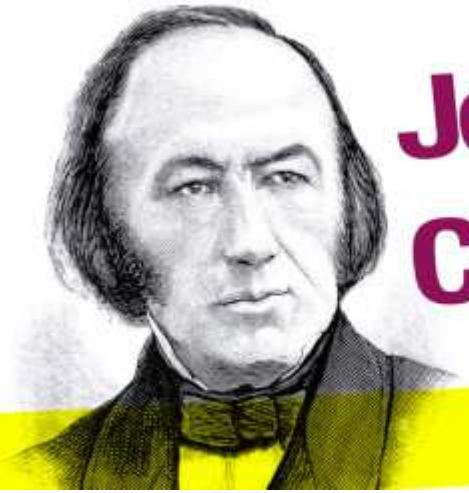


Journée de l'Hôpital Claude Bernard

L'objectif « zéro PAVM » est-il réaliste?

LILA BOUADMA
Service de Réanimation Médicale et des Maladies Infectieuses
Hôpital Bichat-Claude-Bernard, Paris, France
lila.bouadma@bch.aphp.fr

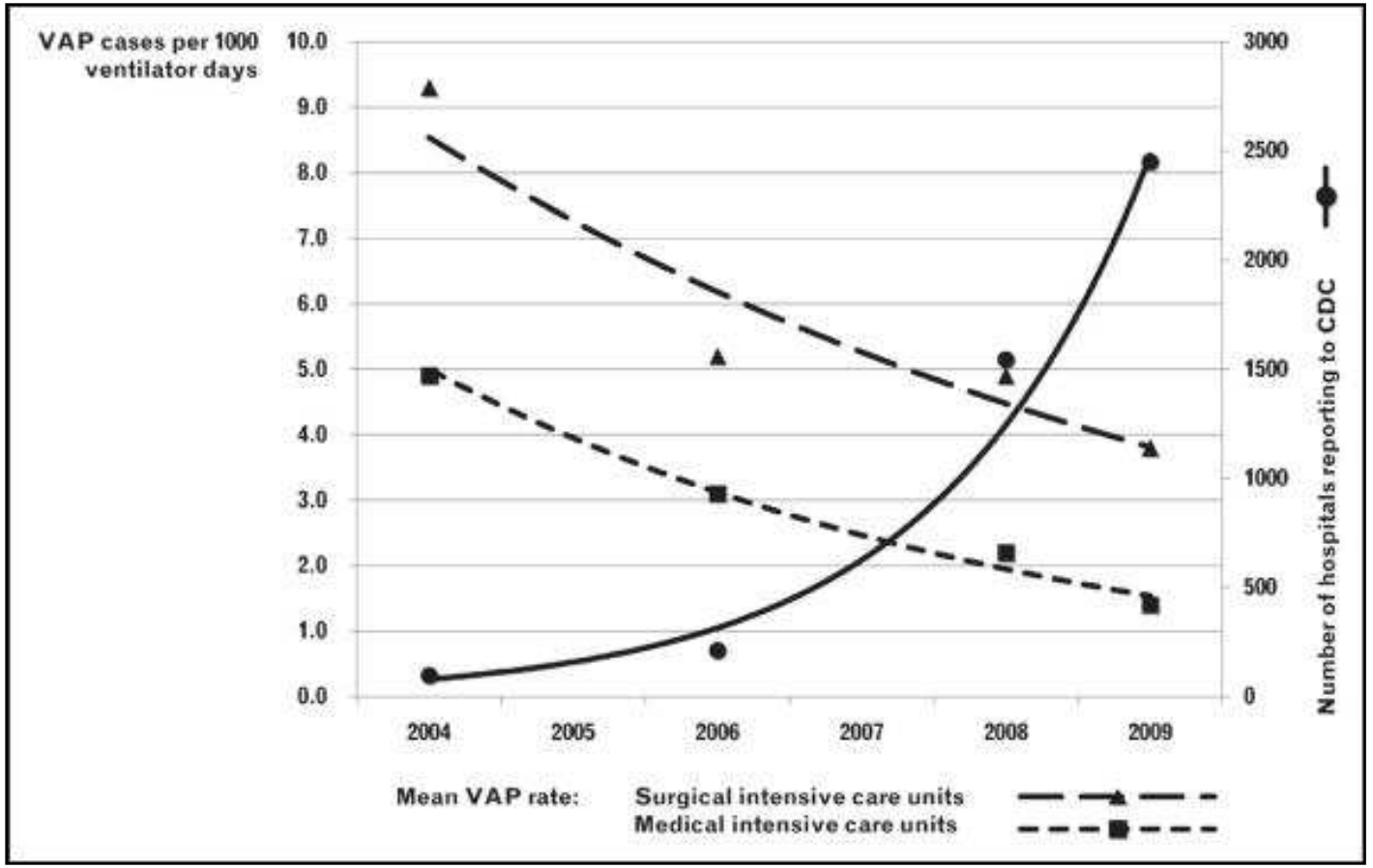
1) LE CONSTAT

REVIEW

CURRENT OPINION

Is a ventilator-associated pneumonia rate of zero really possible?

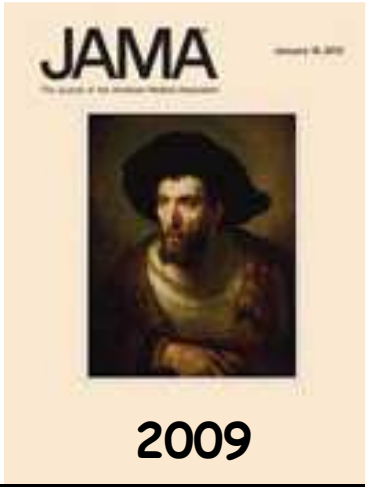
Michael Klompas



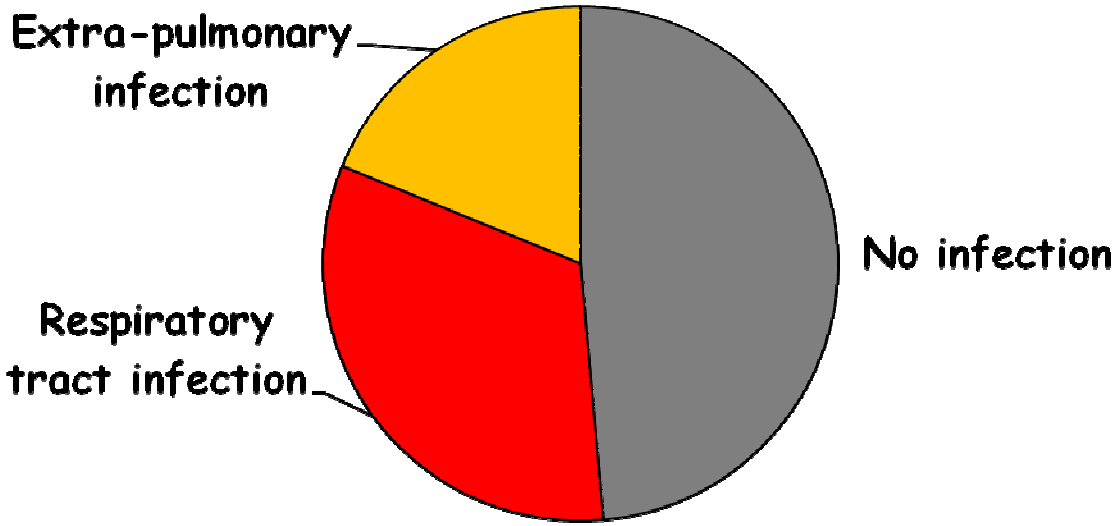
CARING FOR THE
CRITICALLY ILL PATIENT

International Study of the Prevalence and Outcomes of Infection in Intensive Care Units

Vincent JL, Rello J, Marshall J, Silva E, Anzueto A, Martin CD, Moreno R, Lipman J, Gomersall C, Sakr Y, Reinhart K; EPIC II Group of Investigators



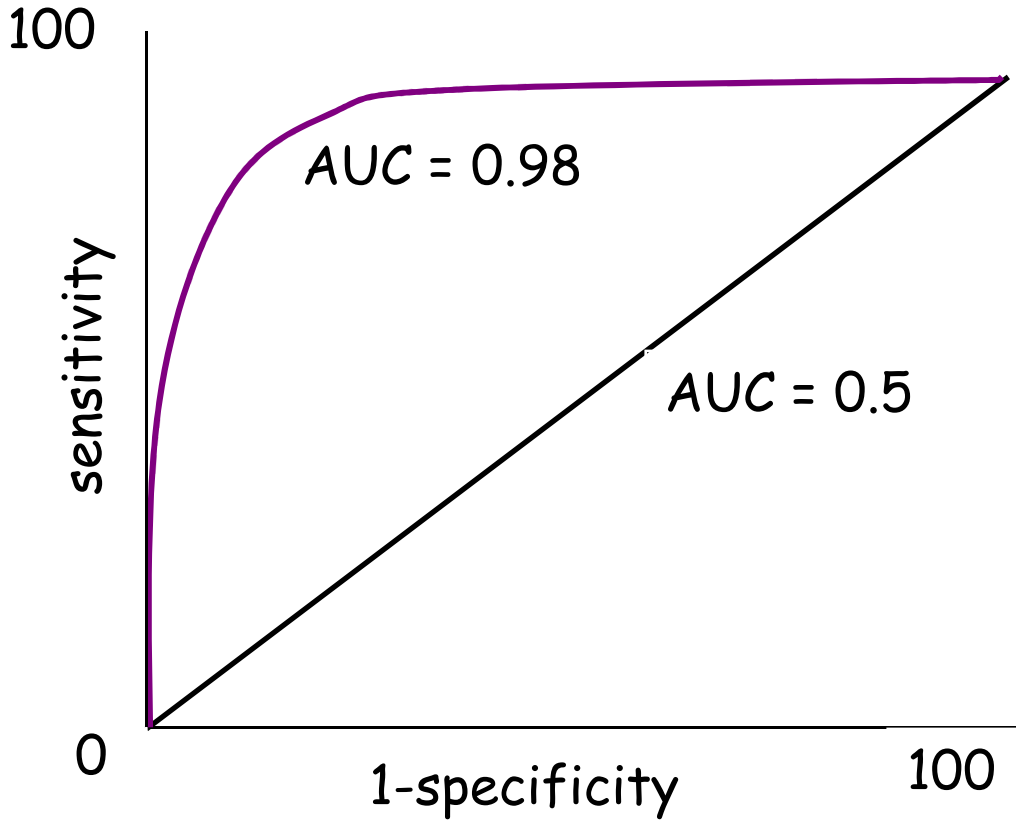
The Extended Prevalence of Infection in Intensive Care (EPIC II)
14 414 patients, 1265 ICUS, 75 countries



About 1/6 patients was being treated
for a possible respiratory infection that was not present on admission.

	Conventional definition
Radiology	Two or more serial chest radiographs with at least 1 of the following: **1.** New or progressive and persistent infiltrate **2.** Consolidation **3.** Cavitation
Systemic signs (at least 1)	**1.** Fever (>38°C or >100.4°F) **2.** Leukopenia (<4000 WBC/mm^3) or leukocytosis (≥12 000 WBC/mm^3) **3.** For adults ≥70 years old, altered mental status with no other recognized cause
Pulmonary signs (at least 2)	**1.** New onset of purulent sputum, or change in character of sputum, or increased respiratory secretions, or increased suctioning requirements **2.** Worsening gas exchange (eg, desaturations, increased oxygen requirements, or increased ventilator demand) **3.** New onset or worsening cough, or dyspnea, or tachypnea **4.** Rales or bronchial breath sounds

Diagnosing VAP



AUC	
1. Histologogy:	0.98
2. Bronchoscopy + Q cult	0.80
3. Blind sample + Q cult	0.75
4. Clinical scores (CPIS)	0.7
5. Surveillance data	0.65

Bonten MJM, ICPIC Geneva 2011

American Journal of Infection Control 2011

Commentary

Eight initiatives that misleadingly lower ventilator-associated pneumonia rates

Michael Klompas

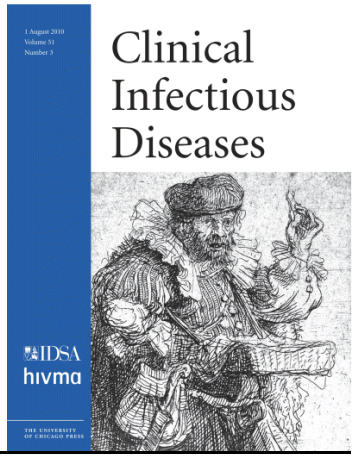
- Interpret clinical signs as strictly as possible
- Interpret chest radiographs as strictly as possible
- Require consensus between 2 or more infection preventionists
- Seek endorsement of intensivists before « certifying » suspected cases of VAP
- Require BAL for diagnosis
- Set quantitative growth thresholds for endotracheal aspirate and BAL cultures
- Transfer patients who require prolonged mechanical ventilation
- Expand surveillance to include uncomplicated postoperative patients

MAJOR ARTICLE

Rapid and Reproducible Surveillance for Ventilator-Associated Pneumonia

2011

Michael Klompas, Ken Kleinman, Yosef Khan, R. Scott Evans James, F. Lloyd, Kurt Stevenson, Matthew Samore, Richard Platt, for the CDC Prevention Epicenters Program



Comparison of Conventional and Streamlined Surveillance Definitions for Ventilator-Associated Pneumonia

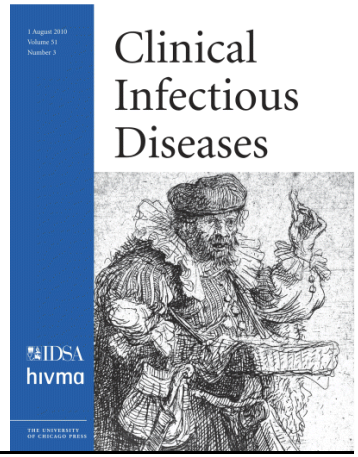
	Conventional definition	Streamlined definition
Radiology	Two or more serial chest radiographs with at least 1 of the following: **1.** New or progressive and persistent infiltrate **2.** Consolidation **3.** Cavitation	Two or more serial chest radiographs with at least 1 of the following: **1.** New or progressive and persistent infiltrate **2.** Consolidation **3.** Cavitation
Systemic signs (at least 1)	**1.** Fever (>38°C or >100.4°F) **2.** Leukopenia (<4000 WBC/mm^3) or leukocytosis (≥12 000 WBC/mm^3) **3.** For adults ≥70 years old, altered mental status with no other recognized cause	**1.** Fever (>38°C or >100.4°F) **2.** Leukopenia (<4000 WBC/mm^3) or leukocytosis (≥12 000 WBC/mm^3)
Pulmonary signs (at least 2)	**1.** New onset of purulent sputum, or change in character of sputum, or increased respiratory secretions, or increased suctioning requirements **2.** Worsening gas exchange (eg, desaturations, increased oxygen requirements, or increased ventilator demand) **3.** New onset or worsening cough, or dyspnea, or tachypnea **4.** Rales or bronchial breath sounds	**1.** ≥25 neutrophils per low power field on Gram stain of endotracheal aspirate or bronchoalveolar lavage specimen **2.** ≥2 days of stable or decreasing daily minimum PEEP followed by a rise in daily minimum PEEP of ≥2.5 cm H_2O, sustained for ≥ 2 calendar days; or ≥2 days of stable or decreasing daily minimum FiO_2 followed by a rise in daily minimum FiO_2 of ≥0.15 points, sustained for ≥2 calendar days

MAJOR ARTICLE

2011

Rapid and Reproducible Surveillance for Ventilator-Associated Pneumonia

Michael Klompas, Ken Kleinman, Yosef Khan, R. Scott Evans James, F. Lloyd, Kurt Stevenson, Matthew Samore, Richard Platt, for the CDC Prevention Epicenters Program



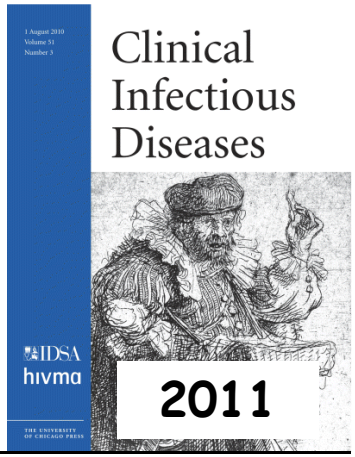
-2 days of stable or decreasing daily minimum PEEP followed by a rise in daily minimum PEEP of ≥2.5 cm H_2O, sustained for ≥ 2 calendar days;

- or ≥2 days of stable or decreasing daily minimum FiO_2 followed by a rise in daily minimum FiO_2 of ≥0.15 points, sustained for ≥2 calendar days;

MAJOR ARTICLE

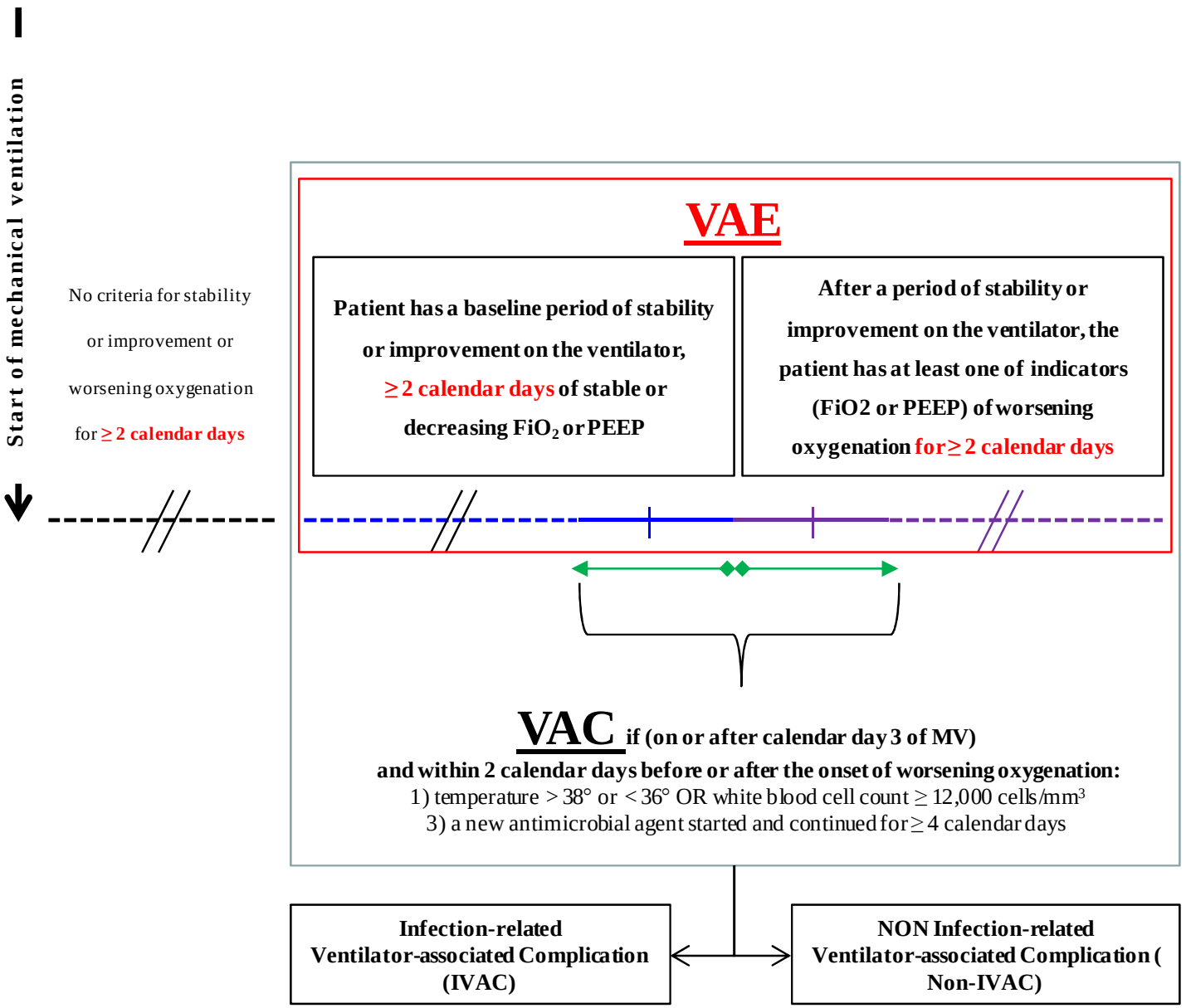
Rapid and Reproducible Surveillance for Ventilator-Associated Pneumonia

Michael Klompas, Ken Kleinman, Yosef Khan, R. Scott Evans James, F. Lloyd, Kurt Stevenson, Matthew Samore, Richard Platt, for the CDC Prevention Epicenters Program



Date	Ventilator day	Maximum PEEP	Maximum FiO2	Maximum temperature	Maximum WBC	Minimum WBC	Sputum or BAL Specimen	Gram stains neutrophils
Jan1	1	10	1.00	101.4	17.2	14.5		
Jan2	2	8	.60	100.8	16.1	12.5		
Jan3	3	5	.40	99.8	10.8	9.4		
Jan4	4	5	.40	97.2	11.1	8.6		
Jan5	5	5	.40	96.7	9.7	6.5		
Jan6	6	5	.40	97.9	8.0	7.1		
Jan7	7	8	.50	100.1	14.5	12.0		
Jan8	8	8	.60	100.9	19.4	14.9	Sputum	Moderate*
Jan9	9	8	.60	101.5	18.6	13.8		
Jan10	10	8	.40	100.5	13.1	10.2		
Jan11	11	8	.40	99.9	10.9	7.0		
Jan12	12	6	.40	98.6	11.1	8.7		
Jan13	13	5	.40	96.4	9.8	9.8		
Jan14	14	5	.40	97.2	8.6	7.4		
Jan15	15	5	.40	99.0	8.7	8.7		

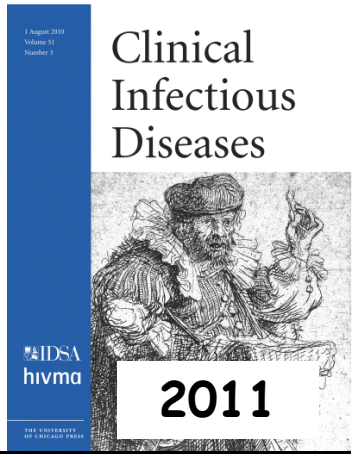
Screening for ventilator associated events (VAEs) and ventilator associated conditions (VACs) according to NHSN definition (CDC)



MAJOR ARTICLE

Rapid and Reproducible Surveillance for Ventilator-Associated Pneumonia

Michael Klompas, Ken Kleinman, Yosef Khan, R. Scott Evans James, F. Lloyd, Kurt Stevenson, Matthew Samore, Richard Platt, for the CDC Prevention Epicenters Program



Crude Outcomes of Patients With and Whithout VAP According to Conventional Versus Streamlined Definitions

	Conventional definition			Streamlined definition		
	VAP positive (n = 57)	VAP negative (n = 542)	P	VAC positive (n = 30)	VAC negative (n = 569)	P
Mechanical ventilation days, median (IQR)	18 (11-27)	7 (4-12)	<0.0001	18 (11-22)	7 (4-12)	<0.0001
Intensive care days, median (IQR)	19 (14-31)	10 (6-17)	<0.0001	20 (13-37)	10 (6-18)	<0.0001
Hospital days, median (IQR)	26 (21-34)	18 (11-28)	<0.0001	24 (19-36)	18 (12-29)	0.005
Hospital mortality	13 (23%)	128 (24%)	1.000	7 (23%)	134 (24%)	1.000

1) Constat

De nombreux hôpitaux rapportent des taux de PAVM à zéro, il est donc possible d'avoir des taux de PAVM à zéro en utilisant les définitions de surveillance actuelles, d'autant que l'on utilise les critères de surveillance de façon rigoureuse.

II EXISTE UNE DISCORDANCE ENTRE LES DONNEES DE SURVEILLANCE ET LA REALITE CLINIQUE
LA SURVEILLANCE N'EST PAS UN INDICATEUR FIABLE

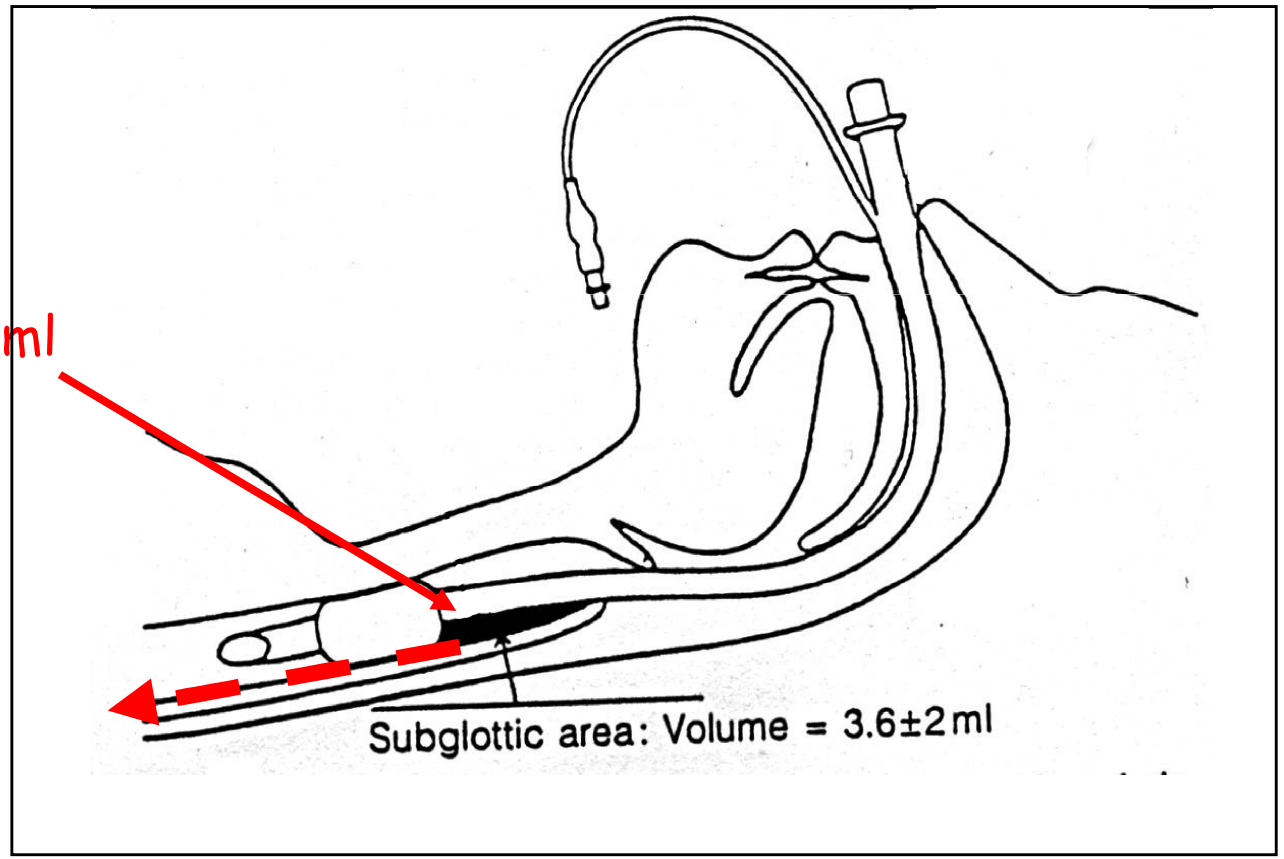
REFLECTION SUR D'AUTRES MOYENS DE SURVEILLANCE (VAEs et VACs)

L'objectif « zéro PAVM » est-il réaliste?
PEUT-ETRE MAIS LES TAUX SEULS NE SONT PAS INFORMATIFS

1) LA PREVENTION EST-ELLE EFFICACE?

Micro-inhalations

réservoir
10^{10} bactéries/ml



State of the Art

Ventilator-associated Pneumonia

Jean Chastre and Jean-Yves Fagon

INDEPENDENT FACTORS FOR VENTILATOR-ASSOCIATED PNEUMONIA IDENTIFIED BY MULTIVARIATE ANALYSIS IN SELECTED STUDIES

Host factors	Intervention factors	Other factors
Serum albumin, <2.2 g/dl	H2 blockers ± antiacids	Season: fall, winter
Age, ≥ 60yr	Paralytic agents, continuous intravenous sedation	
ARDS	> 4 units of blood products	
COPD, pulmonary disease	Intracranial pressure monitoring	
Coma or impaired consciousness	MV > 2 d	
Burns, trauma	Positive end-expiratory pressure	
Organ failure	Frequent ventilator circuit changes	
Severity of illness	Reintubation	
Large-volume gastric aspiration	Nasogastric tube	
Gastric colonization and pH	Supine head position	
Upper respiratory tract colonization	Transport out of the ICU	
Sinusitis	Prior antibiotic or no antibiotic therapy	

REVIEW

CURRENT OPINION

Ventilator-associated pneumonia and its prevention

Lila Bouadma, Michel Wolff and Jean-Christophe Lucet

Beaucoup d'études ++++++++++

Les mesures de prévention citées dans les recommandations sont:

•soit non évaluées mais reposant sur des principes généraux de prévention des infections nosocomiales

•soit évaluées par rapport à un mécanisme physiopathologique supposé

•soit LE PLUS SOUVENT évaluées par rapport à des variations de taux d'infections RAREMENT sur des critères de jugement robustes

Guidelines for the management of adults with hospital-acquired, ventilator-associated, and healthcare-associated pneumonia.

Am J Respir Crit Care Med, 2005. 171(4): p. 388-416.

Major Points and Recommendations for Modifiable Risk Factors

General prophylaxis.

1. Effective infection control measures: staff education, compliance with alcohol-based hand disinfection, and isolation to reduce cross-infection with MDR pathogens should be used routinely (**Level**
2. Surveillance of ICU infections, to identify and quantify endemic and new MDR pathogens, and preparation of timely data for infection control and to guide appropriate, antimicrobial therapy in pati suspected HAP or other nosocomial infections, are recommended (**Level II**).

Intubation and mechanical ventilation.

1. Intubation and reintubation should be avoided, if possible, as it increases the risk of VAP (**Level I**).
2. Noninvasive ventilation should be used whenever possible in selected patients with respiratory failure (**Level I**).
3. Orotracheal intubation and orogastric tubes are preferred over nasotracheal intubation and nasogastric tubes to prevent nosocomial sinusitis and to reduce the risk of VAP, although direct causality h proved (**Level II**).
4. Continuous aspiration of subglottic secretions can reduce the risk of early-onset VAP, and should be used, if available (**Level I**).
5. The endotracheal tube cuff pressure should be maintained at greater than 20 cm H_2O to prevent leakage of bacterial pathogens around the cuff into the lower respiratory tract (**Level II**).
6. Contaminated condensate should be carefully emptied from ventilator circuits and condensate should be prevented from entering either the endotracheal tube or in-line medication nebulizers (**Level**
7. Passive humidifiers or heat–moisture exchangers decrease ventilator circuit colonization, but have not consistently reduced the incidence of VAP, and thus they cannot be regarded as a pneumonia p (**Level I**).
8. Reduced duration of intubation and mechanical ventilation may prevent VAP and can be achieved by protocols to improve the use of sedation and to accelerate weaning (**Level II**).
9. Maintaining adequate staffing levels in the ICU can reduce length of stay, improve infection control practices, and reduce duration of mechanical ventilation (**Level II**).

Aspiration, body position, and enteral feeding.

1. Patients should be kept in the semirecumbent position (30–45°) rather than supine to prevent aspiration, especially when receiving enteral feeding (**Level I**).
2. Enteral nutrition is preferred over parenteral nutrition to reduce the risk of complications related to central intravenous catheters and to prevent reflux villous atrophy of the intestinal mucosa that ma risk of bacterial translocation (**Level I**).

Modulation of colonization: oral antiseptics and antibiotics.

1. Routine prophylaxis of HAP with oral antibiotics (selective decontamination of the digestive tract or SDD), with or without systemic antibiotics, reduces the incidence of ICU-acquired VAP, has he outbreaks of MDR bacteria (**Level I**), but is not recommended for routine use, especially in patients who may be colonized with MDR pathogens (**Level II**).
2. Prior administration of systemic antibiotics has reduced the risk of nosocomial pneumonia in some patient groups, but if a history of prior administration is present at the time of onset of infection, th increased suspicion of infection with MDR pathogens (**Level II**).
3. Prophylactic administration of systemic antibiotics for 24 hours at the time of emergent intubation has been demonstrated to prevent ICU-acquired HAP in patients with closed head injury in one stu use is not recommended until more data become available (**Level I**).
4. Modulation of oropharyngeal colonization by the use of oral chlorhexidine has prevented ICU-acquired HAP in selected patient populations such as those undergoing coronary bypass grafting, but it not recommended until more data become available (**Level I**).
5. Use daily interruption or lightening of sedation to avoid constant heavy sedation and try to avoid paralytic agents, both of which can depress cough and thereby increase the risk of HAP (**Level II**).

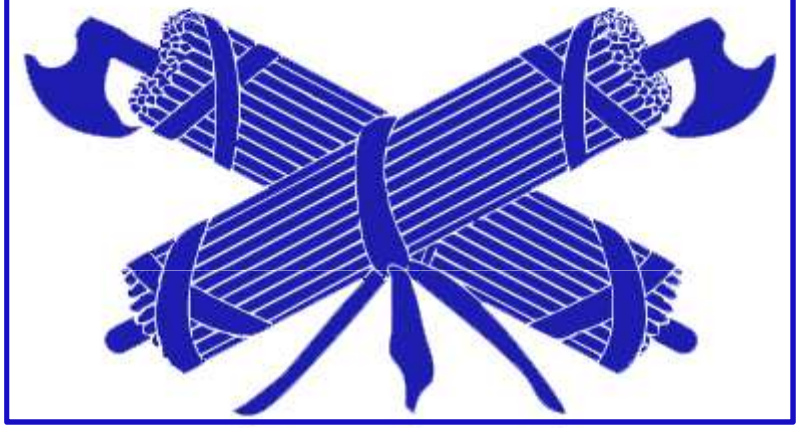
Stress bleeding prophylaxis, transfusion, and hyperglycemia.

1. Comparative data from randomized trials suggest a trend toward reduced VAP with sucralfate, but there is a slightly higher rate of clinically significant gastric bleeding, compared with H_2 antagonis stress bleeding prophylaxis with either H_2 antagonists or sucralfate is acceptable (**Level I**).
2. Transfusion of red blood cell and other allogeneic blood products should follow a restricted transfusion trigger policy; leukocyte-depleted red blood cell transfusions can help to reduce HAP in selec populations (**Level I**).
3. Intensive insulin therapy is recommended to maintain serum glucose levels between 80 and 110 mg/dl in ICU patients to reduce nosocomial blood stream infections, duration of mechanical ventilati morbidity, and mortality (**Level I**).

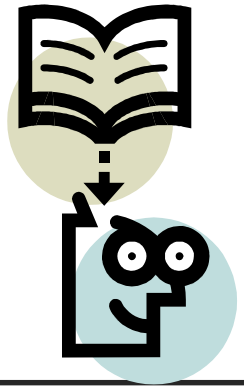
OUTILS

CHECKLISTS

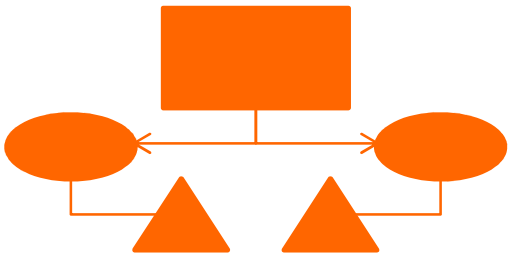
BUNDLES



RECOMMANDATIONS



ALGORITHMES



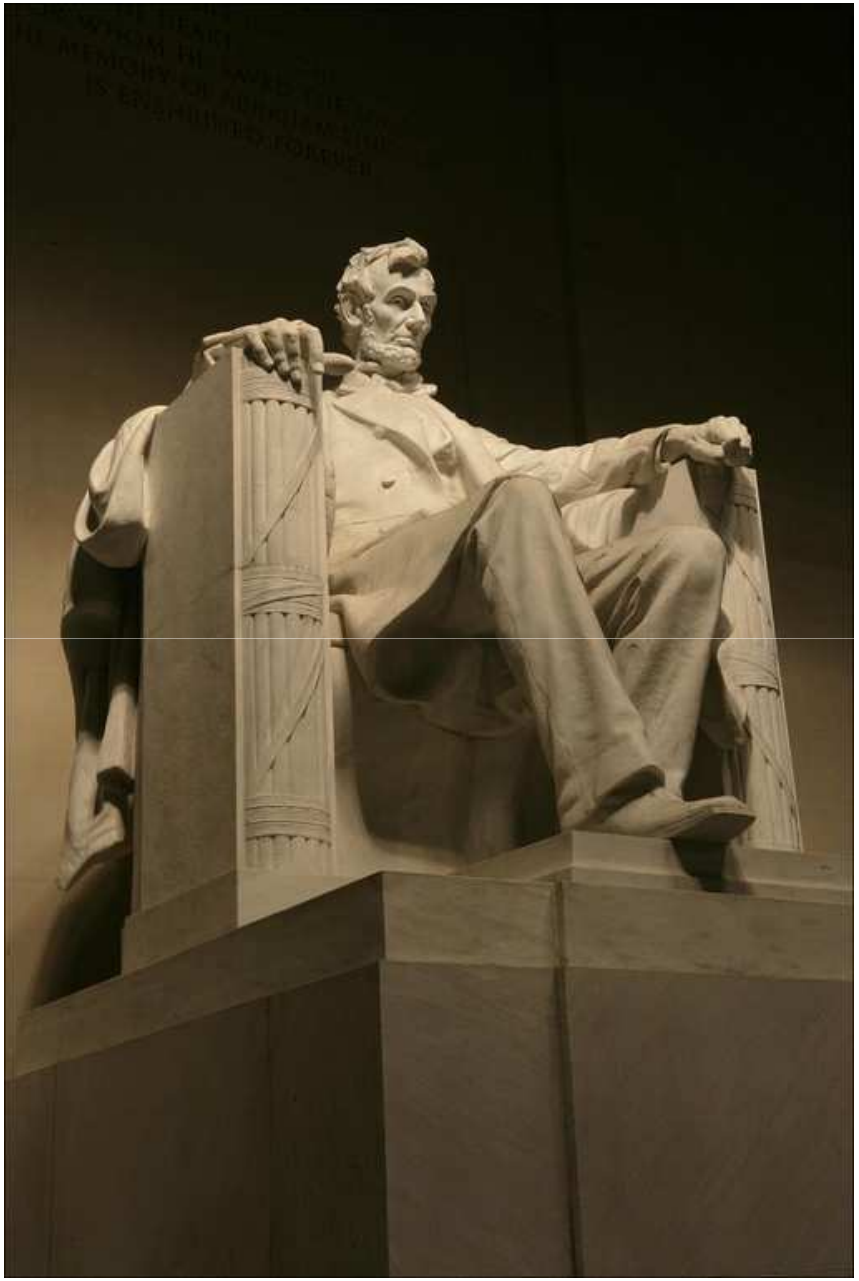
Traduction de « bundle » = faisceau
fasces lictoriae (latin)
fasci, fasco (italien)

Bundles of the lictors
The *fasces lictoriae*

Union européenne

République française

PASSEPORT




UNITED STATES OF AMERICA
E PLURIBUS UNUM
ONE DIME

DEFINITION « Bundle »
selon l'Institute for Healthcare Improvement (IHI)

C'est une méthode structurée pour améliorer le processus de soin (et donc le pronostic des patients). Il est composé d'un petit ensemble simple et cohérent de plusieurs pratiques, généralement 3 à 5, bien définies, fondées sur des preuves scientifiques solides et qui mis en œuvre correctement (95% d'adhérence), se traduit par un meilleur résultat sur le pronostic des patients que lorsque chaque mesure est utilisée seule.

DEFINITION « Bundle »
selon l'Institute for Healthcare Improvement (IHI)

« Ventilator bundle » princeps

1) la prophylaxie de l'ulcère de stress,

2) la prophylaxie des thromboses veineuses profondes,

3) l'élévation de la tête du lit,

4) l'arrêt des sédations et l'évaluation des possibilités de sevrage

5) soins de bouche à la chlorhexidine

Intensive care med (2010) 36: 1841-1845

ORIGINAL

Jordi Rello
Hartmut Lode,
Giuseppe Cornaglia
Robert Masterton
The VAP Care Bundle Contributors

A European care bundle for prevention of ventilator-associated pneumonia

Criterion	Mean weighting sco
Ease of implementation within a care bundle package How easy it will be to implement the element of the care bundle?	18
Clinical effectiveness against VAP and the likely benefit Is there evidence that the intervention is clinically effective in its impact upon VAP? How big a benefit does the intervention produce?	16
Strength of clinical evidence concerning the intervention How good is the evidence that demonstrates the benefit of the intervention? Is all the evidence of the same standard? Are the study results relevant across the range of health systems?	15
Consistency of findings from different studies Are the findings of these studies consistent? Do the studies demonstrating benefit come from a range of health systems?	9
Generalisability to different health care systems and settings Is the recommendation acceptable across different health care systems?	9
Volume of clinical evidence supporting the intervention How many studies are available to show that benefit exists from the recommendation? Do the studies demonstrating benefit come from a range of health systems?	8
Cost effectiveness of the intervention Is the intervention cost effective? How cost effective is the intervention across the different health care systems?	7
Coverage in all VAP patients Is the benefit uniform across the complete VAP group of patients?	5
Impact on the health care system as a whole Think about the impact (positive or negative) on other services, e.g. will this intervention increase/decrease work load for other services (can this other part of the service deliver?), e.g. laboratories/imaging	3

Intensive care med (2010) 36: 1841-1845

ORIGINAL

Jordi Rello
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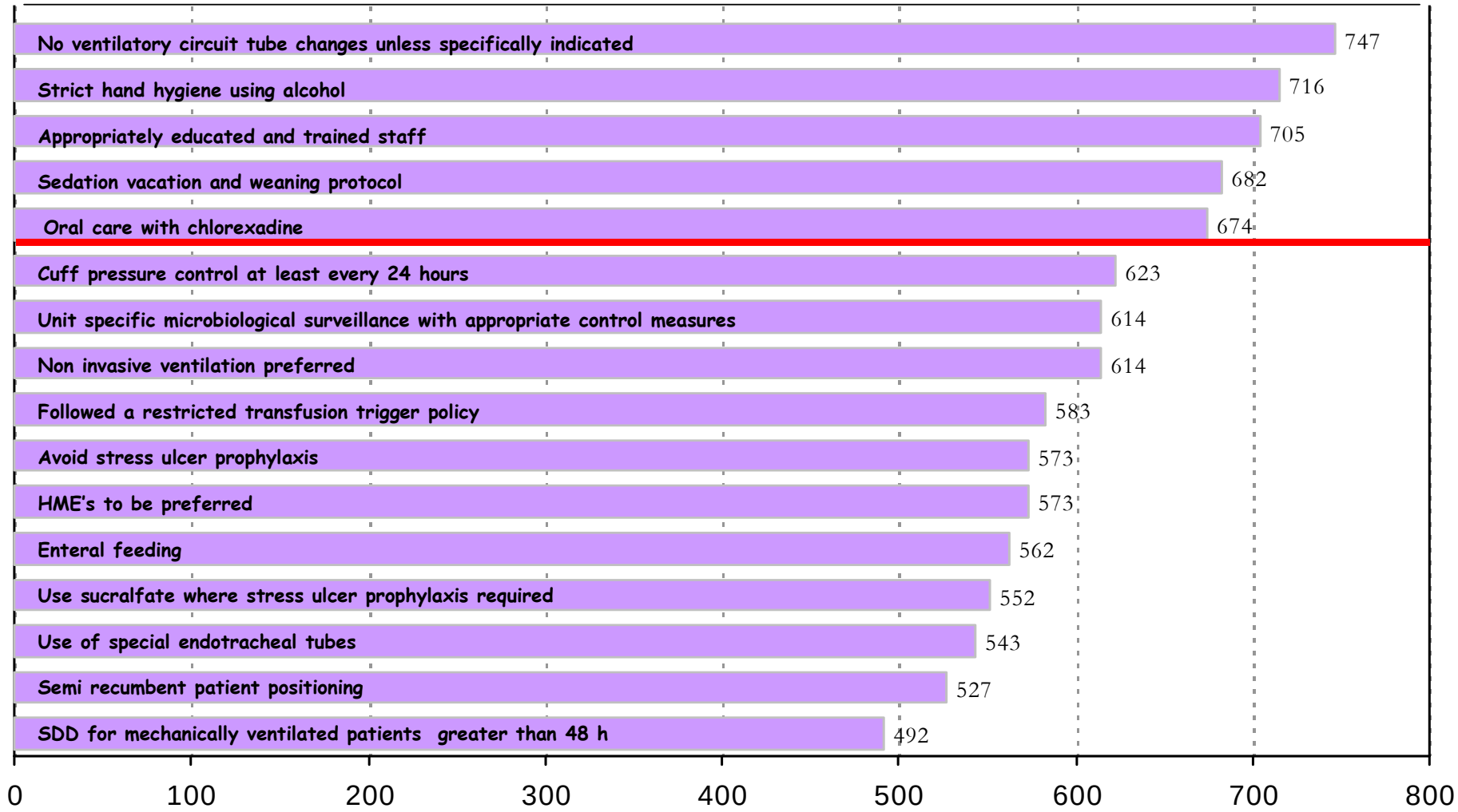
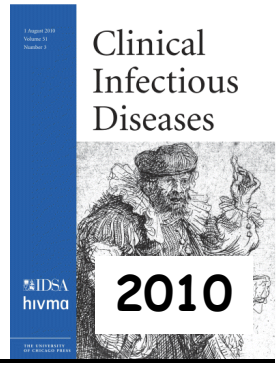
The VAP Care Bundle Contributors

A European care bundle for prevention of ventilator-associated pneumonia

Ranking of VAP prevention interventions.



EDITORIAL COMMENTARY



Ventilator-associated Pneumonia: Is zero Possible?

Michael Klompas

Study, year	Design	VAP rate before	VAP rate after	VAP reduction, %	*P*
Zack et al	Before-after	12.6	5.7	58	*<.001*
Crunden et al	Before-after	NR	NR	NR	*NR*
Resar et al	Before-after	6.6	2.7	59	*<.001*
Berriel-Cass et al	Before-after	8.2	3.3	60	*.02*
Burger and Resar	Before-after	6.0	0.7	88	*NR*
Cocanour et al	Before-after	22.3	10.7	52	*<.05*
Apisarnthanarak et al	Before-after	20.6	8.5	59	*.001*
Yougquist et al	Before-after	6.1	0	100	*NR*
Yougquist et al	Before-after	2.7	1.7	37	*NR*
Blamoun et al	Before-after	14.1	0	100	*.006*
Bloos et al	Before-after	37.6	45.9	+22	*NR*
Hawe et al	Before-after	19.2	7.5	61	*NR*
Hutchins et al	Before-after	12.6	1.3	90	*NR*
Marra et al	Before-after	16.4	10.4	37	*.05*
Zaydfudim et al	Before-after	15.2	9.3	39	*.01*
Bird et al	Before-after	10.2	3.4	67	*.004*
Bouadma et al	Before-after	22.6	13.1	43	*<.001*
Morris et al	Before-after	32	12	63	*<.001*

DEFINITION « Bundle »
selon l'Institute for Healthcare Improvement (IHI)

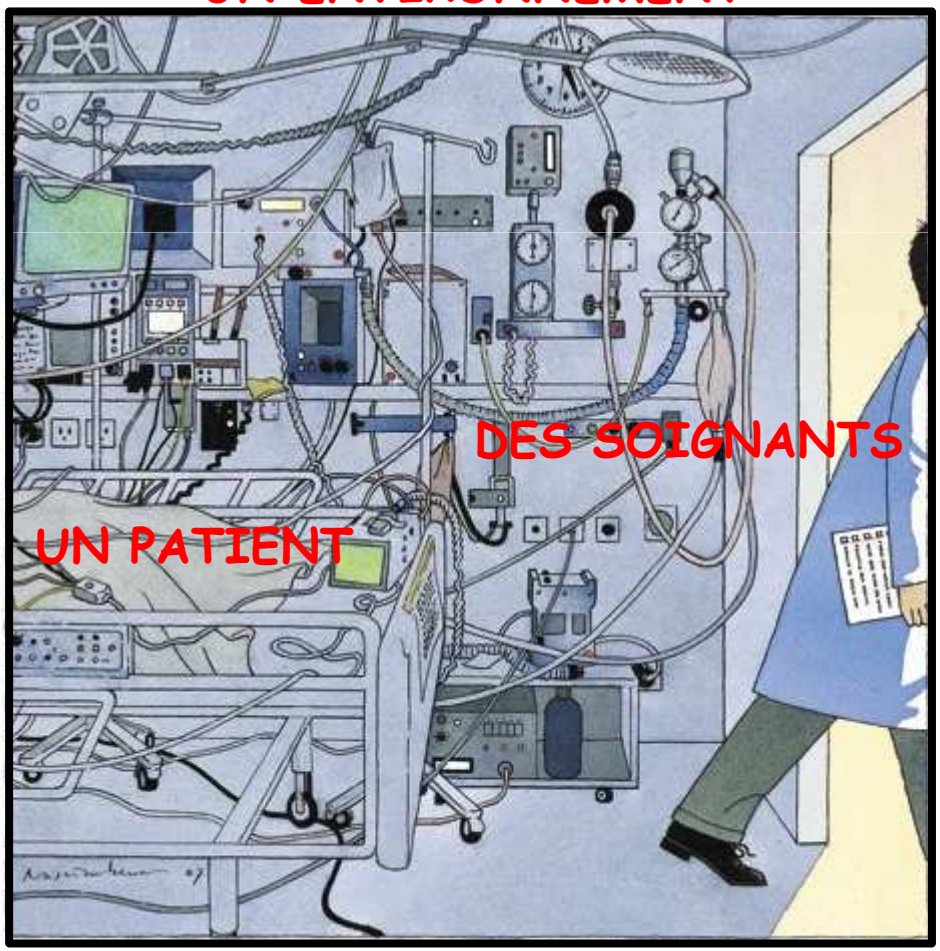
ANNALS OF MEDICINE

The Checklist

If something so simple can transform intensive care, what else can it do?

by Atul Gawande December 10, 2007

UN ENVIRONNEMENT



ANNALS OF MEDICINE

The Checklist

If something so simple can transform intensive care, what else can it do?

by Atul Gawande December 10, 2007

Les soignants n'appliquent pas les recommandations.....

L'erreur est humaine.....

D'autant que les fonctions cognitives sont altérées en cas de fatigue et d' environnement stressant.

Brief Report

Nursing adherence with evidence-based guidelines for preventing ventilator-associated pneumonia

Maite Ricart, RN; Carmen Lorente, MD; Emili Diaz; Marin H. Kollef, MD, FCCP; Jordi rello, MD, PhD

Strategy	Nurse adherence (%)	Physician adherence (%)	P Value
Use of protective gowns and gloves	96.8	76.7	<.05
Provision of adequate nutritional support	96.0	95.1	NS
Dedicated use of disposable suction catheters	90.1	93.1	NS
Adequate hand-washing between patients	90.1	85.0	NS
Routine changes of ventilator circuit	84.3	71.2	<.05
Postural changes	82.3	88.1	NS
Humidification with heat and moisture exchanger with bacteriologic filter	80.3	70.0	NS
Semi recumbent positioning of the patient	76.4	91.8	<.05
Daily changes of heat and moisture exchangers	74.5	58.9	<.05
Chlorhexidine oral rinse	72.5	55.4	<.05
Use a formal infection control program	64.7	78.3	<.05
Routine changes of in-line suction catheter	62.7	70.9	NS
Schedule of condensate from ventilator circuits	58.8	75.4	<.05
Continuous subglottic suctioning	17.6	11.7	NS

Overall the nonadherence rate:
37% for physicians and 22% for the nurses

Brief Report

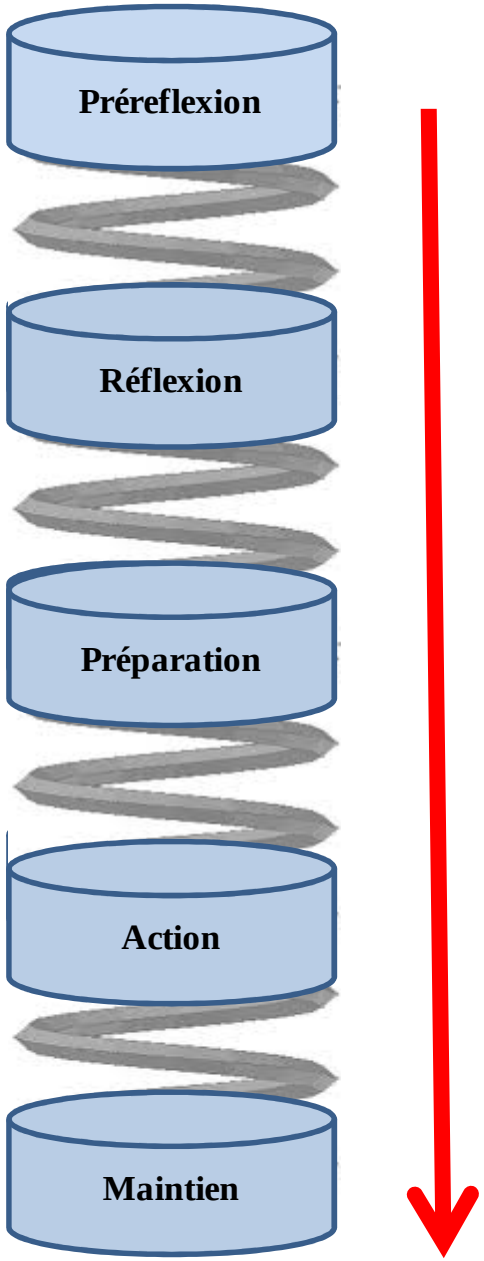
Nursing adherence with evidence-based guidelines for preventing ventilator-associated pneumonia

Maite Ricart, RN; Carmen Lorente, MD; Emili Diaz; Marin H. Kollef, MD, FCCP; Jordi rello, MD, PhD

Reasons for non adherence

Non adherence	Nurses (%)	Physicians (%)	OR (95 %, CI)
Unavailability	37.0	43.0	0.77 (0.44 - 1.37)
Patient discomfort	8.2	1.8	4.87 (2.90 – 8.18)
Disagreement with the results	7.8	23.9	0.26 (0.20 – 0.35)
Adverse effects	5.8	1.8	3.36 (1.96 – 5.74)
Costs	3.4	16.0	0.18 (0.12 – 0.27)
Other	21.9	13.4	1.81 (1.43 – 2.29)

The Transtheoretical Model of Behavior Change
Le modèle du changement de comportement selon Prochaska et DiClemente



The Magical Number Seven, Plus or Minus two.

Miller GA.

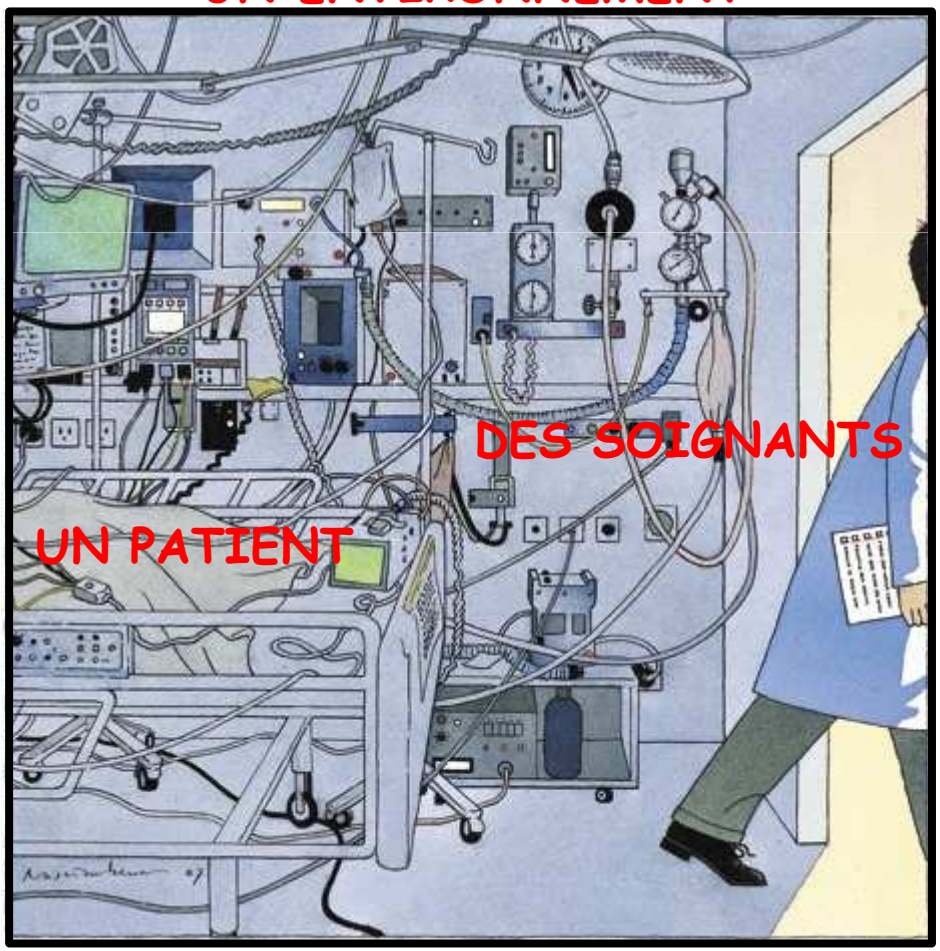
ANNALS OF MEDICINE

The Checklist

If something so simple can transform intensive care, what else can it do?

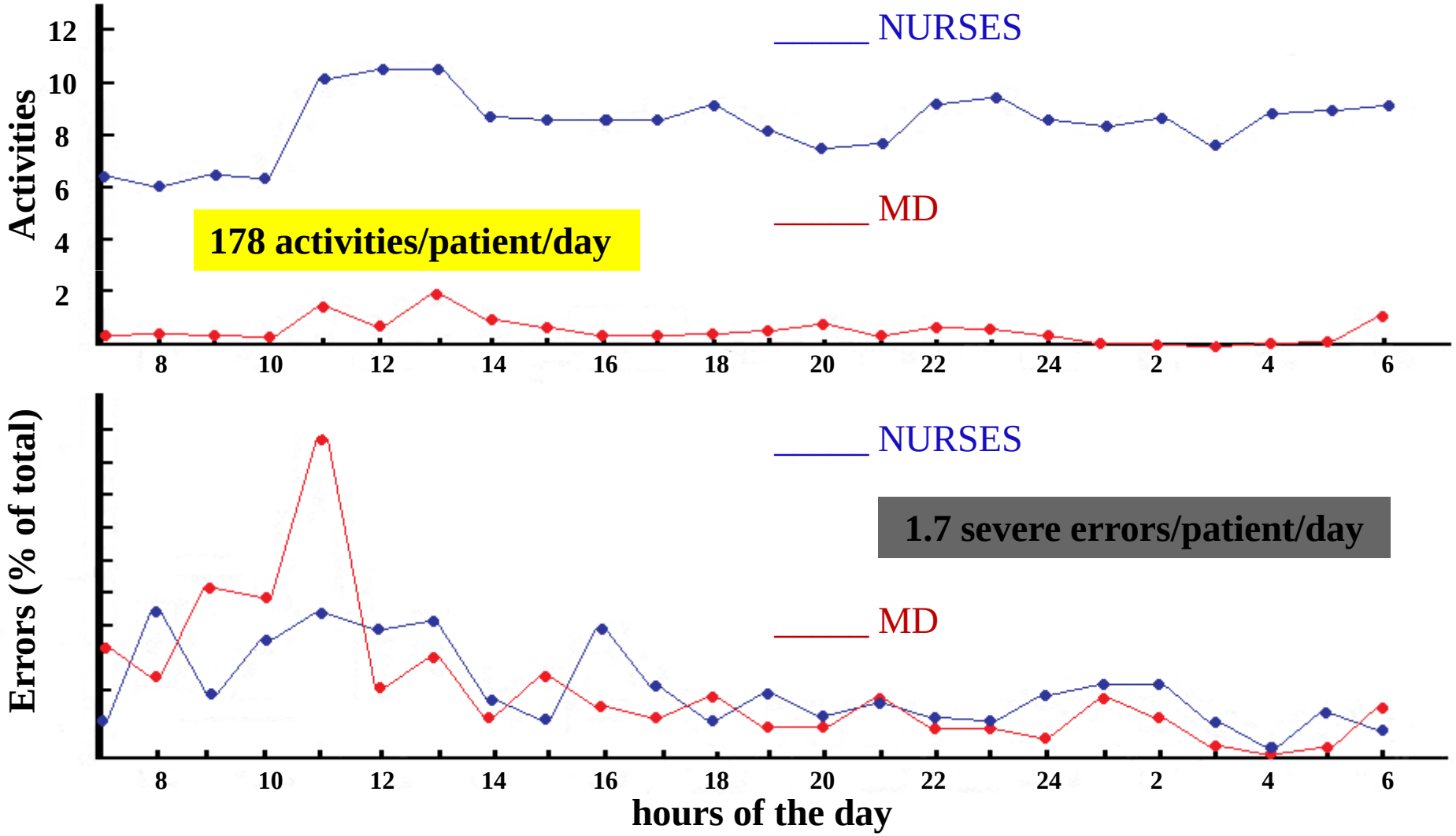
by Atul Gawande December 10, 2007

UN ENVIRONNEMENT



A look into the nature and causes of human errors in the intensive care unit

Donchin, Yoel MD; Gopher, Daniel PhD; Olin, Miriam MA; Badihi, Yehuda PhD; Biesky, Michal RNB; Sprung, Charles L. MD JD, FCCM; Pizov, Ruven MD; Cotev, Shamay MD



Construction et analyse de l'impact d'un programme multifacettes de prévention des PAVM

Bouadma et al., CCM, ICM et CID 2010

L'objectif de ce travail était de construire et d'étudier l'impact d'un programme de prévention multifacettes des PAVM ciblant les 3 déterminants du comportement que sont:

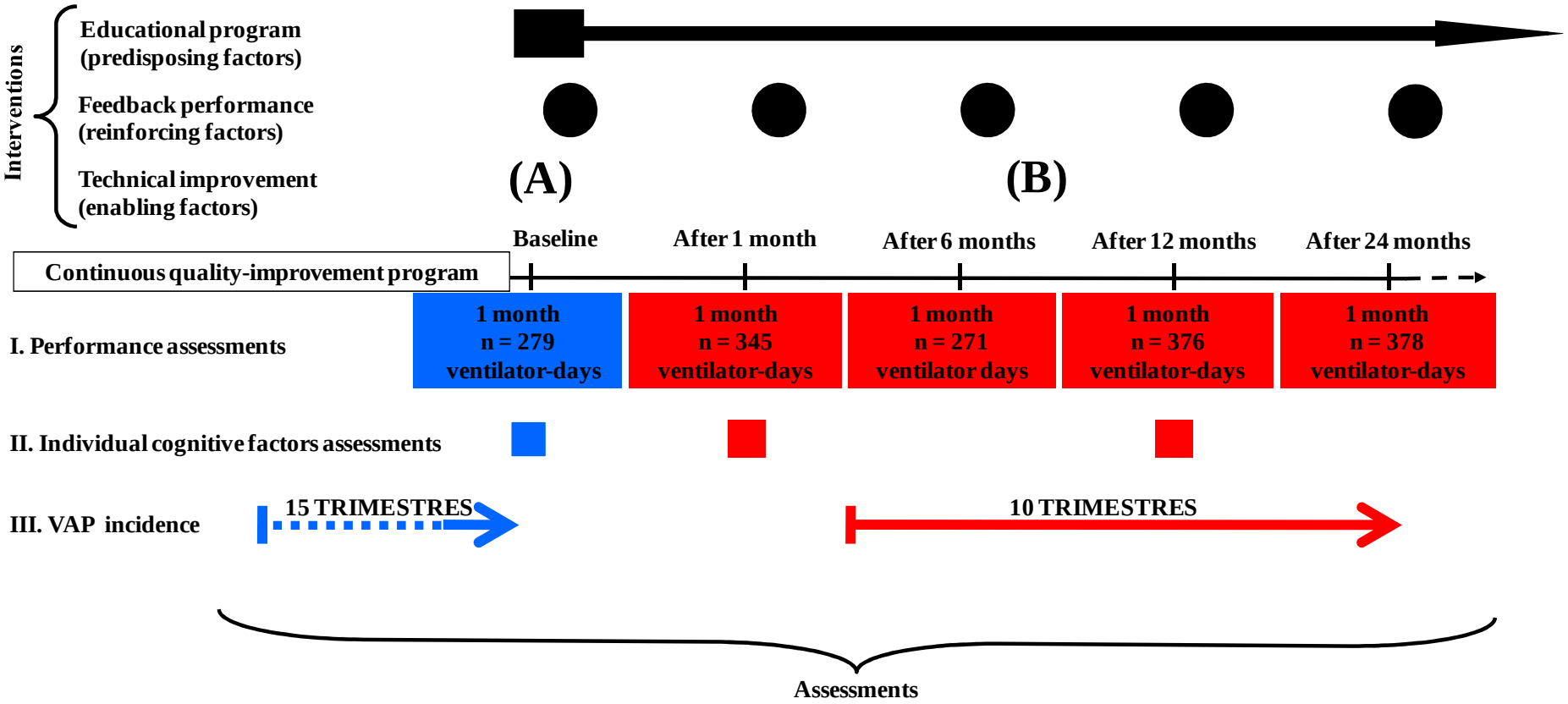
1. les facteurs individuels (facteurs internes) : connaissances, croyances et perceptions (« predisposing factors »)

2. les facteurs favorisants (« enabling factors »)

3. les facteurs liés au renforcement et au retour de l'information (« reinforcing factors »)

A multifaceted program to prevent ventilator-associated pneumonia: Impact on compliance with preventive measures*

Lila Bouadma, MD; Bruno Mourvillier, MD; Veronique Deiler, RN; Bertrand Le Corre, RN; Isabelle Lolom, BS; Bernard Regnier, MD; Michel Wolff, MD; Jean-Christophe Lucet, MD, PhD



A multifaceted program to prevent ventilator-associated pneumonia: Impact on compliance with preventive measures*

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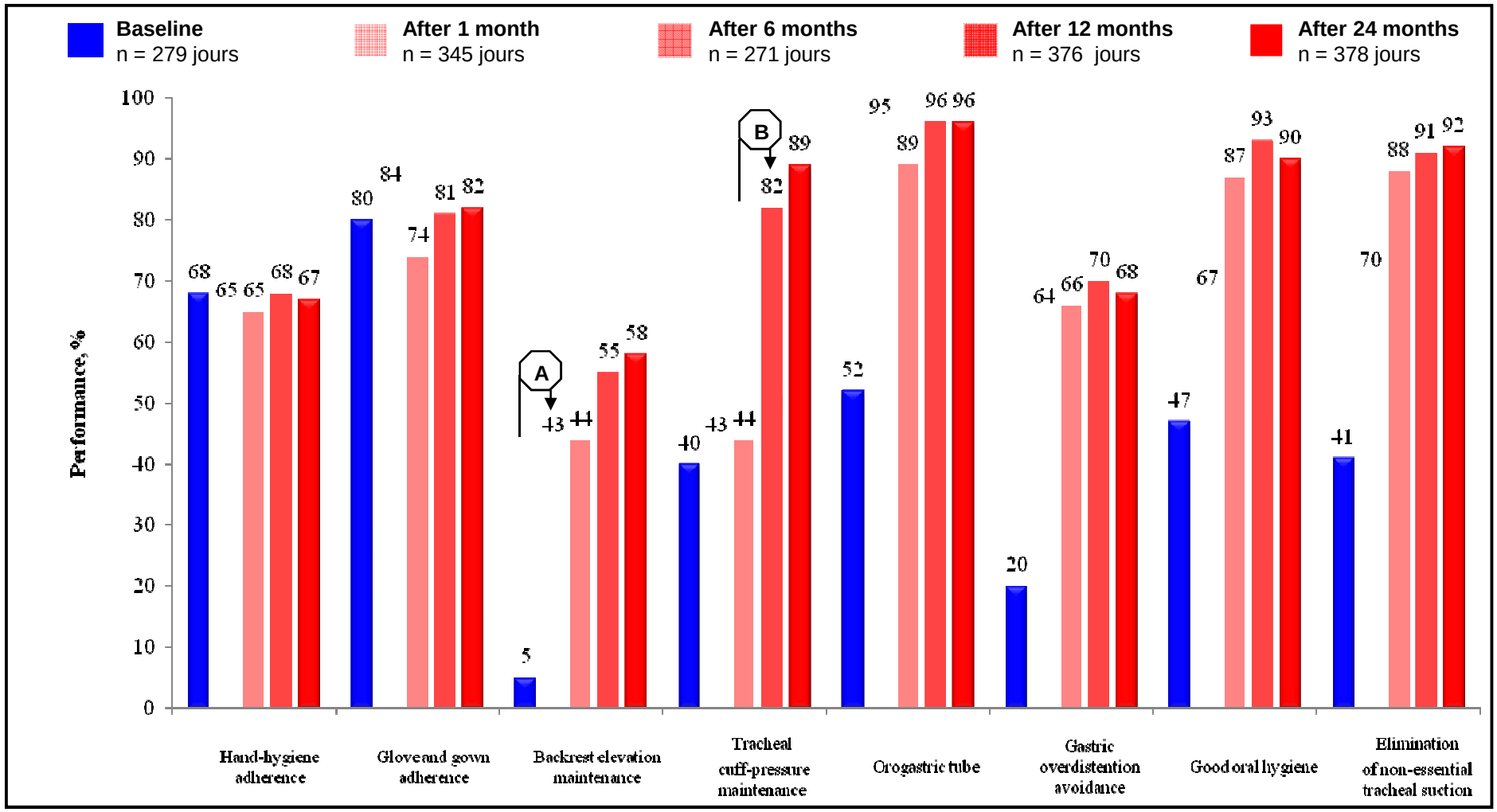
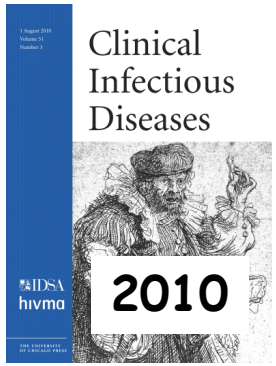
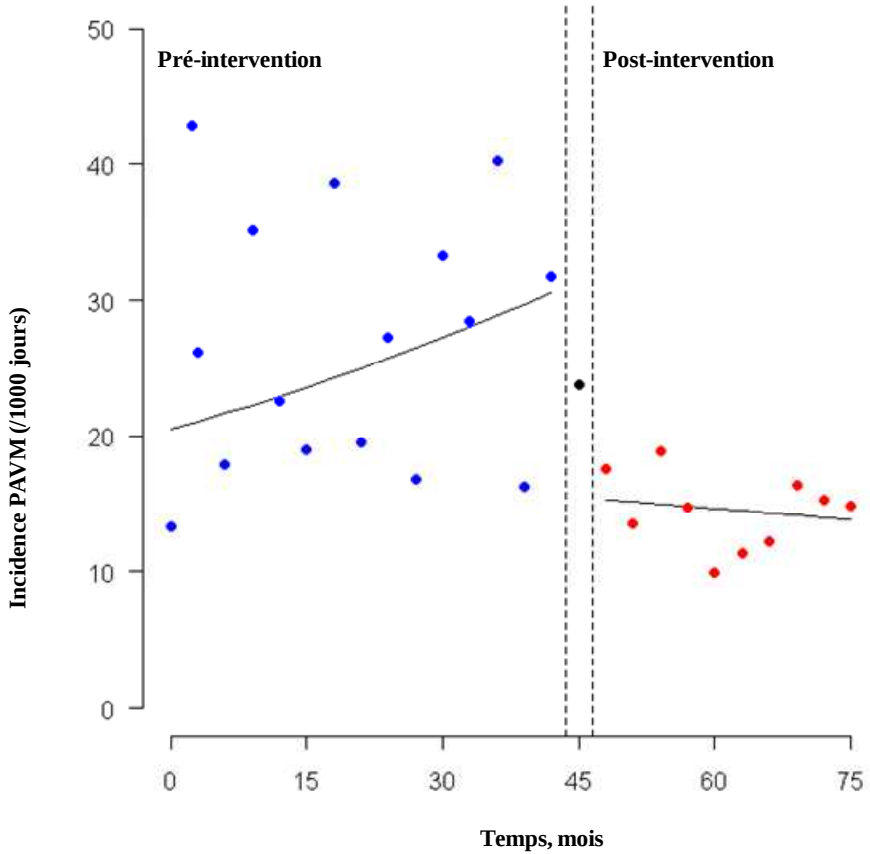


Major article



Long-Term Impact of a Multifaceted Prevention Program on Ventilator-Associated Pneumonia in a Medical Intensive Care Unit

Lila Bouadma, Emmanuelle Deslandes, Isabelle Lolom, Bertrand Le Corre, Bruno Mourvillier, Bernard Régnier, Raphael Porcher, Michel Wolff, and Jean-Christophe Lucet



l'intervention diminue l'incidence des PAVM de 43%
HRajusté: 0,58; 95% IC = 0,46-0,72; p < 0,001

CONCLUSION

Réduire l'incidence des PAVM est possible.

« Zéro PAVM » cela suppose que la PAVM résulte entièrement d'erreurs évitables tout en excluant les facteurs liés à l'hôte.

En fait en raison:

1. d'une physiopathologie complexe
2. des facteurs de risque du patient,
3. du facteur humain (les soignants),
4. d'un environnement stressant et mouvant,

les PAVM ne peuvent pas être éliminées.

LA THEORIE AUTO-REALISATRICE
EFFET PYGMALION