

# IPC in the Emergency Department

# Outline

- Introduction: the ED department
- PVC-BSI
- Blood culture contamination
- Conclusion

# Why the ED is different

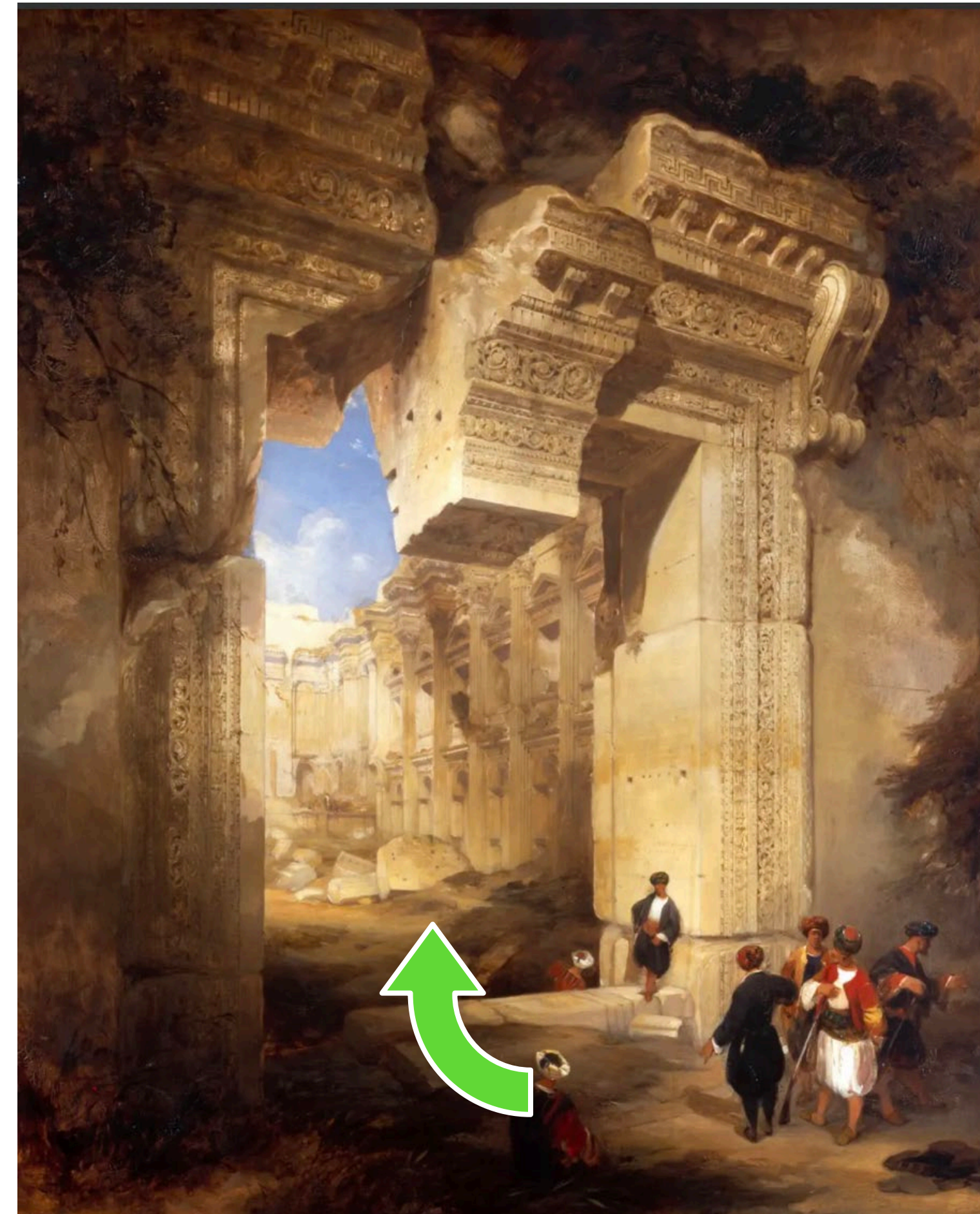
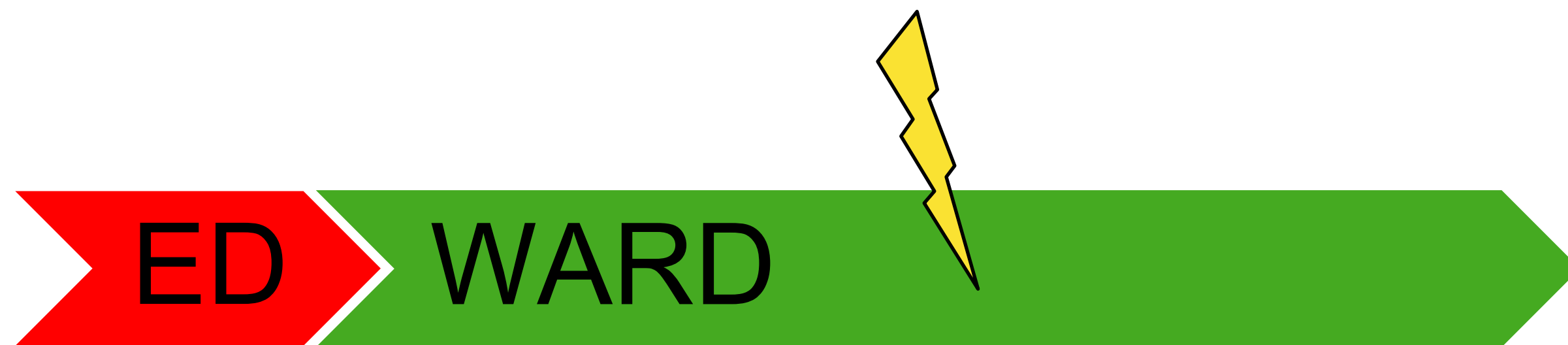
## Challenges:

- Overcrowding
- Rapid turnover (HCWs, Patients)
- Time pressure



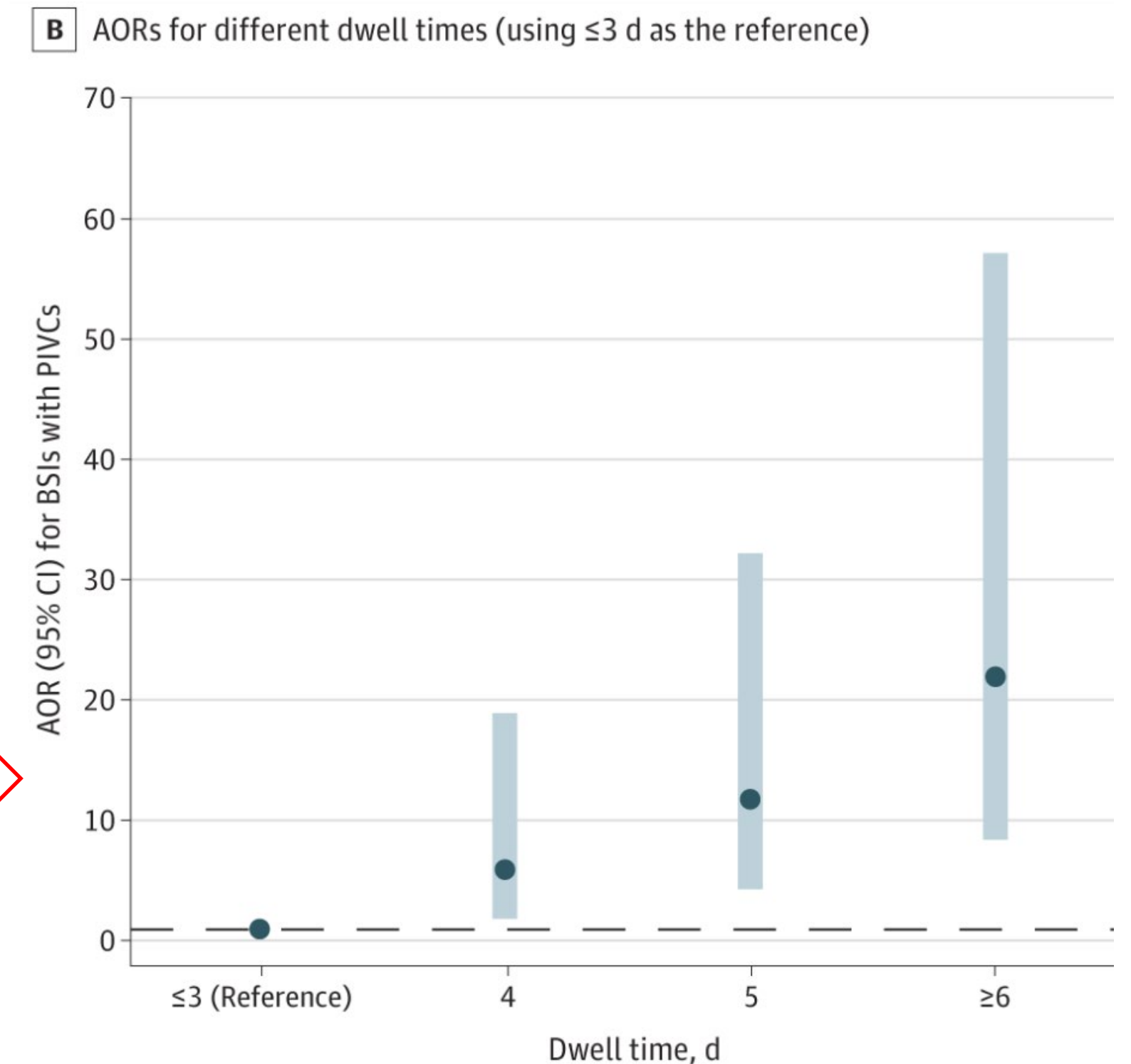
# Why should we care: HAI

- ED is the main admission gateway;
- Invasive procedures
  - Urinary Catheter: inserted in ED in ~10% of admitted patients
  - PVC: inserted in ED in up to 50% of admitted patients



# PVC-BSI

- **Low incidence (variable)**
  - Rate: 0.05/1000 catheter-days
  - Proportion: 0.18%
- Most PVC-BSI occur within 7 days of insertion, **risk rises after 3 days dwell**



JAMA Netw Open. 2025 Apr 1;8(4)  
Med J Aust. 2013 Jun 3;198(10):551-3  
J Hosp Infect. 2007 Sep;67(1):22-9.  
J Hosp Inf. 135 (2023) 67e73  
Clin Infect Dis 2017 Oct 0;65(10):1757-1762

# PVC-associated *S. aureus* BSI

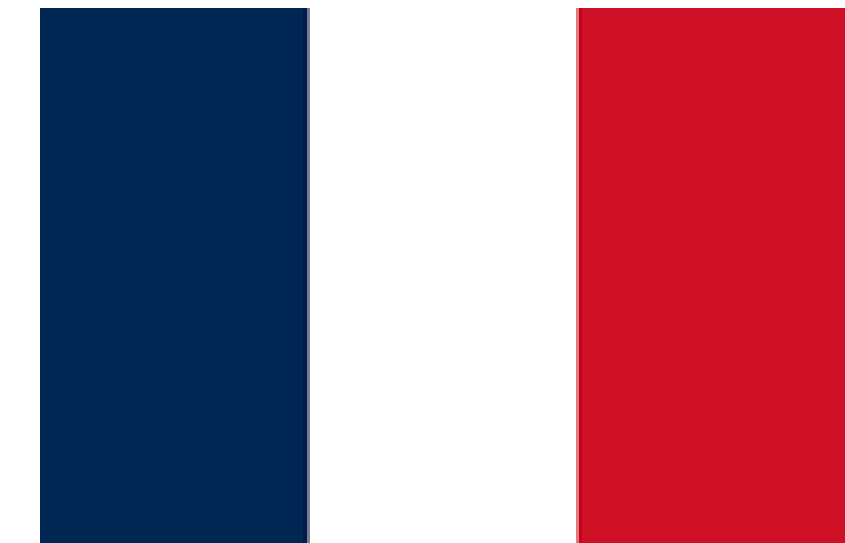
- High complication rate (>40%)
- 5 years of prospective data (Australia, tertiary hospital)
  - 67/111 (60%) PVC inserted in ED or Ambulance
  - Mean dwell time 3.5d

# PVC-BSI Impact

- **Costs** (median)
  - €11'597 (8'479-23'759) for cases
  - €6'789 (4'019-10'764) for controls
- **Length of hospital stay** (median)
  - 21 days for cases
  - 13 days for controls

+ €5'000

+ 8d



# Breach insertion bundle?

Some examples:

- HH compliance PVC placement 23% (France)
- Inadequate time for antiseptic solution to air dry 56.3% (Australia)
- Unused PVC placed in ED: up to 41.8% (Australia)

# Implementing prevention bundle in ED

## **BARRIERS:**

- Low recognition of Infection risk from PVCs
- Missing local leadership, responsibility
- HCW turnover
- Insufficient education and training
- Stressful environment

## **FACILITATOR:**

- recognition of suboptimal practice, desire to improve practice
- audit/feedback



ARIC, 11: 105 (2022)

Infect Dis Health 2019 Aug;24(3):152-168

BMJ Open 2022;12:e054927

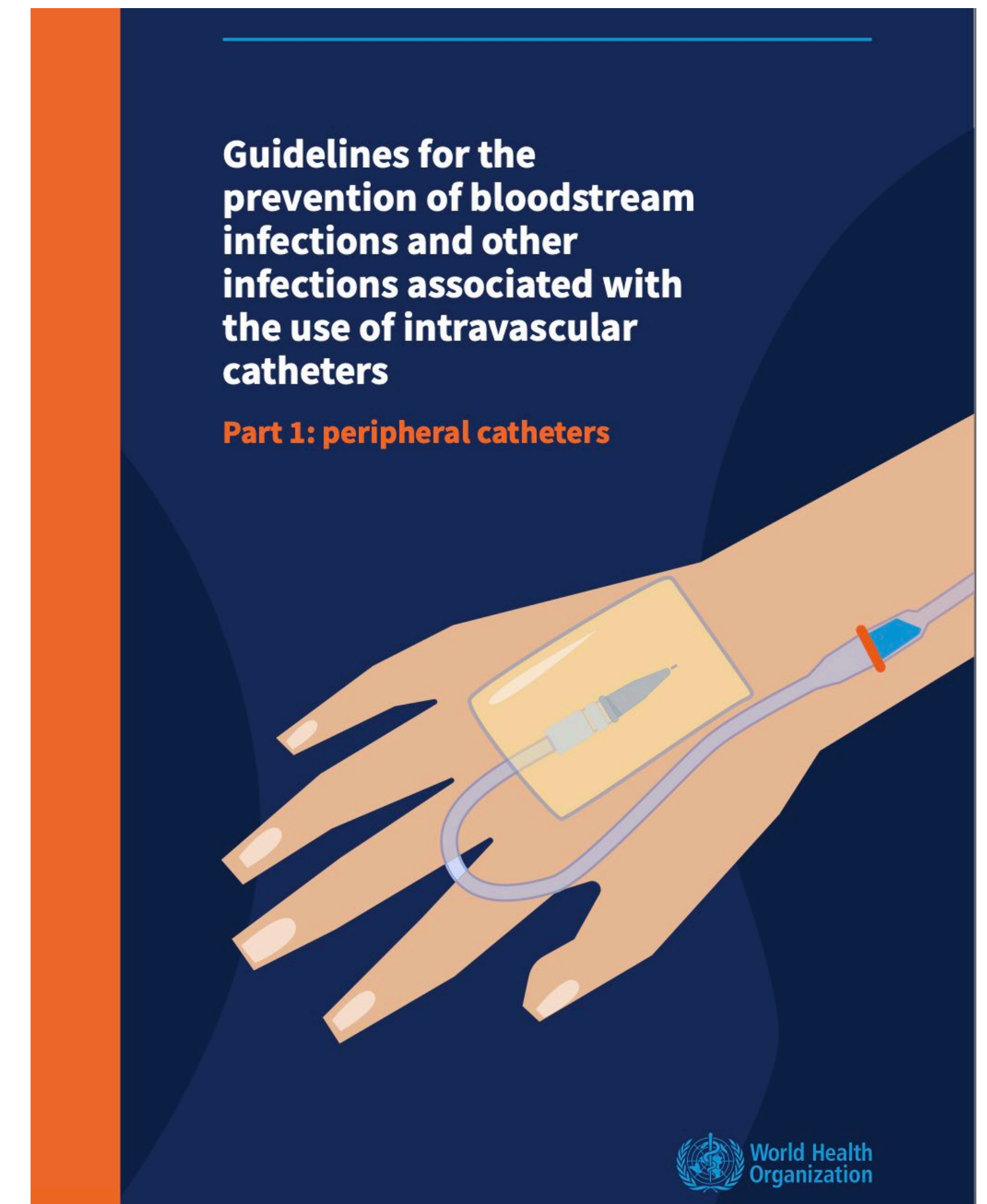
# Guideline: prevention of PVC-BSI

## INSERTION

- Indication
- **Education and training**
- **Hand hygiene**
- **Aseptic “no-touch” technique**
- **Insertion site (distal arm veins)**

## MAINTENANCE

## REMOVAL



# Which prevention bundle?

- The best combination of bundle elements is unknown
- Adapt to your local setting

**Table 4.2.1.**  
Summary of 25 PIVC bundle studies which included some form of aseptic technique for either insertion, access or maintenance of PIVCs, and assessed multiple interventions.

Author	Aseptic procedure during insertion	Training in hand hygiene	Use of chlorhexidine disinfection	Training in insertion procedure	PiVC insertion team	Use of disposable gloves	Use of sterile gloves	Use of insertion kit/pack	Use of ultrasound	Insertion site selection	Formal fixation protocol	Formal dressing protocol	Use of semipermeable transparent dressing	Heparinised saline flush	Use of extension sets	Aseptic procedure in maintenance	Needleless access disinfection	Daily PiVC inspection	Use of dwell-time definitions	Restricted use/removal protocol	Scheduled PiVC change	Outcome
Ahlqvist, 2006 (232)									Y	Y	Y				Y		Y	Y		Y	Supportive	
Alcock, 2017 (233)											Y									Y		No difference
Andersen, 2005 (234)		Y	Y					Y					Y						Y		Y	Supportive
Bhatt, 2021 (235)	Y			Y			Y															No difference
Blanco-Mavillard, 2021 (236)	Y	Y																				Supportive
Chiu, 2015 (237)	Y	Y											Y			Y					Y	Supportive
Cho, 2015 (238)			Y	Y							Y											No difference
Cobo-Sánchez, 2019 (239)	Y	Y	Y																Y			No difference
Couzigou, 2005 (249)		Y							Y	Y	Y				Y		Y	Y			Y	Supportive
DeVries, 2016 (244)	Y		Y	Y		Y	Y	Y			Y				Y							No difference
Diwakar, 2021 (245)		Y											Y	Y	Y							No difference
Duncan, 2018 (246)																		Y	Y			Supportive
Ferraz-Torres, 2021 (250)	Y	Y													Y					Y		No difference
Forberg, 2016 (251)		Y			Y				Y	Y							Y			Y		No difference
Freixas, 2013 (252)		Y	Y								Y	Y					Y	Y			Y	No difference
Garcia-Gasalla, 2019 (253)	Y	Y	Y												Y	Y	Y	Y		Y		No difference
Hontoria-Alcoceba, 2023 (256)		Y	Y						Y		Y	Y			Y	Y	Y	Y		Y		Supportive
Jong Hee, 2020 (257)	Y			Y					Y								Y	Y		Y		No difference
Kleidon, 2019 (258)		Y	Y					Y							Y	Y	Y	Y		Y		No difference
Phan, 2020 (265)	Y	Y		Y					Y					Y		Y		Y				Supportive
Rhodes, 2016 (266)																						Supportive
Salm, 2016 (267)		Y																				Supportive
Sriupayo, 2014 (268)		Y															Y			Y		Supportive
Steere, 2019 (269)			Y		Y		Y	Y	Y								Y					Supportive
Vergara, 2017 (271)		Y											Y		Y		Y					Supportive

Abbreviations: PIVC, peripheral intravenous catheter; Y, yes.

Note: The table summarizes which interventions (other than the aseptic technique) were assessed in each study and whether the findings were supportive of the proposed WHO guideline recommendations for the bundle of interventions cited.

# Blood cultures contamination in ED

**Def: one set out of multiple sets being positive for a commensal organism**

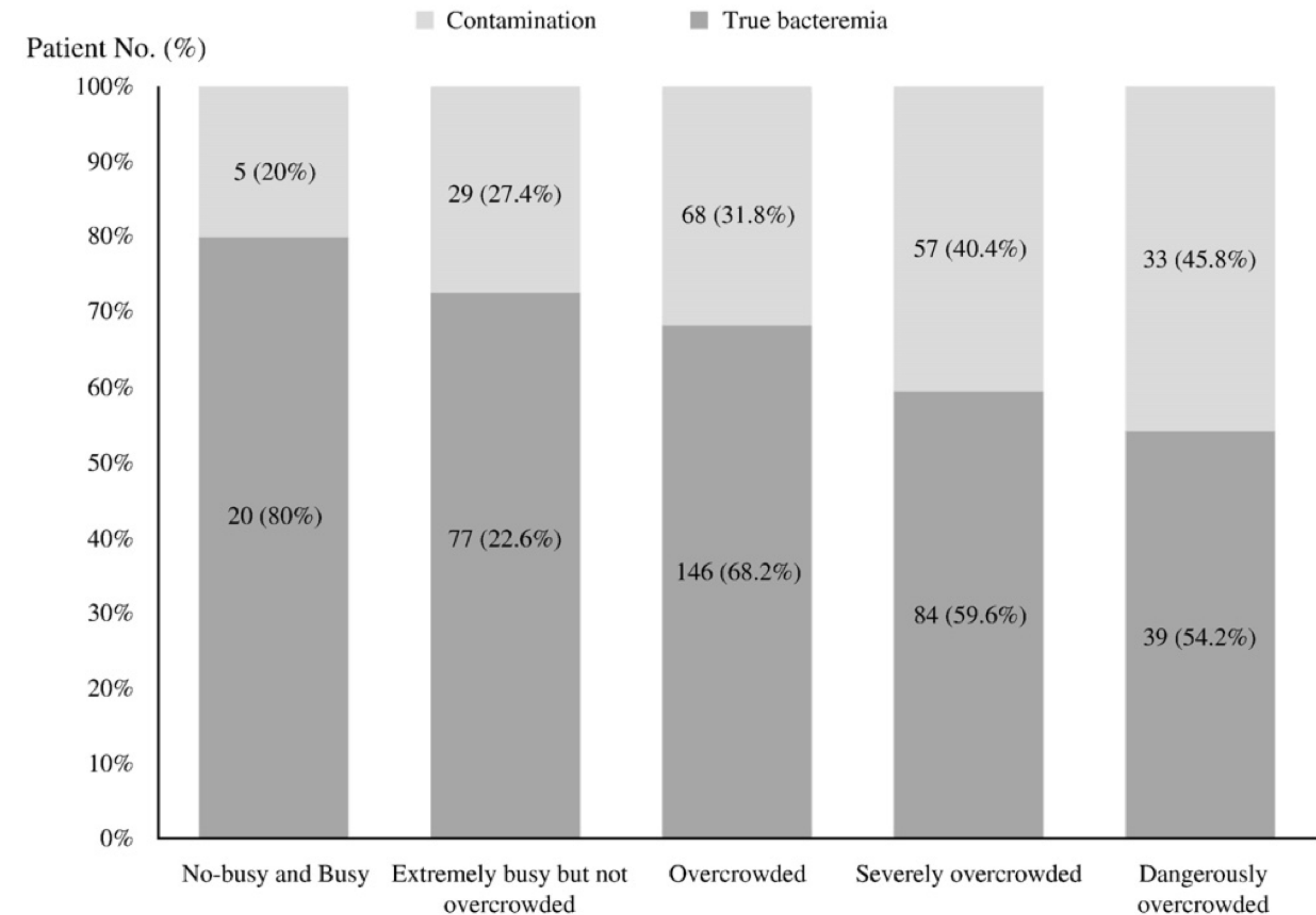
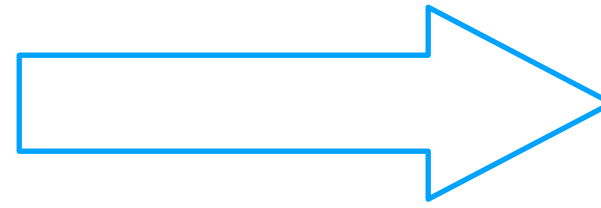
## **Consequences:**

- **Unnecessary antimicrobial treatments**
  - up to 59% patients, especially Vancomycin (AJIC 2019)
- **Increased healthcare costs and Hospital stay**
  - additional hospital costs >\$2,923 (AJIC 2019)
  - +1 day LOS/contamination event
- **Microbiology Lab overload**



# BC contamination in ED: Causes

- Stressful environment
- Low hand hygiene compliance
- Poor collection technique
  - insufficient skin disinfection



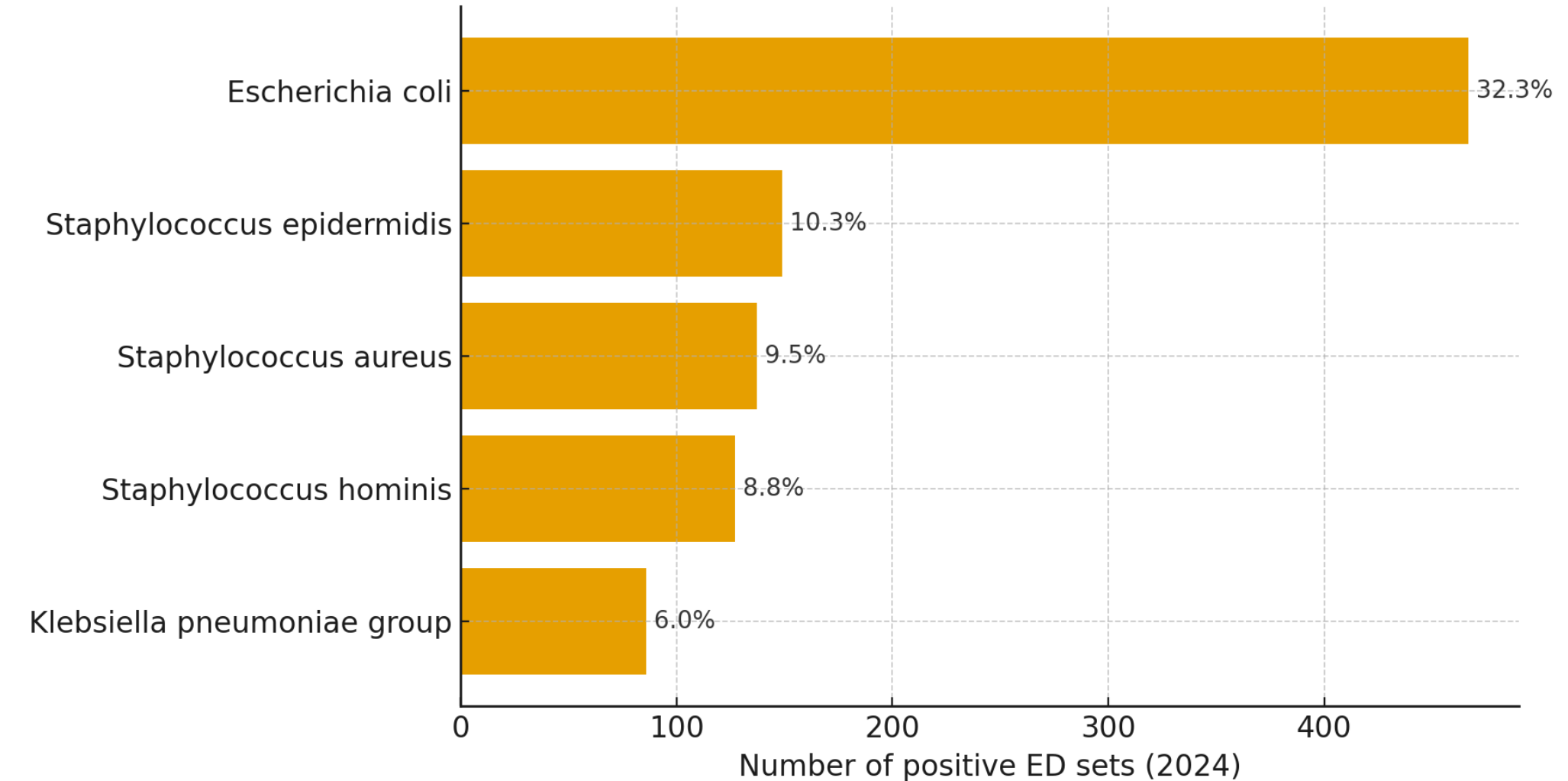
# Blood culture EOC ED

## 6 ED 2024

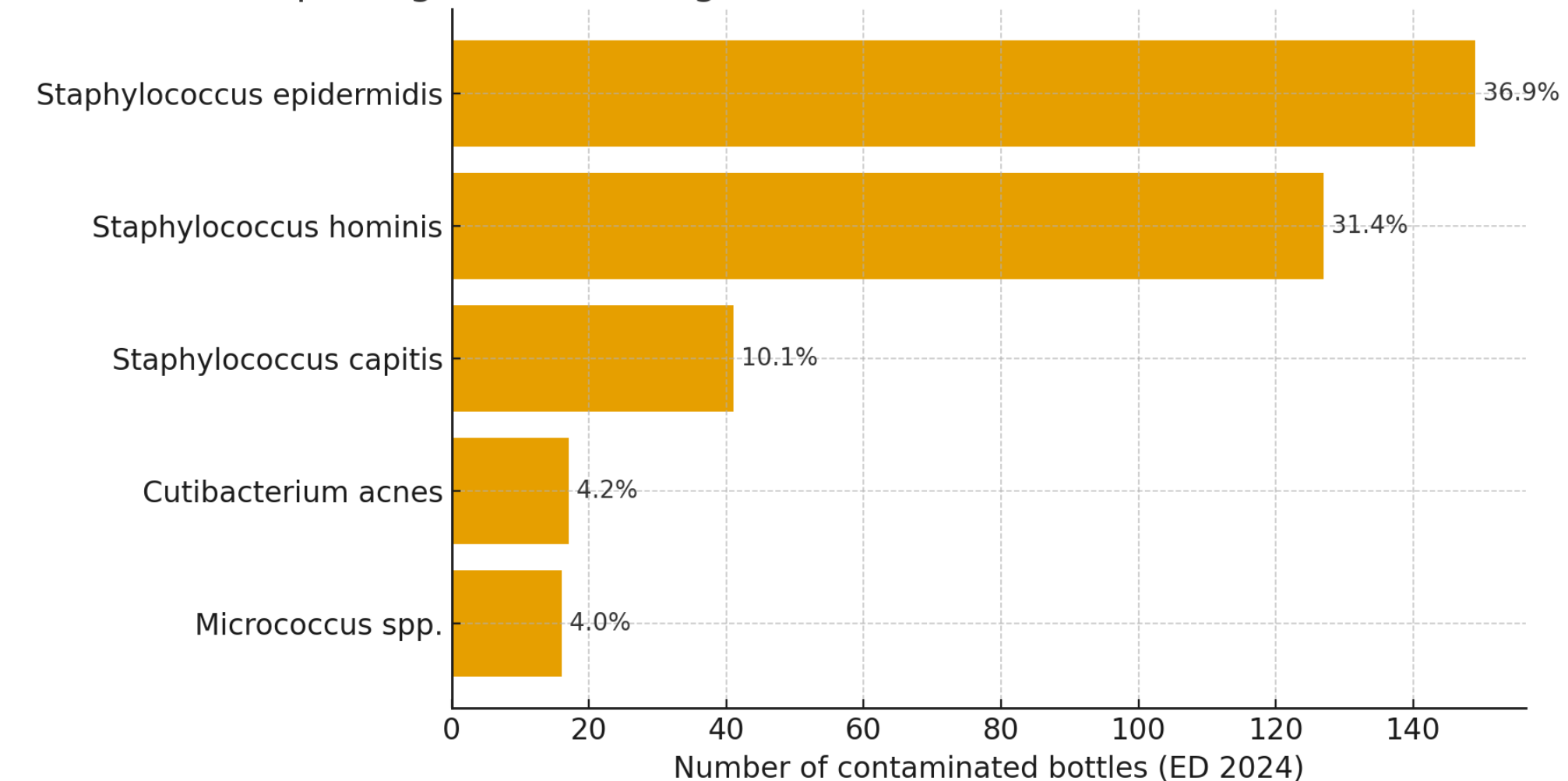
- Patients:  
3'559
- Total BC sets (aerobe+anarobe bottle):  
8'011
- Total positive BCs ( $\geq 1$  bacteria):  
1'449 (18%)
- Possible contaminated BCs ( $\geq 1$  commensal) :  
377 (4.71%)  
47 cases per 1000 blood culture set

CAVE: very dirty data!

Top 5 microorganisms across ED 2024 positive sets — labels show % of positive sets



Top 5 organisms among contaminated bottles — % of contaminated bottles



# Standard practice blood culture collection

- **TARGET CLSI  $\leq 3\%$  ( $\leq 1\%$ ) of contaminated blood cultures**
  - **Hand hygiene**
  - **Aseptic techniques**
    - Skin disinfection (CHG 2%-alcohol)
  - Collection site (venipuncture < catheter)
  - Blood volume (10ml/bottle)
  - BC bottle top disinfection prior to inoculation (isopropyl alcohol)

# Conclusions

- PVC insertions and blood culture often performed in the ED
- ED conditions (crowding, time pressure, mixed skill mix) lower adherence to standard practices/prevention bundle
- ED-tailored IPC interventions can have impact of quality and costs during hospital stay
- Prevention bundles for PVC insertion and BC collection could be introduced simultaneously (share common basic prevention measures)

MERCI!

DANKE!

GRAZIE!

GRAZIA!