



SDRA : Analyse critique des nouvelles recommandations

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Liens d'intérêts

- Financement travaux de recherche
 - General Electric
- Rémunérations d'interventions
 - Getinge
 - Fisher Paykel
 - Dräger Medical
- Rémunérations de consultant
 - Air Liquide Medical Systems
 - Bayer

Acute Respiratory Distress Syndrome

The Berlin Definition

The ARDS Definition Task Force* JAMA, June 20, 2012—Vol 307, No. 23

Acute Respiratory Distress Syndrome			
Timing	Within 1 week of a known clinical insult or new/worsening respiratory symptoms		
Chest Imaging ^a	Bilateral opacities – not fully explained by effusions, lobar/lung collapse, or nodules		
Origin of Edema	Respiratory failure not fully explained by cardiac failure or fluid overload; Need objective assessment (e.g., echocardiography) to exclude hydrostatic edema if no risk factor present		
	Mild	Moderate	Severe
Oxygenation ^b	$200 < \text{PaO}_2/\text{FiO}_2 \leq 300$ with $\text{PEEP or CPAP} \geq 5 \text{ cmH}_2\text{O}^c$	$100 < \text{PaO}_2/\text{FiO}_2 \leq 200$ with $\text{PEEP} \geq 5 \text{ cmH}_2\text{O}$	$\text{PaO}_2/\text{FiO}_2 \leq 100$ with $\text{PEEP} \geq 5 \text{ cmH}_2\text{O}$



A New Global Definition of Acute Respiratory Distress Syndrome

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Am J Respir Crit Care Med 2023 Jul 24. DOI: 10.1164/rccm.202303-0558WS.

Criteria that apply to all ARDS categories

Risk factors and origin of edema	Precipitated by an acute predisposing risk factor such as pneumonia, non-pulmonary infection, trauma, transfusion, aspiration, or shock. Pulmonary edema is not <i>exclusively or primarily</i> attributable to cardiogenic pulmonary edema/fluid overload, and hypoxemia/gas exchange abnormalities are not primarily attributable to atelectasis. However, ARDS can be diagnosed in the presence of these conditions if a predisposing risk factor for ARDS is also present.
Timing	Acute onset or worsening of hypoxemic respiratory failure within 1 week of the estimated onset of the predisposing risk factor or new or worsening respiratory symptoms.
Chest Imaging	Bilateral opacities on chest radiograph, computed tomography, or ultrasound not fully explained by effusions, atelectasis, or nodules/masses.

Criteria that apply to specific ARDS categories

	Non-intubated ARDS	Intubated ARDS	Modified definition for resource-variable settings²
Oxygenation ^{3,4}	$\text{PaO}_2/\text{FiO}_2 \leq 300$ mmHg or $\text{SpO}_2/\text{FiO}_2 \leq 315$ (if $\text{SpO}_2 \leq 97\%$) on HFNO with a flow of ≥ 30 liters per minute or NIV/CPAP with at least 5 cm H ₂ O expiratory pressure	Mild⁵: $200 < \text{PaO}_2/\text{FiO}_2 \leq 300$ or $235 \leq \text{SpO}_2/\text{FiO}_2 \leq 315$ (if $\text{SpO}_2 \leq 97\%$) Moderate: $100 < \text{PaO}_2/\text{FiO}_2 \leq 200$ or $148 < \text{SpO}_2/\text{FiO}_2 \leq 235$ (if $\text{SpO}_2 \leq 97\%$) Severe: $\text{PaO}_2/\text{FiO}_2 \leq 100$ or $\text{SpO}_2/\text{FiO}_2 \leq 148$ (if $\text{SpO}_2 \leq 97\%$)	$\text{SpO}_2/\text{FiO}_2 \leq 315$ (if $\text{SpO}_2 \leq 97\%$). ⁶ End-expiratory pressure or a minimum flow rate of oxygen is not required for diagnosis in resource-variable settings.

Patient Description

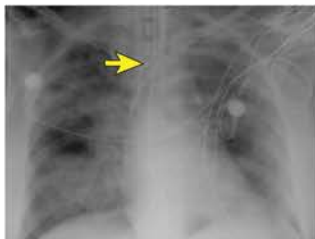
Imaging

Oxygenation

ARDS Categories



68 M with abdominal sepsis, septic shock, and acute hypoxemic respiratory failure



Mechanically ventilated
FiO₂ 0.5
PaO₂ 75
P/F = 150

Intubated ARDS
Severity: Moderate
Typical patient included in prior Berlin definition



54 F with history of breast cancer, COVID-19 pneumonia, and worsening SOB for the past 6 days

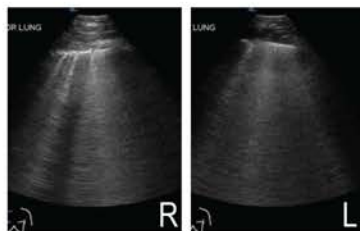


High flow nasal oxygen
HFNO 40L/min
FiO₂ 0.80
SpO₂ 91%
S/F = 114

Non-Intubated ARDS
New category in Global definition



39 F with abdominal sepsis and gram negative bacteremia in a small under-resourced hospital without blood gases, radiography or mechanical ventilation



Supplemental oxygen by face mask at 15L/min
FiO₂ 0.6
SpO₂ 85%
S/F = 142

ARDS in resource-variable settings
New category in Global definition, consistent with Kigali modification

An Official American Thoracic Society/European Society of Intensive Care Medicine/Society of Critical Care Medicine Clinical Practice Guideline: Mechanical Ventilation in Adult Patients with Acute Respiratory Distress Syndrome

Am J Respir Crit Care Med Vol 195, Iss 9, pp 1253–1263, May 1, 2017

REVIEW

Open Access

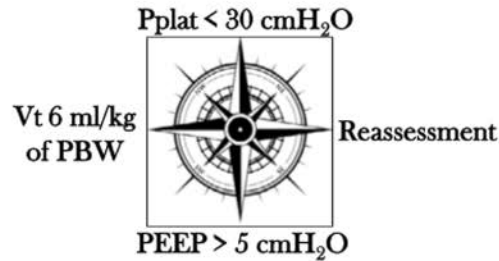
Formal guidelines: management of acute respiratory distress syndrome



Laurent Papazian^{1*}, Cécile Aubron², Laurent Brochard³, Jean-Daniel Chiche⁴, Alain Combes⁵, Didier Dreyfuss⁶, Jean-Marie Forel¹, Claude Guérin⁷, Samir Jaber⁸, Armand Mekontso-Dessap⁹, Alain Mercat¹⁰, Jean-Christophe Richard¹¹, Damien Roux⁶, Antoine Vieillard-Baron¹² and Henri Faure¹³

Ann. Intensive Care (2019) 9:69

Early management of ARDS in 2019



Confirmed
ARDS

Initiation of invasive
mechanical
ventilation with
sedation in ICU

Tidal volume (Vt) about 6 ml/kg of PBW in the absence
of severe metabolic acidosis

Systematic screening for ARDS diagnosis criteria

**Reassessment of ventilator settings and
of the management strategy at least every 24h**

P/F < 200

High level of PEEP
if improves oxygenation

Tidal volume about 6 ml/kg of PBW
Plateau pressure < 30 cmH₂O
PEEP > 5 cmH₂O
Check for hypercapnia

P/F < 150

Neuromuscular blockers
Prone positioning

P/F < 80

Discuss
VV-ECMO

ARDS
S
E
V
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R
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Y

Veno-venous ECMO

- In case of refractory hypoxemia or when protective ventilation can not be applied
- To be discussed with experienced ECMO centres

Neuromuscular blockers: continuous intravenous infusion

- Early initiation (within the first 48h of ARDS diagnosis)

Prone positioning methods :

- Applied for >16h a day, for several consecutive days

Moderate or severe ARDS -> High PEEP test (> 12 cmH₂O)
Use high levels if:

- Oxygenation improvement
- Without hemodynamic impairment or significant decrease in lung compliance
- Maintain Pplat < 30 cmH₂O, continuous monitoring

ARDS diagnosis criteria

- PaO₂/FiO₂ ≤ 300 mmHg
- PEEP ≥ 5 cmH₂O
- Bilateral opacities on chest imaging
- Not fully explained by cardiac failure or fluid overload
- Within a week of a known clinical insult

Might be applied

- > Inhaled Nitric Oxide (iNO), when severe hypoxemia remains despite prone positioning and before considering VV-ECMO
- > Partial ventilation support after early phase to generate tidal volume about 6 ml/kg and less than 8 ml/kg

No recommendation could be made

- > ECCO₂R
- > Driving pressure
- > Partial ventilation support at the early phase

Should probably not be done

- > Systematic recruitment maneuvers

Should not be done

- > HFOV



ESICM guidelines on acute respiratory distress syndrome: definition, phenotyping and respiratory support strategies

Giacomo Grasselli^{1,2*} , Carolyn S. Calfee³, Luigi Camporota^{4,5}, Daniele Poole⁶, Marcelo B. P. Amato⁷, Massimo Antonelli^{8,9}, Yaseen M. Arabi^{10,11,12}, Francesca Baroncelli¹³, Jeremy R. Beitler¹⁴, Giacomo Bellani^{15,16}, Geoff Bellingan¹⁷, Bronagh Blackwood¹⁸, Lieuwe D. J. Bos¹⁹, Laurent Brochard^{20,21}, Daniel Brodie²², Karen E. A. Burns^{21,23,24,25}, Alain Combes^{26,27}, Sonia D'Arrigo⁸, Daniel De Backer²⁸, Alexandre Demoule^{29,30}, Sharon Einav³¹, Eddy Fan²¹, Niall D. Ferguson^{32,33}, Jean-Pierre Frat^{34,35}, Luciano Gattinoni³⁶, Claude Guérin^{37,38}, Margaret S. Herridge³⁹, Carol Hodgson^{40,41}, Catherine L. Hough⁴², Samir Jaber⁴³, Nicole P. Juffermans⁴⁴, Christian Karagiannidis⁴⁵, Jozef Kesecioglu⁴⁶, Arthur Kwizera⁴⁷, John G. Laffey^{48,49}, Jordi Mancebo⁵⁰, Michael A. Matthay⁵¹, Daniel F. McAuley^{18,52}, Alain Mercat⁵³, Nuala J. Meyer⁵⁴, Marc Moss⁵⁵, Laveena Munshi⁵⁶, Sheila N. Myatra⁵⁷, Michelle Ng Gong^{58,59}, Laurent Papazian^{60,61}, Bhakti K. Patel⁶², Mariangela Pellegrini⁶³, Anders Perner⁶⁴, Antonio Pesenti^{1,2}, Lise Piquilloud⁶⁵, Haibo Qiu⁶⁶, Marco V. Ranieri^{67,68}, Elisabeth Riviello⁶⁹, Arthur S. Slutsky^{21,24}, Renee D. Stapleton⁷⁰, Charlotte Summers⁷¹, Taylor B. Thompson⁷², Carmen S. Valente Barbas^{73,74}, Jesús Villar^{24,75,76}, Lorraine B. Ware⁷⁷, Björn Weiss⁷⁸, Fernando G. Zampieri^{79,80}, Elie Azoulay⁸¹ and Maurizio Cecconi^{82,83} on behalf of the European Society of Intensive Care Medicine Taskforce on ARDS

ARDS guidelines ESICM 2023

- Pendant la pandémie Covid
- Plus de 60 experts internationaux, 3 méthodologistes, 8 représentants des patients
- Innombrables e-mails, multiples réunions (visioconférences)
- Méthodologie très stricte (!!!) : PICO, PRISMA, GRADE
- 9 domaines : Définition, phénotypes, HDN, CPAP/VNI, VT, PEEP-RM, DV, curares, ECMO-ECCO₂R
- 1 à 5 questions par domaine → 16 « recommandations »
- Article (32 pages) + supplément « online » (307 pages !!)

ARDS guidelines ESICM 2023

- **P**atient
- **I**ntervention
- **C**omparateur
- **O**utcome

- **GRADE**

- **Niveau de preuve** (RCT +++)
- Importance clinique et ampleur de l'effet, coût, disponibilité
- **Force de la recommandation**

- Opinions des experts

Haut débit nasal vs O₂ conventionnel

Recommendation 3.1

We **recommend** that non-mechanically ventilated patients with AHRF not due to cardiogenic pulmonary edema or acute exacerbation of COPD receive HFNO as compared to conventional oxygen therapy to reduce the risk of intubation

Strong recommendation; moderate level of evidence in favor

We are **unable to make a recommendation** for or against the use of HFNO over conventional oxygen therapy to reduce mortality

No recommendation; high level of evidence of no effect

This recommendation applies also to AHRF from COVID-19

Strong recommendation; low level of evidence in favor for intubation and no recommendation; moderate level of evidence of no effect for mortality, for indirectness.

CPAP/VNI vs O₂ conventionnel

Recommendation 4.1

We are **unable to make a recommendation** for or against the use of CPAP/NIV compared to conventional oxygen therapy for the treatment of AHRF (not related to cardiogenic pulmonary edema or acute exacerbation of COPD) to reduce mortality or to prevent intubation.

No recommendation; high level of evidence for mortality, moderate level of evidence for intubation.

We **suggest** the use of CPAP over conventional oxygen therapy to reduce the risk of intubation in patients with acute hypoxemic respiratory failure due to COVID-19.

Weak recommendation; low level of evidence in favor.

In this population, we are **unable to make a recommendation** for or against the use of CPAP over conventional oxygen therapy to reduce mortality.

No recommendation; moderate level of evidence of no effect.

Haut débit nasal vs CPAP/VNI

Recommendation 3.2

We are **unable to make a recommendation** for or against the use of HFNO compared to continuous positive airway pressure (CPAP)/NIV to reduce intubation or mortality in the treatment of unselected patients with acute hypoxemic respiratory failure not due to cardiogenic pulmonary edema or acute exacerbation of COPD.

No recommendation; moderate level of evidence for mortality, low level of evidence for intubation, not in favor nor against.

We **suggest** that CPAP/NIV can be considered instead of HFNO for the treatment of AHRF due to COVID-19 to reduce the risk of intubation (*weak recommendation, high level of evidence*), but **no recommendation** can be made for whether CPAP/NIV can decrease mortality compared to HFNO in COVID-19.

No recommendation; high level of evidence of no effect.

VT : Rien de nouveau

Recommendation 5.1

We **recommend** the use of low tidal volume ventilation strategies (i.e., 4–8 ml/kg PBW), compared to larger tidal volumes (traditionally used to normalize blood gases), to reduce mortality in patients with ARDS not due to COVID-19.

Strong recommendation based on expert opinion despite lack of statistical significance; high level of evidence.

This recommendation applies also to ARDS from COVID-19.

Strong recommendation; moderate level of evidence for indirectness.

PEEP : Rien

Recommendation 6.1

We are **unable to make a recommendation** for or against routine PEEP titration with a higher PEEP/FiO₂ strategy versus a lower PEEP/FiO₂ strategy to reduce mortality in patients with ARDS.
No recommendation; high level of evidence of no effect.

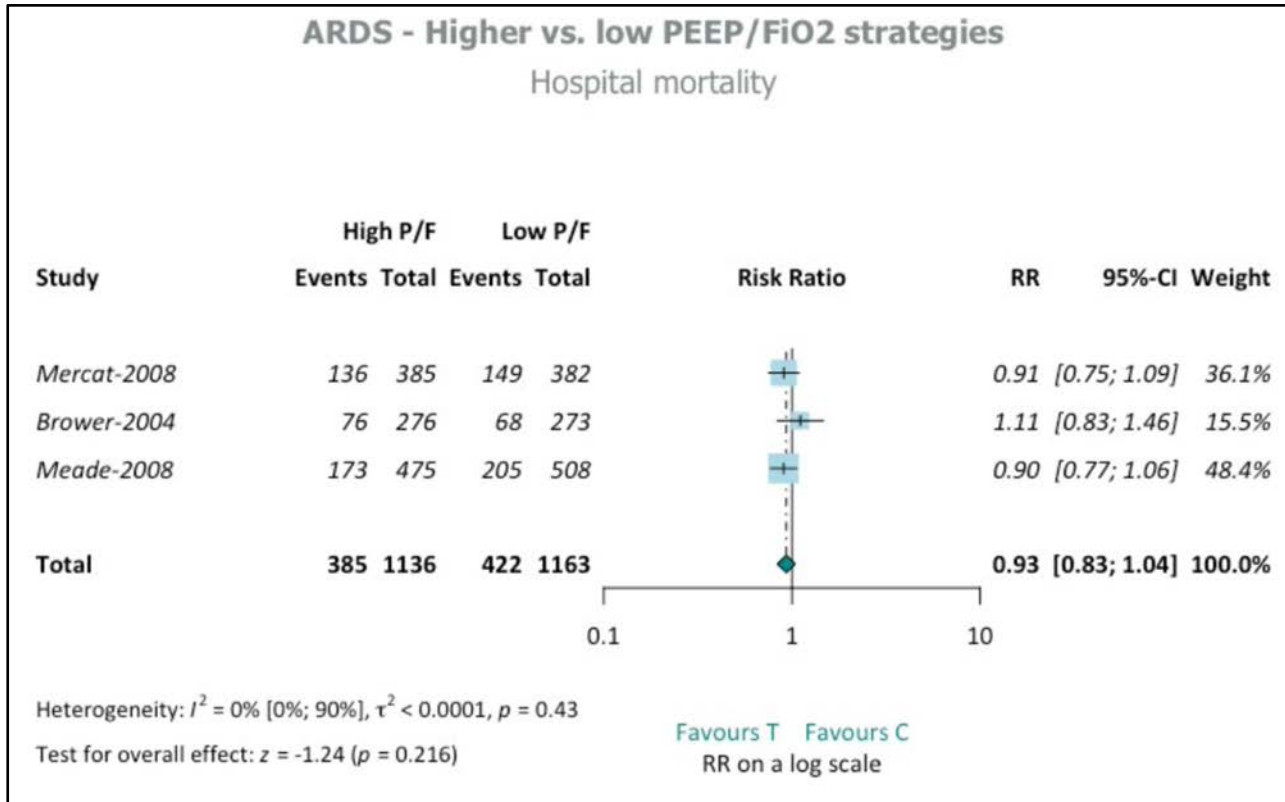
This statement applies also to ARDS from COVID-19.
No recommendation; moderate level of evidence of no effect for indirectness.

Recommendation 6.2

We are **unable to make a recommendation** for or against PEEP titration guided principally by respiratory mechanics, compared to PEEP titration based principally on PEEP/FiO₂ strategy, to reduce mortality in patients with ARDS.
No recommendation; high level of evidence of no effect.

This statement applies also to ARDS from COVID-19.
No recommendation; moderate level of evidence for indirectness.

PEEP : Rien



Manœuvres de recrutement : Non

Recommendation 6.3

We **recommend against** use of prolonged high-pressure recruitment maneuvers (defined as airway pressure maintained ≥ 35 cmH₂O for at least one minute) to reduce mortality of patients with ARDS.

Strong recommendation; moderate level of evidence against.

This recommendation applies also to ARDS from COVID-19.

Strong recommendation; low level of evidence against for indirectness.

DV : C'est clair (mais pas nouveau et pas appliqué !)

Recommendation 7.1

We **recommend** using prone position as compared to supine position for patients with moderate-severe ARDS (defined as $\text{PaO}_2/\text{FiO}_2 < 150$ mmHg and $\text{PEEP} \geq 5$ cmH₂O, despite optimization of ventilation settings) to reduce mortality.

Strong recommendation, high level of evidence in favor.

This recommendation applies also to ARDS from COVID-19.

Strong recommendation; moderate level of evidence in favor for indirectness.

Que faire de tout ça ?

- Lire l'article (pas seulement les recommandations)
- S'approprier ou non les recommandations → Procédure de service
- Les appliquer intelligemment → Soin personnalisé
- Vérifier-mesurer ce que l'on fait → Evaluation
- Se remettre en cause → Adaptation
- Contribuer à répondre aux questions non résolues
→ Recherche clinique

EDITORIAL

Back to the future: ARDS guidelines, evidence, and opinions



Luciano Gattinoni^{1*} , Giuseppe Citerio^{2,3} and Arthur S. Slutsky^{4,5}

Intensive Care Med (2023) 49:1226–1228

« To set the ventilator in ARDS, you must first connect your brain »

L. Gattinoni, ESICM meeting. Milan 2016

