

Electronic Supplementary Material

Title: Intensive Care Unit Stay and Mechanical Ventilation Among Adults with Respiratory Syncytial Virus-Related Hospitalization by Age and Comorbidity Status

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Supplementary material: 4 supplementary tables

Table S1 UB-92 revenue center codes for ICU in this study [19]

Code	Description	Label
0200	Intensive Care Unit (general classification)	ICU
0201	Intensive Care Unit (surgical)	ICU
0202	Intensive Care Unit (medical)	ICU
0203	Intensive Care Unit (pediatric)	ICU
0204	Intensive Care Unit (psychiatric)	ICU
0206	Intensive Care Unit (intermediate care)	ICU
0207	Intensive Care Unit (burn care)	ICU
0208	Intensive Care Unit (trauma)	ICU
0209	Intensive Care Unit (other intensive care)	ICU

ICU intensive care unit, *UB* uniform billing

Table S2 Procedure codes for mechanical ventilation used in this study [22]

Code Type	Code	Description
ICD-10-CM	J95.850	Mechanical complication of respirator
ICD-10-CM	J95.851	Ventilator associated pneumonia
ICD-10-CM	Z43.0	Encounter for attention to tracheostomy
ICD-10-CM	Z93.0	Tracheostomy status
ICD-10-CM	Z99.11	Dependence on respirator [ventilator] status
ICD-10-CM	Z99.12	Encounter for respirator [ventilator] dependence during power failure
ICD-10-PCS	0B717DZ	Dilation of trachea with intraluminal device, via natural or artificial opening
ICD-10-PCS	0B718DZ	Dilation of trachea with intraluminal device, via natural or artificial opening endoscopic
ICD-10-PCS	0BH07DZ	Insertion of intraluminal device into tracheobronchial tree, via natural or artificial opening
ICD-10-PCS	0BH07YZ	Insertion of other device into tracheobronchial tree, via natural or artificial opening
ICD-10-PCS	0BH172Z	Insertion of monitoring device into trachea, via natural or artificial opening
ICD-10-PCS	0BH17EZ	Insertion of endotracheal airway into trachea, via natural or artificial opening
ICD-10-PCS	0BH17YZ	Insertion of other device into trachea, via natural or artificial opening
ICD-10-PCS	0BH182Z	Insertion of monitoring device into trachea, via natural or artificial opening endoscopic
ICD-10-PCS	0BH18YZ	Insertion of other device into trachea, via natural or artificial opening endoscopic

ICD-10-PCS	0BHK7YZ	Insertion of other device into right lung, via natural or artificial opening
ICD-10-PCS	0BHK8YZ	Insertion of other device into right lung, via natural or artificial opening endoscopic
ICD-10-PCS	0BHL7YZ	Insertion of other device into left lung, via natural or artificial opening
ICD-10-PCS	0BHL8YZ	Insertion of other device into left lung, via natural or artificial opening endoscopic
ICD-10-PCS	0WHQ7YZ	Insertion of other device into respiratory tract, via natural or artificial opening
ICD-10-PCS	5A1935Z	Respiratory ventilation, less than 24 consecutive hours
ICD-10-PCS	5A1945Z	Respiratory ventilation, 24-96 consecutive hours
ICD-10-PCS	5A1955Z	Respiratory ventilation, greater than 96 consecutive hours
CPT	31502	Tracheotomy tube change prior to establishment of fistula tract
CPT	31600	Tracheostomy, planned (separate procedure);
CPT	31601	Tracheostomy, planned (separate procedure); younger than 2 years
CPT	31603	Tracheostomy, emergency procedure; transtracheal
CPT	31605	Tracheostomy, emergency procedure; cricothyroid membrane
CPT	31610	Tracheostomy, fenestration procedure with skin flaps
CPT	31611	Construction of tracheoesophageal fistula and subsequent insertion of an alaryngeal speech prosthesis (eg, voice button, Blom-Singer prosthesis)
CPT	31612	Tracheal puncture, percutaneous with transtracheal aspiration and/or injection
CPT	31613	Tracheostoma revision; simple, without flap rotation
CPT	31614	Tracheostoma revision; complex, with flap rotation
CPT	94002	Ventilation assist and management, initiation of pressure or volume preset ventilators for assisted or controlled breathing; hospital inpatient/observation, initial day
CPT	94003	Ventilation assist and management, initiation of pressure or volume preset ventilators for assisted or controlled breathing; hospital inpatient/observation, each subsequent day
CPT	94004	Ventilation assist and management, initiation of pressure or volume preset ventilators for assisted or controlled breathing; nursing facility, per day
CPT	94005	Home ventilator management care plan oversight of a patient (patient not present) in home, domiciliary or rest home (eg, assisted living) requiring review of status, review of laboratories and other studies and revision of orders and respiratory care plan (as appropriate), within a calendar month, 30 minutes or more
HCPSC	E0450	Volume control ventilator, without pressure support mode, may include pressure control mode, used with invasive interface (e.g., tracheostomy tube)
HCPSC	E0454	Pressure ventilator with pressure control, pressure support and flow triggering

HCPCS	E0470	Respiratory assist device, bi-level pressure capability, without backup rate feature, used with noninvasive interface, e.g., nasal or facial mask (intermittent assist device with continuous positive airway pressure device)
HCPCS	E0471	Respiratory assist device, bi-level pressure capability, with back-up rate feature, used with noninvasive interface, e.g., nasal or facial mask (intermittent assist device with continuous positive airway pressure device)
HCPCS	E0472	Respiratory assist device, bi-level pressure capability, with backup rate feature, used with invasive interface, e.g., tracheostomy tube (intermittent assist device with continuous positive airway pressure device)

CM clinical modification, *CPT* current procedural terminology, *HCPCS* healthcare common procedure coding system, *ICD* International Classification of Diseases, *PCS* procedure coding system

Table S3 30-day all-cause death, ICU admission, length of ICU stay, and use of mechanical ventilation among adult patients hospitalized with RSV, using Optum Market Clarity Dataset, 2017–2024

	Overall		18–49 years		50–59 years		60–74 years		≥75 years	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Low-risk										
RSV hospitalization	1,304		463		193		324		324	
RSV hospitalization with ICU	295	22.6 (20.4, 25.0)	83	17.9 (14.6, 21.8)	52	26.9 (20.9, 33.9)	90	27.8 (23.0, 33.1)	70	21.6 (17.3, 26.6)
RSV hospitalization with ICU + MV	34	2.6 (1.8, 3.7)	12	2.6 (1.4, 4.6)	8	4.1 (1.9, 8.3)	8	2.5 (1.2, 5.0)	6	1.9 (0.8, 4.2)
Length of ICU stay, days, mean (SD)		2.8 (10.9)		1.8 (3.4)		3.2 (7.0)		4.2 (18.5)		1.8 (3.5)
Length of ICU stay with MV, mean (SD)		12.6 (30.1)		4.6 (8.3)		11.8 (15.6) ^a		33.0 (56.9) ^a		2.8 (3.5)
Death status*	21	1.6 (1, 2.5)	2	0.4 (0.1, 1.7)	1	0.5 (0, 3.3)	2	0.6 (0.1, 2.5)	16	4.9 (2.9, 8.1)
High-risk										
RSV hospitalization	12,430		1,062		1,179		4,102		6,087	
RSV hospitalization with ICU	3,996	32.1 (31.3, 33.0)	330	31.1 (28.3, 34.0)	410	34.8 (32.1, 37.6)	1,411	34.4 (32.9, 35.9)	1,845	30.3 (29.2, 31.5)
RSV hospitalization with ICU + MV	821	6.6 (6.2, 7.1)	89	8.4 (6.8, 10.3)	101	8.6 (7.1, 10.3)	345	8.4 (7.6, 9.3)	286	4.7 (4.2, 5.3)
Length of ICU stay, mean (SD)		4.6 (19.8)		5.9 (21.1)		5.4 (36.9)		5.2 (20.3)		3.8 (12.1)
Length of ICU stay with MV, mean (SD)		10.5 (28.5)		13.6 (36.4)		11.0 (36.0)		11.2 (30.5)		8.4 (18.5)
Death status*	735	5.9 (5.5, 6.3)	20	1.9 (1.2, 2.9)	36	3.1(2.2, 4.2)	173	4.2 (3.6, 4.9)	506	8.3 (7.6, 9)
Overall										
RSV hospitalization	13,734		1,525		1,372		4,426		6,411	
RSV hospitalization with ICU	4,291	31.2 (30.5, 32.0)	413	27.1 (24.9, 29.4)	462	33.7 (31.2, 36.3)	1,501	33.9 (32.5, 35.3)	1,915	29.9 (28.8, 31.0)
RSV hospitalization with ICU + MV	855	6.2 (5.8, 6.6)	101	6.6 (5.5, 8.0)	109	7.9 (6.6, 9.5)	353	8.0 (7.2, 8.8)	292	4.6 (4.1, 5.1)
Length of ICU stay, mean (SD)		4.5 (19.3)		5.1 (19.0)		5.2 (34.8)		5.1 (20.2)		3.7 (11.9)
Length of ICU stay with MV, mean (SD)		10.6 (28.5)		12.5 (34.3)		11.1 (34.9)		11.7 (31.4)		8.3 (18.3)
Death status*	756	5.5 (5.1, 5.9)	22	1.4 (0.9, 2.2)	37	2.7 (1.9, 3.7)	175	4.0 (3.4, 4.6)	522	8.1 (7.5, 8.8)

CI confidence interval, *ICU* intensive care unit, *MV* mechanical ventilation, *RSV* respiratory syncytial virus, *SD* standard deviation

^aThe extended duration of ICU stay with mechanical ventilation is a result of the limited number of patients included in this calculation

*Death status is defined as follows: a patient is considered deceased (death = 1) if the month of death matches the month of hospital discharge, ICU admission, or mechanical ventilation (MV) service date. Otherwise, patients are considered alive (death = 0).

Wilson method used for calculating 95% CI as it provides more accurate results with small samples. It also provides coverage closer to the intended 95% and always stays within the valid range of 0–100%, avoiding impossible values.

Table S4 ICU admission, length of ICU stay, and use of mechanical ventilation among adult patients hospitalized with RSV, excluding patients with 30-day all cause deaths, using Optum Market Clarity Dataset, 2017–2024

	Overall		18–49 years		50–59 years		60–74 years		≥75 years	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Low-risk										
RSV hospitalization	1,283		461		192		322		308	
RSV hospitalization with ICU	283	22.1 (19.8, 24.4)	81	17.6 (14.3, 21.4)	51	26.6 (20.6, 33.5)	90	28.0 (23.2, 33.3)	61	19.8 (15.6, 24.8)
RSV hospitalization with ICU + MV	30	2.3 (1.6, 3.4)	11	2.4 (1.3, 4.4)	8	4.2 (2, 8.3)	8	2.5 (1.2, 5)	3	1.0 (0.3, 3.1)
Length of ICU stay, days, mean (SD)		2.8 (11.1)		1.9 (3.4)		3.2 (7.1)		4.2 (18.5)		1.9 (3.7)
Length of ICU stay with MV, mean (SD)		14.2 (31.8)		4.9 (8.6)		11.8 (15.6)		33.0 (56.9)		4.3 (4.9)
High-risk										
RSV hospitalization	11,695		1,042		1,143		3,929		5,581	
RSV hospitalization with ICU	3,531	30.2 (29.4, 31)	312	29.9 (27.2, 32.8)	381	33.3 (30.6, 36.2)	1,283	32.7 (31.2, 34.2)	1,555	27.9 (26.7, 29.1)
RSV hospitalization with ICU + MV	598	5.1 (4.7, 5.5)	74	7.1 (5.7, 8.9)	80	7.0 (5.6, 8.7)	260	6.6 (5.9, 7.5)	184	3.3 (2.9, 3.8)
Length of ICU stay, mean (SD)		4.1 (16.9)		5.9 (21.6)		3.6 (18.3)		4.9 (20.5)		3.1 (11.0)
Length of ICU stay with MV, mean (SD)		11.0 (31.6)		15.3 (39.6)		11.5 (38.5)		11.4 (33.6)		8.4 (19.7)
Overall										
RSV hospitalization	12,978		1,503		1,335		4,251		5,889	
RSV hospitalization with ICU	3,814	29.4 (28.6, 30.2)	393	26.1 (24, 28.5)	432	32.4 (29.9, 35)	1,373	32.3 (30.9, 33.7)	1,616	27.4 (26.3, 28.6)
RSV hospitalization with ICU + MV	628	4.8 (4.5, 5.2)	85	5.7 (4.6, 7)	88	6.6 (5.3, 8.1)	268	6.3 (5.6, 7.1)	187	3.2 (2.7, 3.7)
Length of ICU stay, mean (SD)		4.0 (16.5)		5.1 (19.4)		3.6 (17.4)		4.8 (20.4)		3.1 (10.8)
Length of ICU stay with MV, mean (SD)		11.1 (31.6)		13.9 (37.2)		11.5 (37.0)		12.1 (34.5)		8.3 (19.6)

CI confidence interval, *ICU* intensive care unit, *MV* mechanical ventilation, *RSV* respiratory syncytial virus, *SD* standard deviation

*Death status is defined as follows: a patient is considered deceased (death = 1) if the death month matches the month of hospital discharge, ICU admission, or mechanical ventilation (MV) service date. Otherwise, patients are considered alive (death = 0).

Wilson method used for calculating 95% CI. The Wilson score interval adjusts both the center and width of the CI, giving more accurate results with small samples. It also provides coverage closer to the intended 95% and always stays within the valid range of 0–100%, avoiding impossible values.