كلية الطب بالمنستير
FACULTÉ DE Médecine DE MONASTIR

# Apport de la définition de Berlin

**Pr Souheil Elatrous**

# Pourquoi une définition du SDRA ?

# Importance pour les chercheurs

- Conduire des études épidémiologiques
- Faciliter l'inclusion des patients dans les essais cliniques
- Permettre la comparaison entre les études
- Renforcer les liens entre la science fondamentale et clinique

# Importance pour les cliniciens

- Capacité à mettre en œuvre les résultats des ECR positifs dans la pratique clinique
- Peut aussi être utile dans les discussions pronostiques avec les patients / familles
- Allocation des ressources

# Définition ARDS

**Ashbaugh** 1967

**Murray** 1988

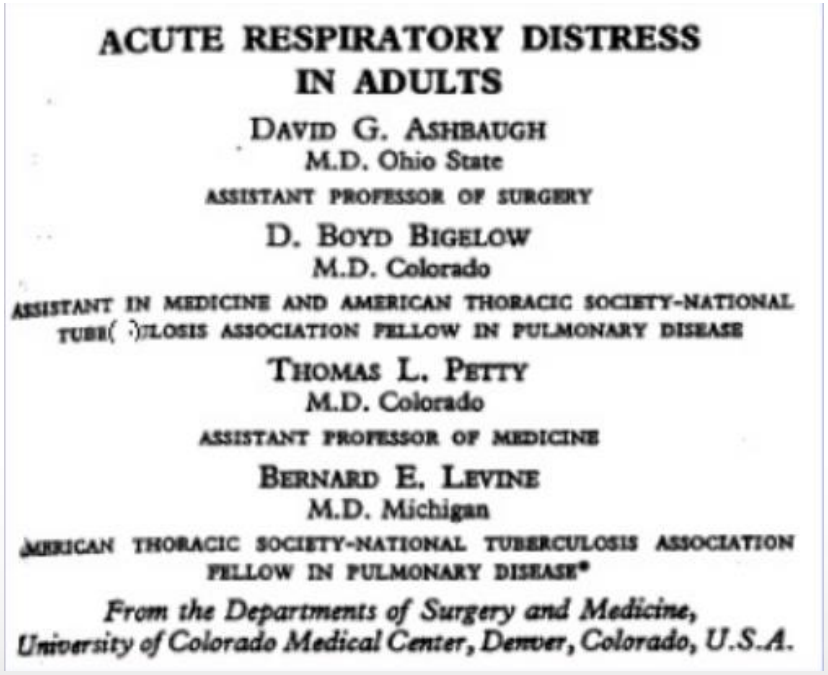
**AECC** 1994

**Berlin** 2011-2012

# 1ère description Ashbaugh 1967

The Lancet · Saturday 12 August 1967

ACUTE RESPIRATORY DISTRESS IN ADULTS



ACUTE RESPIRATORY DISTRESS
IN ADULTS

DAVID G. ASHBAUGH
M.D. Ohio State
ASSISTANT PROFESSOR OF SURGERY
D. BOYD BIGELOW
M.D. Colorado
ASSISTANT IN MEDICINE AND AMERICAN THORACIC SOCIETY-NATIONAL
TUBE( )ULOSIS ASSOCIATION FELLOW IN PULMONARY DISEASE
THOMAS L. PETTY
M.D. Colorado
ASSISTANT PROFESSOR OF MEDICINE
BERNARD E. LEVINE
M.D. Michigan
MERICAN THORACIC SOCIETY-NATIONAL TUBERCULOSIS ASSOCIATION
FELLOW IN PULMONARY DISEASE*
*From the Departments of Surgery and Medicine,*
*University of Colorado Medical Center, Denver, Colorado, U.S.A.*

- Dyspnée aigue sévère
- Tachypnée
- Cyanose refractaire à l'O2
- Baisse de la compliance
- Infiltrat radiologique

**20 ans d'utilisation**

# Murray
# Lung injury score
# 1988

**Table 1** Acute lung injury score - Murray score.

| | |
|---|---|
| *1- Chest X-ray score* | |
| No alveolar consolidation | 0 |
| Alveolar consolidation confined to one quadrant | 1 |
| Alveolar consolidation confined to two quadrants | 2 |
| Alveolar consolidation confined to three quadrants | 3 |
| Alveolar consolidation confined to all four quadrants | 4 |
| *2- Hypoxemia score* | |
| $PaO_2/FiO_2 \geq 300$ mmHg | 0 |
| $PaO_2/FiO_2$ 225-299 mmHg | 1 |
| $PaO_2/FiO_2$ 175-224 mmHg | 2 |
| $PaO_2/FiO_2$ 100-174 mmHg | 3 |
| $PaO_2/FiO_2 < 100$ mmHg | 4 |
| *3- PEEP score in $cmH_2O$ (when receiving mechanical pulmonary ventilation)* | |
| PEEP $\leq 5$ | 0 |
| PEEP 6-8 | 1 |
| PEEP 9-11 | 2 |
| PEEP 12-14 | 3 |
| PEEP $\geq 15$ | 4 |
| *4- Respiratory system compliance score in $mL/cmH_2O$ (when available)* | |
| Compliance $\geq 80$ | 0 |
| Compliance 60-79 | 1 |
| Compliance 40-59 | 2 |
| Compliance 20-39 | 3 |
| Compliance $\leq 19$ | 4 |

The final score is attained by dividing the values obtained from the initial analysis by the number of elements used for the analysis. When the score value is zero, there is no lung injury; from 1 to 2.5, lung injury is considered to be mild to moderate; and when greater than 2.5, the diagnosis of ARDS is established.

# Conférence de consensus AECC

- **Définition (4 critères) :**
  - **Début aigu**
  - **PaO2/FiO2 < 200 (sans tenir compte de la PEEP)**
  - **Opacités pulmonaires bilatérales à la RP**
  - **Absence d'insuffisance cardiaque, d'hypervolémie ou PAPO < 18 mm Hg**
- **ALI : PaO2/FiO2 < 300**

*Bernard at al Am J Respir Crit Care Med 1994*

# Définition AECC

- Utilisation large les 20 dernières années
- Données épidémiologiques et cliniques
- Un certains nombres de problèmes avec la définition ont émergé

# Les critiques de la définition AECC

- **Début aigu:** absence de définition de laps de temps spécifique : heures, jours, semaines

# Les critiques de la définition AECC

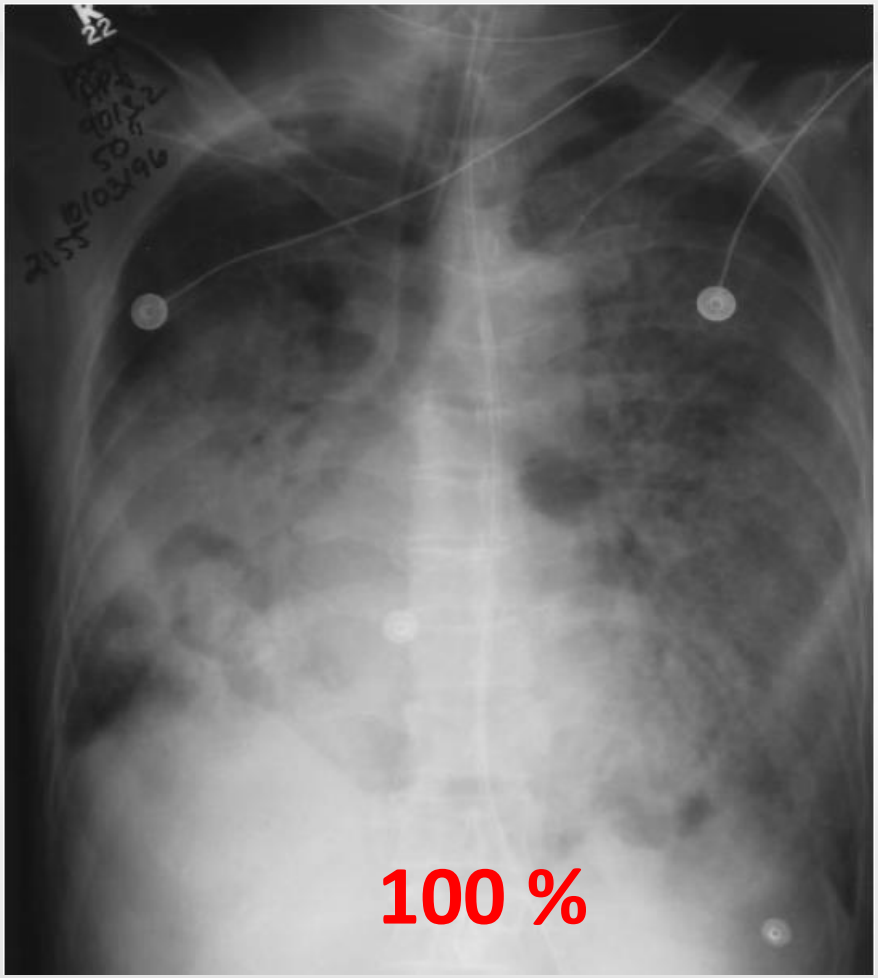
- Radiographie du thorax
  - Fiabilité inter observateur modérée même lorsqu'il est appliqué par des experts

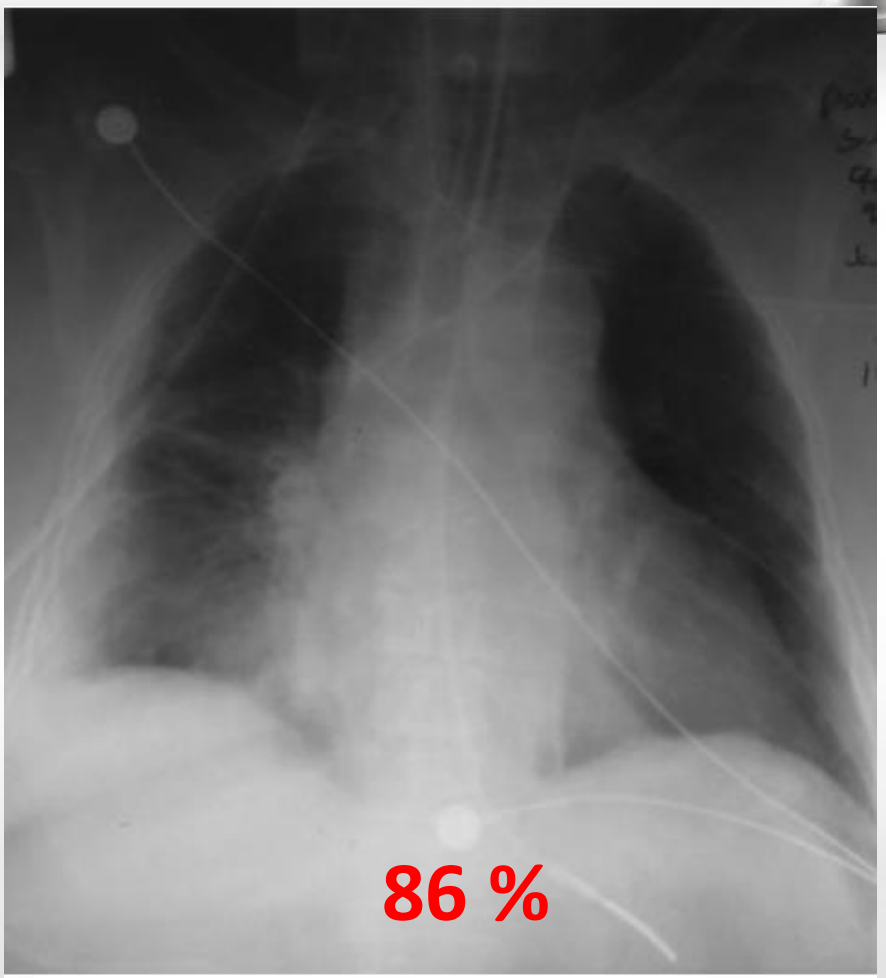
# Interobserver Variability in Applying a Radiographic Definition for ARDS*

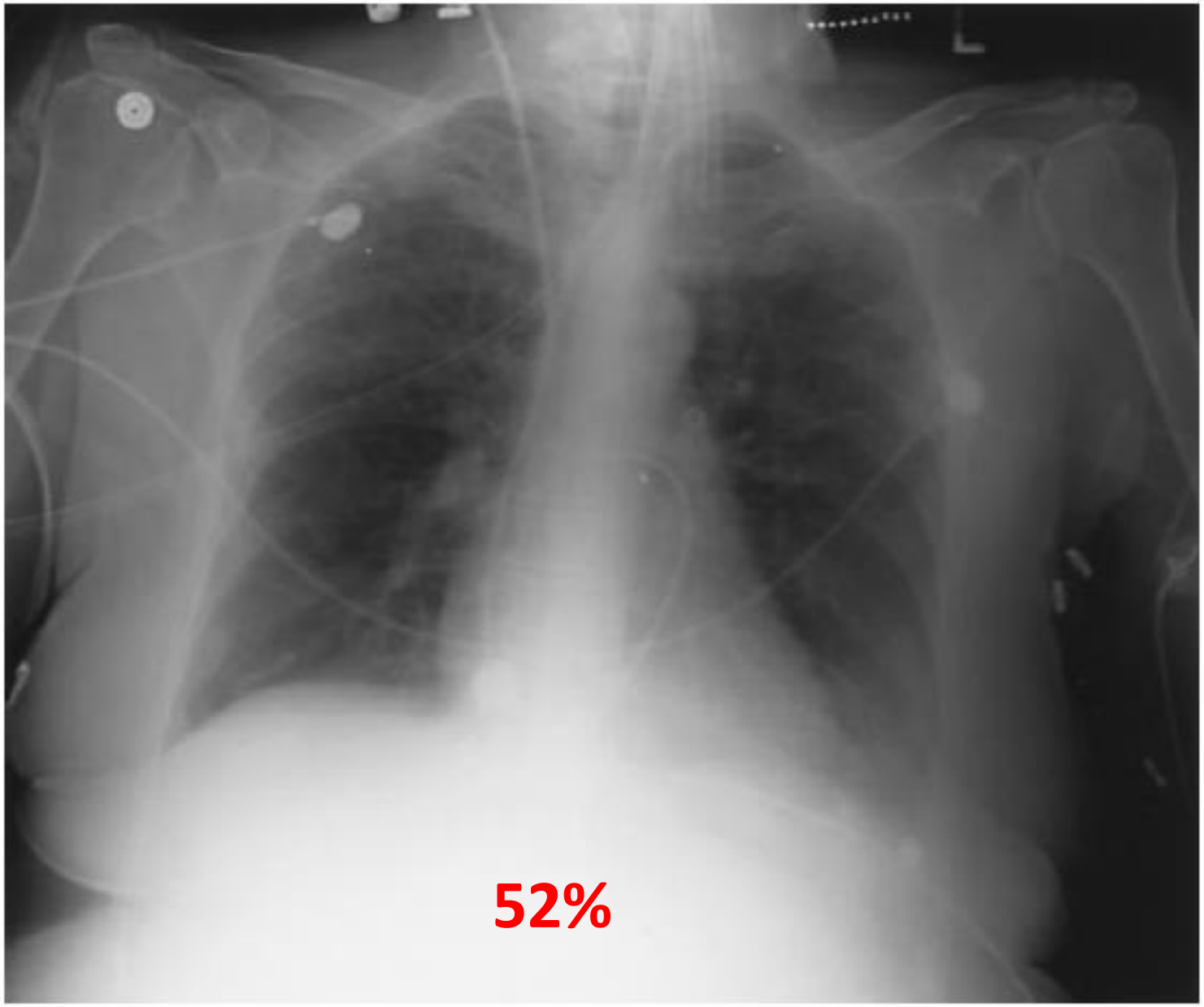
*Gordon D. Rubenfeld, MD, MSc; Ellen Caldwell, MS;*
*John Granton, MD, FCCP; Leonard D. Hudson, MD, FCCP; and*
*Michael A. Matthay, MD, FCCP†*

- 29 experts
- 28 Radiographies
- Concordance Inter observateur en appliquant la définition AECC pour ALI-ARDS est modérée (**kappa: 50.55; Ic 95%, 0.52 to 0.57**).
- Le pourcentage de radiographie interprétée comme ALI-ARDS par les lecteurs varie de **36 à 71%.**

*CHEST 1999; 116:1347–1353*


100 %


86 %


52%

# Interobserver Variation in Interpreting Chest Radiographs for the Diagnosis of Acute Respiratory Distress Syndrome

MAUREEN O. MEADE, RICHARD J. COOK, GORDON H. GUYATT, RYAN GROLL, JOHN R. KACHURA, MICHEL BEDARD, DEBORAH J. COOK, ARTHUR S. SLUTSKY, and THOMAS E. STEWART

- Réanimateurs et radiologistes : lecture de 778 Radio
- Kappa= **0.38 to 0.55** concordance inter-observateurs
- Kappa = **0.72 to 0.88** concordance inter-observateurs après "**formation**"

AM J RESPIR CRIT CARE MED 2000;161:85–90.

# Les critiques de la définition AECC

- **Le rapport PaO2/FiO2**
  - Rapport Pao2 / Fio2 n'est pas constante sur une gamme de Fio2
  - peut varier en réponse au réglage du ventilateur, particulièrement PEEP.

Intensive Care Med (2013) 39:583–592
DOI 10.1007/s00134-012-2803-x

ORIGINAL

Jesús Villar
Lina Pérez-Méndez
Jesús Blanco
José Manuel Añón
Lluís Blanch
Javier Belda

# A universal definition of ARDS: the $PaO_2/FiO_2$ ratio under a standard ventilatory setting—a prospective, multicenter validation study

**Table 2** Classification of 170 ARDS patients from the derivation cohort into three phenotypic categories based on the $PaO_2$ response to four ventilatory settings at the time of ARDS diagnosis (ARDS onset) and at 24 h

| | $PaO_2/FiO_2 > 200$ No. patients (% mortality) | $PaO_2/FiO_2$ 101–200 No. patients (% mortality) | $PaO_2/FiO_2 \leq 100$ No. patients (% mortality) | *p* value |
|---|---|---|---|---|
| At ARDS onset | | | | |
| $FiO_2 \geq 0.5$, PEEP $\geq 5$ | 7 (14.3) | 92 (33.7) | 71 (46.5) | 0.114 |
| $FiO_2 \geq 0.5$, PEEP $\geq 10$ | 29 (17.2) | 105 (38.1) | 36 (33.3) | 0.100 |
| $FiO_2 = 1$, PEEP $\geq 5$ | 30 (40.0) | 61 (29.5) | 79 (34.2) | 0.586 |
| $FiO_2 = 1$, PEEP $\geq 10$ | 56 (30.3) | 75 (34.7) | 39 (35.9) | 0.833 |
| 24 h after ARDS onset | | | | |
| $FiO_2 \geq 0.5$, PEEP $\geq 5$ | 30 (23.3) | 90 (31.1) | 50 (44.0) | 0.139 |
| $FiO_2 \geq 0.5$, PEEP $\geq 10$ | 71 (16.9) | 70 (41.4) | 29 (55.2) | 0.0001 |
| $FiO_2 = 1$, PEEP $\geq 5$ | 45 (33.3) | 74 (27.0) | 51 (43.1) | 0.174 |
| $FiO_2 = 1$, PEEP $\geq 10$ | 95 (30.5) | 46 (28.3) | 29 (51.7) | 0.081 |

# Les critiques de la définition AECC

- **PAPO : Les patients atteints de SDRA peuvent avoir une élévation de la PAPO**
  - **en raison de transmission des pression des voies aériennes**
  - **et / ou d'un remplissage rigoureux en réanimation**

Intensive Care Med (2002) 28:1073–1077
DOI 10.1007/s00134-002-1354-y

ORIGINAL

Niall D. Ferguson
Maureen O. Meade
David C. Hallett
Thomas E. Stewart

# High values of the pulmonary artery wedge pressure in patients with acute lung injury and acute respiratory distress syndrome

- 842 mesures de PAPO chez 71 patients (en moyenne 12 / patient).
- Chez 58 patients (82%) au moins une mesure de PAPO >18 mmHg.

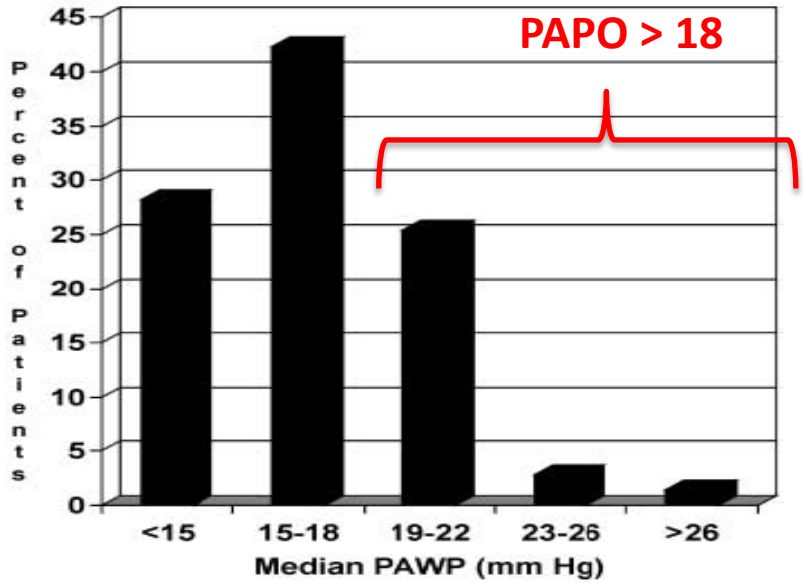



**Fig. 1** Frequency of observed patient median PAWP measurements

# Comparison of Two Fluid-Management Strategies in Acute Lung Injury

The National Heart, Lung, and Blood Institute Acute Respiratory Distress Syndrome (ARDS) Clinical Trials Network*

**Table 1. Baseline Characteristics.***

| Characteristic | Conservative Strategy (N=503) | Liberal Strategy (N=497) | P Value |
|---|---|---|---|
| Age (yr) | 50.1±0.7 | 49.5±0.7 | 0.57 |
| Male sex (%) | 52 | 55 | 0.48 |
| Race or ethnic group (%) | | | 0.66 |
| White | 65 | 63 | |
| Black | 20 | 24 | |
| Hispanic | 12 | 10 | |
| Asian | 2 | 2 | |
| Other | 1 | 1 | |
| Primary lung injury (%) | | | 0.33 |
| Pneumonia | 46 | 48 | |
| Sepsis | 22 | 25 | |
| CVP (mm Hg) | 11.9±0.3 | 12.2±0.3 | 0.56 |
| PAOP (mm Hg) | 15.6±0.4 | 15.7±0.4 | 0.82 |
| PAOP >18 mm Hg (%) | 30 | 29 | 0.96 |
| Cardiac index (liters/min/m²) | 4.2±0.1 | 4.3±0.1 | 0.46 |
| Mixed venous oxygen saturation (%) | 69±0.78 | 69±0.87 | 0.97 |
| Met shock criteria (%)‡ | 33 | 36 | 0.21 |
| Vasopressor use (%) | 31 | 35 | 0.10 |
| Prerandomization fluid balance (ml) | 2655±156 | 2875±166 | 0.34 |

| CVP (mm Hg) | 11.9±0.3 | 12.2±0.3 | 0.56 |
|---|---|---|---|
| PAOP (mm Hg) | 15.6±0.4 | 15.7±0.4 | 0.82 |
| PAOP >18 mm Hg (%) | 30 | 29 | 0.96 |
| Cardiac index (liters/min/m²) | 4.2±0.1 | 4.3±0.1 | 0.46 |
| Mixed venous oxygen saturation (%) | 69±0.78 | 69±0.87 | 0.97 |
| Met shock criteria (%)‡ | 33 | 36 | 0.21 |
| Vasopressor use (%) | 31 | 35 | 0.10 |
| Prerandomization fluid balance (ml) | 2655±156 | 2875±166 | 0.34 |

N Engl J Med 2006;354:2564-75.

# Les critiques de la définition AECC

- **ALI:**
  - **Perception de ALI comme SDRA non grave**
  - **Incidence sous estimée car les cliniciens ne pense pas au SDRA lors d'un ALI définies selon les critères AECC.**

# Underuse of lung protective ventilation: Analysis of potential factors to explain physician behavior*

Ravi Kalhan, MD; Mark Mikkelsen, MD; Pali Dedhiya, MD; Jason Christie, MD; Christine Gaughan, MS; Paul N. Lanken, MD; Barbara Finkel, MD; Robert Gallop, PhD; Barry D. Fuchs, MD

**88 patients ALI / ARDS**

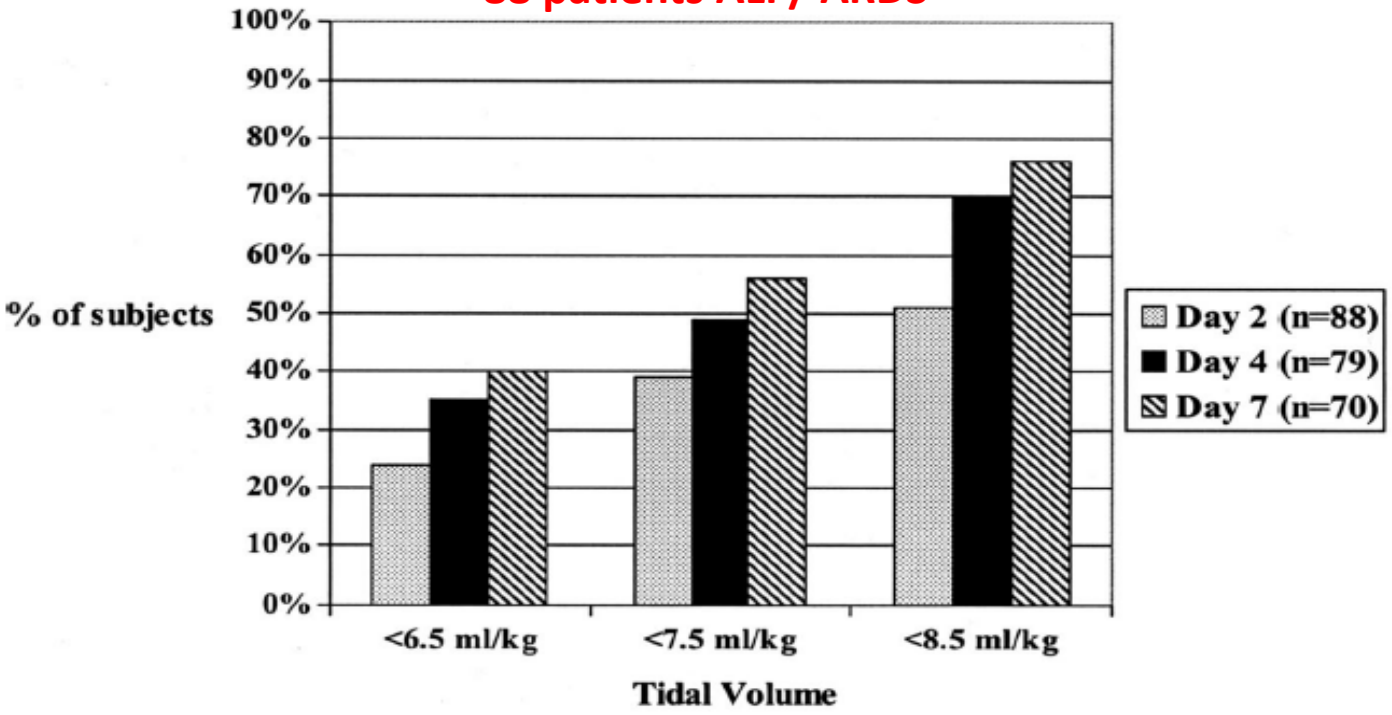



Figure 3. Percentage of patients with tidal volumes equal to or below specified values on days 2, 4, and 7 after meeting criteria for acute lung injury (see Methods for details).

Crit Care Med 2006; 34:300–306

# Underuse of lung protective ventilation: Analysis of potential factors to explain physician behavior*

Ravi Kalhan, MD; Mark Mikkelsen, MD; Pali Dedhiya, MD; Jason Christie, MD; Christine Gaughan, MS; Paul N. Lanken, MD; Barbara Finkel, MD; Robert Gallop, PhD; Barry D. Fuchs, MD

| Characteristic | Mean ± SD: TV <7.5 mL/kg PBW | Mean ± SD: TV >7.5 mL/kg PBW | Odds Ratio (95% CI) | *p* Value |
|---|---|---|---|---|
| Age | 46.5 ± 19.0 | 52.2 ± 16.8 | 0.83 (0.648–1.063)[a] | .14 |
| Female | 13/26 (50%) | 13/26 (50%) | 1.95 (0.77–4.96) | .15 |
| Male | 21/62 (34%) | 41/62 (66%) | | |
| APACHE III | 71.0 ± 21.2 | 77.3 ± 25.8 | 0.898 (0.748–1.078)[a] | .25 |
| Arterial pH | 7.41 ± 0.08 | 7.40 ± 0.06 | 1.065 (0.544–2.014)[b] | .86 |
| Arterial $Pco_2$, mm Hg | 43.1 ± 9.16 | 40.4 ± 8.33 | 1.445 (0.829–2.520)[a] | .19 |
| Arterial $Po_2$, mm Hg | 78.7 ± 20.0 | 97.2 ± 41.5 | 0.817 (0.671–0.994)[a] | .01 |
| $Fio_2$, % | 0.54 ± 0.18 | 0.62 ± 0.19 | 0.976 (0.887–1.072)[b] | .52 |
| P/F ratio | 167 ± 78.0 | 200 ± 78.5 | 0.945 (0.885–1.008)[a] | .08 |
| Peak inspiratory pressure, cm $H_2O$ | 33.3 ± 7.13 | 32.2 ± 6.48 | 1.281 (0.516–3.180)[a] | .60 |
| PEEP, cm $H_2O$ | 8.44 ± 3.80 | 7.25 ± 3.43 | 2.525 (0.728–8.750)[a] | .14 |
| End inspiratory (plateau) pressure, cm $H_2O$ | 28.3 ± 6.32 | 25.8 ± 6.07 | 2.117 (0.691–6.486)[a] | .17 |
| Compliance, mL/cm $H_2O$ | 26.4 ± 7.98 | 34.8 ± 11.36 | 0.460 (0.235–0.899)[a] | .006 |
| No. of CXR quadrants | 3.54 ± 0.52 | 3.59 ± 0.50 | 1.232 (0.517–12.932)[c] | .65 |

**PaO2 , P/F, Compliance**

Crit Care Med 2006; 34:300–306

# Acute respiratory distress syndrome: Underrecognition by clinicians and diagnostic accuracy of three clinical definitions*

Niall D. Ferguson, MD, MSc; Fernando Frutos-Vivar, MD; Andrés Esteban, MD, PhD; Pilar Fernández-Segoviano, MD, PhD; José Antonio Aramburu, MD; Laura Nájera, MD; Thomas E. Stewart, MD

**Table 1.** ARDS definition summaries

| Score | Hypoxemia, $Pao_2/Fio_2$ | Consolidation on Chest Radiograph | PEEP (when Ventilated) | Compliance (when Available), mL/cm $H_2O$ |
|---|---|---|---|---|
| Lung Injury Score[a] | | | | |
| 0 | ≥300 | No alveolar | ≤5 cm $H_2O$ | ≥80 |
| 1 | 225–299 | 1 Quadrant | 6–8 cm $H_2O$ | 60–79 |
| 2 | 175–224 | 2 Quadrants | 9–11 cm $H_2O$ | 40–59 |
| 3 | 100–174 | 3 Quadrants | 12–14 cm $H_2O$ | 20–39 |
| 4 | <100 | 4 Quadrants | ≥15 cm $H_2O$ | <20 |

| | Hypoxemia | Chest Radiograph | Onset | Pulmonary Artery Occlusion Pressure |
|---|---|---|---|---|
| American-European Consensus Conference Definition[b] | $Pao_2/Fio_2$ ≤ 300 (ALI) | Bilateral infiltrates | Acute onset | ≤18 mm Hg or no clinical suspicion of left atrial hypertension |
| | 1. Hypoxemia | 2. Chest radiograph | 3. Onset | 4. Noncardiogenic—Subjective |
| Delphi definition[c] | $Pao_2/Fio_2$ ≤ 200 with PEEP ≥10 | Bilateral airspace disease | Within 72 hrs | No clinical evidence of congestive heart failure |
| | 5a. Noncardiogenic—objective | | | 5b. Predisposition |
| | PAWP ≤18 mm Hg or LV ejection fraction ≥40% | | | Presence of a recognized risk factor for ARDS |

Crit Care Med 2005; 33:2228–2234

Table 4. Definition operating characteristics

| Analysis | Sensitivity (95% CI) | *p* Value vs. AECC | Specificity (95% CI) | *p* Value vs. AECC |
|---|---|---|---|---|
| Primary | | | | |
| AECC definition | 0.83 (0.72–0.95) | — | 0.51 (0.41–0.61) | — |
| LIS >2.5 | 0.74 (0.61–0.87) | .34 | 0.77 (0.69–0.86) | <.001 |
| Delphi definition | 0.69 (0.55–0.83) | .07 | 0.82 (0.75–0.90) | <.001 |
| Secondary (*a priori*) | | | | |
| AECC + PEEP 10[a] | 0.69 (0.55–0.83) | .03 | 0.79 (0.71–0.87) | <.001 |
| AECC + CXR air space[b] | 0.83 (0.72–0.95) | 1.00 | 0.65 (0.55–0.74) | <.001 |
| LIS >2.5 with dynamic compliance[c] | 0.88 (0.78–0.98) | .69 | 0.64 (0.54–0.73) | .10 |
| Secondary (*post hoc*) | | | | |
| LIS >2.5 + AECC[d] | 0.62 (0.47–0.77) | .004 | 0.87 (0.80–0.93) | <.001 |
| LIS >2.5 + Delphi[e] | 0.60 (0.45–0.74) | .006 | 0.88 (0.81–0.94) | <.001 |

# Nouvelle définition

- **ESICM** a réuni un groupe d'experts internationaux, avec représentation de l'ATS et SCCM
- **Les objectifs** étaient de mettre à jour la définition SDRA l'aide d'une analyse systématique :
  - Des données épidémiologiques actuelles
  - Concepts physiologiques
  - Les résultats des essais cliniques

# ARDS Task Force members

| | AECC Definition | AECC Limitations | Addressed in Berlin Definition |
|---|---|---|---|
| **Timing** | **Acute onset** | **No definition of acute** | **Acute time frame specified** |

# The Berlin Definition of Acute Respiratory Distress Syndrome

**Acute Respiratory Distress Syndrome**

ONLINE FIRST

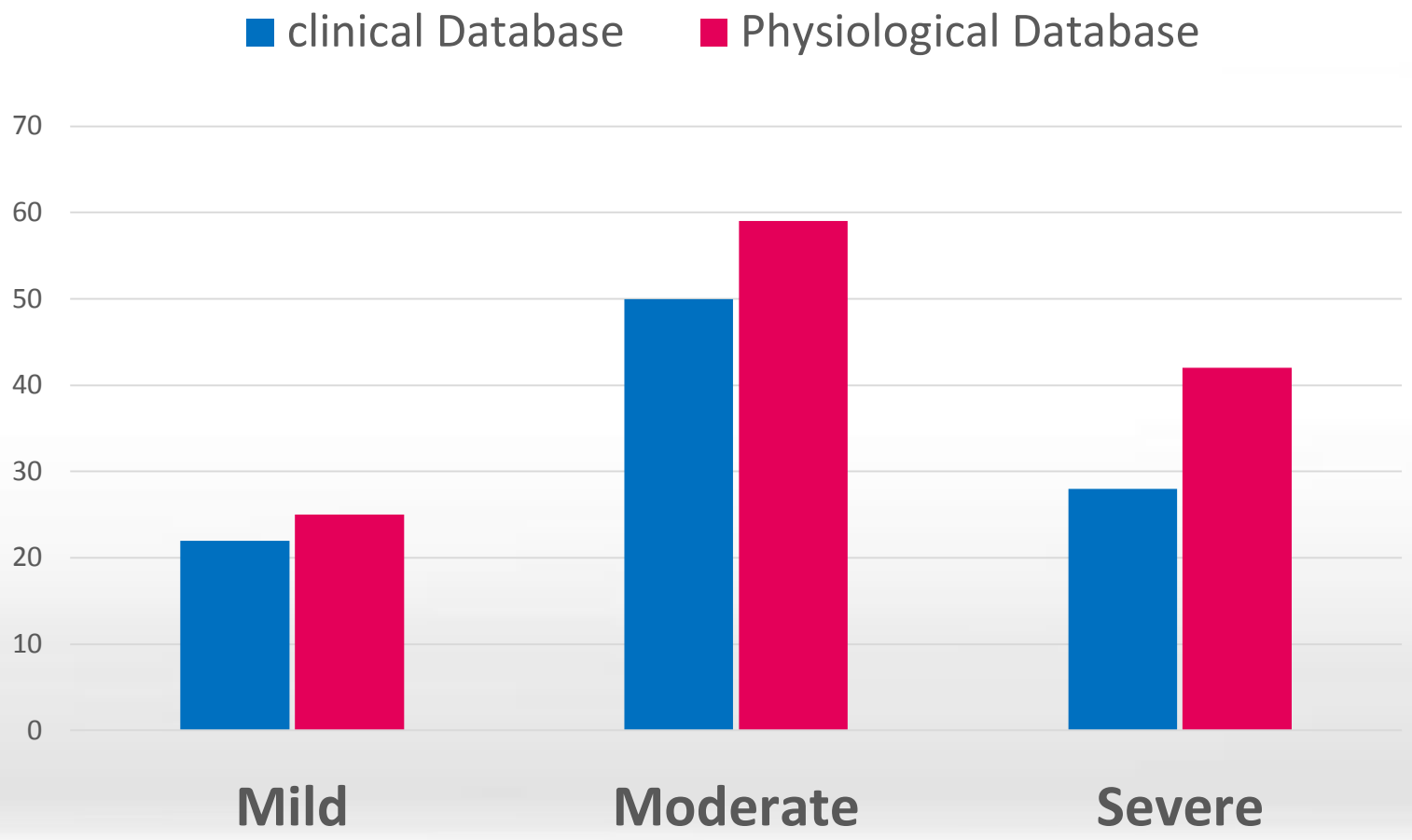
# Acute Respiratory Distress Syndrome

## The Berlin Definition

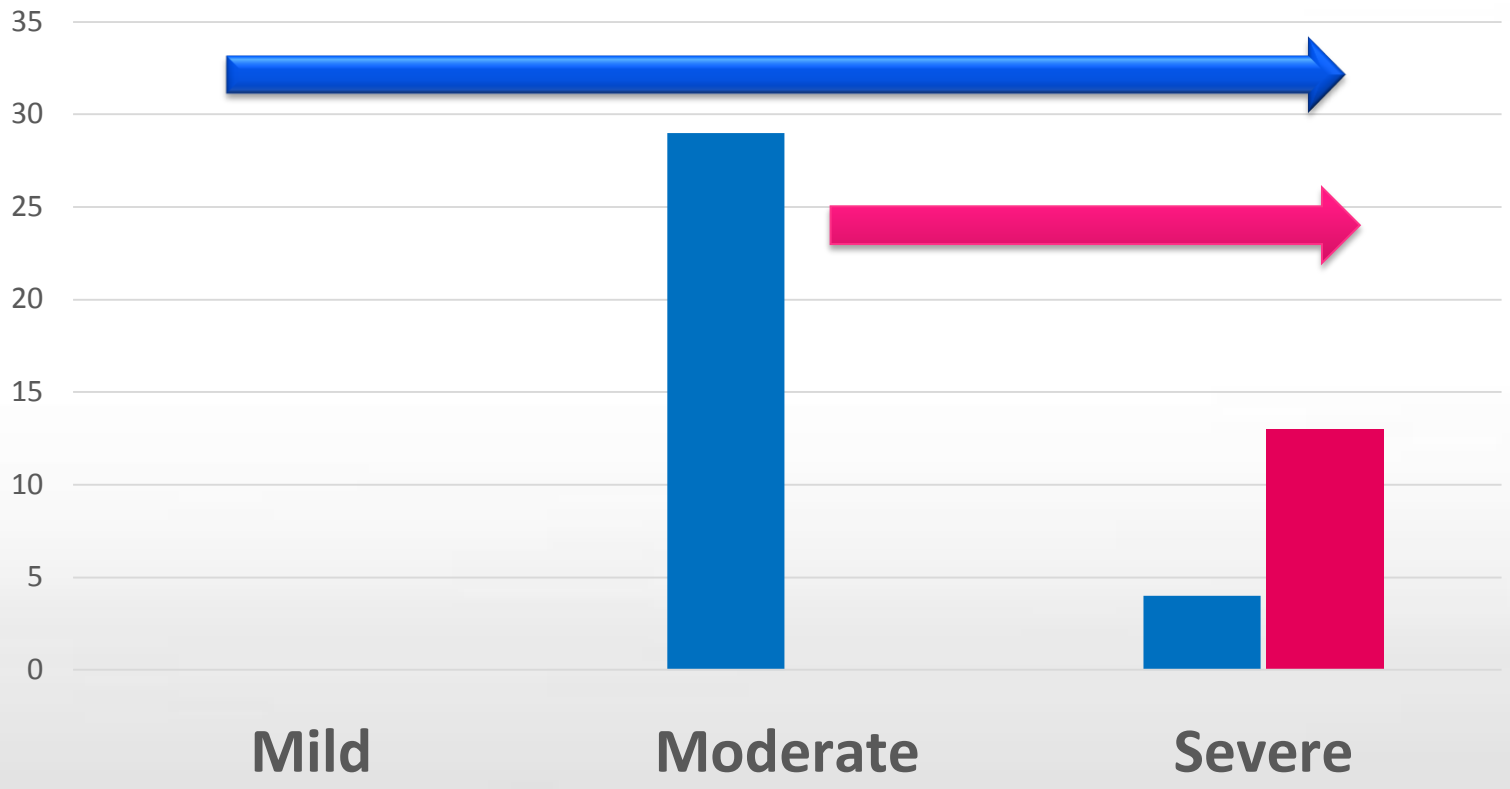
- **Evaluation de la définition**
- 4188 patients « clinical database » et 269 patients « physiological database »,
- 518 non classé par définition Berlin
  - PEEP non mentionnée ou PEEP <5 CmH2O
  - Mortalité : 35% (IC95%: 31-39%)
  - VFD: 19(1-25)
  - DVM: 4(2-8)

*JAMA. 2012;307(23):2526-2533*

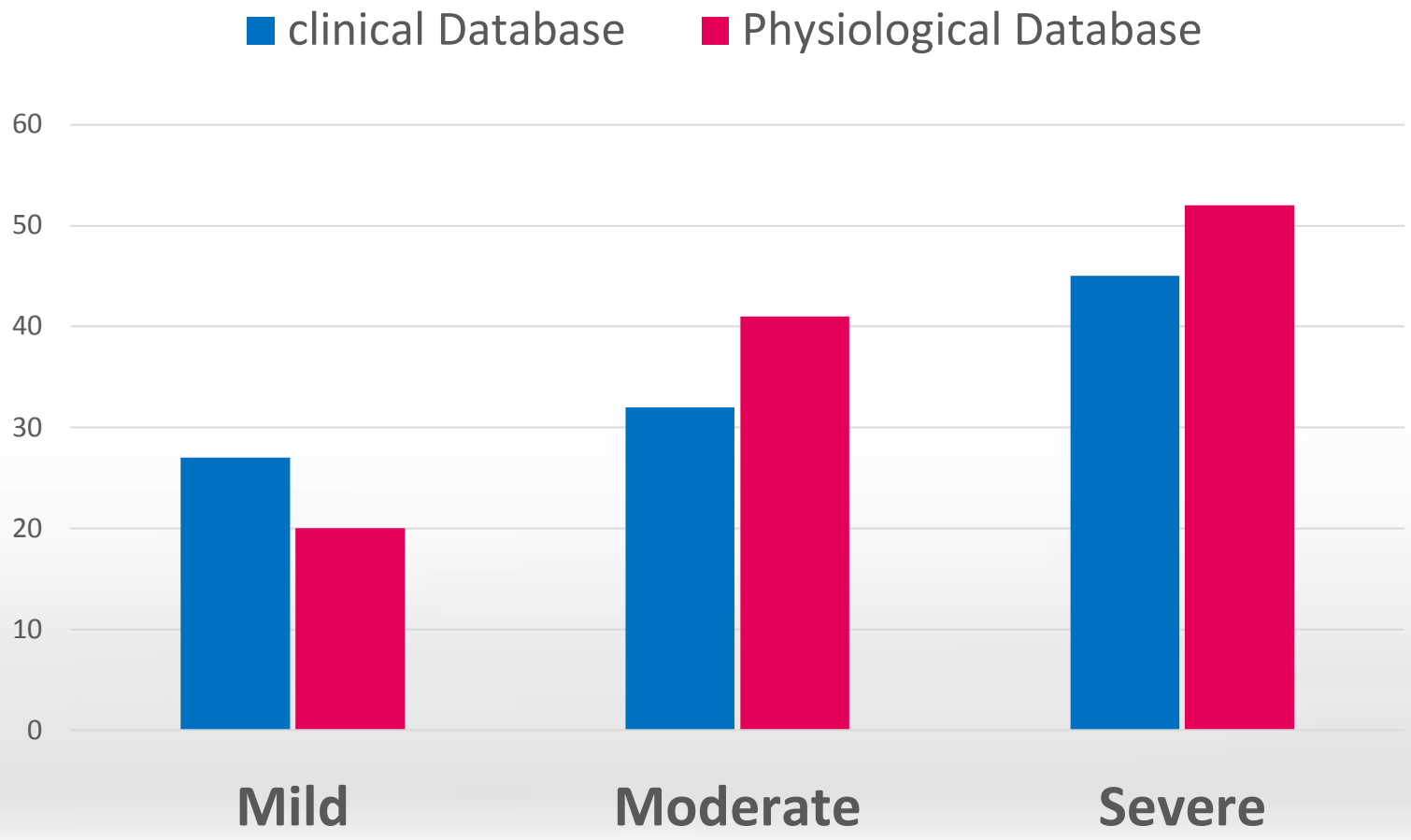
# Patients


clinical Database
Physiological Database
70
60
50
40
30
20
10
0
Mild
Moderate
Severe

# Progression in 7 days



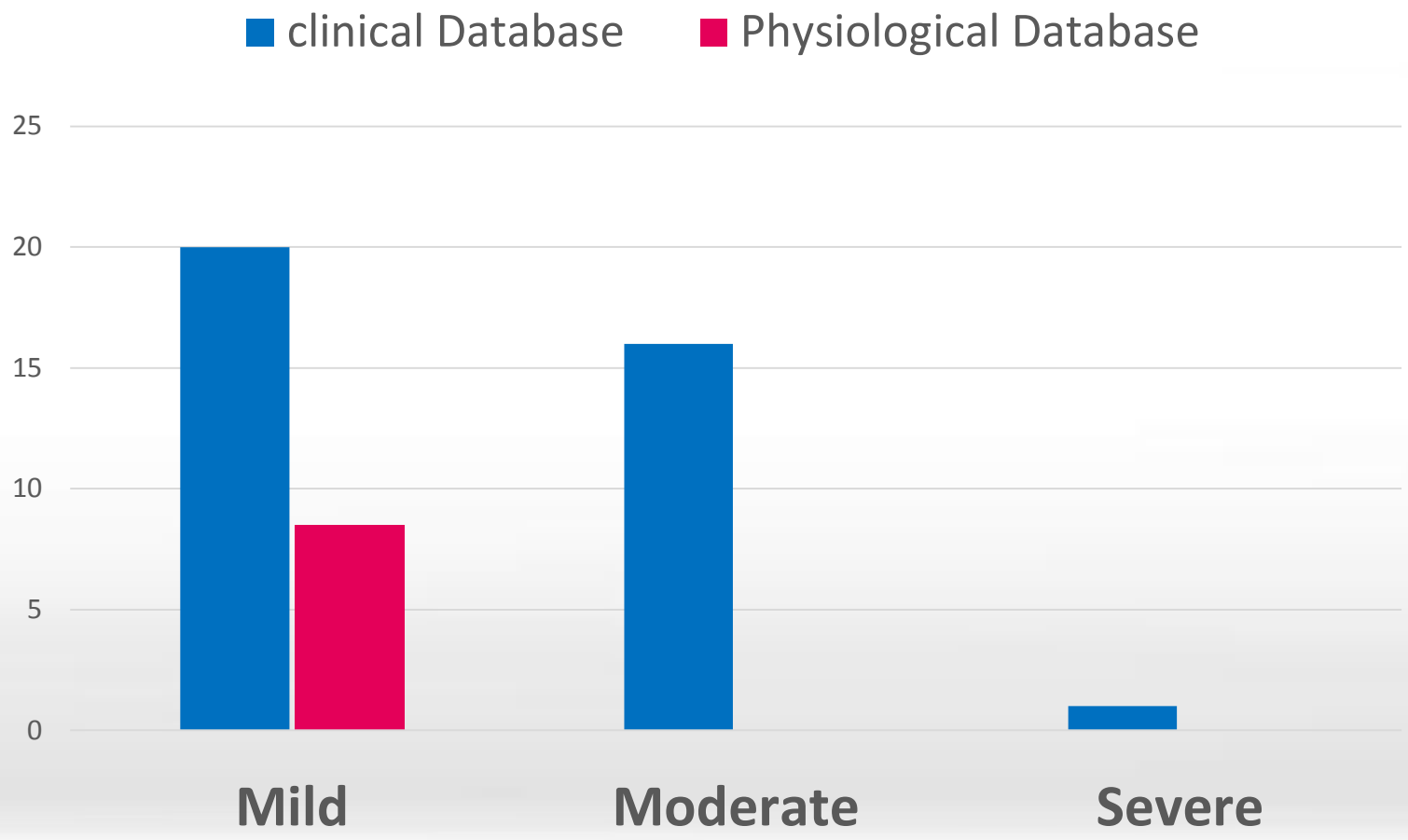
# Mortality


clinical Database
Physiological Database
60
50
40
30
20
10
0
Mild
Moderate
Severe

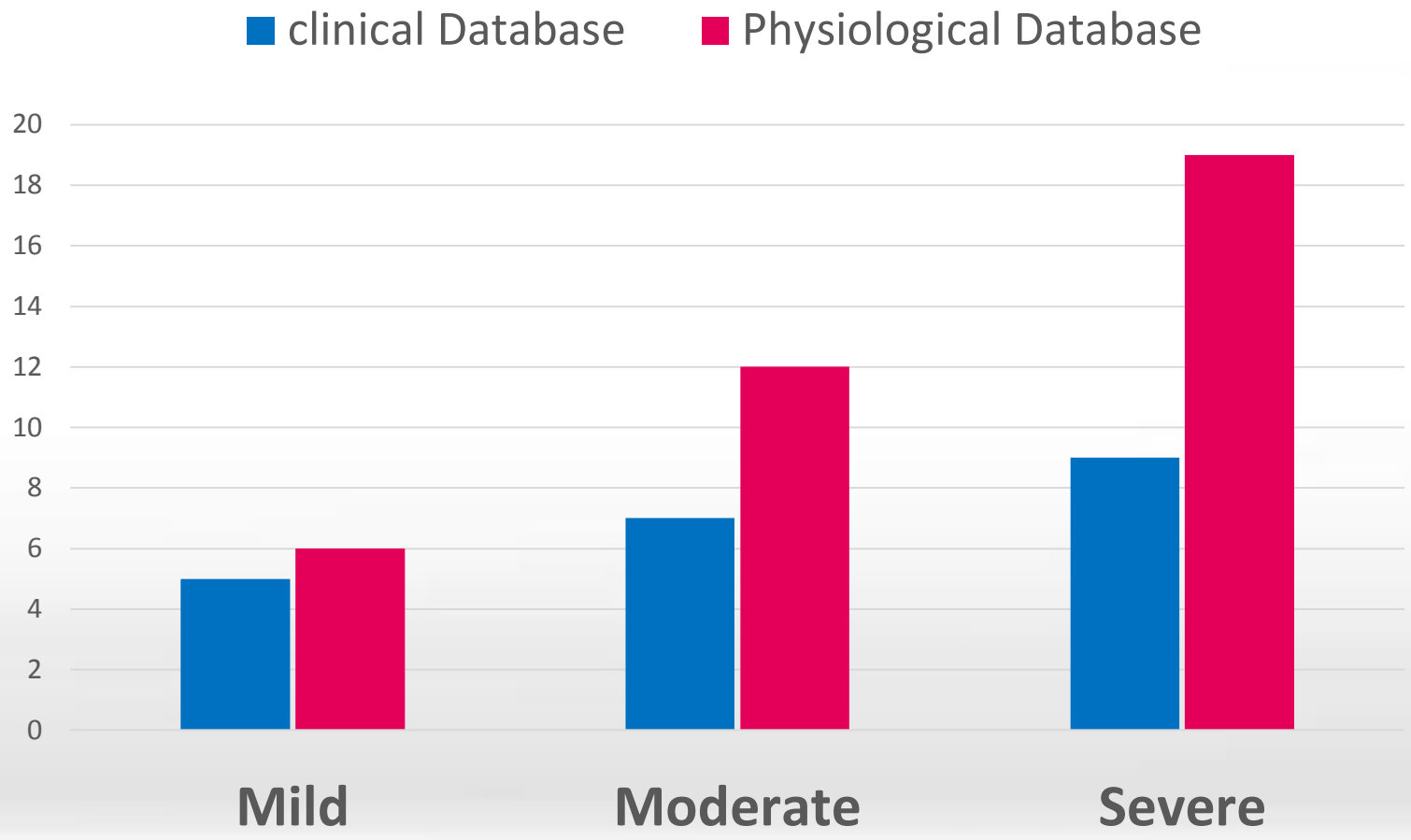
# Prédiction de la mortalité

- **Comparée à la définition AECC, la définition de Berlin a une meilleur prédiction de la mortalité :**
  - **avec AUROC of 0.577 (95% CI, 0.561-0.593) vs 0.536 (95% CI, 0.520-0.553; *P*.001),**
  - **avec une différence de AUROC of 0.041 (95% CI, 0.030-0.050),**

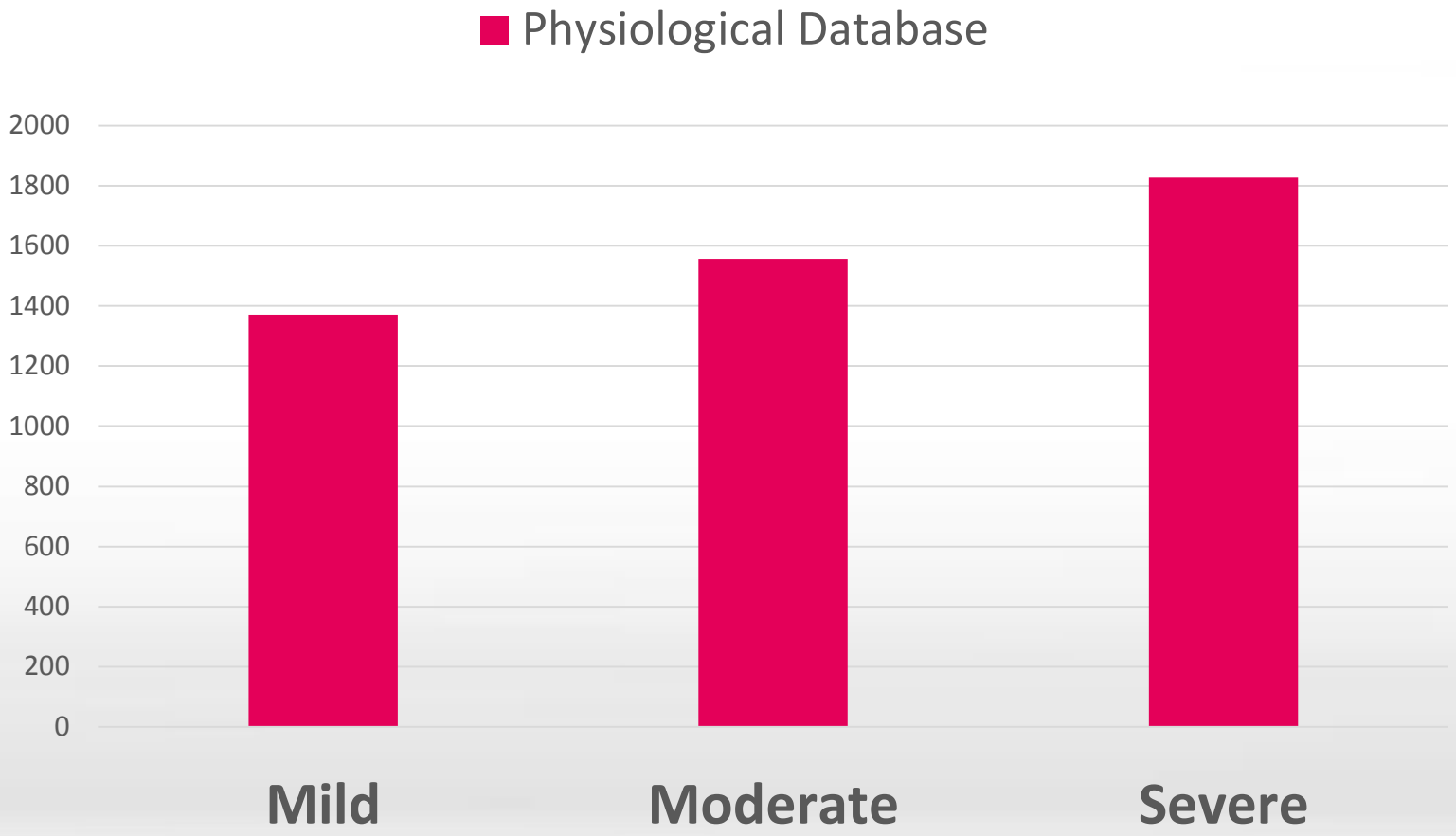
# Ventilator-free days



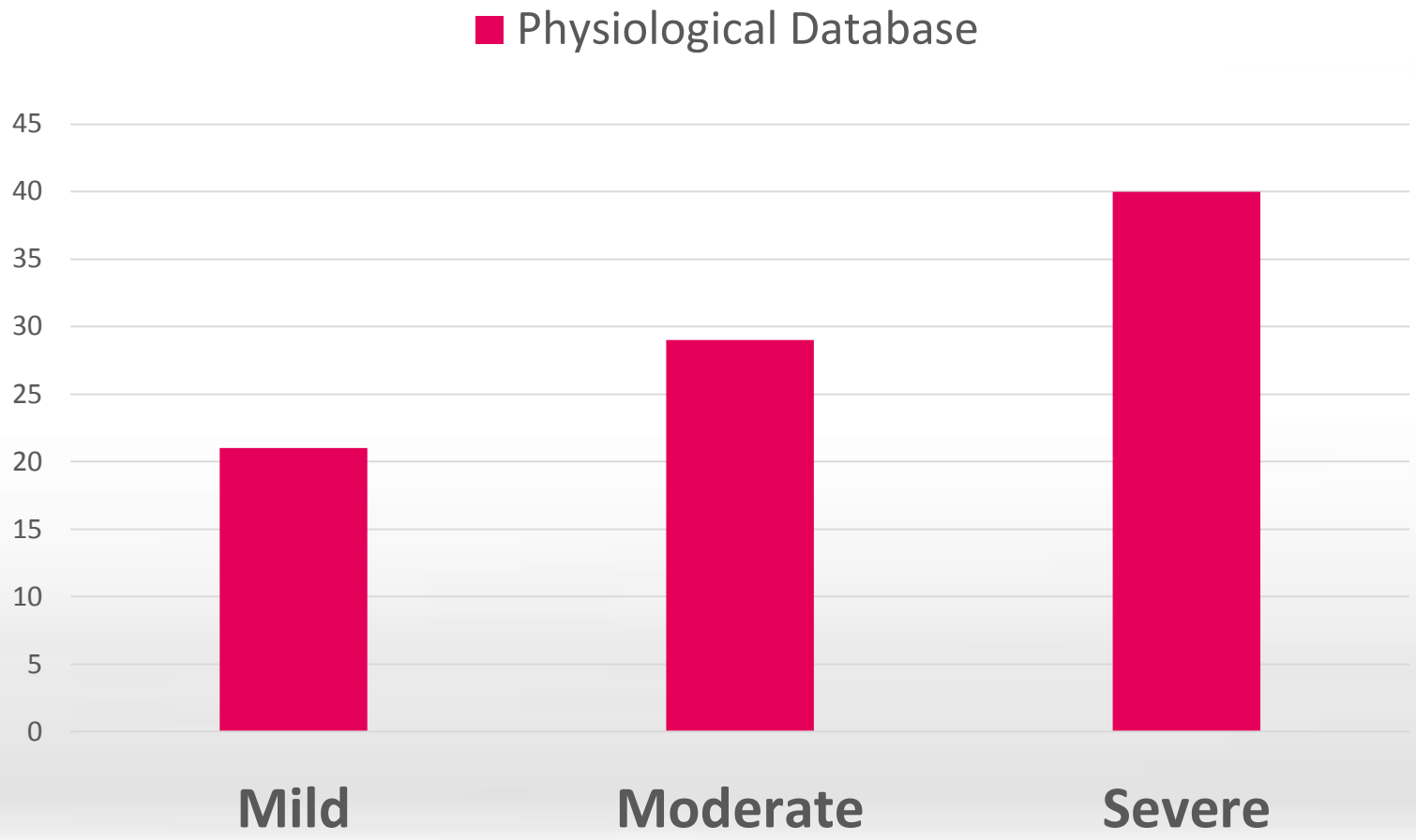
# Duration of mechanical ventilation in survivors



# Lung Weight by CT scan (mg)



# Shunt (%)


Physiological Database
45
40
35
30
25
20
15
10
5
0
Mild
Moderate
Severe

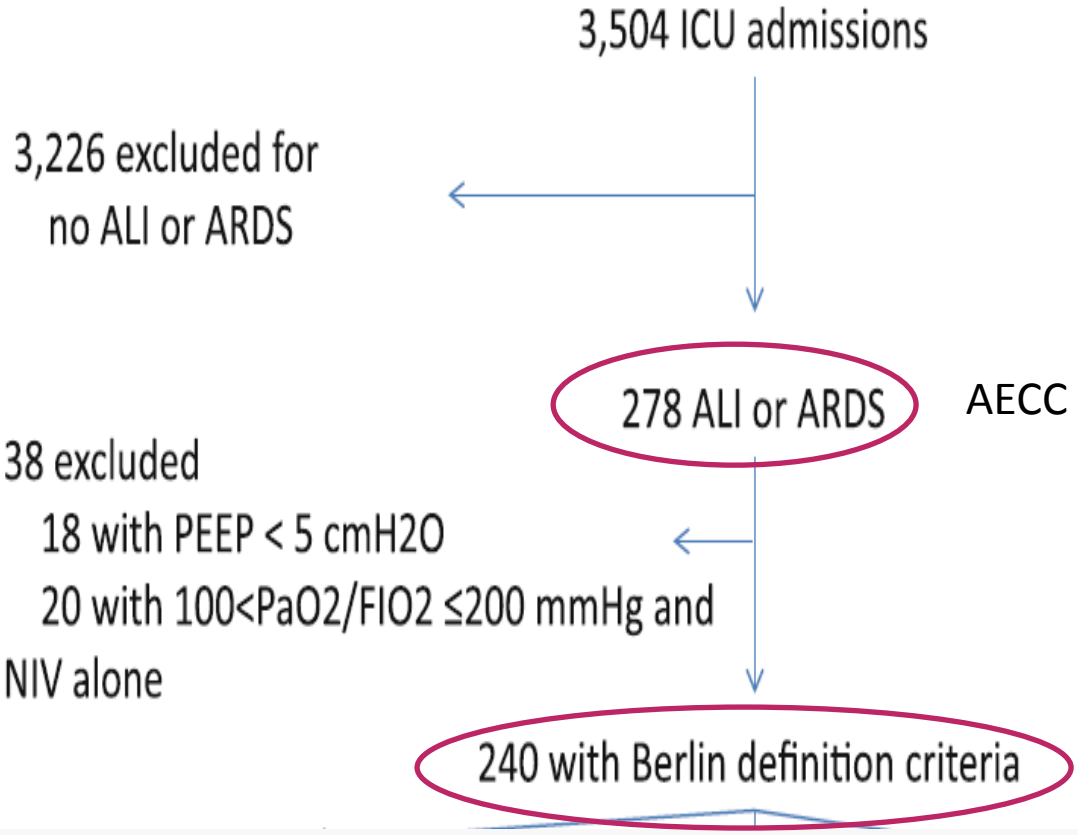
Intensive Care Med (2013) 39:2161–2170
DOI 10.1007/s00134-013-3122-6

ORIGINAL

R. Hernu
F. Wallet
F. Thiollière
O. Martin
J. C. Richard
Z. Schmitt
G. Wallon
B. Delannoy
T. Rimmelé
C. Démaret

# An attempt to validate the modification of the American-European consensus definition of acute lung injury/acute respiratory distress syndrome by the Berlin definition in a university hospital

- Etude observationnelle
- 6 mois (Mars 2012-septembre 2012)
- 10 réanimations Lyon
- Inclusion:
  - Patients sous VNI ou VI,
  - PaO2/FiO2 < 300 mmHg (quelque soit la PEP),
  - infiltrat radiologique bilatéral d'installation aigue ou aggravation récente


3,504 ICU admissions
3,226 excluded for
no ALI or ARDS
278 ALI or ARDS
AECC
38 excluded
18 with PEEP < 5 cmH2O
20 with 100<PaO2/FIO2 ≤200 mmHg and
NIV alone
240 with Berlin definition criteria

# Berlin definition

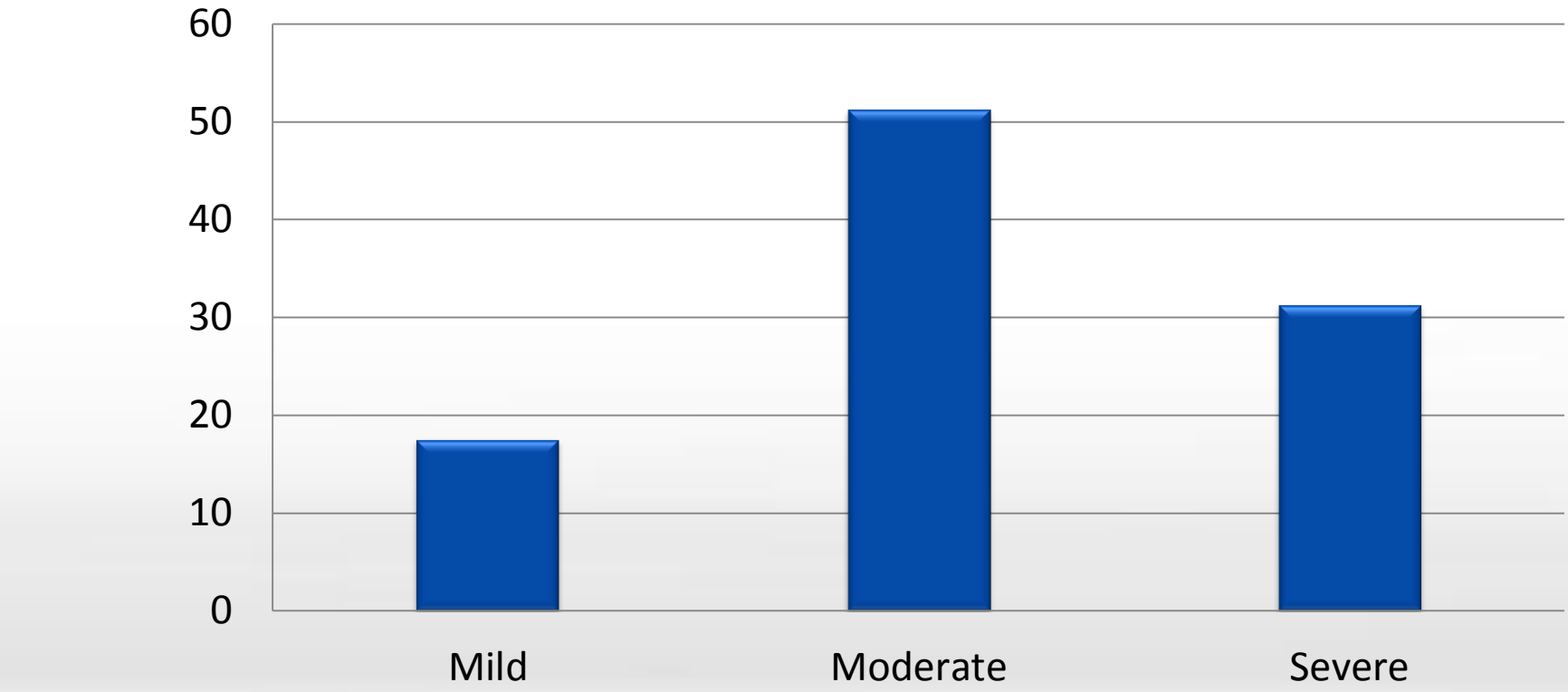


**Table 1** Prevalence and incidence of 240 patients with acute respiratory distress syndrome according to the Berlin definition criteria

| | Mild ARDS | Moderate ARDS | Severe ARDS | All ARDS |
|---|---|---|---|---|
| Number of patients, *n* (%) | 42 (17.5) | 123 (51.3) | 75 (31.3) | 240 |
| Prevalence (%) | 1.20 | 3.51 | 2.14 | 6.85 |
| Incidence (per 100,000 population per year) | 5.6 | 16.3‡ | 10*† | 32 |

# Mortalily

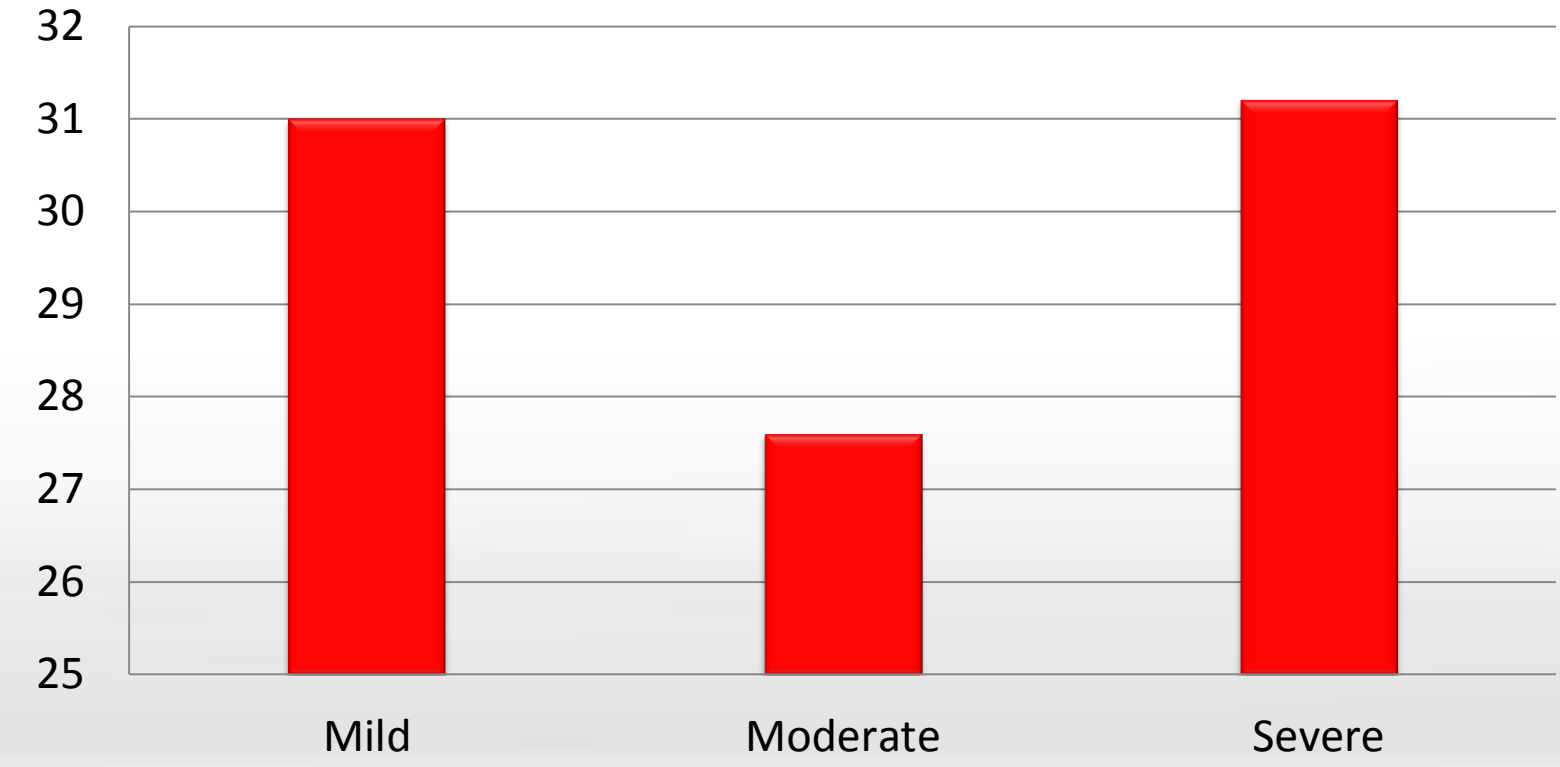
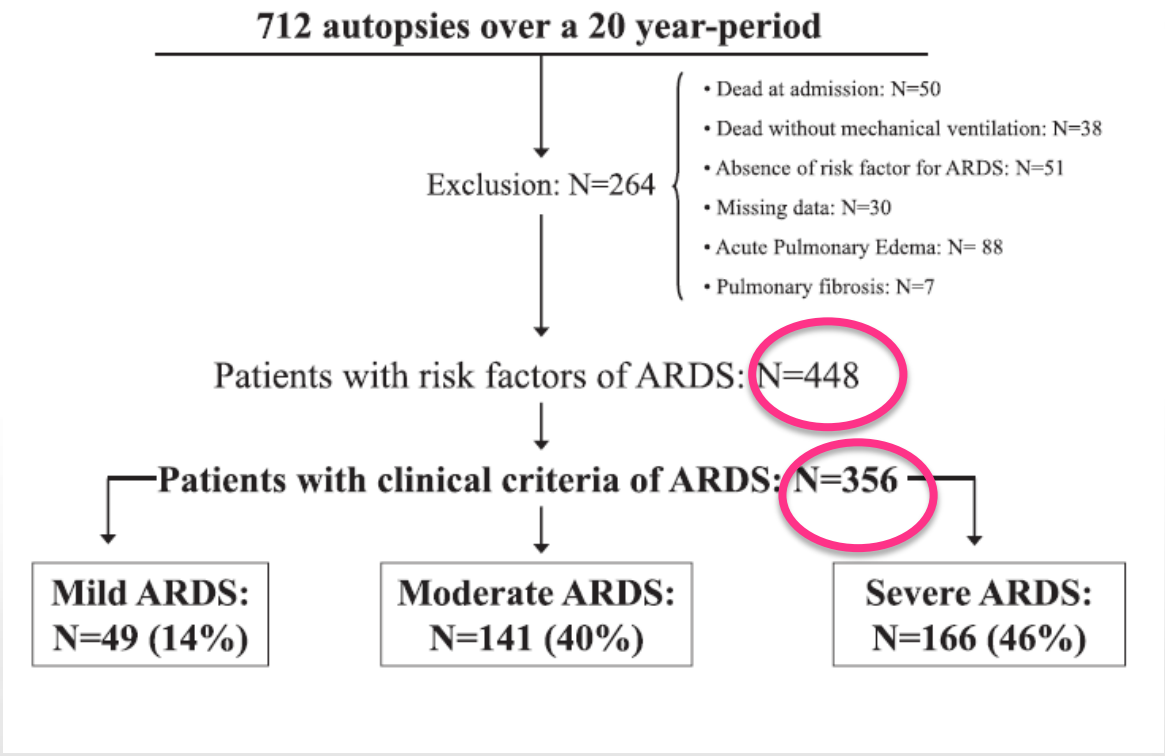


**Table 3** Cox proportional hazard regression model for 28-day mortality in 239 ARDS patients according to the Berlin definition criteria

| | Model 1 | | | | Model 2 | | | |
|---|---|---|---|---|---|---|---|---|
| | *P* value | Hazard ratio | 95 % CI | | *P* value | Exp (*B*) | 95 % CI | |
| | | | Lower | Upper | | | Lower | Upper |
| Age (per year) | 0.048 | 1.015 | 1.000 | 1.029 | 0.039 | 1.015 | 1.001 | 1.030 |
| Charlson (per unit) | 0.909 | 1.006 | 0.911 | 1.110 | 0.554 | 1.031 | 0.931 | 1.143 |
| SOFA (per unit) | 0.000 | 1.204 | 1.118 | 1.297 | 0.000 | 1.193 | 1.108 | 1.285 |
| SAPS II (per unit) | 0.034 | 1.013 | 1.001 | 1.025 | 0.029 | 1.013 | 1.001 | 1.026 |
| NMB | 0.143 | 1.398 | 0.893 | 2.188 | 0.176 | 1.361 | 0.871 | 2.129 |
| $PaO_2/FiO_2$ (per mmHg) | 0.585 | 0.999 | 0.995 | 1.003 | | | | |
| Severe ARDS (reference) | | | | | 0.236 | | | |
| Mild ARDS | | | | | 0.738 | 0.895 | 0.467 | 1.716 |
| Moderate ARDS | | | | | 0.095 | 0.645 | 0.386 | 1.079 |

# Comparison of the Berlin Definition for Acute Respiratory Distress Syndrome with Autopsy

Arnaud W. Thille[1,3], Andrés Esteban[1], Pilar Fernández-Segoviano[2], José-Maria Rodriguez[2], José-Antonio Aramburu[2], Oscar Peñuelas[1], Irene Cortés-Puch[1], Pablo Cardinal-Fernández[1], José A. Lorente[1], and Fernando Frutos-Vivar[1]



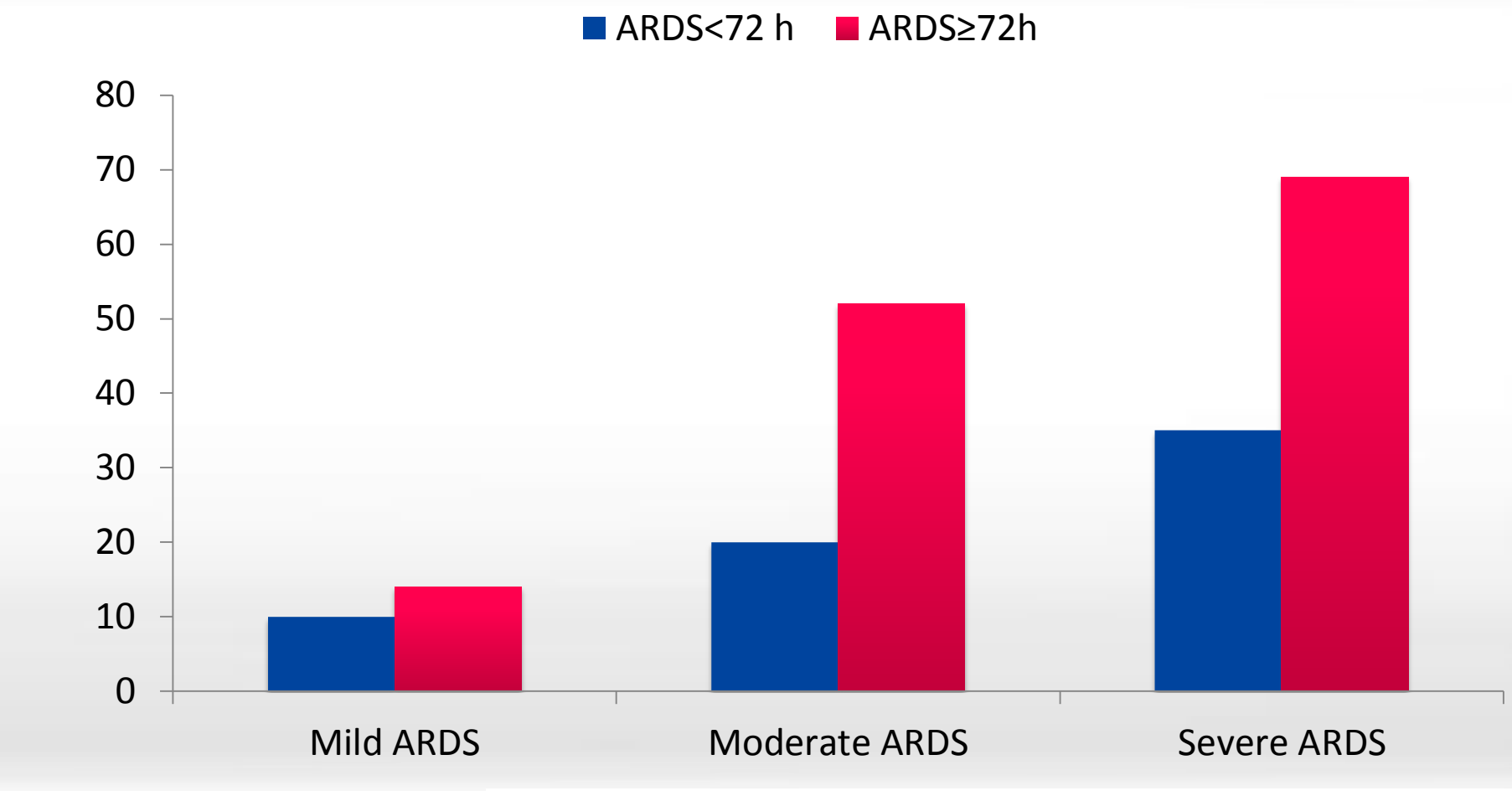

Am J Respir Crit Care Med Vol 187, Iss. 7, pp 761–767, Apr 1, 2013

TABLE 2. SENSITIVITY AND SPECIFICITY OF THE CLINICAL CRITERIA FOR THE DIAGNOSIS OF ACUTE RESPIRATORY DISTRESS SYNDROME ACCORDING TO THE BERLIN DEFINITION USING DIFFUSE ALVEOLAR DAMAGE OR PNEUMONIA AS THE REFERENCE STANDARD

| | Clinical Criteria for ARDS | | No Clinical Criteria for ARDS | | % Sensitivity (95% CI) | % Specificity (95% CI) | Positive Likelihood Ratio (95% CI) | Negative Likelihood Ratio (95% CI) |
|---|---|---|---|---|---|---|---|---|
| | + | − | + | − | | | | |
| Using DAD as the reference standard | | | | | | | | |
| Mild, moderate, or severe ARDS | | | | | | | | |
| All patients with autopsy (n = 712) | 159 | 197 | 19 | 337 | 89 (84–93) | 63 (59–67) | 2.4 (2.1–2.7) | 0.2 (0.1–0.3) |
| Patients with risk factors for ARDS (n = 448) | 159 | 197 | 4 | 88 | 98 (94–99) | 31 (26–36) | 1.4 (1.3–1.5) | 0.1 (0.0–0.2) |
| Moderate or severe ARDS | | | | | | | | |
| All patients with autopsy (n = 712) | 153 | 154 | 25 | 380 | 86 (80–90) | 71 (69–75) | 3.0 (2.6–3.4) | 0.2 (0.1–0.3) |
| Patients with risk factors for ARDS (n = 448) | 153 | 154 | 10 | 131 | 94 (89–97) | 46 (40–52) | 1.7 (1.6–1.9) | 0.1 (0.1–0.2) |
| Using DAD or pneumonia as the reference standard | | | | | | | | |
| Mild, moderate, or severe ARDS | | | | | | | | |
| All patients with autopsy (n = 712) | 262 | 94 | 49 | 307 | 84 (80–88) | 77 (72–80) | 3.6 (3.0–4.3) | 0.2 (0.2–0.3) |
| Patients with risk factors for ARDS (n = 448) | 262 | 94 | 37 | 55 | 88 (83–91) | 37 (30–45) | 1.4 (1.2–1.6) | 0.3 (0.2–0.5) |
| Moderate or severe ARDS | | | | | | | | |
| All patients with autopsy (n = 712) | 234 | 73 | 77 | 328 | 75 (70–80) | 82 (78–85) | 4.1 (3.3–5.1) | 0.3 (0.2–0.4) |
| Patients with risk factors for ARDS (n = 448) | 234 | 73 | 40 | 101 | 85 (81–89) | 58 (51–65) | 2.0 (1.7–2.4) | 0.3 (0.2–0.3) |

Am J Respir Crit Care Med Vol 187, Iss. 7, pp 761–767, Apr 1, 2013

# Proportion of patients with ARDS with DAD on autopsy examination according to severity and duration of time during which patients met clinical criteria of ARDS before autopsy examination




Am J Respir Crit Care Med Vol 187, Iss. 7, pp 761–767, Apr 1, 2013

Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

# Epidemiology, Patterns of Care, and Mortality for Patients With Acute Respiratory Distress Syndrome in Intensive Care Units in 50 Countries

Giacomo Bellani, MD, PhD; John G. Laffey, MD, MA; Tài Pham, MD; Eddy Fan, MD, PhD; Laurent Brochard, MD, HDR; Andres Esteban, MD, PhD; Luciano Gattinoni, MD, FRCP; Frank van Haren, MD, PhD; Anders Larsson, MD, PhD; Daniel F. McAuley, MD, PhD; Marco Ranieri, MD; Gordon Rubenfeld, MD, MSc; B. Taylor Thompson, MD, PhD; Hermann Wrigge, MD, PhD; Arthur S. Slutsky, MD, MASc; Antonio Pesenti, MD; for the LUNG SAFE Investigators and the ESICM Trials Group

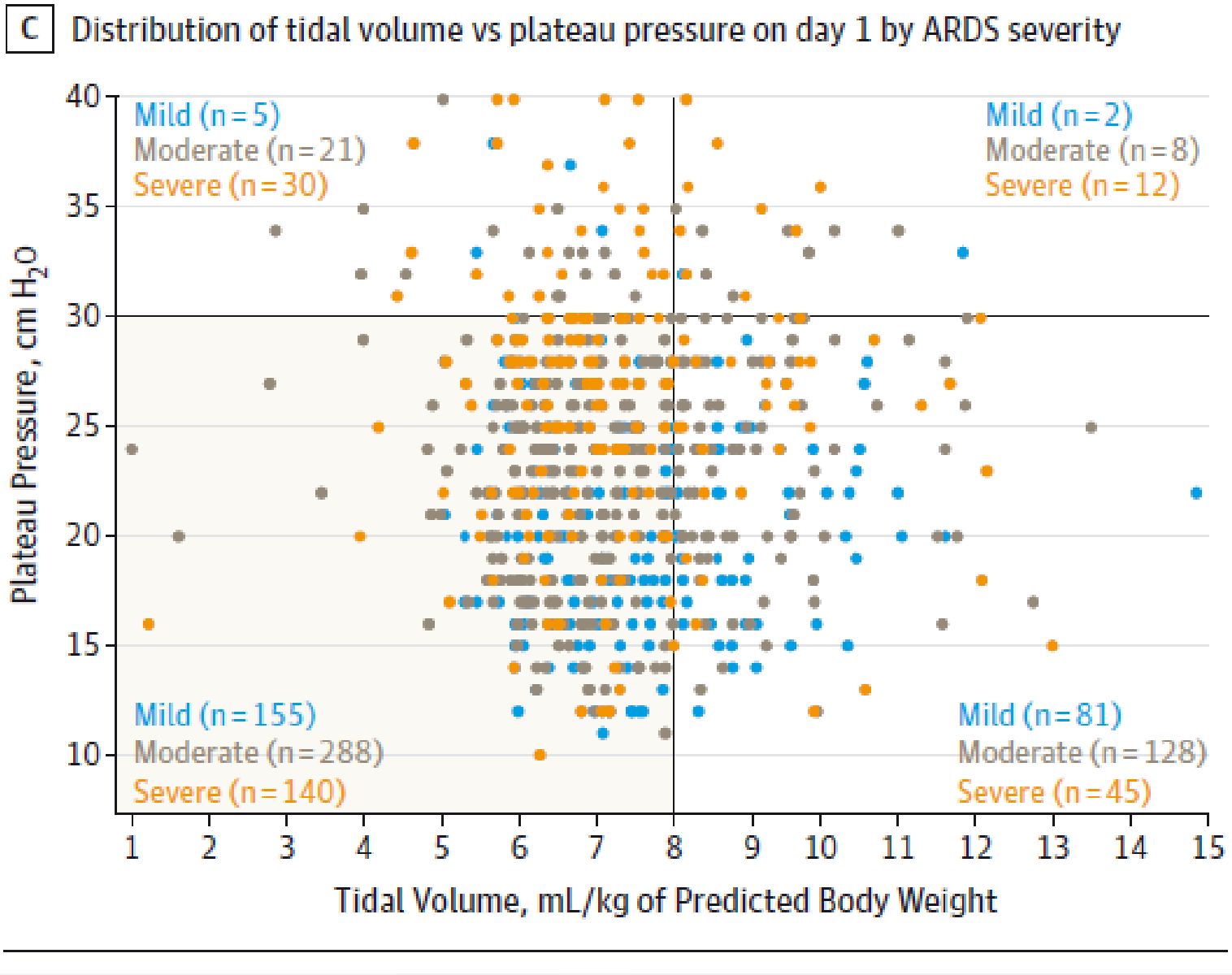
## Table 1. Characteristics of Patients With Acute Respiratory Distress Syndrome

| Parameter | Value |
|---|---|
| No. of patients | |
| ARDS | 3022 |
| ARDS in first 48 h after AHRF | 2813 |
| No longer fulfill ARDS criteria after 24 h, No. (%) [95% CI] | 486 (17) [15.9-18.7] |
| Clinician recognition of ARDS, No. (%) [95% CI] | 1820 (60) [59-62.0] |

*JAMA*. 2016;315(8):788-800.

# Recognition of ARDS

- Clinician recognition of ARDS
  - ranged from 51.3% (95% CI, 47.5%-55.0%) for mild ARDS to 78.5% (95% CI, 74.8%-81.8%) for severe ARDS.
- Clinician recognition of ARDS at the time of fulfillment of ARDS criteria was
  - 34.0% (95% CI, 32.0-36.0),
  - diagnosis of ARDS was frequently delayed.


C
Distribution of tidal volume vs plateau pressure on day 1 by ARDS severity
Mild (n = 5)
Moderate (n = 21)
Severe (n = 30)
Mild (n = 2)
Moderate (n = 8)
Severe (n = 12)
Mild (n = 155)
Moderate (n = 288)
Severe (n = 140)
Mild (n = 81)
Moderate (n = 128)
Severe (n = 45)
Plateau Pressure, cm H2O
40
35
30
25
20
15
10
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Tidal Volume, mL/kg of Predicted Body Weight

# Conclusion

- Nouvelle définition = **améliorations**
- Largement adoptée dans les nouvelles études
  - 1500 citations
  - 150 articles Pub Med
- Les nouvelles études observationnelles vont permettre un perfectionnement des cette définition dans le but de conserver la **faisabilité** et l'amélioration de sa **fiabilité** et de **validité.**