FROM ZERO TO HERO
DEVELOPING A BEST PRACTICE IN VAP-PREVENTION

November 2016
dr. Walter Swinnen

az Sint Blasius

DISCLOSURE

NONE


North Sea
NETHERLANDS
Brugge
Dendermonde
Antwerp
Hasselt
BRUSSELS
Kortrijk
Liège
Mons
Charleroi
Namur
Bastogne
FRANCE
LUXEMBOUR
0 20 40 km


Kroonveldlaan
Salemstraat


WELKOM


6


az Sint Blasius

CORE DATA ICU-azSB

SINCE 1-1-1999

Mixed medical/surgical ICU
Closed type

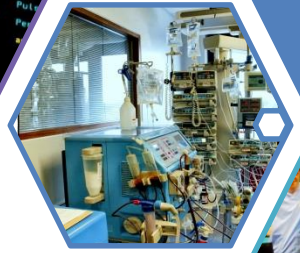
6 intensivists
25 FTE nurses
0,6 FTE physio
1 FTE logistics

5,4 %
Mortality

1200 patients / year

12
beds

0,36
SMR (SAPS-2)



1,4 VAP
/ 1000 VD

5 jan 2011
Last catheter sepsis

PATIENTS FIRST: OUR VALUE EQUATION

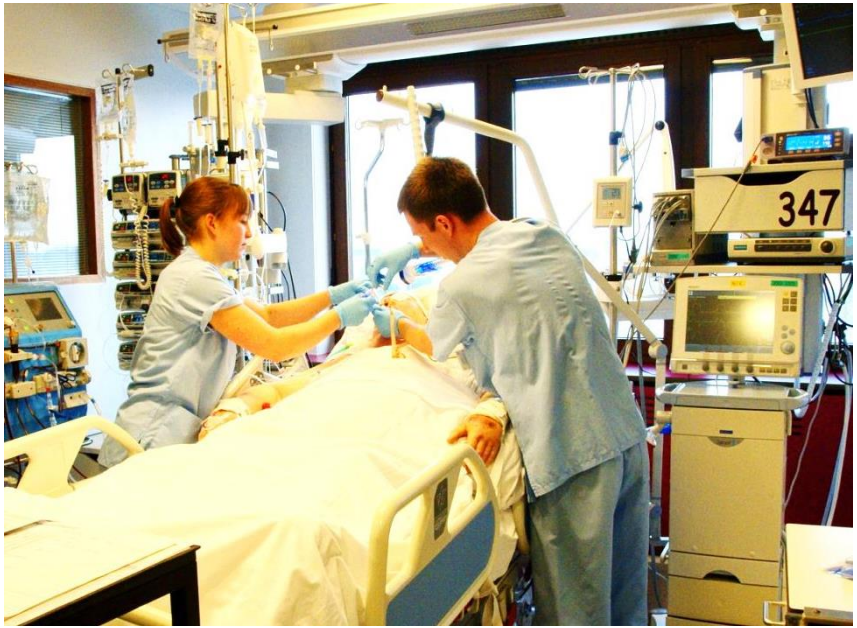
Everyone has an idea for how to improve health care, and they all have merit. There are no one-size-fits-all solutions. There's one common thread, however, woven throughout all of them: Creating more value for patients. This is how we define value.

WHAT'S SO SPECIAL ABOUT VAP?

SPECIAL CIRCUMSTANCES

Special patients

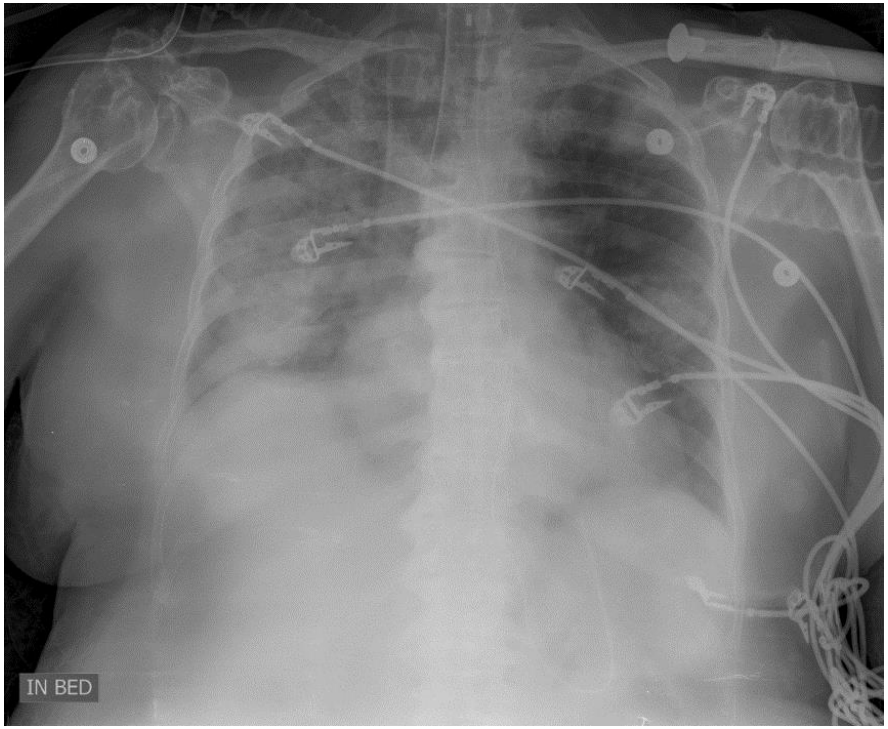
Special environment



After a few days

of mechanical ventilation

SPECIAL CIRCUMSTANCES



SPECIAL CONSEQUENCES

SPECIAL CONSEQUENCES

NCBI Resources How To Sign in to NCBI

PubMed.gov
US National Library of Medicine
National Institutes of Health

PubMed ((ventilator[Title/Abstract]) AND associated[Title/Abstract]) AND pneumonia[Title/Abstract] Search

Create RSS Create alert Advanced Help

Article types
Clinical Trial
Review
Customize ...

Text availability
Abstract
Free full text
Full text

PubMed Commons
Reader comments
Trending articles

Publication dates
5 years
10 years
Custom range...

Species
Humans
Other Animals

Clear all

Show additional filters

Format: Summary Sort by: Most Recent Send to

Filters: Manage Filters

Search results

Items: 1 to 20 of 4477

<< First < Prev Page 1 of 224 Next > Last >>

1. Intensive care unit-acquired **pneumonia** due to Pseudomonas aeruginosa with and without multidrug resistance.
Fernández-Barat L, Ferrer M, De Rosa F, Gabarrús A, Esperatti M, Terraneo S, Rinaudo M, Bassi GL, Torres A.
J Infect. 2016 Nov 16. pii: S0163-4453(16)30290-0. doi: 10.1016/j.jinf.2016.11.008. [Epub ahead of print]
PMID: 27865895

2. Predictors of extubation outcomes following myasthenic crisis.
Liu Z, Yao S, Zhou Q, Deng Z, Zou J, Feng H, Zhu H, Cheng C.
J Int Med Res. 2016 Nov 17. pii: 0300060516669893. [Epub ahead of print]
PMID: 27856933
Similar articles

3. 1532: EMPIRIC BROAD-SPECTRUM ANTIBIOTICS FOR EARLY **VENTILATOR-ASSOCIATED PNEUMONIA** IN TRAUMA PATIENTS.
Davis N, McGinn K, Simmons J, Lee YL, Morgan J, Brevard S.
Crit Care Med. 2016 Dec;44(12 Suppl 1):458. No abstract available.
PMID: 27851168
Similar articles

4. 707: DEVELOPMENT OF PROGNOSTIC BIOMARKERS FOR **VENTILATOR-ASSOCIATED PNEUMONIA** BY ACINETOBACTER BAUMANNII.
Kwon S, Na M, Son J, Jung I, Kim J, Kang P, Uk Kwon H, Cho C.
Crit Care Med. 2016 Dec;44(12 Suppl 1):253. No abstract available.
PMID: 27850345
Similar articles

5. 683: OUTCOMES COMPARING INHALED AND INTRAVENOUS TOBRAMYCIN IN **VENTILATOR-ASSOCIATED PNEUMONIA**

Results by year

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Inhaled Antibiotics for Hospital-acquired and **Ventilator-associated Pne** [Clin Infect Dis. 2016]

Impact of colistin-initiation delay on mortality of **ventilator-associated** [J Infect Dev Ctries. 2016]

Oral hygiene care for critically ill patients to prevent **ven** [Cochrane Database Syst Rev. 2016]

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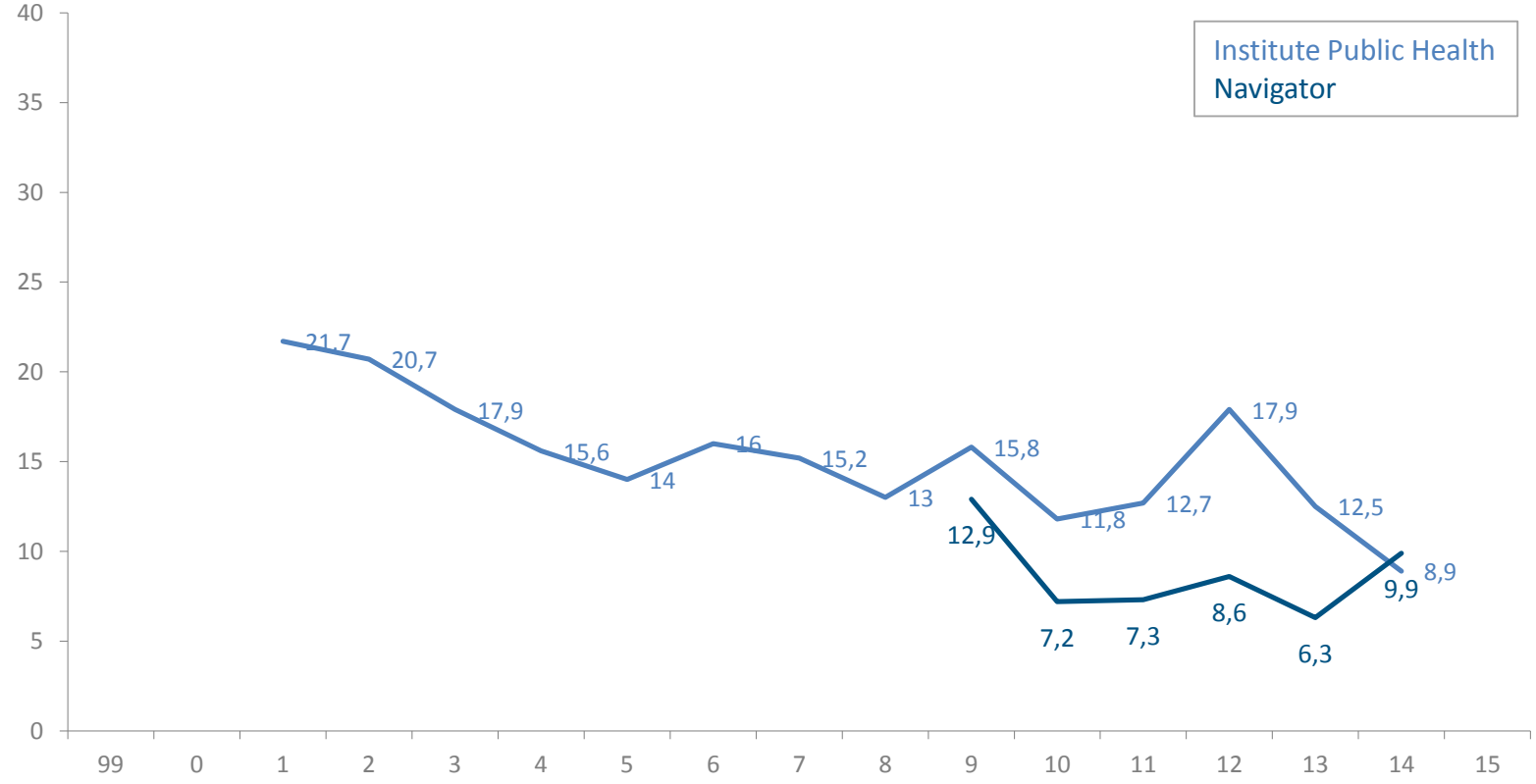
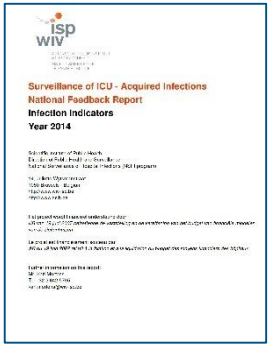
(ventilator[Title/Abstract] AND
associated[Title/Abstract]) AND
pneumonia[Title/Abstract]
```

Search date Nov 21th 2016

SPECIAL CONSEQUENCES

TO IMPROVE DIFFICULT IS




isp wiv

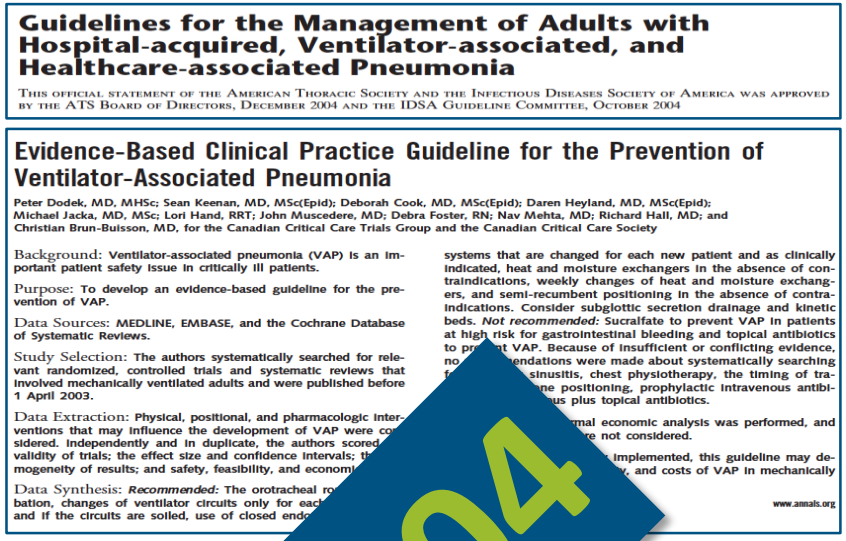
Surveillance of ICU - Acquired Infections
National Feadback Report
Infection Indicators
Year 2014


KATHOLIEKE UNIVERSITEIT LEUVEN

JAARRAPPORT 2011
Benchmarking van de klinische kwaliteit op de diensten voor Intensieve Zorg

navigator

TO IMPROVE IS DIFFICULT



Guidelines for the Management of Adults with Hospital-acquired, Ventilator-associated, and Healthcare-associated Pneumonia

This official statement of the American Thoracic Society and the Infectious Diseases Society of America was approved by the ATS Board of Directors, December 2004 and the IDSA Guideline Committee, October 2004

Evidence-Based Clinical Practice Guideline for the Prevention of Ventilator-Associated Pneumonia

Peter Dodek, MD, MHSc; Sean Keenan, MD, MSc(Epid); Deborah Cook, MD, MSc(Epid); Daren Heyland, MD, MSc(Epid); Michael Jacka, MD, MSc; Lori Hand, RRT; John Muscedere, MD; Debra Foster, RN; Nav Mehta, MD; Richard Hall, MD; and Christian Brun-Buisson, MD, for the Canadian Critical Care Trials Group and the Canadian Critical Care Society

Background: Ventilator-associated pneumonia (VAP) is an important patient safety issue in critically ill patients.

Purpose: To develop an evidence-based guideline for the prevention of VAP.

Data Sources: MEDLINE, EMBASE, and the Cochrane Database of Systematic Reviews.

Study Selection: The authors systematically searched for relevant randomized, controlled trials and systematic reviews that involved mechanically ventilated adults and were published before 1 April 2003.

Data Extraction: Physical, positional, and pharmacologic interventions that may influence the development of VAP were considered. Independently and in duplicate, the authors scored validity of trials; the effect size and confidence intervals; the homogeneity of results; and safety, feasibility, and economic

Data Synthesis: *Recommended:* The orotracheal route, bation, changes of ventilator circuits only for each and if the circuits are soiled, use of closed endo

systems that are changed for each new patient and as clinically indicated, heat and moisture exchangers in the absence of contraindications, weekly changes of heat and moisture exchangers, and semi-recumbent positioning in the absence of contraindications. Consider subglottic secretion drainage and kinetic beds. *Not recommended:* Sucralfate to prevent VAP in patients at high risk for gastrointestinal bleeding and topical antibiotics to prevent VAP. Because of insufficient or conflicting evidence, no recommendations were made about systematically searching for sinusitis, chest physiotherapy, the timing of tracheostomy positioning, prophylactic intravenous antibiotics plus topical antibiotics.

...mal economic analysis was performed, and ...re not considered.

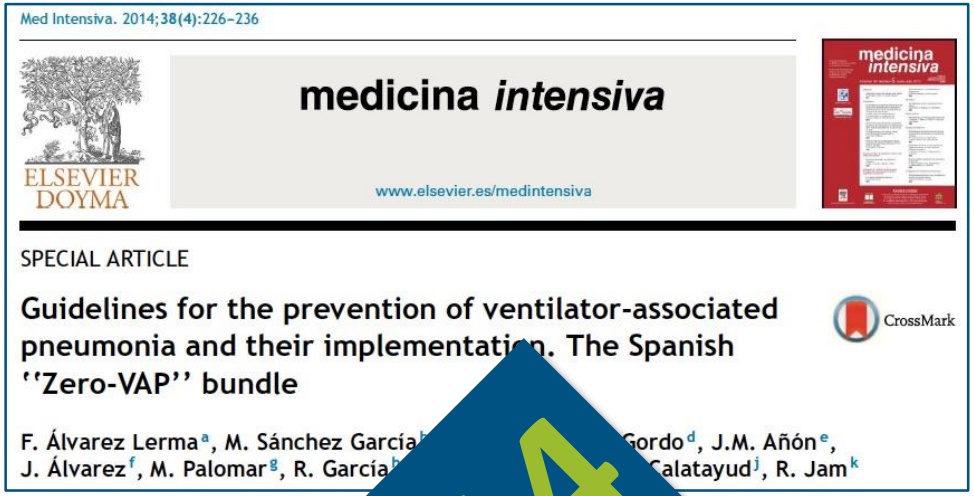
...implemented, this guideline may de... and costs of VAP in mechanically

www.annals.org

Comprehensive e... ...ctice guidelines for ventilator-a... ...evention☆

John Muscedere M... ...enan
Rob Fowler MD, M... Daren
for the VAP Guideli... ...an Critical Care Trials Group

2004



Med Intensiva. 2014;38(4):226–236

ELSEVIER DOYMA

medicina *intensiva*

www.elsevier.es/medintensiva

SPECIAL ARTICLE

Guidelines for the prevention of ventilator-associated pneumonia and their implementation. The Spanish "Zero-VAP" bundle

F. Álvarez Lerma[a], M. Sánchez García[b], ...Gordo[d], J.M. Añón[e], J. Álvarez[f], M. Palomar[g], R. García[h], ...Calatayud[j], R. Jam[k]

2014

TO IMPROVE IS DIFFICULT

CODE: PN

Rx

Optreden van een suggestief beeld van een pneumonie in 2 of meerdere opeenvolgende thorax radiografieën of CT-scans bij patiënten met onderliggende cardiale of pulmonaire aandoeningen. Bij patiënten zonder onderliggende cardiale of pulmonaire aandoeningen volstaat één bevestigende thorax radiografie of CT-scan.

Symptomen

En tenminste één van de volgende:

- Koorts > 38 °C zonder ander oorzakelijk verband
- Leukopenie (<4000 WBC/mm^3) of leucocytose (≥ 12 000 WBC/mm^3)

En tenminste één van de volgende
(of ten minste 2 bij 'slechts' een klinische pneumonie= PN 4 en 5)

- Optreden van etterig sputum of veranderingen in de karakteristieken van het sputum (kleur, geur, hoeveelheid, consistentie)
- Hoest of dyspnee of tachypnee
- Suggestieve auscultatie (crepitaties of bronchiaal ademgeruis), ronchi, wheezing
- Verslechtering van de gasuitwisseling (bv. O_2-desaturatie of toegenomen zuurstofbehoefte of toegenomen nood aan ventilatie)

en volgens de gebruikte diagnostische methode:

Microbiologie

a – Bacteriologische diagnose :

*Positieve kwantitatieve cultuur van een minimaal gecontamineerd lage luchtwegen (LRT) specimen** **(PN 1)**

- Bronchio-alveolaire lavage (BAL) met een drempelwaarde van ≥ 10^4 kolonievormende éénheden (KVE)/ml of ≥ 5 % van de BAL verkregen cellen bevatten intracellulaire bacteriën bij direct microscopisch onderzoek (geclassificeerd door de diagnostische categorie BAL).
- Protected brush (PB Wimberley) met een drempelwaarde van ≥10^3 KVE/ml
- Distal protected aspirate (DPA) met een drempelwaarde van ≥ 10^3 KVE/ml

*Positieve kwantitatieve cultuur van een mogelijk gecontamineerd LRT specimen** **(PN 2)**

- Kwantitatieve cultuur van LRT specimen (bv. endotracheaal aspiraat) met een drempelwaarde van ≥10^6 KVE/ml

b – Alternatieve microbiologische methoden : **(PN 3)**

- Positieve hemocultuur niet gerelateerd aan een andere infectiebron
- Pleuraal vocht met positieve groei (in cultuur)
- Pleuraal of pulmonair abces met positieve kweek van het aspiraat
- Histologisch pulmonair onderzoek toont evidentie van een pneumonie
- Positief onderzoek voor pneumonie met virus of een specifiek micro-organisme (*Legionella, Aspergillus*, mycobacteria, mycoplasma, *Pneumocystis carinii*)
  - Viraal antigen of antistof aangetoond in respiratoire secreties (bv., EIA, FAMA, shell vial assay, PCR)
  - Positief direct onderzoek of positieve cultuur van bronchiaal secreet of weefsel
  - Seroconversie (bv. influenza virus, *Legionella, Chlamydia*)
  - Detectie van antigenen in urine (*Legionella*)

c – Andere :

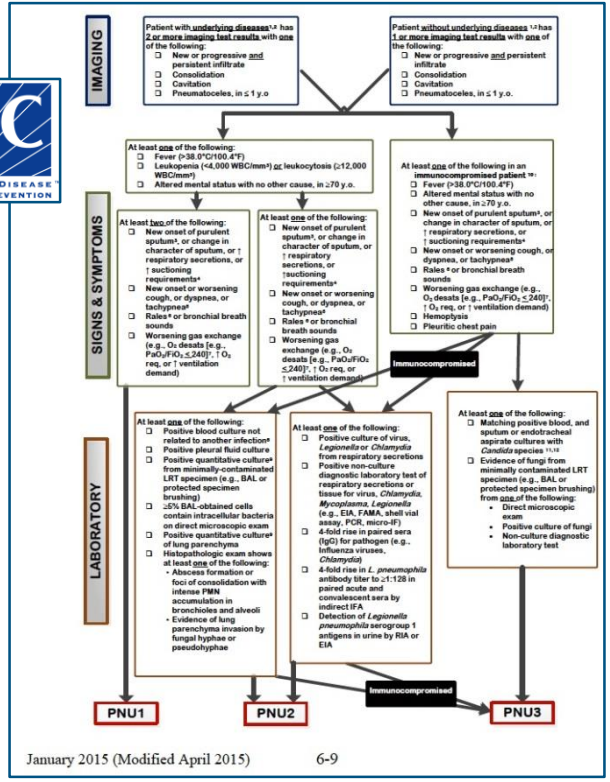
- Positieve **sputum** cultuur **of niet-kwantitatieve LRT specimen** cultuur **(PN 4)**
- **Geen positieve microbiologie** **(PN 5)**

*Noteer: deze criteria werden gevalideerd zonder voorafgaande antimicrobiële therapie

ecdc EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

≠

CDC CENTERS FOR DISEASE CONTROL AND PREVENTION



NOTHING LASTS FOREVER…
9 QUALITY INDICATORS OF ESICM 201

Intensive Care Med (2012) 38:598–605
DOI 10.1007/s00134-011-2462-3

ORIGINAL

A. Rhodes
R. P. Moreno
E. Azoulay
M. Capuzzo
J. D. Chiche
J. Eddleston
R. Endacott
P. Ferdinande
H. Flaatten
B. Guidet
R. Kuhlen
C. León-Gil
M. C. Martin Delgado
P. G. Metnitz
M. Soares
C. L. Sprung
J. F. Timsit
A. Valentin

Prospectively defined indicators to impr
the safety and quality of care for c
ill patients: a report from the T
on Safety and Quality of th
of Intensive Care Medi

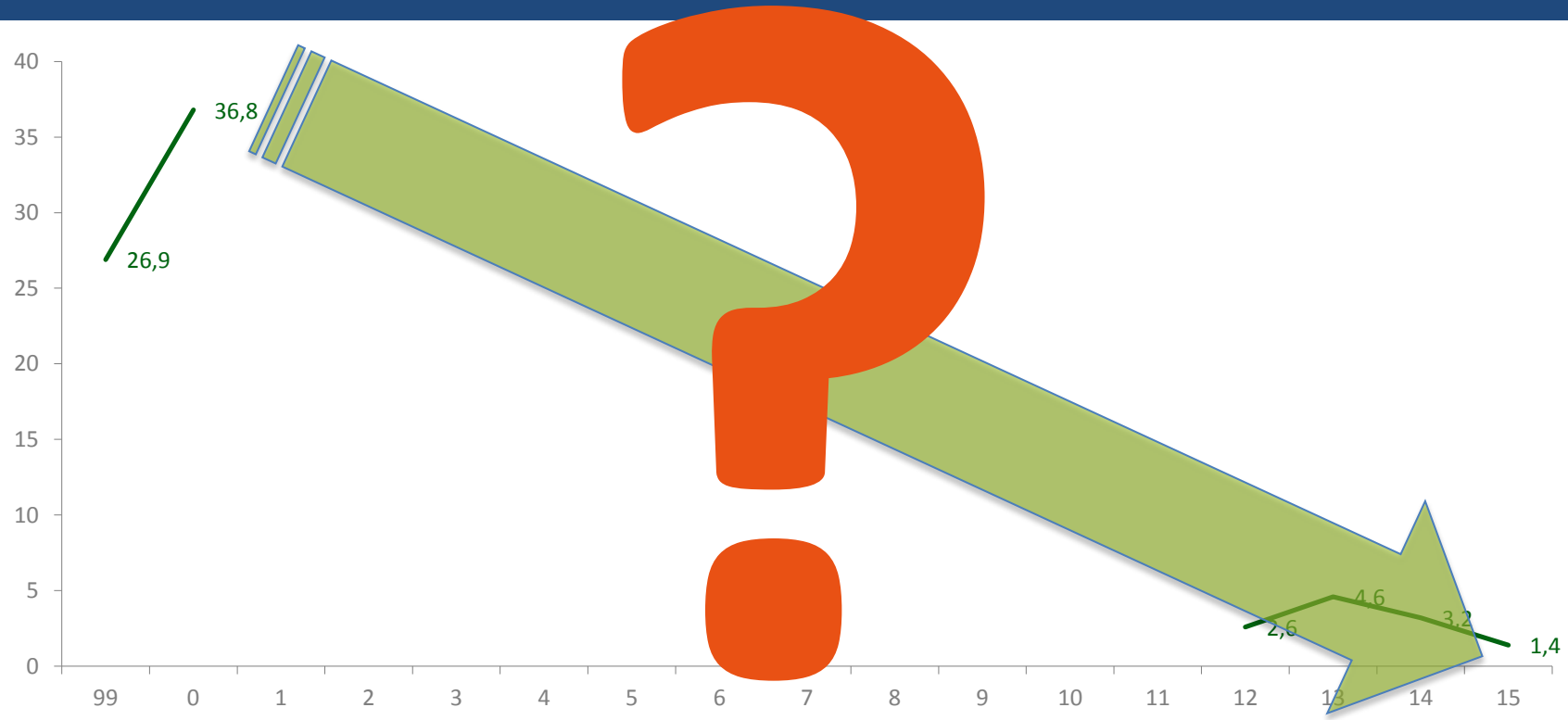
NO ROOM FOR VAP !

- with okay with national legislation
- ntensivist 24/24 available
- Multidisciplinary consultation
- Incident reporting
- Standardized hand over at discharge
- Standardized Mortality Ratio (SMR)
- Readmission < 48u after discharge
- Unplanned extubations
- Catheter associated blood stream infections

ESICM
EUROPEAN SOCIETY OF INTENSIVE CARE MEDICINE
The Intensive Connection

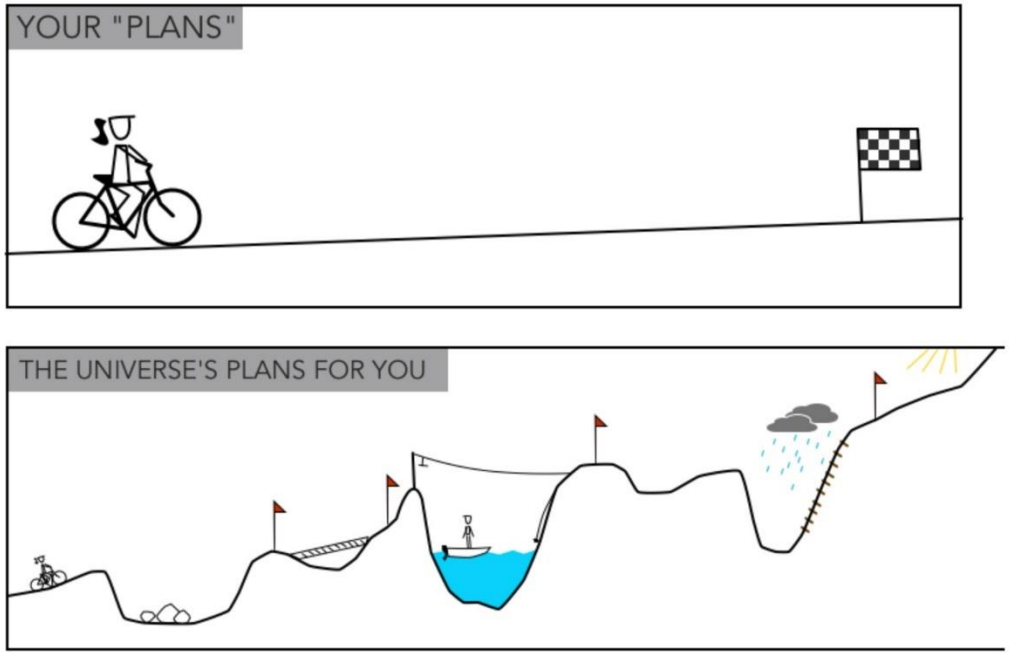
az Sint Blasius

FROM ZERO TO HERO



VAP > D2 / 1000 ventilatiedagen

FROM ZERO TO HERO
NOT THAT EASY !

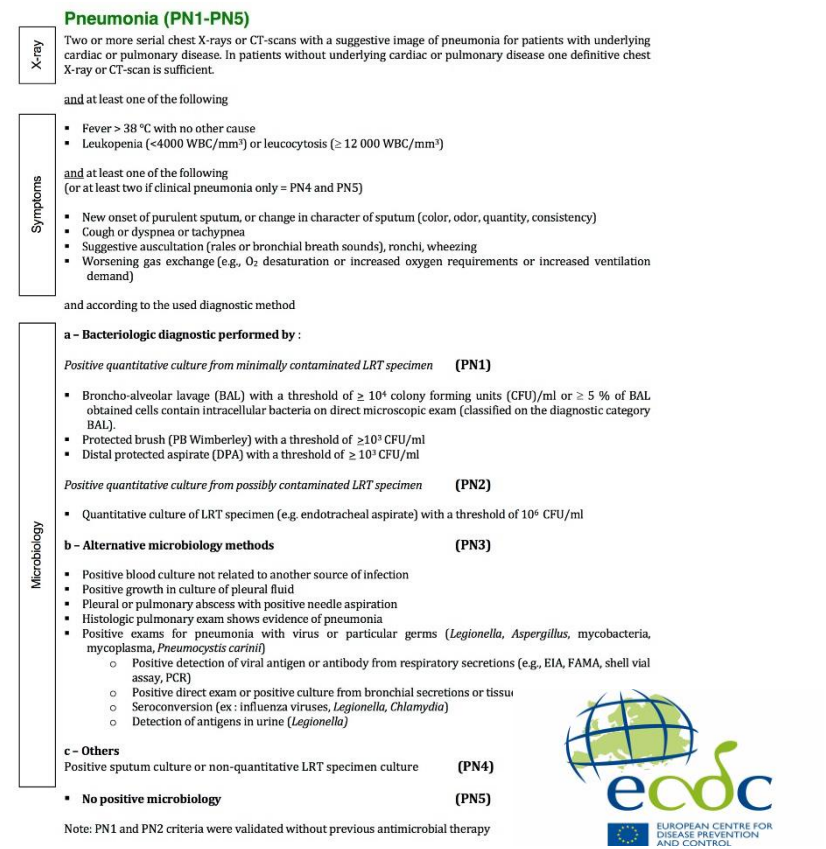


UNIFORM DEFINITIONS

$$\text{VAP incidence} = \frac{\text{VAP (n)} * 1000}{\text{ventilator days (n)}}$$

- Exclude patients with LOS < 48h
- Stop measuring 48h after extubation
- Count patients with duration of MV < 48h
- Measure continuously, or:
  - You lose the attention of your collaborators
  - You lose knowledge of registration & definitions

USE UNIFORM DEFINITIONS



Pneumonia (PN1-PN5)

X-ray

Two or more serial chest X-rays or CT-scans with a suggestive image of pneumonia for patients with underlying cardiac or pulmonary disease. In patients without underlying cardiac or pulmonary disease one definitive chest X-ray or CT-scan is sufficient.

and at least one of the following

Symptoms

- Fever > 38 °C with no other cause
- Leukopenia (<4000 WBC/mm³) or leucocytosis (≥ 12 000 WBC/mm³)

and at least one of the following
(or at least two if clinical pneumonia only = PN4 and PN5)

- New onset of purulent sputum, or change in character of sputum (color, odor, quantity, consistency)
- Cough or dyspnea or tachypnea
- Suggestive auscultation (rales or bronchial breath sounds), ronchi, wheezing
- Worsening gas exchange (e.g., O_2 desaturation or increased oxygen requirements or increased ventilation demand)

and according to the used diagnostic method

Microbiology

a – Bacteriologic diagnostic performed by :

Positive quantitative culture from minimally contaminated LRT specimen **(PN1)**

- Broncho-alveolar lavage (BAL) with a threshold of ≥ 10^4 colony forming units (CFU)/ml or ≥ 5 % of BAL obtained cells contain intracellular bacteria on direct microscopic exam (classified on the diagnostic category BAL).
- Protected brush (PB Wimberley) with a threshold of ≥10^3 CFU/ml
- Distal protected aspirate (DPA) with a threshold of ≥ 10^3 CFU/ml

Positive quantitative culture from possibly contaminated LRT specimen **(PN2)**

- Quantitative culture of LRT specimen (e.g. endotracheal aspirate) with a threshold of 10^6 CFU/ml

b – Alternative microbiology methods **(PN3)**

- Positive blood culture not related to another source of infection
- Positive growth in culture of pleural fluid
- Pleural or pulmonary abscess with positive needle aspiration
- Histologic pulmonary exam shows evidence of pneumonia
- Positive exams for pneumonia with virus or particular germs (*Legionella*, *Aspergillus*, mycobacteria, mycoplasma, *Pneumocystis carinii*)
  - Positive detection of viral antigen or antibody from respiratory secretions (e.g., EIA, FAMA, shell vial assay, PCR)
  - Positive direct exam or positive culture from bronchial secretions or tissu
  - Seroconversion (ex : influenza viruses, *Legionella*, *Chlamydia*)
  - Detection of antigens in urine (*Legionella*)

c – Others

Positive sputum culture or non-quantitative LRT specimen culture **(PN4)**

- **No positive microbiology** **(PN5)**

Note: PN1 and PN2 criteria were validated without previous antimicrobial therapy

ecdc
EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

Peer review of possible VAP's:

- Promote identification
- Data manager checks definitions
- 2 peers review data
- Majority wins

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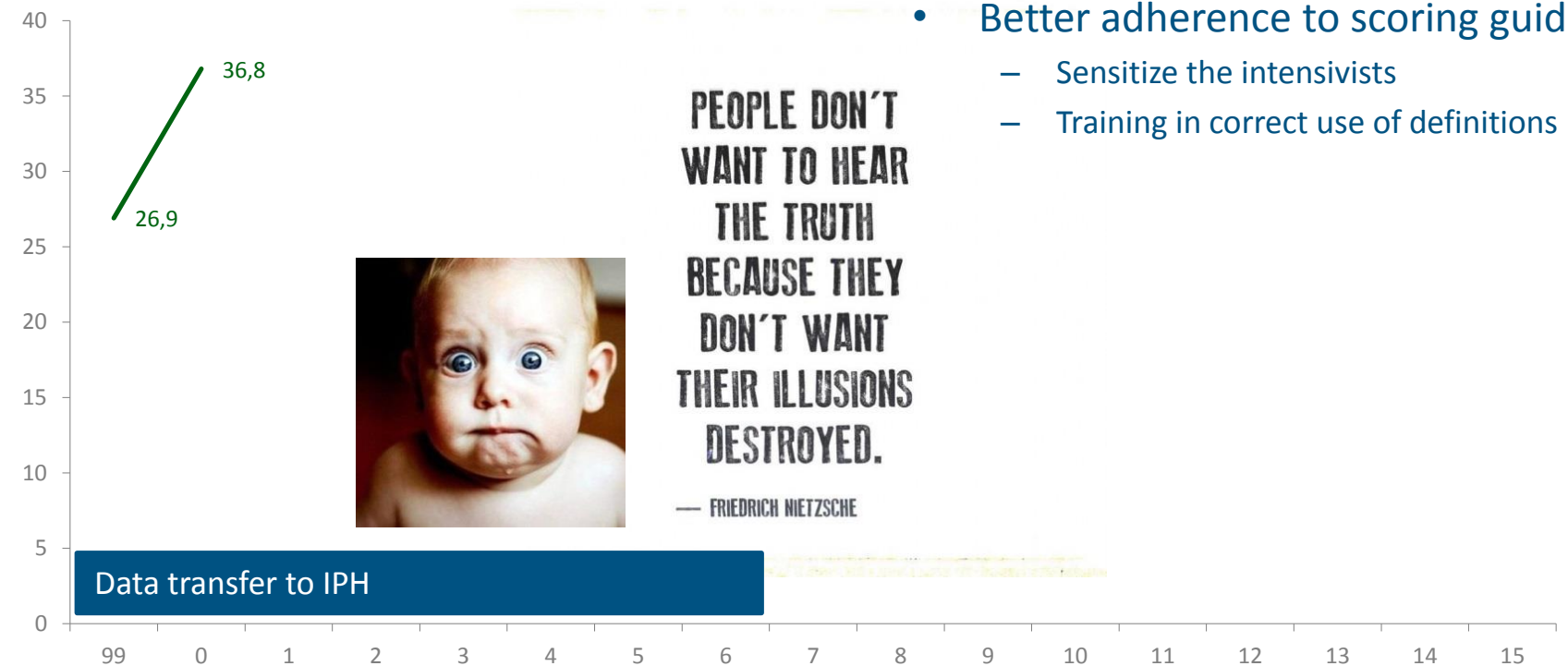
EVOLUTION VAP ICU-azSB
2000: FIRST FEEDBACK



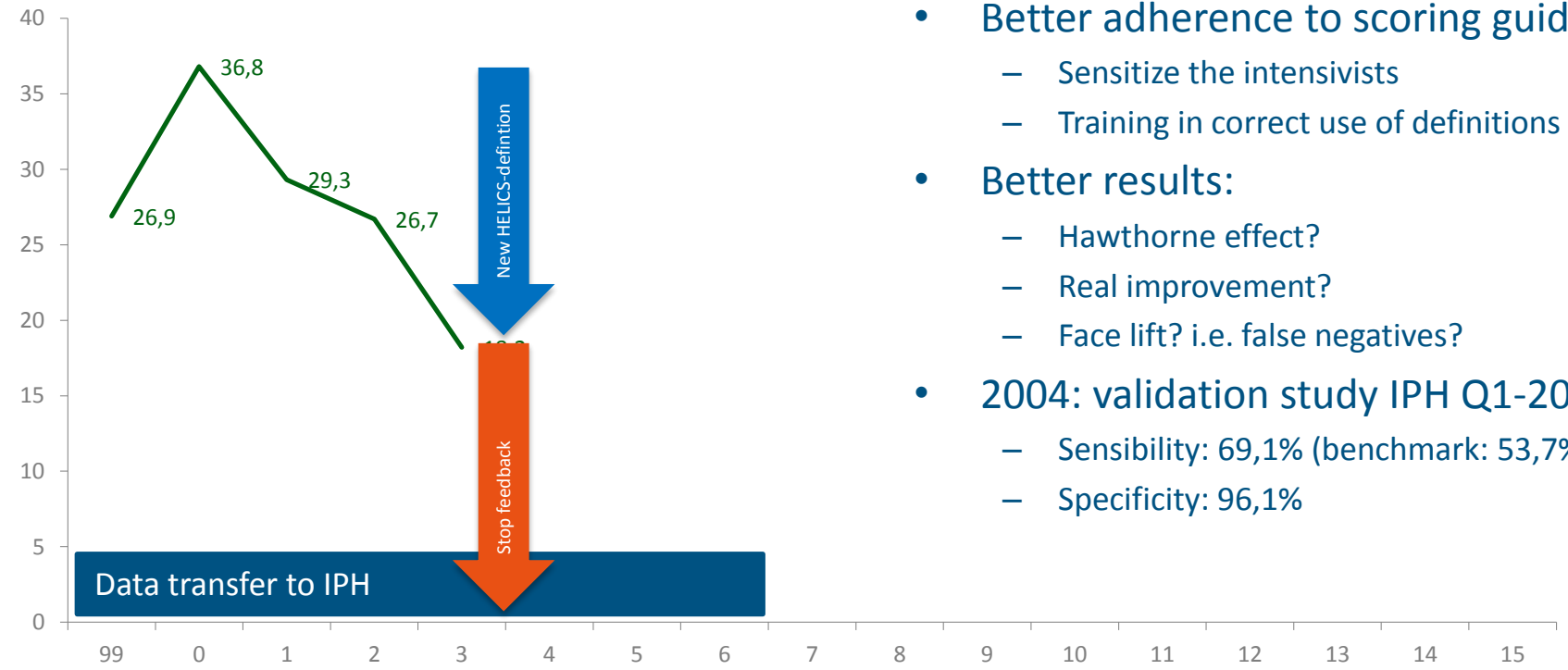
PEOPLE DON´T WANT TO HEAR THE TRUTH BECAUSE THEY DON´T WANT THEIR ILLUSIONS DESTROYED.

— FRIEDRICH NIETZSCHE

Data transfer to IPH

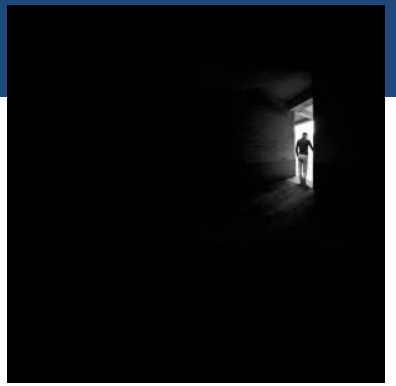
- Better adherence to scoring guidelines by:
  - Sensitize the intensivists
  - Training in correct use of definitions

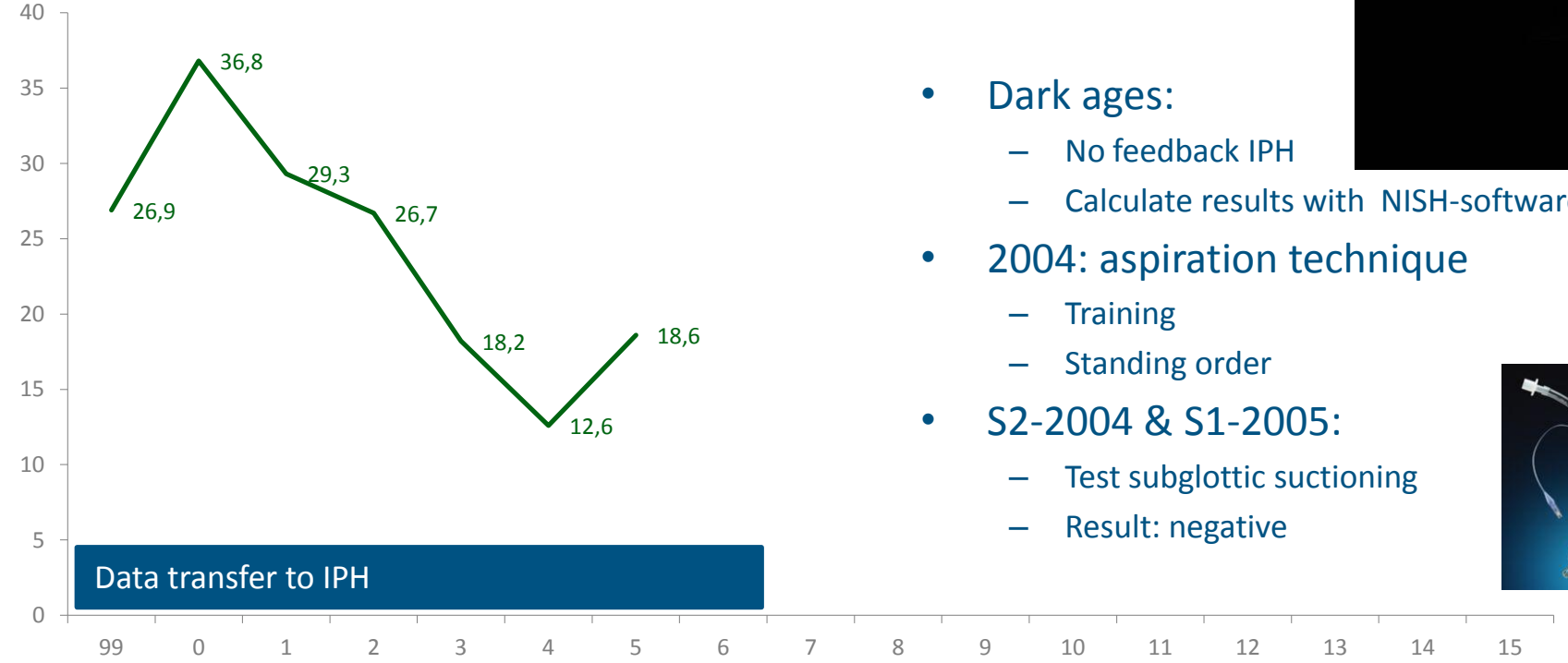
EVOLUTION VAP ICU-azSB 2001-2003



- Better adherence to scoring guidelines by:
  - Sensitize the intensivists
  - Training in correct use of definitions
- Better results:
  - Hawthorne effect?
  - Real improvement?
  - Face lift? i.e. false negatives?
- 2004: validation study IPH Q1-2001
  - Sensibility: 69,1% (benchmark: 53,7%)
  - Specificity: 96,1%

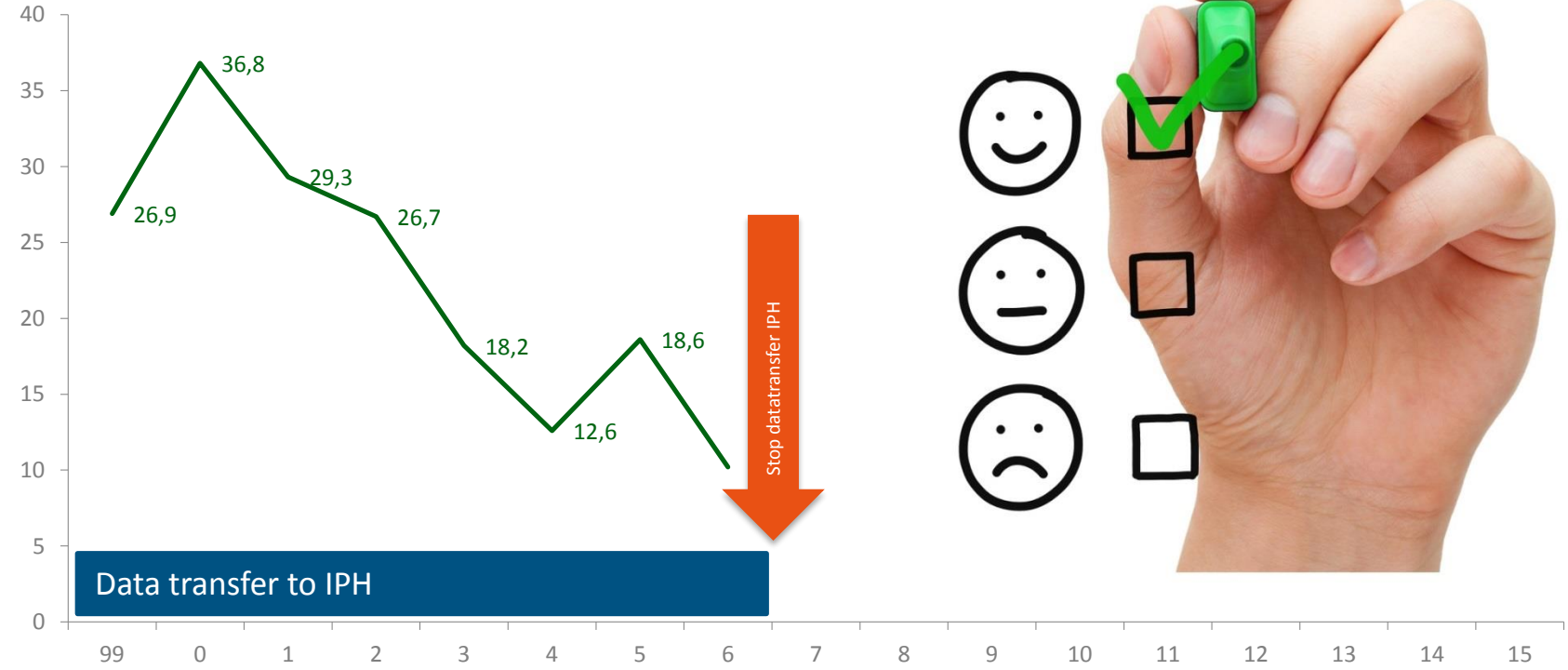
EVOLUTION VAP ICU-azSB 2004-2005



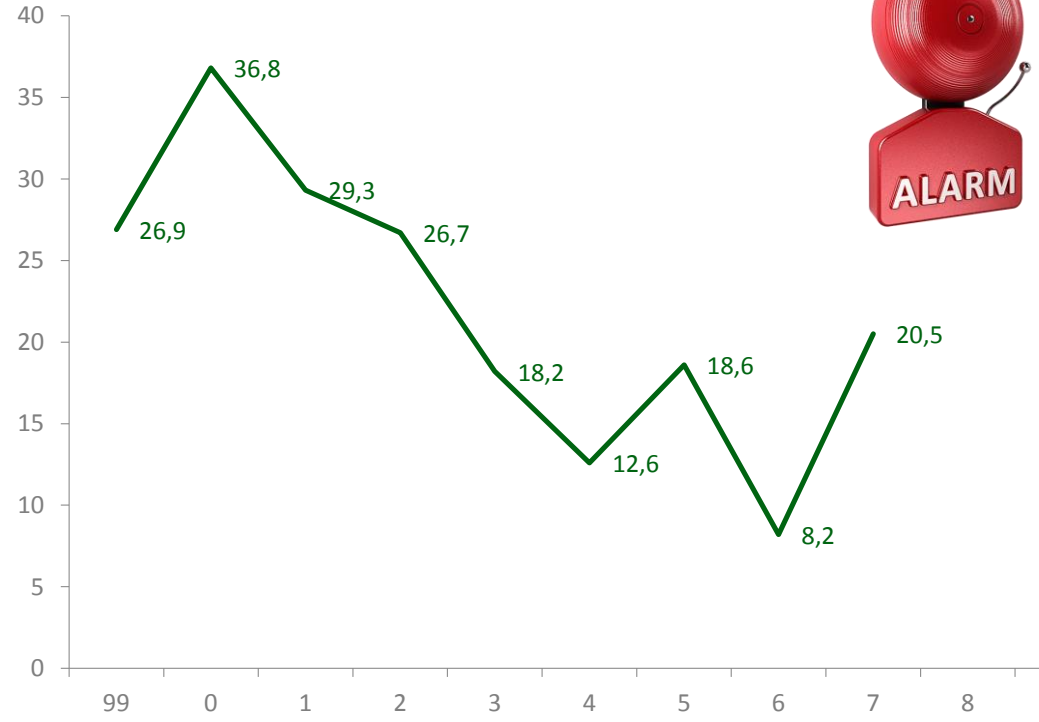


- Dark ages:
  - No feedback IPH
  - Calculate results with NISH-software
- 2004: aspiration technique
  - Training
  - Standing order
- S2-2004 & S1-2005:
  - Test subglottic suctioning
  - Result: negative

EVOLUTION VAP ICU-azSB
2006



EVOLUTION VAP ICU-azSB
2007



Institute *for* Healthcare Improvement

100k *lives* Campaign

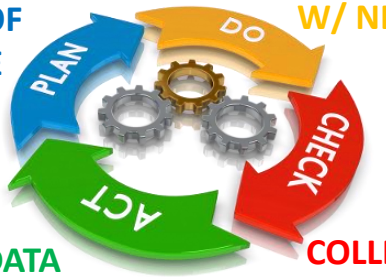
SOME IS NOT A NUMBER. SOON IS NOT A TIME.

"YOU CAN'T MANAGE WHAT YOU DON'T MEASURE."

- W. Edward Deming

TRAINING ICU-STAFF W/ NEW STUFF

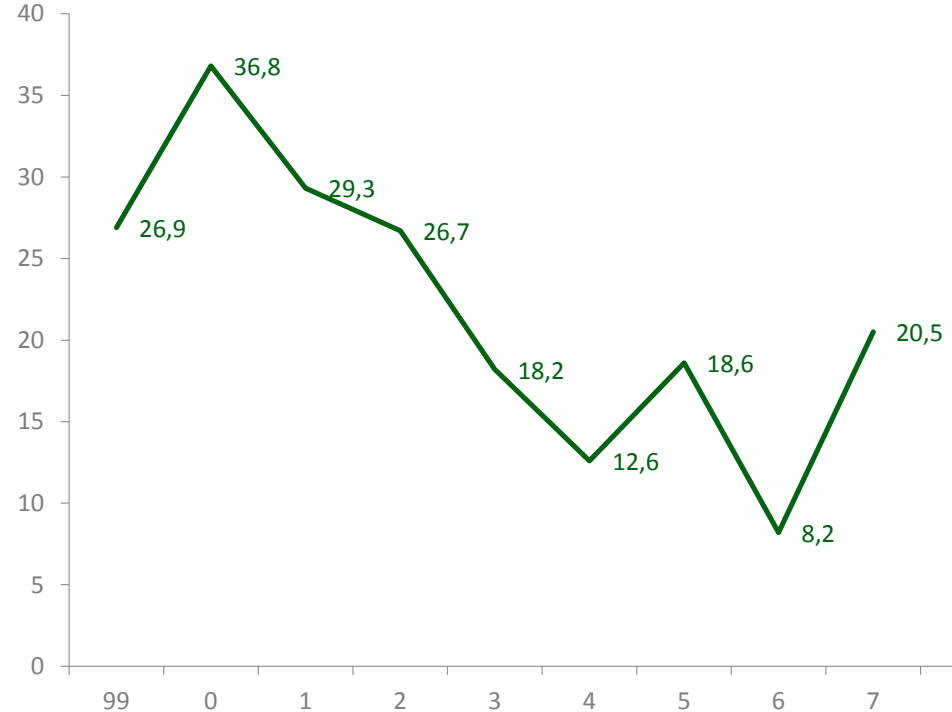
REVIEW OF EVIDENCE

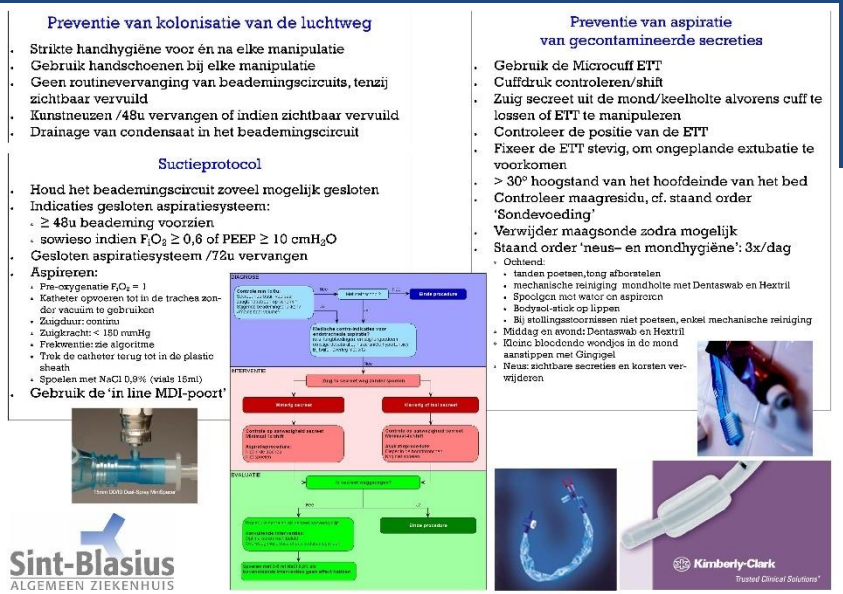


DATA COLLECTION

REPORT DATA EVERY Q TO STAFF

EVOLUTION VAP ICU-azSB 2008





- New new stuff:
  - Closed airway suctioning
  - MDI-port
  - ETT with PU-cuff
  - Manual cuff pressure measurement
- Poster in every room

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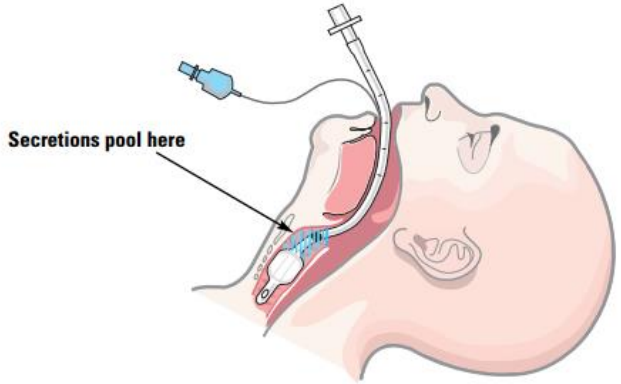
EVOLUTION VAP ICU-azSB
2008

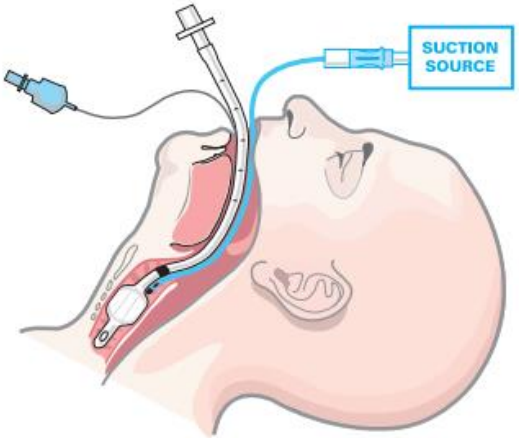
- Nurses' observations: closed suction doesn't work
- New focus: micro-aspiration



HOW TO TACKLE MICRO ASPIRATION ?

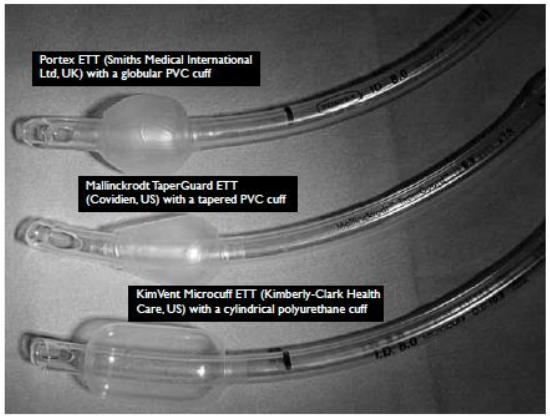
Subglottic suctioning

- Evacuation of secretions above the cuff
- Manual vs. automatic

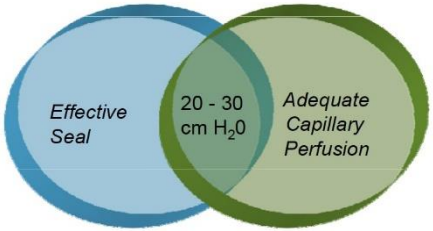


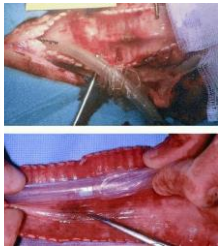
Cuff

- Design: barrel vs. cylindric vs. tapered
- Material: PVC vs. PU vs. silicone



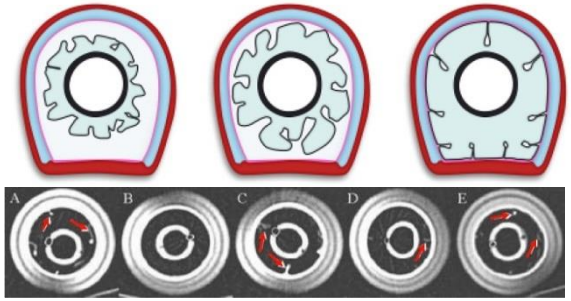
Cuff pressure

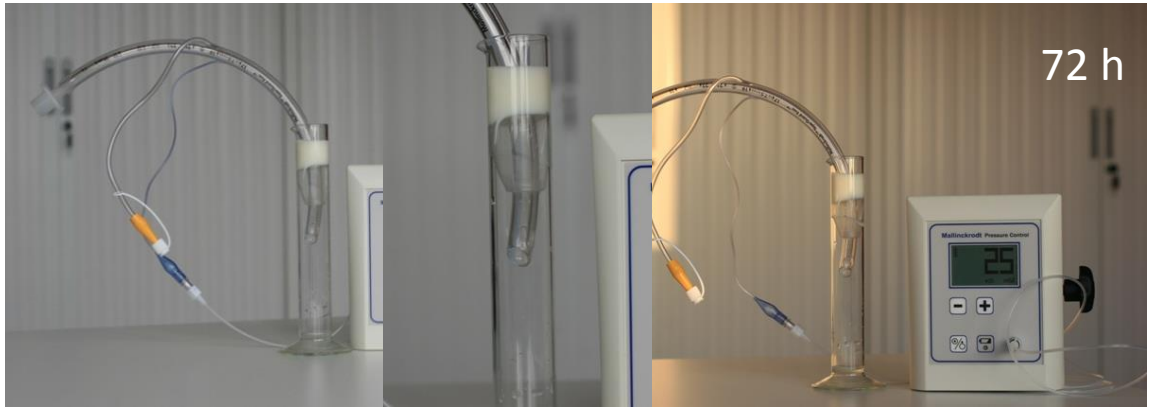


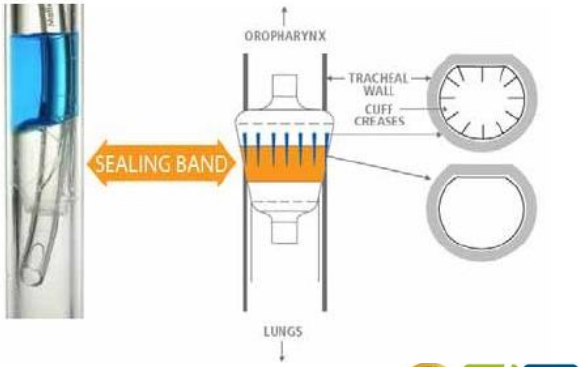


- Intermittent vs. continuous measurement
- Automatic vs. manual correction

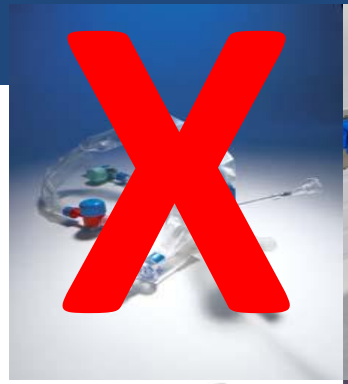
MICRO ASPIRATION

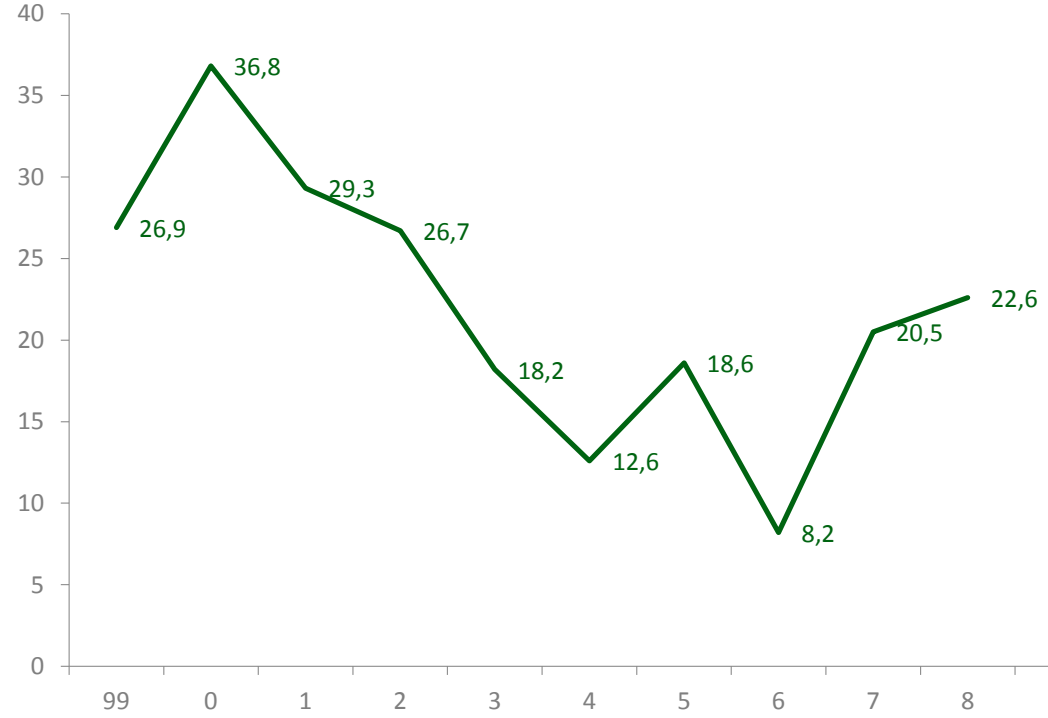




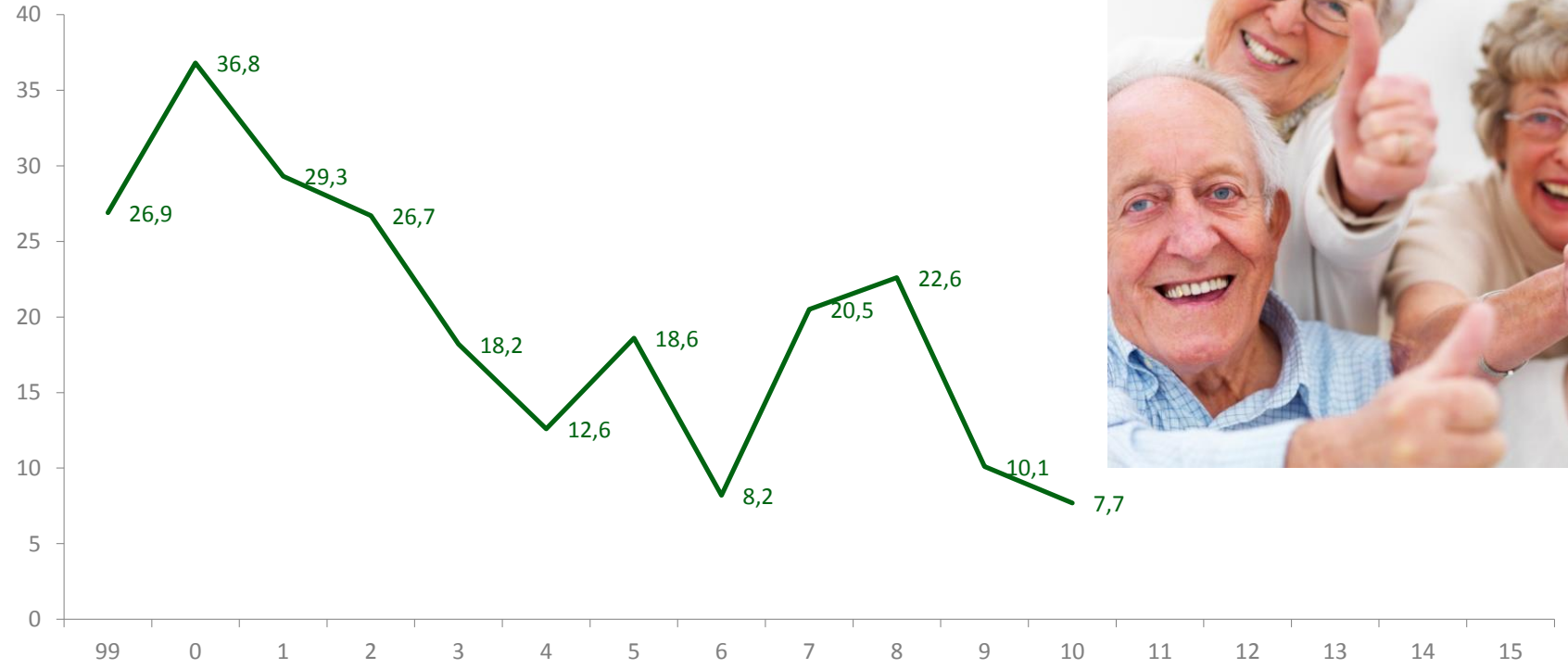


EVOLUTION VAP ICU-azSB
2009

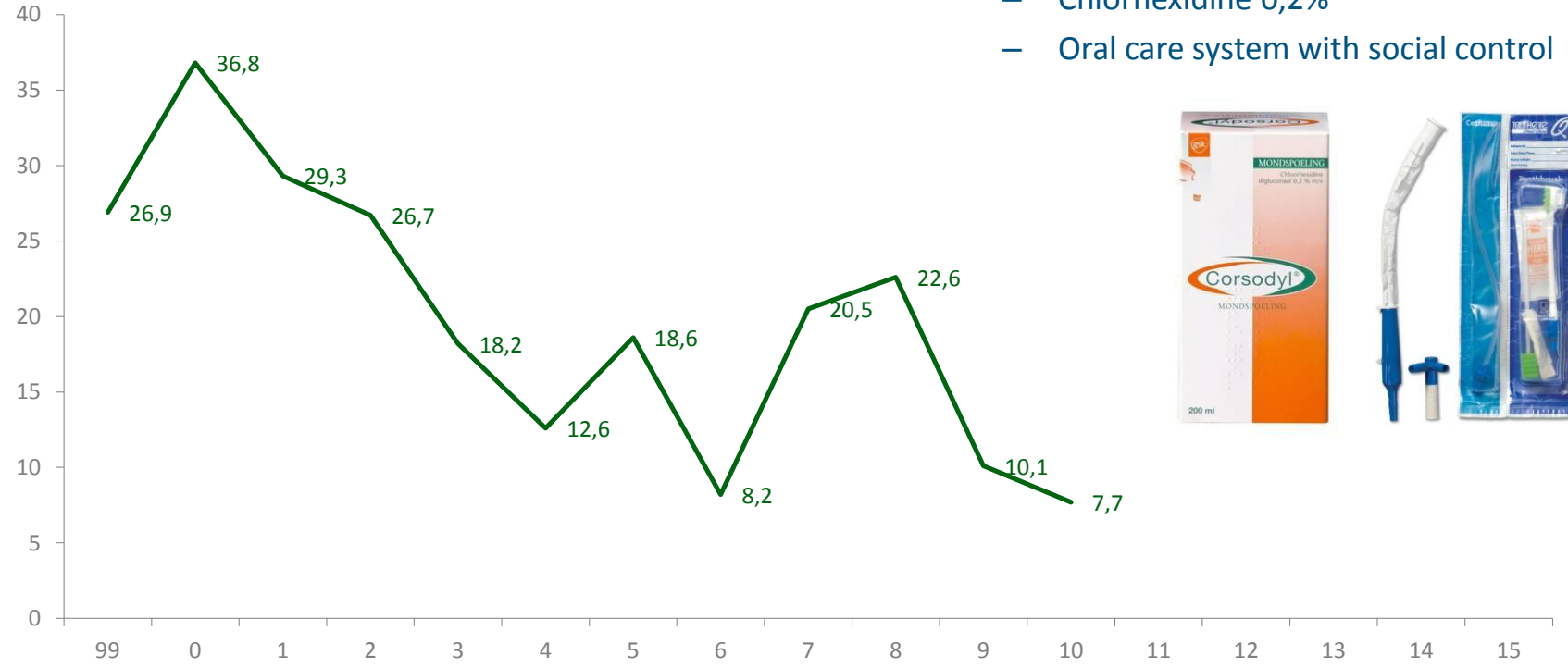




EVOLUTION VAP ICU-azSB
2009-2010



EVOLUTION VAP ICU-azSB 2009-2010



- New oral care materials:
  - Chlorhexidine 0,2%
  - Oral care system with social control

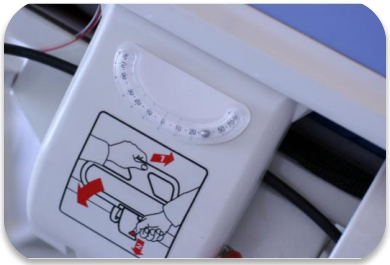
EVOLUTION VAP ICU-azSB
2011

- Project Fed Dpt Health, cell Quality
- Development Belgian VAP-bundle

BUNDLE

- Synergistic combination of ‘best practices’ that improve care (1+1=3).
- Evidence based & 'standard of care’.
- Very clear, measurable elements: yes / no answers.
- All the elements in the bundle must be carried out together: non-compliance with one element =non-compliance of the complete bundle.

BELGIAN VAP-BUNDLE v2012



> 30° elevation

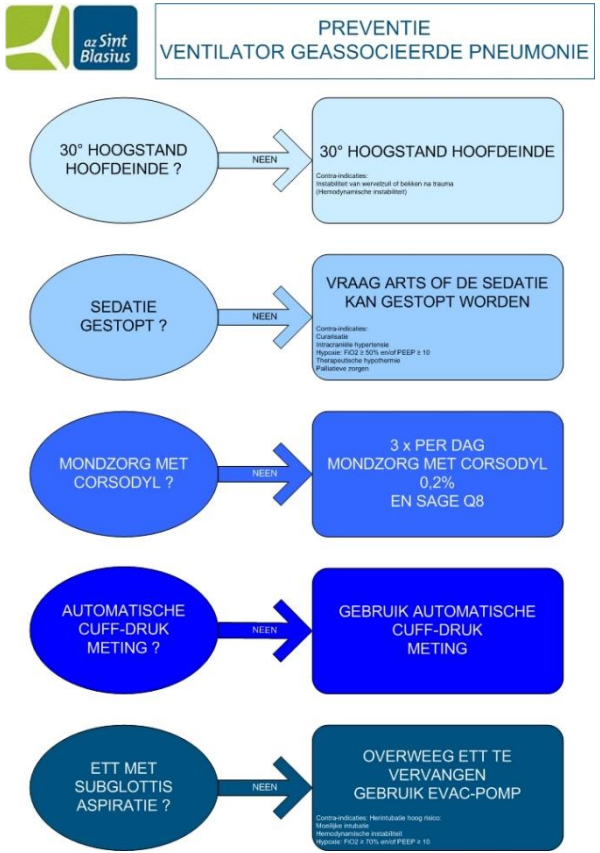
Sedation stop?

Cuff pressure control

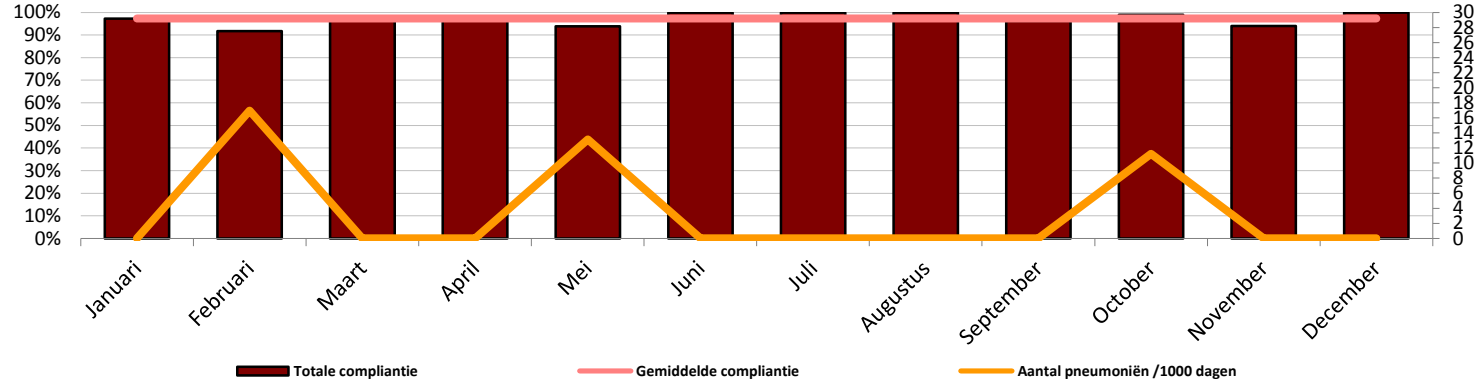
Oral Care Chlorhexidine

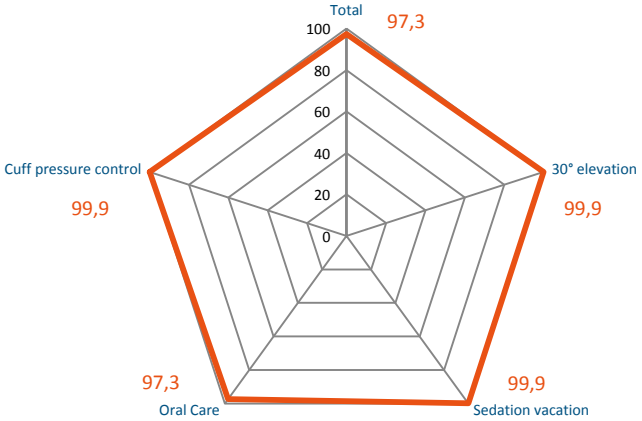
Optional: Subglottic suctioning

azSB VAP-BUNDLE v2012

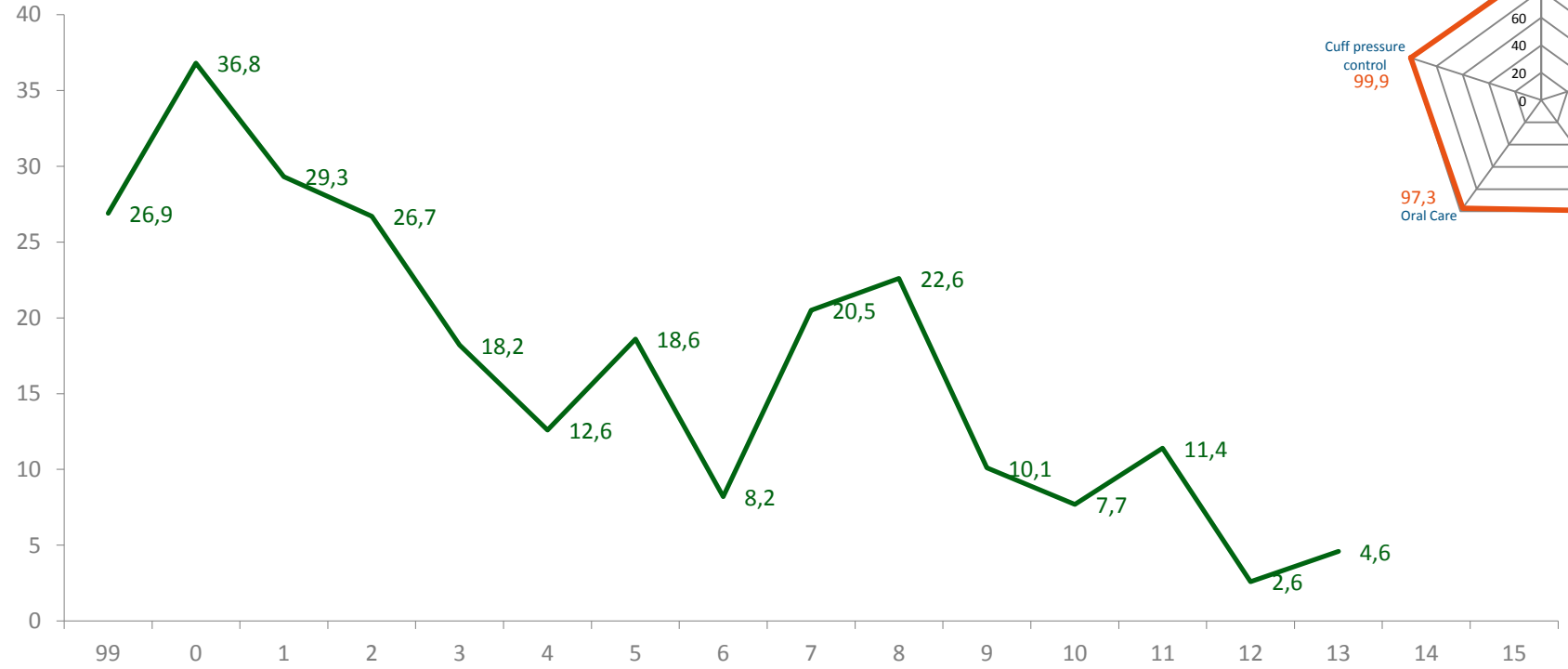


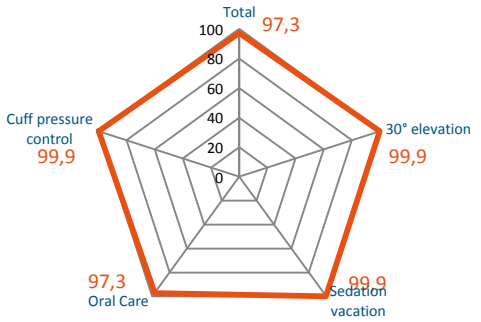
COMPLIANCE azSB 2013





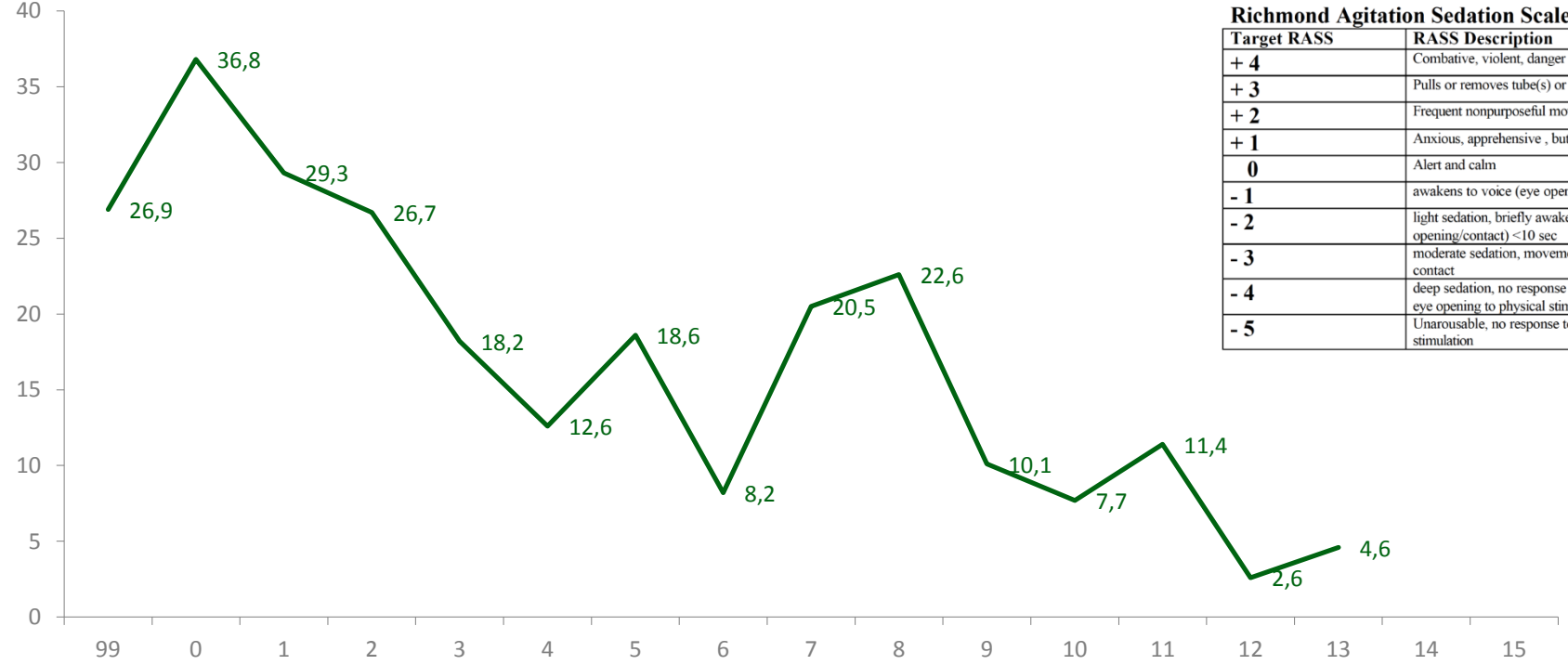
EVOLUTION VAP ICU-azSB
2012-2013





EVOLUTION VAP ICU-azSB 2012-2013

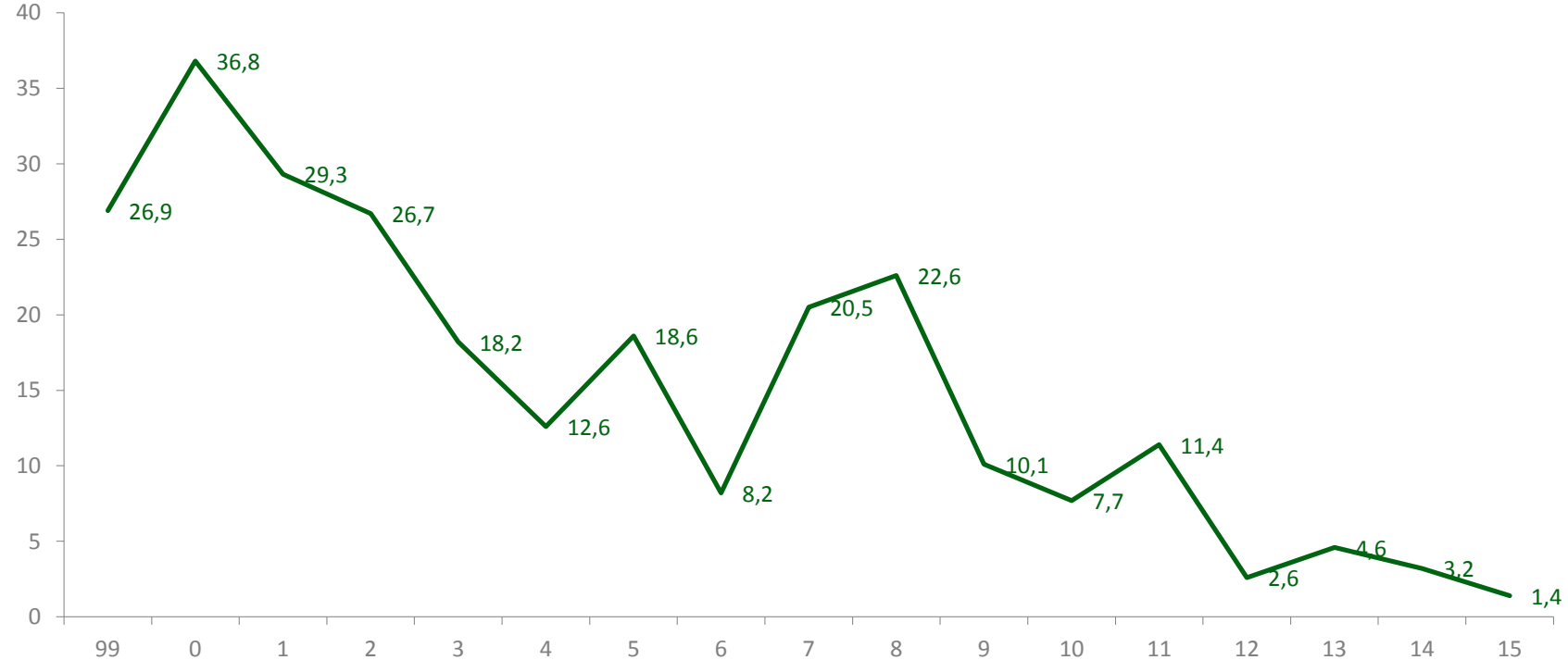
- Sedation protocol with RASS



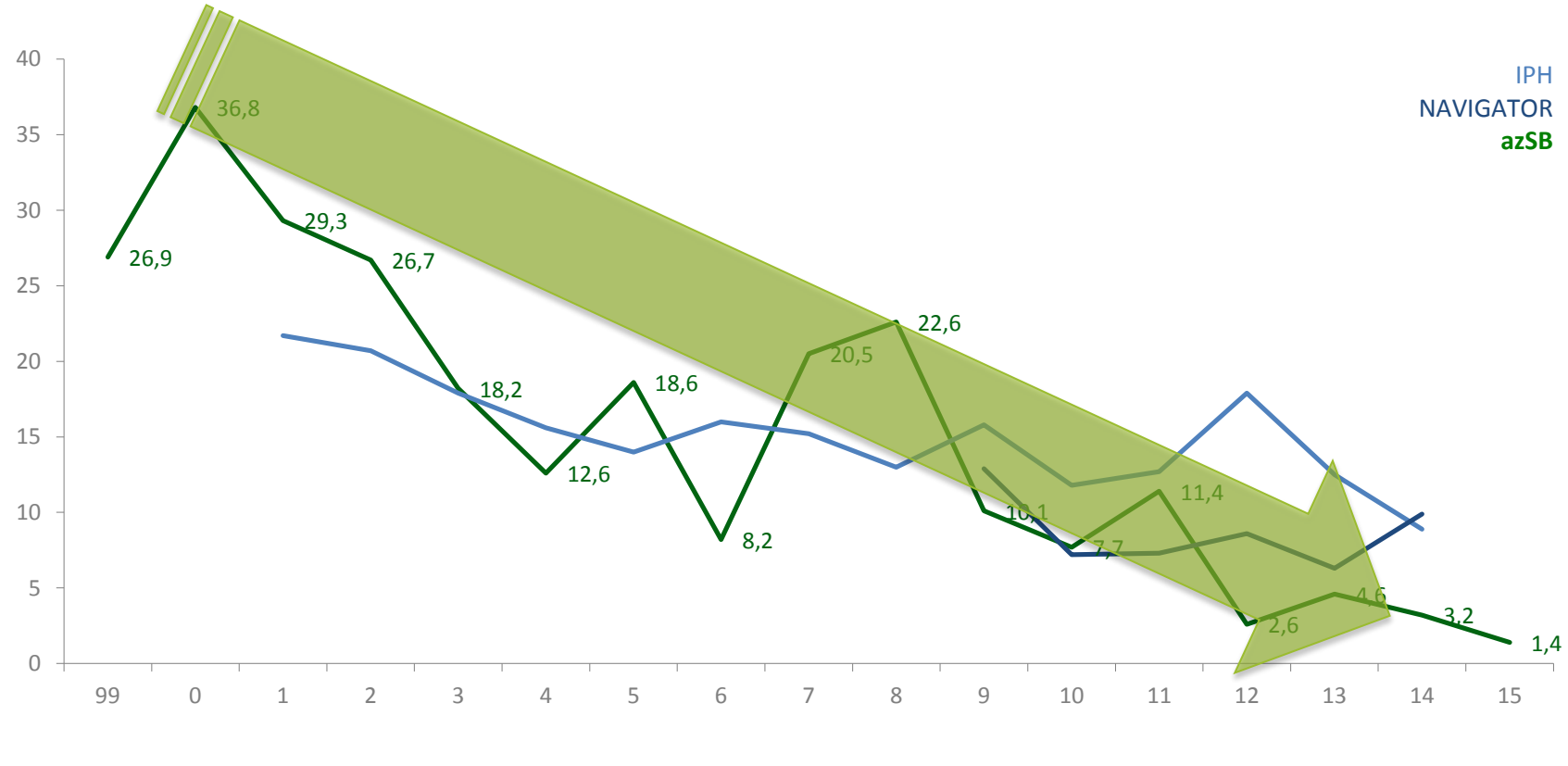
Richmond Agitation Sedation Scale (RASS)

Target RASS	RASS Description
+ 4	Combative, violent, danger to staff
+ 3	Pulls or removes tube(s) or catheters; aggressive
+ 2	Frequent nonpurposeful movement, fights ventilator
+ 1	Anxious, apprehensive , but not aggressive
0	Alert and calm
- 1	awakens to voice (eye opening/contact) >10 sec
- 2	light sedation, briefly awakens to voice (eye opening/contact) <10 sec
- 3	moderate sedation, movement or eye opening. No eye contact
- 4	deep sedation, no response to voice, but movement or eye opening to physical stimulation
- 5	Unarousable, no response to voice or physical stimulation

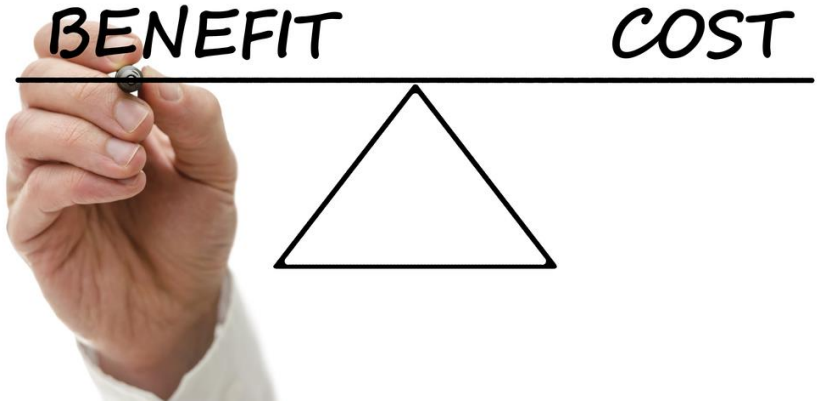
EVOLUTION VAP ICU-azSB
2014-2015



EVOLUTION VAP IZ-azSB
1999-2015



CRITICISM



REPRODUCIBILITY INITIATIVE

Science EXCHANGE PLOS figshare MENDELEY

COSTS OF INNOVATION

COST-EFFECTIVE ?

COST

For the hospital

- ETT: 200x
  - € 20 vs. € 2
- Cuff controller: 12x
  - € 1.440 vs. € 141
- Suction pumps: 12x
  - € 650
  - Reservoirs 200mL: € 3
  - Reservoirs 1L: € 1

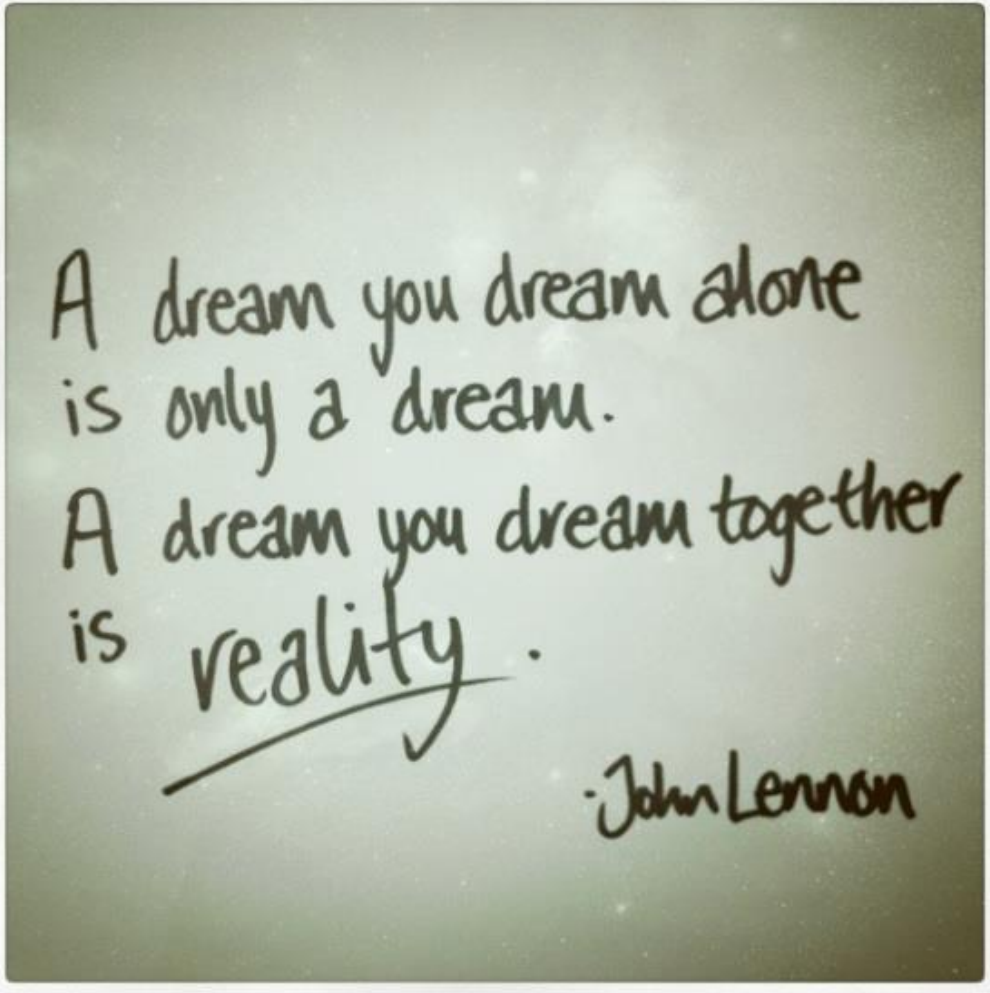
Total: € 28.080
Additional expenses: € 21.080

BENEFIT

For society

3 VAP's = € 30.000 benefit = cost neutral

COST-EFFECTIVE ?


A dream you dream alone
is only a dream.
A dream you dream together
is reality.
-John Lennon

IMAGINE…

67 accredited ICU's, 1152 beds

REPRODUCIBILITY ?

azSB

- ETT: Covidien Taperguard EVAC
- Intermittent subglottic suctioning pump
- Continuous cuff pressure measurement
- > 30° elevation head end bed
- Oral care with hexetidine
- No sedation goals

22,6 → 7,7
VAP/1000 VD

Prevention of Ventilator-Associated Pneumonia and Ventilator-Associated Conditions: A Randomized Controlled Trial With Subglottic Secretion Suctioning*

Pierre Damas, MD, PhD[1]; Frédéric Frippiat, MD, PhD[2]; Arnaud Ancion, MD[2]; Jean-Luc Canivet, MD, PhD[1]; Bernard Lambermont, MD, PhD[2]; Nathalie Layios, MD[1]; Paul Massion, MD, PhD[1]; Philippe Morimont, MD, PhD[2]; Monique Nys, PhD[1]; Sonia Piret, MD[1]; Patrizio Lancellotti, MD, PhD[2]; Patricia Wiesen, MD[1]; Vincent D'orio, MD, PhD[3]; Nicolas Samalea[1]; Didier Ledoux, MD, PhD[1]

- ETT: Teleflex Isis
- Subglottic suctioning, no data about technique
- Non-continuous cuff pressure measurement
- > 30° elevation head end bed
- Oral care with chlorhexidine
- Daily reassessment of sedation goals

Crit Care Med 2015; 43(1):22-31

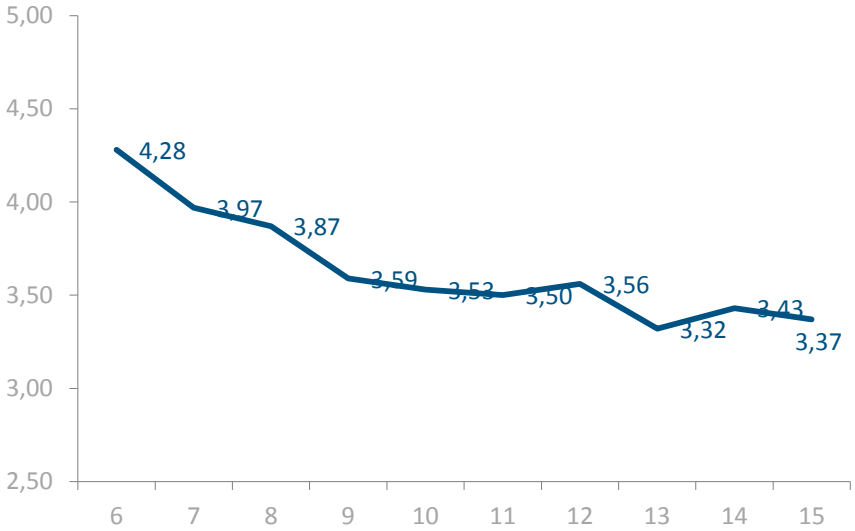
20 → 9,8
VAP/1000 VD

EVERY ADVANTAGE HAS ITS DISADVANTAGE

Johan Cruyff, reversed

DISADVANTAGES

MEAN LENGTH OF STAY



BED OCCUPANCY 2015

Calender day based	Exact (minute based)
3961 d	2763,63 d
90,4 %	63,1 %

CONSEQUENCES

STAFF REDUCTION

INCOME DROP

BUT, IF YOU ASK ME …

Was it

Worth

it?

PATIENTS FIRST: OUR VALUE EQUATION

Everyone has an idea for how to improve health care, and they all have merit. There are no one-size-fits-all solutions. There's one common thread, however, woven throughout all of them: Creating more value for patients. This is how we define value.

Credits to…

Dr. Koch
Chloé
Pascal
Paul
Vicky
Marc
Sofie
Aafke
Mira
David
Maria
Karen
Stefaan
Annelies

Dr. Temmerman Leen
Gudrun Dr. Mignolet
Kathleen Thijs Cindy
Dr. Pannier Helena
Marijke
Astrid
Evelien
Guido
Mieke
Marlies
Serge Kelly Sonja
MarijkeV Mariaken
Dr. Sarens Rita Chris
Hendrik Dr. Swinnen


KEEP
CALM
Because
IT'S THE
END