13.9)
	COVID-19 (-)	3 (1.2)	255 (97.3)	4 (1.5)

Supplemental Table S2. Number of intubation attempts, stratified by known or suspected COVID-19 status, at 20 COVERED U.S. academic medical center emergency departments, May-December 2020. Each cell represents a mutually exclusive stratum of patients, based on knowledge available at the time of intubation. Patients who were never successfully intubated are included in the last row of the table (all patients for whom cricothyroidotomy was performed are included in “unsuccessful” intubations).

	COVID-19 Confirmed or Suspected (n=564)	No COVID-19 Confirmed or Suspected (n=2,868)	Proportion Difference (95% CI)¹
Intubation Attempts	n (%)		
1	496 (87.9)	2506 (87.4)	0.6 ([-2.4]-3.6)
2	56 (9.9)	257 (9.0)	1.2 ([-1.5]-3.8)
3	7 (1.2)	59 (2.1)	-0.8 ([-2.0]-0.3) ²
4 or more	4 (0.7)	33 (1.2)	-0.5 ([-1.5]-0.4) ²
Unsuccessful	1 (0.2)	13 (0.5)	-0.3 ([-0.8]-0.3) ²

¹ Difference is calculated using univariate generalized linear mixed models with random effects for site and person performing the procedure. Some values may have a difference calculated that differs from the arithmetic difference because of the effects of modeling and rounding.

² Low counts affected estimability. Unadjusted proportions and differences are calculated instead using a score test.

Supplemental Table S3. Characteristics of patients who died without being intubated at 20 COVERED U.S. academic medical center emergency departments, May-December 2020.

Age	Sex	Indication for Intubation	Timing of Cardiac Arrest	Predicted Airway Difficulty	Suspected COVID-19 Status	SARS-CoV-2 Test	Number of Intubation Attempts	Rapid Sequence Induction	Preoxygenation	Passive Nasal Oxygenation	Intubation Medications	First-Attempt Equipment	Cardiac Arrest During Procedure	Intubation Adjuncts	Primary Intubator
61	Male	Cardiac Arrest	Prior to ED Arrival	Expected to be Difficult	NOT Suspected	Negative	3	No	Bag-Mask	No	None	Video Laryngoscopy	Yes	None	Resident, Year 2
29	Male	Cardiac Arrest	Prior to ED Arrival	Expected to be Difficult	NOT Suspected	Negative	1	No	Bag-Mask	Yes	None	Video Laryngoscopy	Yes	None	Resident, Year 1

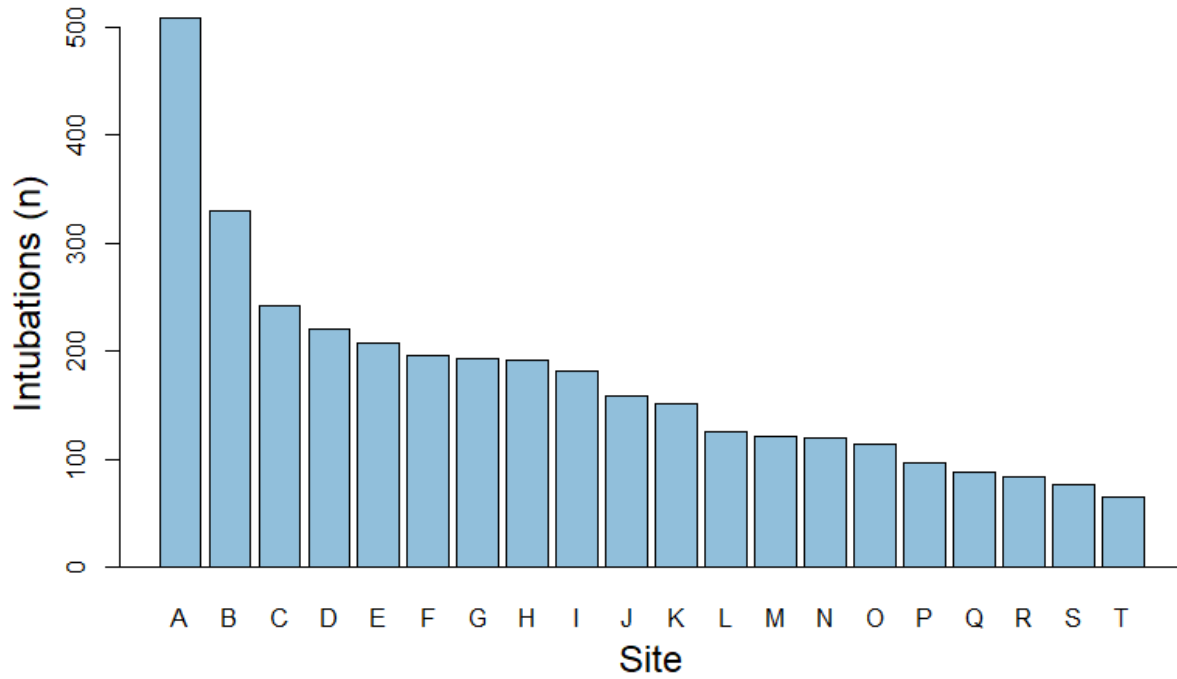
Supplemental Table S4. Multivariable regression model beta coefficients for outcomes of first pass success and adverse events for patients intubated at 20 COVERED U.S. academic medical center emergency departments, May-December 2020. On the left side of this table, 3 models are presented for the outcome of first-pass success: one for the unadjusted estimate, one for the estimate adjusted for patient factors, and one for the model adjusted for patient and procedure factors. On the right side of the table, the same three models are presented for the outcome of adverse events. Interaction terms are noted as coefficients in the model, which is why stratified analyses are reported in Figure 5. All coefficients are reported as beta coefficients with 95% confidence intervals.

Covariates	First Pass Success			Adverse Events		
	Unadjusted (95% CI)	Adjusted for Patient Factors (95% CI)	Adjusted for Patient and Procedure Factors (95% CI)	Unadjusted (95% CI)	Adjusted for Patient Factors (95% CI)	Adjusted for Patient and Procedure Factors (95% CI)
Known or Predicted COVID-19 Status	0.05 ([-0.24]-0.34)	0.18 ([-0.13]-0.49)	0.13 ([-0.18]-0.44)	0.93 (0.71-1.16)	0.84 (0.55-1.14)	0.87 (0.57-1.17)
Expected Airway Difficulty	—	-1.11 ([-1.33] - [-0.89])	-1.26 ([-1.52]- [-1.01])	—	0.98 (0.76-1.20)	0.98 (0.76-1.20)
Interaction (Known or Predicted COVID-19 Status x Expected Airway Difficulty)	—	—	—	—	-0.68 ([-1.13] - [-0.22])	-0.69 ([-1.15] - [-0.23])
Acuity: Semi-Elective	—	-0.07 ([-1.09]-0.94)	-0.12 ([-1.15]-0.90)	—	0.11 ([-0.72]-0.93)	0.10 ([-0.72]-0.92)
Acuity: Emergent	—	-0.48 ([-1.46]-0.50)	-0.51 ([-1.50]-0.48)	—	0.42 ([-0.38]-1.22)	0.39 ([-0.41]- [1.19])
Reason for Intubation: Mental Status Changes	—	0.17 ([-0.08]-0.42)	0.16 ([-0.08]-0.41)	—	-1.06 ([-1.27] - [-0.85])	-1.06 ([-1.27] - [-0.85])

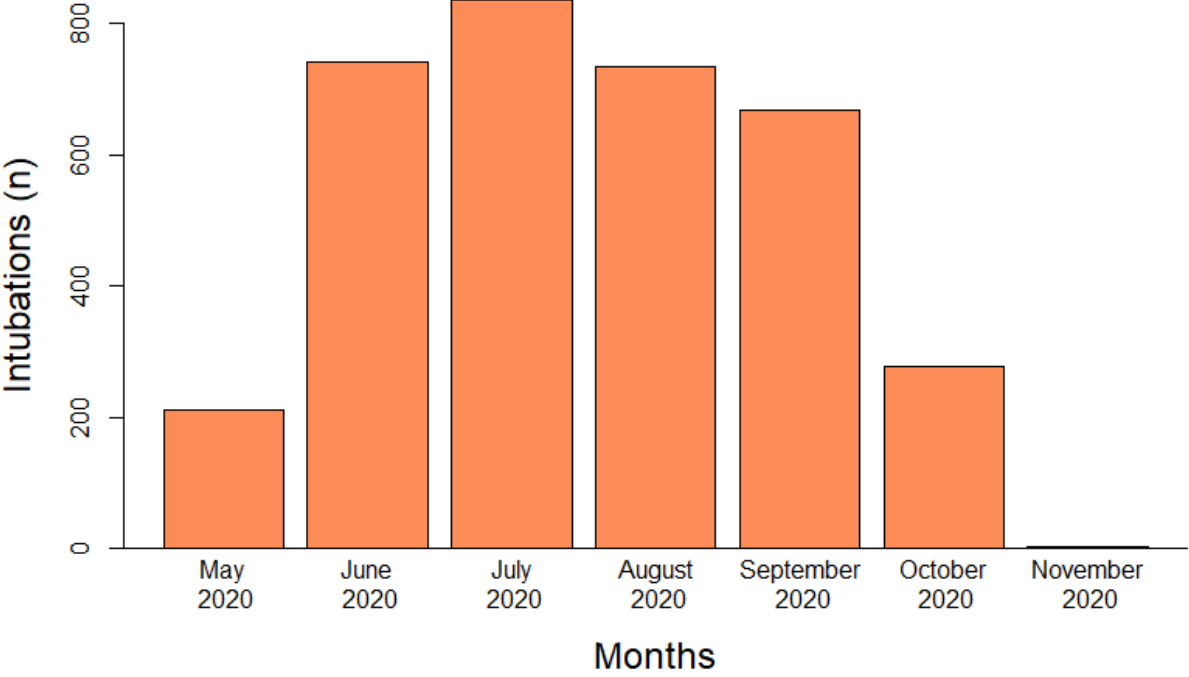
Reason for Intubation: Airway Compromise	—	0.04 ([-0.47]-0.54)	0.03 ([-0.48]-0.53)	—	-1.02 ([-1.50] - [-0.54])	-1.01 ([-1.50] - [-0.53])
Reason for Intubation: Cardiac Arrest	—	-0.01 ([-0.44]-0.42)	0.04 ([-0.40]-0.48)	—	-0.92 ([-1.32] - [-0.52])	-0.98 ([-1.38] - [-0.57])
Reason for Intubation: Polytrauma	—	0.00 ([-0.84]-0.85)	0.00 ([-0.86]-0.85)	—	-1.44 ([-2.29] - [-0.59])	-1.44 ([-2.29] - [-0.59])
Passive Oxygenation	—	—	0.01 ([-0.23]-0.24)	—	—	-0.19 ([-0.40]-[0.02])
Video Laryngoscopy	—	—	-1.01 ([-1.36] - [-0.66])	—	—	0.14 ([-0.12]-0.41)
Interaction (Video Laryngoscopy x Expected Airway Difficulty)	—	—	0.60 (0.07-1.13)	—	—	—

SUPPLEMENTAL FIGURE LEGENDS

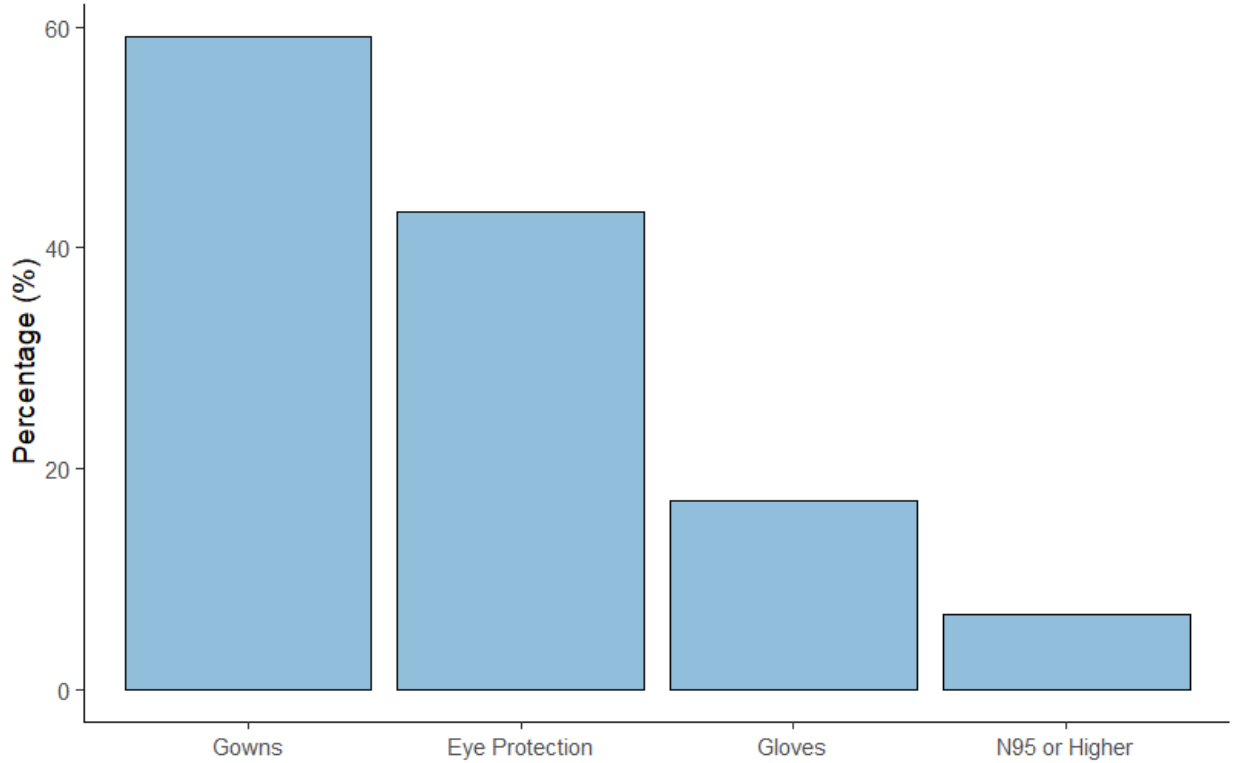
Supplemental Figure S1. Number of intubations included from each site during the COVID-19 pandemic at 20 COVERED U.S. academic medical center emergency departments, May-December 2020. Each letter indicates one of the sites that participated in the project.



Supplemental Figure S2. Number of endotracheal intubation (ETI) procedures performed by month during the COVID-19 pandemic at 20 COVERED U.S. academic medical center emergency departments, May-December 2020.



Supplemental Figure S3. Percentage of total intubations without components of CDC guideline-adherent full-barrier airborne precautions among intubations of patients who tested positive for SARS-CoV-2 at 20 COVERED U.S. academic medical center emergency departments, May-December 2020. The total number of intubations without components of CDC guideline-adherent full-barrier airborne precautions among intubations of patients who tested positive for SARS-CoV-2 is n=88.



Supplemental Figure S4. Time spent in the patient care room for endotracheal intubation, stratified by COVID-19 known or suspected status at the time of intubation at 20 COVERED U.S. academic medical center emergency departments, May-December 2020.

