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# *Towards Excellence in Nursing ...*

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# Backgrounds

ICU



↑ Severity  
of illness



↑ Use of invasive  
techniques



↑ Use of immunosuppr.  
therapies



↑ Use of AB  
therapies

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↑ Hospital-acquired infections

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↑ Morbidity



↑ Mortality



↑ Costs

# Backgrounds

ICU



↑ Severity of illness



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↑ Morbidity



↑ Mortality



↑ Costs

Most preventable complication!

Emerging spread of nosocomial infections



CDC introduced set of evidence-based guidelines for preventing NIs

Preventing infection

Diagnosing infections appropriately

Treating infections appropriately

Using antimicrobials wisely

Preventing transmission of MDR pathogens

Emerging spread of nosocomial infections



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Preventing infection

Diagnosing infections appropriately

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Preventing transmission of MDR pathogens

→ = Basics of nursing!

# Challenge

To ensure implementation of, and compliance with the evidence-based recommendations in daily nursing practice

# However ...

*“What we think we do”*

vs.

*“What we actually do”*

Nurses' compliance, knowledge,  
attitude, and perception with  
evidence-based guidelines is poor!

# EVIDENCE - Project



- European platform
- To test nurses' knowledge, attitude, and perception of evidence-based guidelines for infection prevention and control
- Based on CDC guidelines
- Nurses oriented items

# EVIDENCE - Project



- European platform
- To test nurses' knowledge, attitude, and perception of evidence-based guidelines for infection prevention and control
- Based on CDC guidelines
- Nurses oriented items

Aim = promoting knowledge, by meeting the educational needs of nurses working in the ICU environment

# Evidence-based Guidelines for the Prevention of VAP: Results of a Knowledge Test among European Intensive Care Nurses

Average score: 45.1%

Blot S, Labeau S, Vandijck D, et al. *Intensive Care Med* 2007;33:1463-7

Labeau S, Vandijck D, Rello J, et al. *J Hosp Infect* 2008;70:180-185

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# Evidence-based Guidelines for the Prevention of VAP:

## Results of a Knowledge Test among European Intensive Care Nurses

*Frequency of ventilator circuits changes:*

- It is recommended to change circuits every 48hrs (or when clinically indicated)
- **It is recommended to change circuits every week (or when clinically indicated)**
- It is recommended to change circuits for every new patient (or when clinically indicated)
- I do not know

➔ **35.1%**

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# Evidence-based Guidelines for the Prevention of VAP:

## Results of a Knowledge Test among European Intensive Care Nurses

*Frequency of humidifier changes:*

- It is recommended to change humidifiers every 48hrs (or when clinically indicated)
- It is recommended to change humidifiers every 72hrs (or when clinically indicated)
- **It is recommended to change circuits for every week (or when clinically indicated)**
- I do not know

➔ **21.4%**

Blot S, Labeau S, Vandijck D, et al. *Intensive Care Med* 2007;33:1463-7

Labeau S, Vandijck D, Rello J, et al. *J Hosp Infect* 2008;70:180-185

# Evidence-based Guidelines for the Prevention of VAP: Results of a Knowledge Test among European Intensive Care Nurses

*Open vs. closed suction systems:*

- Open suction systems are recommended
- **Closed suction systems are recommended**
- Both systems can be recommended
- I do not know

➡ **45.7%**

Blot S, Labeau S, Vandijck D, et al. *Intensive Care Med* 2007;33:1463-7

Labeau S, Vandijck D, Rello J, et al. *J Hosp Infect* 2008;70:180-185

# Evidence-based Guidelines for the Prevention of VAP:

## Results of a Knowledge Test among European Intensive Care Nurses

*Frequency of change in suction systems:*

- Daily changes are recommended (or when clinically indicated)
- Weekly changes are recommended (or when clinically indicated)
- **It is recommended to change systems for every new patient (or when clinically indicated)**
- I do not know

➔ **18.2%**

# Evidence-based Guidelines for the Prevention of **CR-BSI**: Results of a Knowledge Test among European Intensive Care Nurses

Average score: 44.4%

# Evidence-based Guidelines for the Prevention of CR-BSI: Results of a Knowledge Test among European Intensive Care Nurses

Average score: 44.4%

# Evidence-based Guidelines for the Prevention of CR-BSI:

## Results of a Knowledge Test among European Intensive Care Nurses

*It is recommended to change the dressing on the catheter insertion site:*

- On a daily basis
- Every three days
- **When indicated (soiled, loosened, ...) and at least weekly**
- I do not know

➔ **43.4%**

# Evidence-based Guidelines for the Prevention of CR-BSI:

## Results of a Knowledge Test among European Intensive Care Nurses

*It is recommended to cover up the catheter insertion site with:*

- Polyurethane dressing (transparent, semipermeable)
- Gauze dressing
- **Both are recommended because the type of dressing does not affect the risk for CR-BSI**
- I do not know

➔ **26.2%**

# Evidence-based Guidelines for the Prevention of CR-BSI: Results of a Knowledge Test among European Intensive Care Nurses

*It is recommended to disinfect the catheter insertion site with:*

- **2% aqueous chlorhexidine**
- 0.5% alcoholic chlorhexidine
- 10% povidone-iodine
- I do not know

➔ **13.9%**

# Evidence-based Guidelines for the Prevention of CR-BSI: Results of a Knowledge Test among European Intensive Care Nurses

*When neither lipid emulsions, nor blood products are administered through a CVC, it is recommended to replace the administration set:*

- Every 24hrs
- Every 72hrs
- **Every 96hrs**
- I do not know

➔ **26.5%**

# Critical Care Nurses' Knowledge of the Evidence-Based Guidelines for Preventing SSI:

## An Evaluation Questionnaire

Average score: 29.0%

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# Critical Care Nurses' Knowledge of the Evidence-Based Guidelines for Preventing SSI:

## An Evaluation Questionnaire

*It is recommended to protect a primarily closed incision:*

- During the first 12hrs following surgery
- **During the first 24-48hrs following surgery**
- During the first 5 days following surgery
- I do not know

➔ **45.7%**

# Critical Care Nurses' Knowledge of the Evidence-Based Guidelines for Preventing SSI:

## An Evaluation Questionnaire

*The appropriate time to shower or bathe with an uncovered incision is:*

- $\geq 48$ hrs following surgery
- $\geq 96$ hrs following surgery
- **Unresolved issue by lack of evidence**
- I do not know

➔ **39.4%**

# Critical Care Nurses' Knowledge of the Evidence-Based Guidelines for Preventing SSI:

## An Evaluation Questionnaire

*If the patient's hair at or around the incision site interferes with the operation, it is recommended to remove it by:*

- Razor shave
- Depilatory agents
- **Electric clippers**
- I do not know

➔ **49.9%**

# Critical Care Nurses' Knowledge of the Evidence-Based Guidelines for Preventing SSI:

## An Evaluation Questionnaire

*The recommended time of pre-operative hair removal in elective surgery is:*

- **Immediately before surgery**
- ≤ 12hrs before surgery
- Unresolved issue by lack of evidence
- I do not know

➔ **25.9%**

# Undergraduate Nursing Students' Knowledge and Perception about Infection Prevention and Control

*What is the correct definition of a needlestick injury:*

An accident with occupational exposure to blood, serum, plasma, or culture fluids as a result of a needlestick or sharp object injury, but also as a result of biting, or blood transfusion, but not via a wound, lesion or gash in the patients' skin or via mucocutaneous exposure of the mouth, nose or eyes.

➔ **25.9%**

# Needlestick Injuries among Nurse Students: Incidence, Knowledge and Attitude

*Which task is the most frequent cause of injury:*

- Sudden and unexpected movement of the patient
- Injection
- **Recapping**
- Sort medical instruments and needles
- I do not know

➔ **80.0%**

# Needlestick Injuries among Nurse Students: Incidence, Knowledge and Attitude

*Already experienced a needlestick injury:*

➔ **19.7%**

# Needlestick Injuries among Nurse Students: Incidence, Knowledge and Attitude

*Already experienced a needlestick injury:*

➔ **19.7%**

*Task performed during injury:*

- **Recapping**
- Other
- Cleaning up
- Injection
- Passing needle

➔ **31.2%**

# Needlestick Injuries among Nurse Students: Incidence, Knowledge and Attitude

*What is the correct action to take (in successive order) after having had a needlestick injury or other occupational exposure to patients' blood or body fluids according to current recommendations:*

Stimulating the bleeding, wash out under streaming water, disinfection, consultation of the company doctor, and obtaining a blood sample from the patient (to control for HIV infection, HBV infection, etc.).

➔ **55.4%**

- 67% reported insufficient emphasis on infection control teaching during their training
- 55.2% thought they had sufficient knowledge on this topic

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- 55.2% thought they had sufficient knowledge on this topic



Half of the students would like to have infection control topics more highlighted during lectures

# Translating Theory into Practice

## Eliminating catheter-related bloodstream infections in the intensive care unit\*

Sean M. Berenholtz, MD, MHS; Peter J. Pronovost, MD, PhD; Pamela A. Lipsett, MD; Deborah Hobson, BSN; Karen Earsing, RN, MS; Jason E. Farley, MSN, MPH, CRNP; Shelley Milanovich, RN, MSN, ACNP; Elizabeth Garrett-Mayer, PhD; Bradford D. Winters, MD, PhD; Haya R. Rubin, MD, PhD; Todd Dorman, MD; Trish M. Perl, MD, MSc

*Crit Care Med* 2004;32:2014-2020

### Study objective

1. To determine whether a multifaceted systems intervention would eliminate CRBSI
2. To evaluate compliance to evidence-based infection control guidelines

Five interventions were implemented

1. Education
2. “Catheter cart”
3. CVC ↑↑ / daily base
4. Checklist
5. Empowering nurses

# Checklist → to empower nurses to ensure compliance with the evidence-based guidelines

## Catheter-related Blood Stream Infection Care Team Checklist

**Purpose:** To work as a team to decrease patient harm from catheter-related blood stream infections  
**When:** During all central venous or central arterial line insertions or re-wires  
**By whom:** Bedside nurse

1. Today's date \_\_\_\_/\_\_\_\_/\_\_\_\_  
month day year
  
2. Procedure:  New line  Rewire
  
3. Is the procedure:  Elective  Emergent
  
4.
 

	Yes	No	Don't know
<b>Before the procedure, did the housestaff:</b>			
Wash hands (chlorhexidine or soap) immediately prior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sterilize procedure site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drape entire patient in a sterile fashion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>During the procedure, did the housestaff:</b>			
Use sterile gloves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use hat, mask and sterile gown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintain a sterile field	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did all personnel assisting with procedure follow the above precautions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>After the procedure:</b>			
Was a sterile dressing applied to the site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Please return completed form to the designated location in your ICU.**

# Results

- Two weeks before implementation of checklist:

Table 1. Baseline surgical intensive care unit compliance with evidence-based infection control guidelines

Guideline	n (%)
Cleaned hands	16 (62)
Sterilized procedure site	26 (100)
Draped patient in sterile fashion	22 (85)
Used hat, mask, and sterile gown	24 (92)
Used sterile gloves	26 (100)
Applied sterile dressing	26 (100)
Compliance with all guidelines	16 (62)

- One month after implementation of checklist:

increase of compliance

Figure: Number of CRBSIs per 1.000 CVC-days

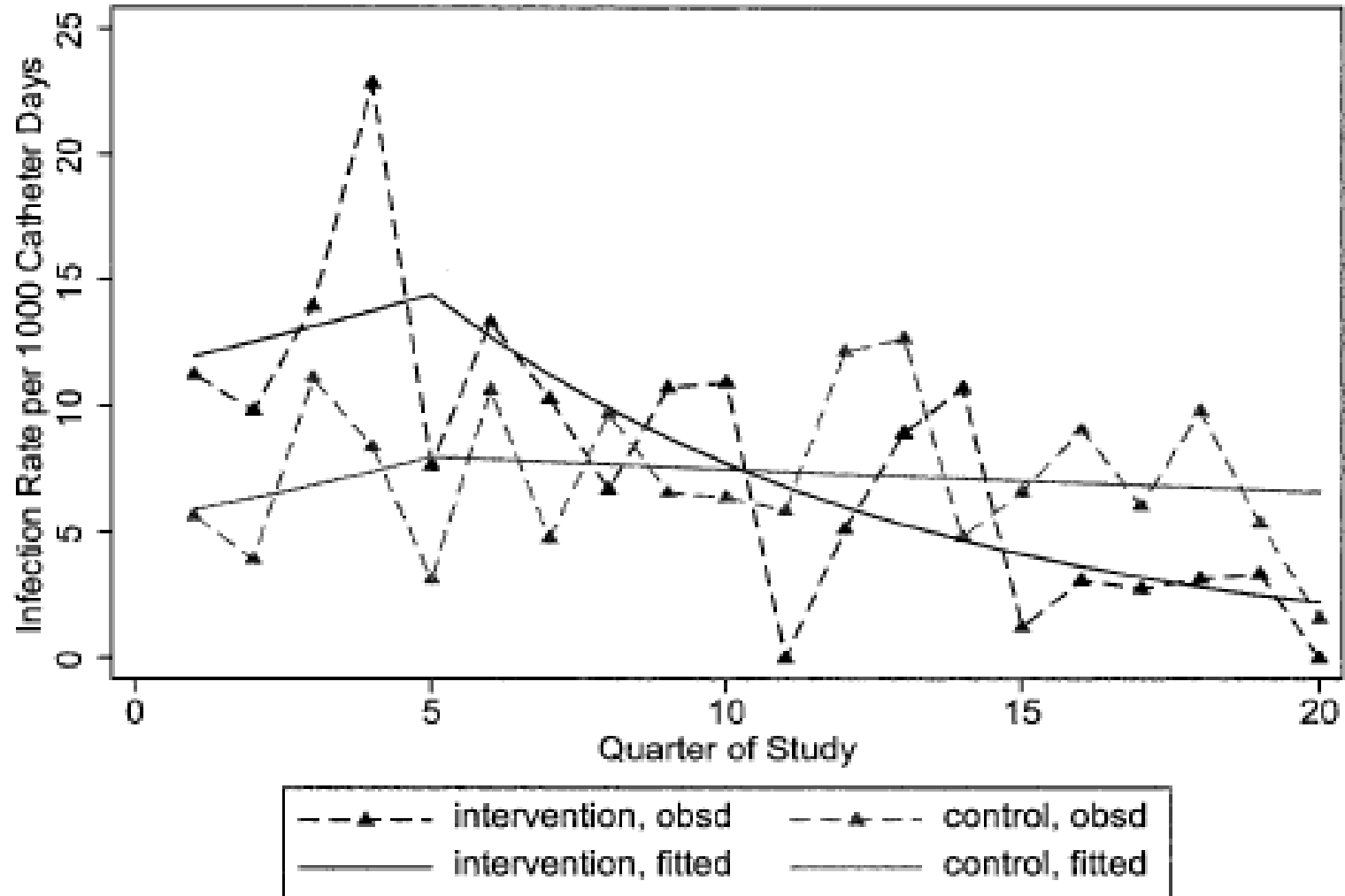


Figure: Number of CRBSIs per 1.000 CVC-days

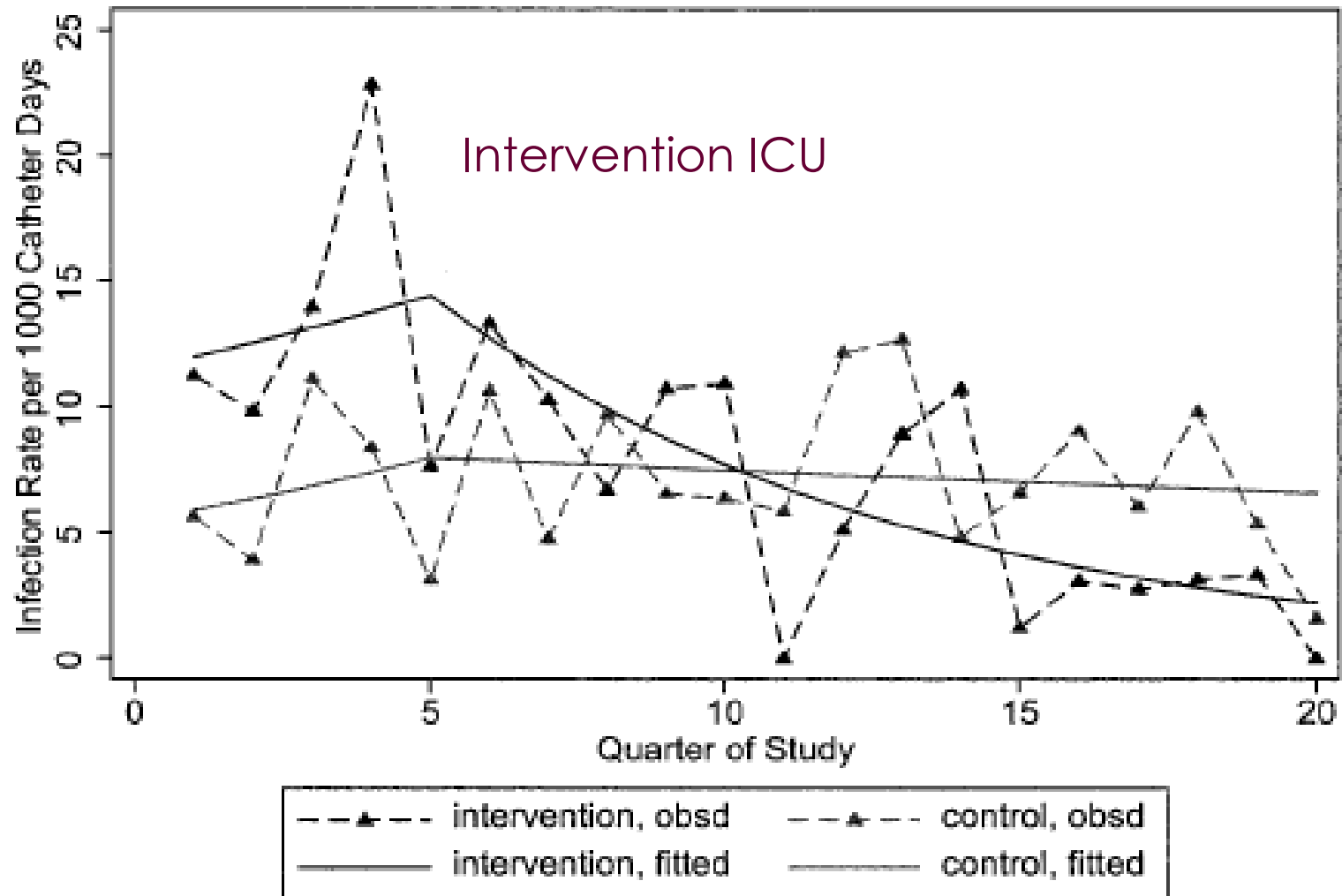


Figure: Number of CRBSIs per 1.000 CVC-days

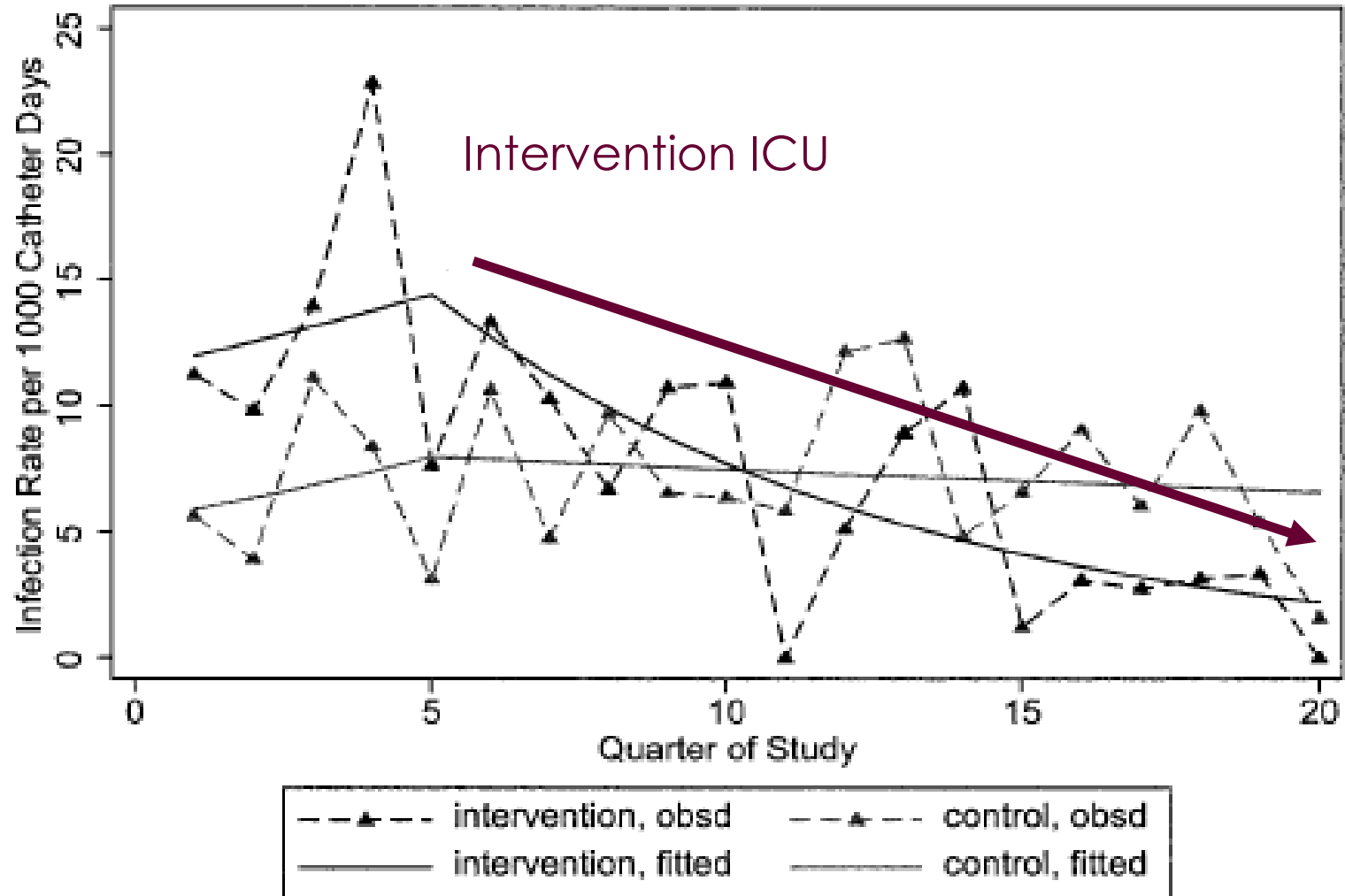
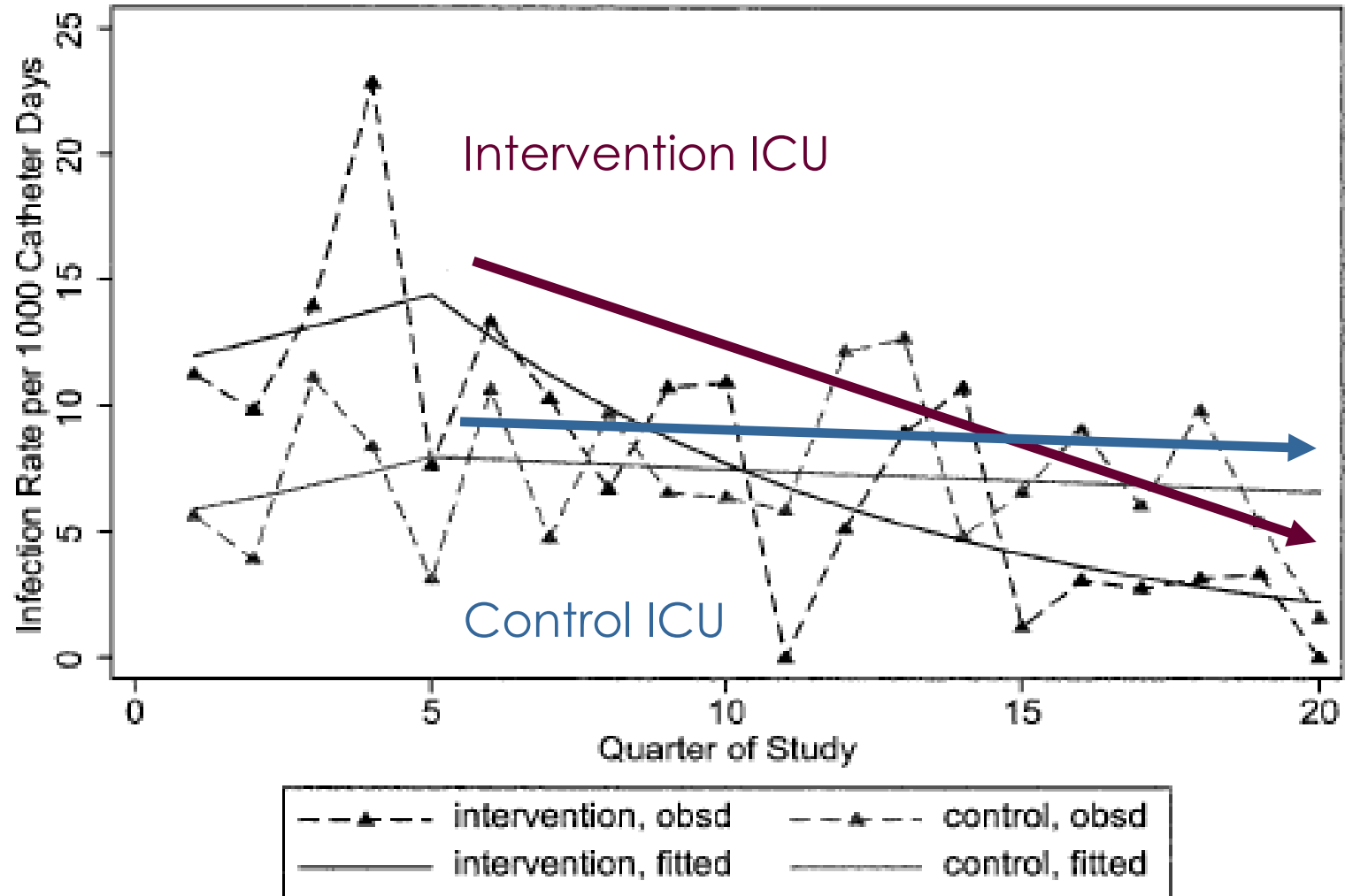


Figure: Number of CRBSIs per 1.000 CVC-days



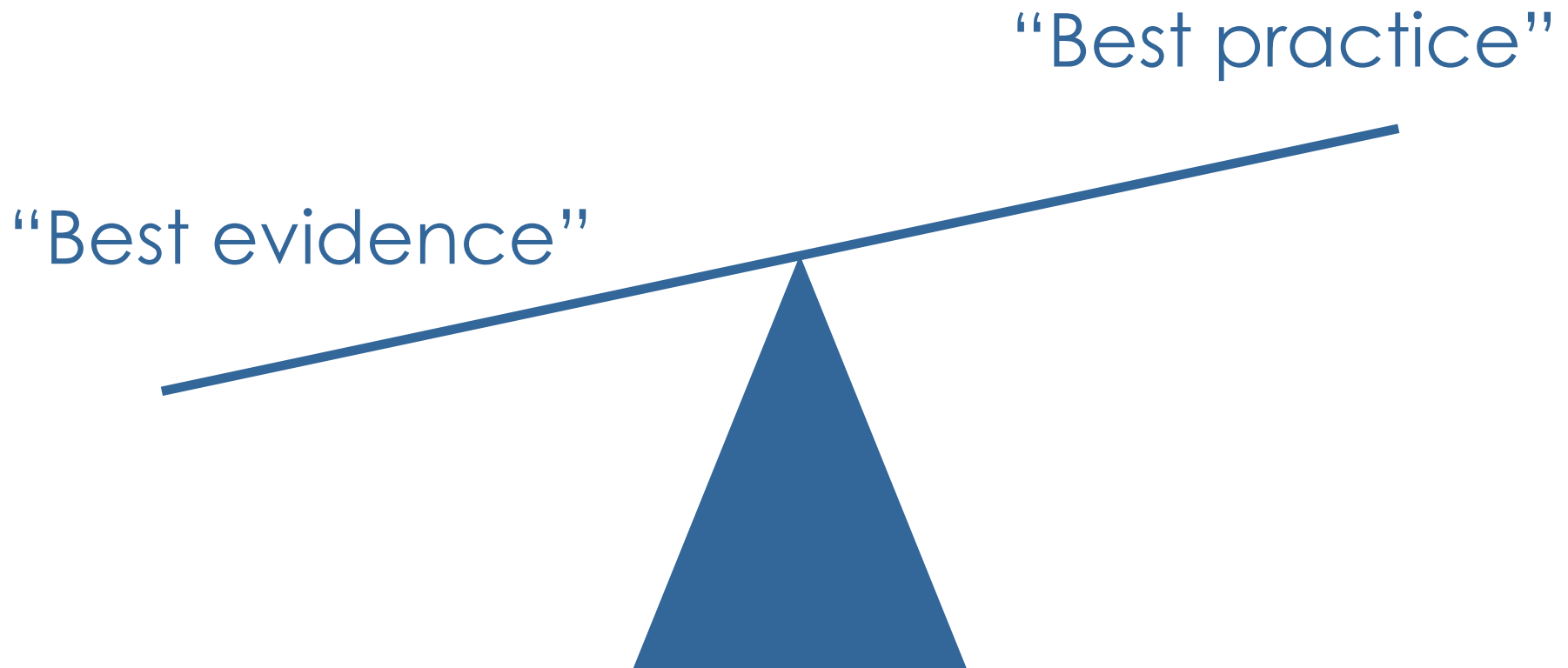
**Table:** Number of CRBSIs\* in intervention and control ICU (1998 – 2002)

	Intervention ICU	Control ICU
1998	11.3	5.7
2002	0.0	1.6

\* Data are presented per 1.000 CVC-days

- Period following intervention: Jan 2003 – April 2004  
2 cases of CRBSI (0.54 BSIs / 1,000 CVC days)
- Estimations:
  - 43 cases of CRBSI prevented
  - 8 deaths prevented
  - Cost saving of about US \$1.945.922

- An educational effort is able to significantly improve the rate of correctly executed CVC care procedures AND to reduce the number of CR-BSIs.



# Bridging the Gap between Evidence-Based Nursing and Best Practice

- Huge difference exists between theory and practice
- Bridging gap evidence-based supported guidelines and best practices is a tough struggle
- Several important lessons to keep in mind

# Lesson 1

- Hard to change habits
- Crucial to inform 'all' staff members who have to deal with it
- Provide sufficient and detailed information
- If necessary, information sessions should be repeatedly organized

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- Crucial to inform ‘all’ staff members who have to deal with it
- Provide sufficient and detailed information
- If necessary, information sessions should be repeatedly organized

*“Don’t leave your staff **WONDERING** why,  
let them **UNDERSTAND** and **TELL** them why”*



# Lesson 2

- Use simple and inexpensive interventions
- Group a set of best practices (~ patient safety)
- When implemented together, it will result in better outcomes than when implemented individually

# Lesson 3

- Avoid to impact thoroughly on someone's autonomy
- Highly unlikely that detailed guidelines will be strictly implemented into daily practice
- Allow staff to use their professional judgement

# Lesson 4

- For every step in a process  independent probability of failure  
  
the more steps included,  
the more likely it is to fail

# Lesson 4

- For every step in a process → independent probability of failure  
↓  
the more steps included, the more likely it is to fail
- To improve compliance → facilitate process to a max  
↓  
reducing or eliminating unnecessary steps

# Lesson 5

- Avoid that people have to do things over and over again
- Use of checklists may be effective to ensure that:
  - ➔ people will not waste their valuable time
  - ➔ patients will receive the care they deserve

# Lesson 6

- Multidisciplinary approach
- Teamwork
- Encourage open communication

# Lesson ...

Reducing infections

- Hard work
- Enthusiasm
- Continuous assessment and monitoring

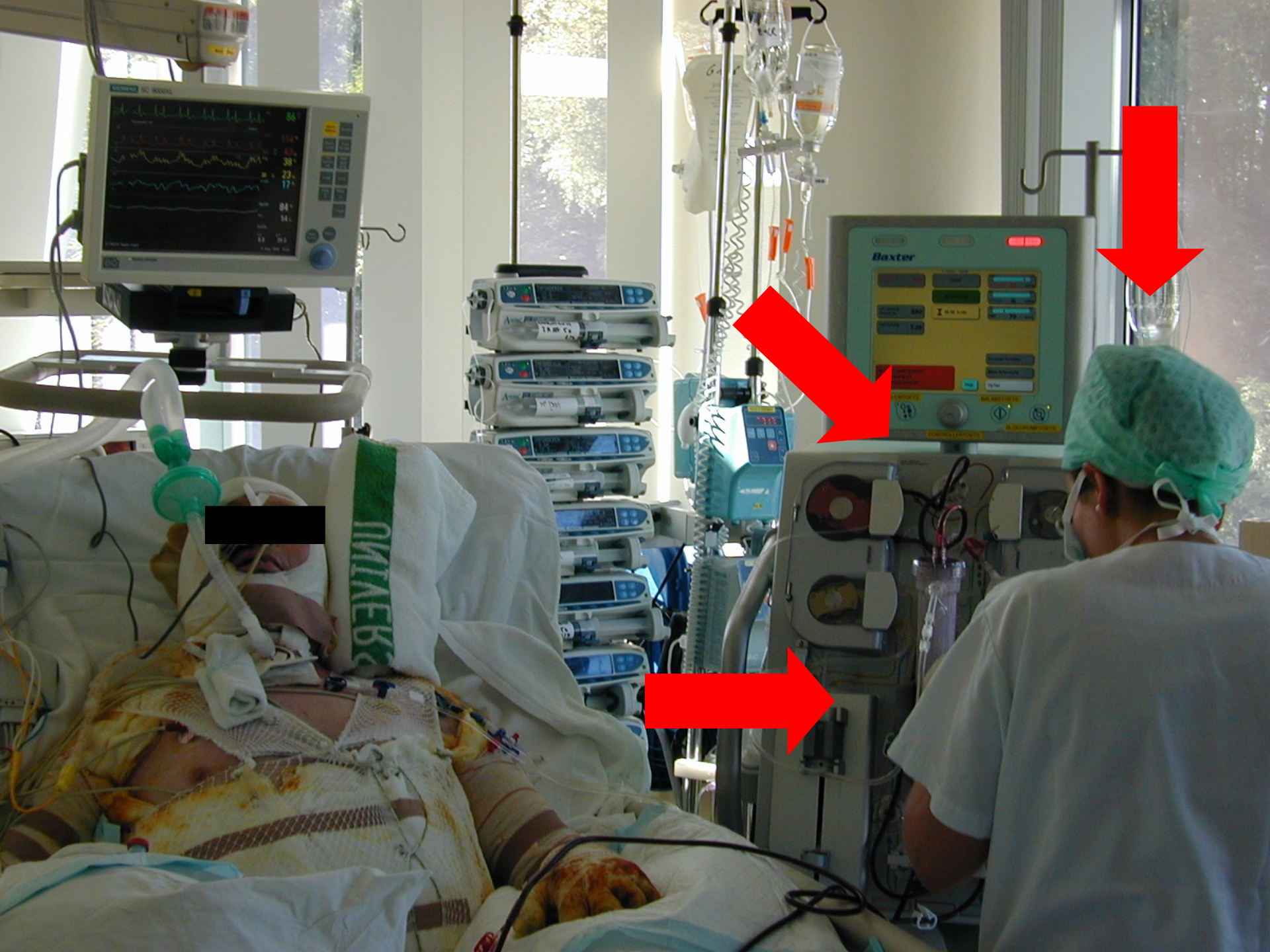
but above all ...

It requires the 'willingness' and a 'culture' of working together  
AND of never stopping to learn new skills

# Some final thoughts

- Nurses can substantially contribute in decreasing (avoidable) complications such as NIs by taking full advantage of quality improving measures such as IPC
- Their education should include supplementary support from evidence-based guidelines
  - ↳ essential part of the basic nursing curricula
- This may provide a solid basis for continuing refresher courses, and specific bedside training
- Favorable impact may be higher if underlying principles are better understood





# Thank you

*“The great aim of education is not  
knowledge, but action”*

## Thanks to

Prof. Dr. S. Blot

Drs. S. Labeau

Prof. Dr. D. Vogelaers

Prof. Dr. J. Rello

Flemish Society for Critical Care Nurses

EVIDENCE Study Investigators