Development and Validation of a Multidisciplinary Standardized Management Pathway for Hypoxemic Respiratory Failure and ARDS

Supplementary Digital Content

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Supplementary Digital Content 1. Summary of HRF and ARDS statements and qualifying criteria included by the expert panel in a modified Delphi consensus process.

Sta	stements and <i>qualifying criteria**</i> for items	for screening in HRF/AR	DS			Median (% agree
(1)	All mechanically ventilated patients should	have their height and Pl	BW measured / calc	ulated upon intubation a	nd / or admission to ICU.	9 (97)
	i. When should documentation occur?	Prior to charting	Within 1H	Within 4H		
		32%	64%	5%		
Sta	atements and qualifying criteria for screening	g for HRF/ARDS				
(2)	Screening is completed on all patients who	are mechanically ventila	ated for ≥ 24 hours.			9 (74)
(3)	Screening is completed only if patient has a	a certain PF ratio.				8.5 (76)
	ii. What PF ratio?	PF<100	PF<200	PF<300		
		0%	4%	96%		
(4)	An arterial blood gas (ABG) should be comp	oleted daily at clinical ste	eady state between	00:00 and 08:00		8.5 (79)
	A chest x-ray should be completed as part a care ateral infiltrates (as per the Berlin definition		for diagnosis of HR	-/ARDS and/or determin	e the presence of	9 (86)
(6)	A chest x-ray for screening should be comp	leted only if patient has	a certain PF ratio.			8.5 (75)
	iii. What PF ratio?	PF<100	PF<200	PF<300		
		0%	14%	86%		
7)	Patients should be identified and classified	using the Berlin criteria	for ARDS.			9 (96)
8)	Patients who are eligible for screening sho	uld be determined by an	RRT.			9 (86)
9)	The screening process would be completed	by the RRT.				9 (97)
10)) Results of the screen (positive or negative) to be reported on daily	rounds by the RRT			9 (97)
11	l) Patients that are screened negative for HI	RF/ARDS would be rescr	eened Q24H (if eligi	ole)		9 (86)
(12	2) The need for screening is determined and	enacted by the RRT/RN	team, once protoco	l is initiated by the physi	cian team.	8.5 (71)
(13	3) Intensivist/delegate to interpret the ches	x-ray completed for scr	eening to determin	e the presence of ARDS.		9 (96)
(14	1) The Intensivist/delegate (on daily rounds)	would appropriately r/c	heart failure as the	primary cause of ARDS		9 (100)
Sta	stements for goals and early management o	f HRF/ARDS				
Th	e goal of lung protective strategies / ventila	tion include:				
	 Aiming for a neutral or negative fluid bala povolemia). 	nce in the absence of co	ntraindications (uns	table hemodynamics, ris	ing creatinine,	8 (89)
(16	b) The use of controlled mode of ventilation	for all patients with HRF	ARDS.			9 (69)
(17	7) If on controlled ventilation, adhere to goa	l of plateau pressure <3	0 cm H2O.			9 (90)
(18	B) If on controlled ventilation, adhere to low	tidal ventilation (6-8ml,	/kg IBW).			9 (93)
(19	9) Adhering to the goal of a driving pressure	of <18 if on controlled v	entilation.			8 (76)
lni	tiating the protocol and determining oxyger	nation and ventilation go	als:			
(20)) Discussion on daily multidisciplinary roun	ds, including both oxyge	nation and ventilation	on goals, should occur.		9 (100)
(2:) Goals around oxygenation and ventilation	shall be documented by	y the RRT.			9 (97)
(22	2) Goals around oxygenation and ventilation	shall be documented by	the Intensivist/del	egate.		9 (79)
Τh	e escalation of treatment modalities for HR	F / ARDS should be based	d on:			
(23	3) Increasing Fi02 requirements.					9 (93)
(24	l) Worsening PF ratios.					9 (100)
(25	s) Increasing respiratory acidosis.					9 (90)
(26	 S) Violation of lung protective ventilation (i.essures, higher driving pressures than typical 		g respiratory acidos	is by using higher tidal vo	olumes, higher plateau	8 (72)

requirements, or lung compliance. iv. How quickly should Pplat be measured	Within 1H	Within 2F	I	Within	3H	Within 4H	
after meeting criteria?		1=0/				201	
v. How often should plateau pressures be	70%	17%		13%		0%	
measured?	Q4H	Q12H		Q12 or	Q24 H	Other	
	68%	14%		10%		9%	
18) The need for a plateau pressure maybe det eam.	ermined and ena	cted by the RRT/R	N team, onc	e the pro	tocol is initiate	ed by the physician	9 (85)
(9) A PEEP study should be completed Q4H onl	ly if patient has a	certain PF ratio.					7 (55)
vi. If yes, what PF ratio range would justify the need for a PEEP study?	PF<100	PF<200	PF<200		1		
	0%	92%		8%			
vii. How quickly should the first PEEP study be completed?	Within1H	Within 2 H	Within .	3H	Within 4H	Other	
	32%	11%	26%	T	5%	26%	
viii. How often should a PEEP study be completed?	Q12H	Q24H		Other			
	20%	70%		10%			
30) The need for a PEEP study may be determin similar to the TIBI protocol).							9 (76)
 The placement of an esophageal balloon sh PEEP). 	ould be considere	ed to guide/deteri	nine both er	nd inspira	tory and end e	expiratory pressures	7 (71)
32) The placement of an esophageal balloon to	should be consid	ered if patient is o	bese or is su	spected	to have a stiff	chest wall.	9 (79)
(33) The need for an esophageal balloon is determined by the Intensivist/delegate team only.							
34) The need for an esophageal balloon may be	· · · · · · · · · · · · · · · · · · ·			once pro	otocol is initiate		9 (65) 7 (61)
33) The need for an esophageal balloon is dete 34) The need for an esophageal balloon may be eam. Statements and qualifying criteria for items for l	e determined and	enacted by the RI	RT/RN team,		otocol is initiato		
34) The need for an esophageal balloon may be eam. tatements and qualifying criteria for items for last security.	determined and	enacted by the RI	RT/RN team,	ARDS			
34) The need for an esophageal balloon may be eam. tatements and qualifying criteria for items for	determined and	enacted by the RI	RT/RN team,	ARDS			7 (61)
34) The need for an esophageal balloon may be eam. tatements and qualifying criteria for items for last should be assessed ix. If being used, how often should	basic intervention	enacted by the RI as in the managem	RT/RN team,	ARDS OS manag			7 (61)
34) The need for an esophageal balloon may be eam. tatements and qualifying criteria for items for last should be assessed ix. If being used, how often should recruitment maneuvers be done? 36) The need for recruitment maneuvers may be seen as a second should recruitment maneuvers be done?	basic intervention droutinely for use Q4H	enacted by the RI as in the management in a care bundle Q12H 13%	ent of HRF/A	ARDS OS manag Other 50%	ement.	ed by the physician	7 (61)
34) The need for an esophageal balloon may be eam. tatements and qualifying criteria for items for last should be assessed ix. If being used, how often should recruitment maneuvers be done? 36) The need for recruitment maneuvers may be eam.	basic intervention droutinely for use Q4H 38% De determined and	enacted by the RI as in the managem in a care bundle Q12H 13% d enacted by the R	ent of HRF/ARD	ARDS S manag Other 50% n, once p	ement. rotocol is initia	ed by the physician	7 (61)
34) The need for an esophageal balloon may be eam. tatements and qualifying criteria for items for last statements and under statement should recruitment maneuvers be done? 36) The need for recruitment maneuvers may be eam. 37) Using sedatives to target a RASS of ≤-3 shoulds.	basic intervention of routinely for use Q4H 38% De determined an	enacted by the RI as in the managem e in a care bundle Q12H 13% d enacted by the RI as a potential tre	ent of HRF/ARD	ARDS S manag Other 50% n, once p	ement. rotocol is initia	ed by the physician	7 (61) 7 (61) 9 (86)
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34) The need for an esophageal balloon may be eam. tatements and qualifying criteria for items for least. 35) Recruitment maneuvers should be assessed ix. If being used, how often should recruitment maneuvers be done? 36) The need for recruitment maneuvers may be eam. 37) Using sedatives to target a RASS of ≤-3 shoulds. 38) The need for a sedation strategy is determinated tatements and qualifying criteria for items for a sedation strategy.	basic intervention droutinely for use Q4H 38% De determined an uld be considered ned by the physicadvanced intervention	enacted by the RI as in the management in a care bundle of the RI as a potential tresian team only.	ent of HRF/ARD ERT/RN team ERT/RN team atment mod	Other 50% n, once possible for H	ement. rotocol is initia HRF/ARDS.	ed by the physician	7 (61) 7 (61) 9 (86) 9 (82)
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(45) Proning to manage HRF/ARDS should be co	onsidered only if a p	oatient has a certain PF	ratio.		9 (85)
xii. What PF ratio would you consider the need for proning?	PF<100	PF<150	PF<200	PF<300	
	0%	45%	45%	0%	
xiii. What PF ratio would necessitate the need for proning?	PF<100	PF<150	PF<200	PF<300	
	40%	25%	35%	0%	
(46) Proning to manage HRF/ARDS should be co	onsidered only if a p	atient has a specific Fi	02 requirement?		7 (59)
xiv. If yes, what Fi02 requirement would need to be present to justify the need for proning?	Fi02>0.60	Fi02>0.80	Fi02>1	Refractory	
	33%	58%	0%	8%	
(47) The need for proning a patient is determin	ed by the physician	team only.			7 (52)
(48) The need for proning a patient may be det	ermined and enacte	ed by the RRT/RN team	n, once protocol is initia	ted by the physician team.	7 (70)
49) The need for inhaled vasodilators is detern	nined by the physic	ian team only.			9 (76)
(50) ECMO should be considered as a potential	treatment modality	y for HRF/ARDS.			9 (96)
(51) ECMO should be considered only if a patie	nt has a certain PF i	atio.			9 (79)
xv. What PF ratio would necessitate the need for ECMO?	PF<100	PF<150	PF<200	PF<300	
	89%	11%	0%	0%	
(52) The need for ECMO is determined by t	he physician tean	n only.	1		9 (93)

⁺Data for Statements are expressed as median, and percentage of consensus panelists agree (7-9) Likert scale.

HRF=hypoxemic respiratory failure. ICU=intensive care unit. PBW=predicted body weight. ICU=intensive care unit. H=hour. PF ratio=the ratio of arterial oxygen partial pressure to fractional inspired oxygen. Pplat=plateau pressures. PEEP=Positive End Expiratory Pressure. RRT=Registered Respiratory Therapist. RN=Registered Nurse. RASS=Richmond Agitation-Sedation Scale. ECMO=Extracorporeal Membrane Oxygenation.

^{**}Data for qualifying criteria are expressed as percentage of consensus panelists agree.

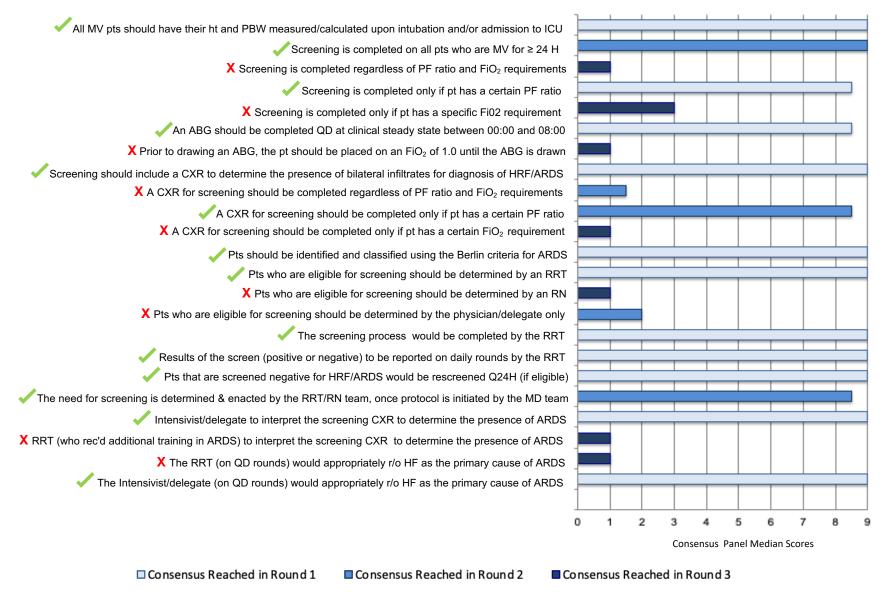


Figure 1. Consensus panel scores on 23 Statements on screening for HRF and ARDS, with the round in which consensus was achieved shown by color

The bars represent the median scores of consensus panel agreement on a 9-point Likert scale. Items reached consensus to exclude if median = 1-3, consensus to include if median = 7-9.

⁼ include. X = exclude. MV=mechanically ventilated. Ht=height. PBW=predicted body weight. ICU=intensive care unit. Pts=patients. PF ratio=PF ratio of arterial oxygen partial pressure to fractional inspired oxygen. FiO2=fraction of inspired oxygen. QD=daily. ABG=arterial blood gas. HRF=hypoxemic respiratory failure. ARDS=acute respiratory distress syndrome. QD=daily. CXR=chest x-ray. RRT=registered respiratory therapist. MD team=intensivist/delegate. r/o=rule out. HF=heart failure.

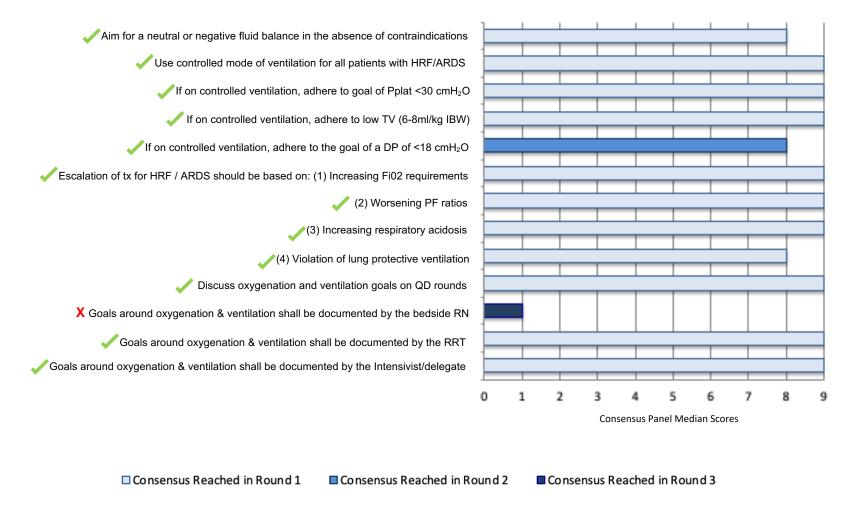


Figure 2. Consensus panel scores on 13 goals and early management Statements for HRF/ARDS, with the round in which consensus was achieved shown by color

The bars represent the median scores from a 9-point Likert scale. Items reached consensus to exclude if median = 1-3, consensus to include if median = 7-9.

= include. X = exclude. HRF=hypoxemic respiratory failure. ARDS=acute respiratory distress syndrome. Pplat=plateau pressure. TV=tidal volume. DP=driving pressure. FiO2=fraction of inspired oxygen. PF ratio=PF ratio of arterial oxygen partial pressure to fractional inspired oxygen. QD=daily. RN=registered nurse. RRT=registered respiratory therapist.

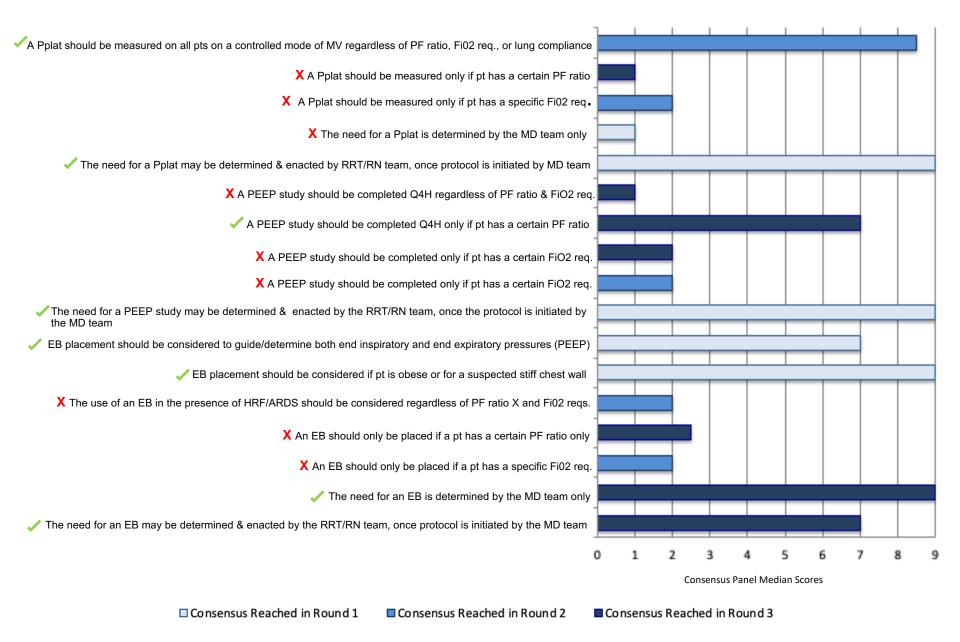


Figure 3. Consensus panel scores on 17 monitoring Statements for HRF/ARDS, with the round in which consensus was achieved shown by color

The bars represent the median scores from a 9-point Likert scale. Items reached consensus to exclude if median = 1-3, consensus to include if median = 7-9.

^{✓ =} include. X=exclude. Pplat=plateau pressure. PF ratio=PF ratio of arterial oxygen partial pressure to fractional inspired oxygen. FiO2=fraction of inspired oxygen. Reg=requirement. MD team=intensivist/delegate. PEEP=positive end expiratory pressure. Q4H=every 4 hours. EB=esophageal balloon. RRT=registered respiratory therapist. RN=registered nurse.

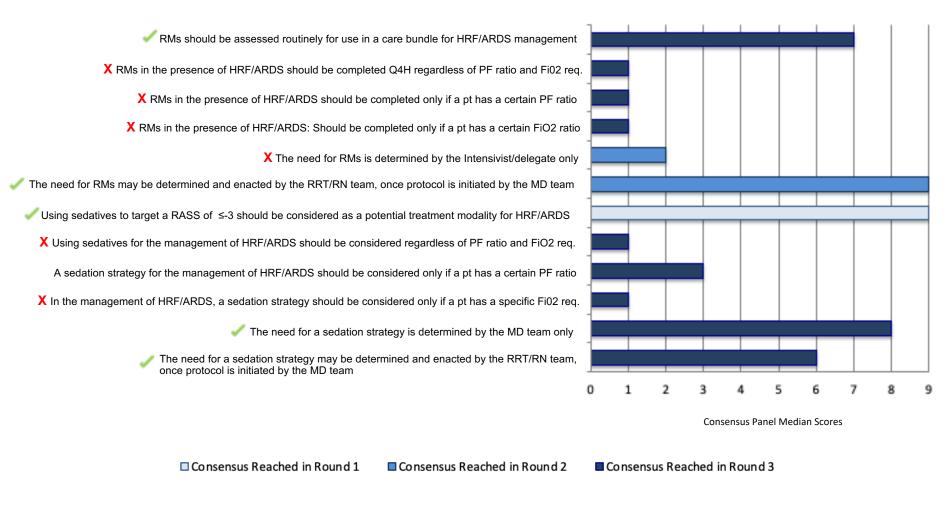


Figure 4. Consensus panel scores on 12 basic management items for HRF/ARDS, with the round in which consensus was achieved shown by color

Scores are medians from a 9-point Likert scale. Items reached consensus to exclude if median = 1-3, consensus to include if median = 7-9.

=include. X=exclude. RMs=recruitment maneuvers. HRF=hypoxemic respiratory failure. ARDS=acute respiratory distress syndrome. PF ratio=PF ratio of arterial oxygen partial pressure to fractional inspired oxygen. FiO2=fraction of inspired oxygen. RASS= Richmond Agitation and Sedation Scale. Pt=patient. MD team=intensivist/delegate.

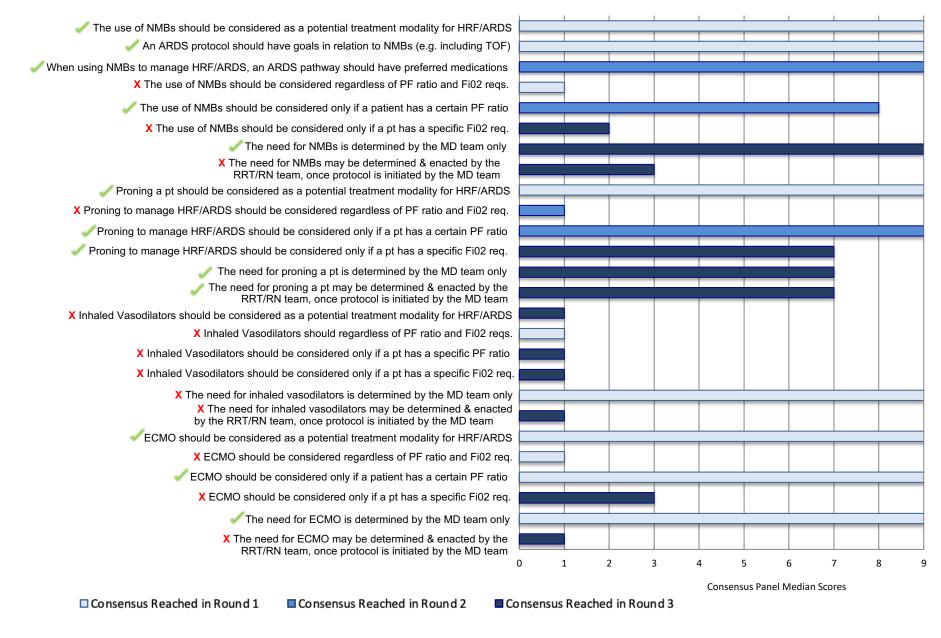


Figure 5. Consensus panel scores on 26 advanced management Statements for HRF/ARDS, with the round in which consensus was achieved shown by color Scores are medians from a 9-point Likert scale. Statements reached consensus to exclude if median = 1-3, consensus to include if median = 7-9.

⁼include. X=exclude. NMBs=neuromuscular blockades. ARDS=acute respiratory distress syndrome. TOF=train of four. HRF=hypoxemic respiratory failure. FiO2=fraction of inspired oxygen. PF ratio=PF ratio of arterial oxygen partial pressure to fractional inspired oxygen. MD team=intensivist/delegate. Pt=patient. RRT=registered respiratory therapist. RN=registered nurse. ECMO=extracorporeal membrane 9 oxygenation.

Supplementary Digital Content 7.

Summary of HRF and ARDS Statements included by the expert panel in a modified Delphi consensus process by discipline

Statements for items for screening in HRF/ARDS		Median		
	MD/NP	RT	RN	
(1) All mechanically ventilated patients should have their height and PBW measured / calculated upon intubation and / or admission to ICU.	9	9	9	
Statements and QC for screening for HRF/ARDS				
(2) Screening is completed on all patients who are mechanically ventilated for ≥ 24 hours.	9	8.5	8	
(3) Screening is completed only if patient has a certain PF ratio.	8	9	5.5	
(4) An arterial blood gas (ABG) should be completed daily at clinical steady state between 00:00 and 08:00	7.5	8.5	9	
(5) A chest x-ray should be completed as part of the screening process for diagnosis of HRF/ARDS and/or determine the presence of bilateral infiltrates (as per the Berlin definition).	9	9	9	
(6) A chest x-ray for screening should be completed only if patient has a certain PF ratio.	8	9	5	
(7) Patients should be identified and classified using the Berlin criteria for ARDS.	9	9	9	
(8) Patients who are eligible for screening should be determined by an RRT.	9	9	9	
(9) The screening process would be completed by the RRT.	9	9	9	
(10) Results of the screen (positive or negative) to be reported on daily rounds by the RRT	9	9	9	
(11) Patients that are screened negative for HRF/ARDS would be rescreened Q24H (if eligible)	9	9	7	
(12) The need for screening is determined and enacted by the RRT/RN team, once protocol is initiated by the physician team.	9	8.5	3.5	
(13) Intensivist/delegate to interpret the chest x-ray completed for screening to determine the presence of ARDS.	9	8	9	
(14) The Intensivist/delegate (on daily rounds) would appropriately r/o heart failure as the primary cause of ARDS	9	9	9	
Statements for items for goals and early management of HRF/ARDS				
The goal of lung protective strategies / ventilation include:				
(15) Aiming for a neutral or negative fluid balance in the absence of contraindications (unstable hemodynamics, rising creatinine, hypovolemia).	8	8.5	9	
(16) The use of controlled mode of ventilation for all patients with HRF/ARDS.	7.5	9	9	
(17) If on controlled ventilation, adhere to goal of plateau pressure <30 cm H2O.	9	9	9	
(18) If on controlled ventilation, adhere to low tidal ventilation (6-8ml/kg IBW).	9	9	9	
(19) Adhering to the goal of a driving pressure of <18 if on controlled ventilation.	7	9	N/A	
Initiating the protocol and determining oxygenation and ventilation goals:				
(20) Discussion on daily multidisciplinary rounds, including both oxygenation and ventilation goals, should occur.	9	9	9	
(21) Goals around oxygenation and ventilation shall be documented by the RRT.	9	9	9	

(22) Goals around oxygenation and ventilation shall be documented by the Intensivist/delegate.	7.5	9	9
The escalation of treatment modalities for HRF / ARDS should be based on:			
(23) Increasing Fi02 requirements.	8.5	9	9
(24) Worsening PF ratios.	9	9	9
(25) Increasing respiratory acidosis.	9	9	9
(26) Violation of lung protective ventilation (i.e. oxygenating or treating respiratory acidosis by using higher tidal volumes, higher plateau pressures, higher driving pressures than typically accepted).	7.5	7	9
Statements & Quality Criteria for items for monitoring in the management of HRF/ARDS			
(27) A plateau pressure should be measured on all patients with a controlled mode of ventilation regardless of PF ratio and FiO2 requirements, or lung compliance.	8	9	6.5
(28) The need for a plateau pressure maybe determined and enacted by the RRT/RN team, once the protocol is initiated by the physician team.	9	9	9
(29) A PEEP study should be completed Q4H only if patient has a certain PF ratio.	7	3	N/A
(30) The need for a PEEP study may be determined and enacted by the RRT/RN team, once the protocol is initiated by the physician team (similar to the TIBI protocol).	8.5	9	9
(31) The placement of an esophageal balloon should be considered to guide/determine both end inspiratory and end expiratory pressures (PEEP).	7	7.5	7.5
(32) The placement of an esophageal balloon to should be considered if patient is obese or is suspected to have a stiff chest wall.	9	9	8
(33) The need for an esophageal balloon is determined by the Intensivist/delegate team only.	9	3	5
(34) The need for an esophageal balloon may be determined and enacted by the RRT/RN team, once protocol is initiated by the physician team.	1	8	5
Statements & Quality Criteria for items for basic interventions in the management of HRF/ARDS			
(35) Recruitment maneuvers should be assessed routinely for use in a care bundle for HRF/ARDS management.	9	7	5
(36) The need for recruitment maneuvers may be determined and enacted by the RRT/RN team, once protocol is initiated by the physician team.	9	9	9
(37) Using sedatives to target a RASS of ≤-3 should be considered as a potential treatment modality for HRF/ARDS.	9	9	8
(38) The need for a sedation strategy is determined by the physician team only.	9	7	5
Statements & Qualilty Criteria for items for advanced interventions in the management of HRF/ARDS			
(39) The use of neuromuscular blockades should be considered as a potential treatment modality for HRF/ARDS.	9	8.5	9
(40) An ARDS protocol should have goals in relation to neuromuscular blockades (i.e. including train of four and other physiological parameters).	9	8.5	9
(41) When using Neuromuscular Blockades to manage HRF/ARDS: An ARDS care pathway should have preferred medications (i.e. use of Cisatracurium vs others).	9	9	9
(42) The use of neuromuscular blockades should be considered only if a patient has a certain PF ratio.	9	8.5	1
(43) The need for neuromuscular blockades is determined by the physician team only.	9	9	5
(44) Proning a patient should be considered as a potential treatment modality for HRF/ARDS.	9	9	9

(45) Proning to manage HRF/ARDS should be considered only if a patient has a certain PF ratio.	9	9	7
(46) Proning to manage HRF/ARDS should be considered only if a patient has a specific Fi02 requirement?	7	7	1
(47) The need for proning a patient is determined by the physician team only.	9	2	5
(48) The need for proning a patient may be determined and enacted by the RRT/RN team, once protocol is initiated by the physician team.	5	8	5
(49) The need for inhaled vasodilators is determined by the physician team only.	9	6	8
(50) ECMO should be considered as a potential treatment modality for HRF/ARDS.	9	9	9
(51) ECMO should be considered only if a patient has a certain PF ratio.	9	8	9
(52) The need for ECMO is determined by the physician team only.	9	7.5	9

⁺Data for Statements are expressed as median.

MD=physician. NP=Nurse Practitioner. RN=Registered Nurse. RT=Respiratory Therapist. HRF=hypoxemic respiratory failure. ICU=intensive care unit. PBW=predicted body weight. ICU=intensive care unit. H=hour. PF ratio=the ratio of arterial oxygen partial pressure to fractional inspired oxygen. Pplat=plateau pressures. PEEP=Positive End Expiratory Pressure. RRT=Registered Respiratory Therapist. RASS=Richmond Agitation Scale. ECMO=Extracorporeal Membrane Oxygenation.

Supplementary Digital Content 8. Validation survey respondents' ability to rate and agreement among those able to rate HRF and ARDS pathway elements by Discipline % Agreement among those able to % Able to rate rate MD/NP RT RN MD/NP RT RN Pathway elements Within 1 hour of intubation/admission to ICU: all mechanically ventilated patients should have the following documented in the Electronic Medical Record: i. Height ii. Predicted body weight (PBW) **SCREENING** All patients who are mechanically ventilated for ≥ 24 hours AND have a PF ratio (paO2/FiO2) <300 on ANY arterial blood gas (ABG) should be identified for screening for hypoxemic respiratory failure (HRF) / ARDS by the RRT Screening for hypoxemic respiratory failure (HRF) should consist of an ABG performed at clinical steady state between 00:00 and 08:00 to demonstrate PF ratio <300 (on a minimum PEEP of 5) Screening for ARDS should consist of the following 3 criteria: i. Meeting criteria for HRF (as in Question 12 above) plus: ii. Bilateral infiltrates: Screening chest x-ray should be performed and interpreted by intensivist/delegate to determine the presence of bilateral infiltrates iii. Absence of heart failure: Intensivist/delegate appropriately rules out heart failure as the primary cause of Results of the HRF/ARDS screen (positive or negative) should be reported on daily multidisciplinary rounds by the RRT Patients that are screened negative for HRF/ARDS should be rescreened Q24H GOALS AND EARLY MANAGEMENT In the absence of contraindications (e.g. unstable hemodynamics, rising creatinine, hypovolemia) target neutral or negative fluid balance For all patients with new onset HRF/ARDS controlled mode of ventilation should be used (e.g. pressure / volume control) On controlled ventilation the following initial "lung protective" goals should be targeted: i. Low tidal volume (6-8ml/kg PBW) ii. Plateau pressure <30 cm H2O iii. Driving pressure of <18 Oxygenation and ventilation goals:

Escalation of treatment should be based on:

i. Should be defined on patient admission and reviewed on daily multidisciplinary rounds

ii. Should be documented by the RRT (MetaVision) and intensivist/delegate (Sunrise Clinical Manager)

i. Increasing FiO2 requirements	98	98	100	100	99	94
ii. Worsening PF ratio	98	94	99	98	98	81
iii. Increasing respiratory acidosis	83	94	100	98	98	93
iv. Violation of lung protective ventilation (e.g. oxygenating or treating respiratory acidosis by using higher tidal volumes, higher plateau pressures, higher driving pressures than typically accepted)	84	90	99	94	94	69
MONITORING						
Plateau Pressures: i. Plateau pressures should be measured on all patients with a controlled mode of ventilation (independent of PF ratio, Fi02 requirements, or lung compliance)	96	81	97	96	98	38
ii. Initial plateau pressures should be measured within 1H of inclusion to the protocol	95	91	98	94	95	34
iii. Should be repeated at least Q12H (consider Q4H)	100	87	99	89	98	35
RRT should determine appropriateness of measuring plateau pressures and complete	93	98	94	94	99	73
PEEP Study:						
i. A PEEP study should be completed for patients with a PF ratio < 200	85	85	99	87	88	33
ii. First PEEP study should be completed within 4H of meeting threshold	86	83	98	79	86	33
iii. Should be repeated Q24H	80	58	94	85	83	33
A PEEP study may be proposed by any member of the multidisciplinary team. RRT should perform	76	80	88	87	92	67
Consider an esophageal balloon to guide/determine both end inspiratory and end expiratory transpulmonary pressures (PEEP) in particular if patient is obese or is suspected to have a stiff chest wall	82	94	90	72	72	29
Esophageal balloon may be proposed by any member of the multidisciplinary team; however, needs most responsible practitioner approval prior to initiation. RRT should perform	80	89	90	74	75	39
BASIC INTERVENTIONS						
Recruitment maneuvers:						
i. Should be routinely assessed for appropriateness	81	93	98	91	96	88
ii. If used, should be performed Q4H	54	63	75	74	92	62
Recruitment maneuvers may be proposed by any member of the multidisciplinary team; however, needs most responsible practitioner approval prior to initiation. RRT should perform	93	87	95	87	98	89
Consider using sedatives to a target RASS of ≤-3 or to reduce ventilator dyssynchrony	93	94	94	94	95	97
Sedatives may be proposed by any member of multidisciplinary team; however, needs most responsible practitioner approval prior to initiation. RN should administer and meet sedation goals	96	99	99	100	98	99
ADVANCED INTERVENTIONS						
Neuromuscular blockade should be:						
i. Considered for patients with a PF ratio <150	95	92	99	87	85	53

ii. Necessitated for patients with a PF ratio <100	75	83	87	85	80	48
Goals for neuromuscular blockade (e.g. train of four or ventilator dyssynchrony) should be determined and documented in Sunrise Clinical Manager	95	99	96	87	74	71
Preferred medications (e.g. use of Cisatracurium vs others) should be provided to RN team	93	99	99	94	70	89
Neuromuscular blockade may be proposed by any member of the multidisciplinary team; however, needs most responsible practitioner approval prior to initiation. RN should administer and meet goals	100	98	99	98	93	99
Proning should be:						
i. Considered for patients with a PF ratio <200 AND Fi02 requirement >0.60	88	88	91	87	95	51
ii. Necessitated for PF ratio <150 AND Fi02 requirement >0.60, in the absence of contraindications	62	68	79	79	92	46
Proning may be proposed by any member of the multidisciplinary team; however, needs most responsible practitioner approval prior to initiation. Multidisciplinary team should enact	100	97	97	96	99	90
Routine use of inhaled vasodilators is not recommended; however, they are available on a case by case basis in exceptional circumstances	95	93	94	94	88	67
ECMO should be considered as a potential treatment modality for HRF/ARDS only if a patient has a PF ratio <100 despite above therapies and in the absence of contraindications	84	85	78	81	68	30
Referral for ECMO May be proposed by any member of the multidisciplinary team; however, needs most responsible practitioner approval prior to initiation of referral	100	95	91	96	76	55
responsible practitioner approval prior to initiation of referral						

RN=Registered Nurse. RT=Respiratory Therapist. HRF=hypoxemic respiratory failure. PEEP=Positive End-Expiratory Pressure. FiO2=fraction of inspired oxygen. PF ratio=PaO2: FiO2 ratio. RASS=Richmond Agitation Sedation Scale. ECMO=extracorporeal membrane oxygenation.