IPC in the Emergency Department

Outline

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

Why the ED is different

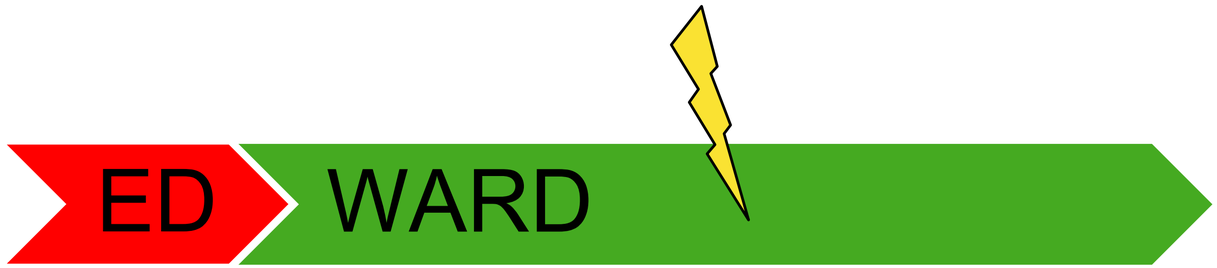
Challenges:

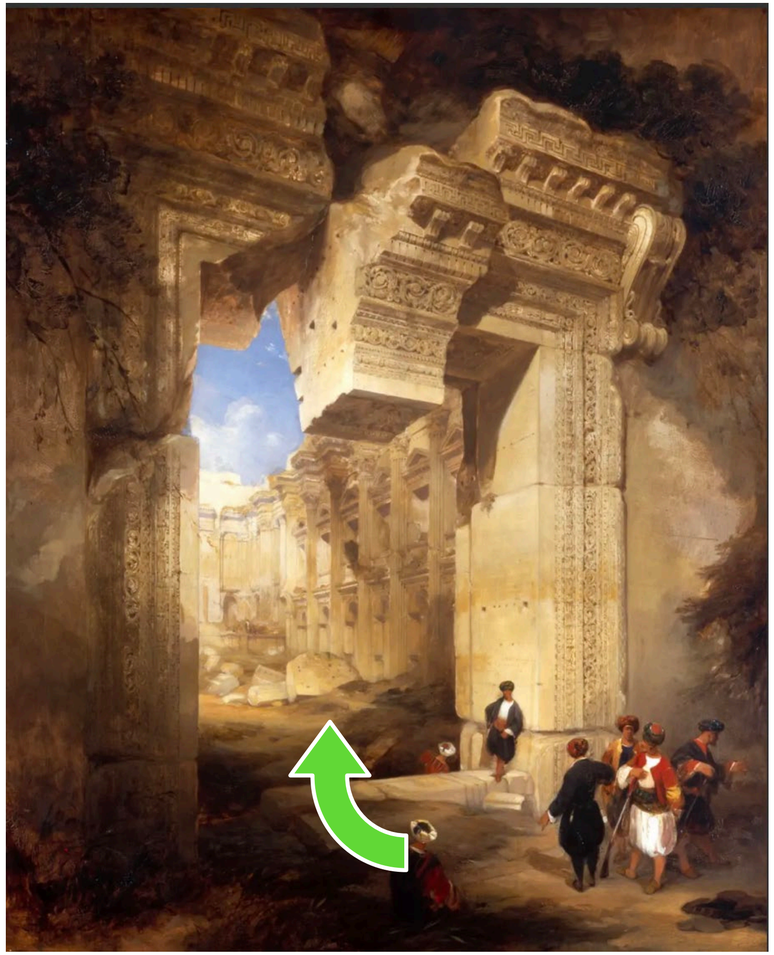
- Overcrowding
- Rapid turnover (HCWs, Patients)
- Time pressure

Emerg Med Clin North Am. 2018

Why should we care: HAI

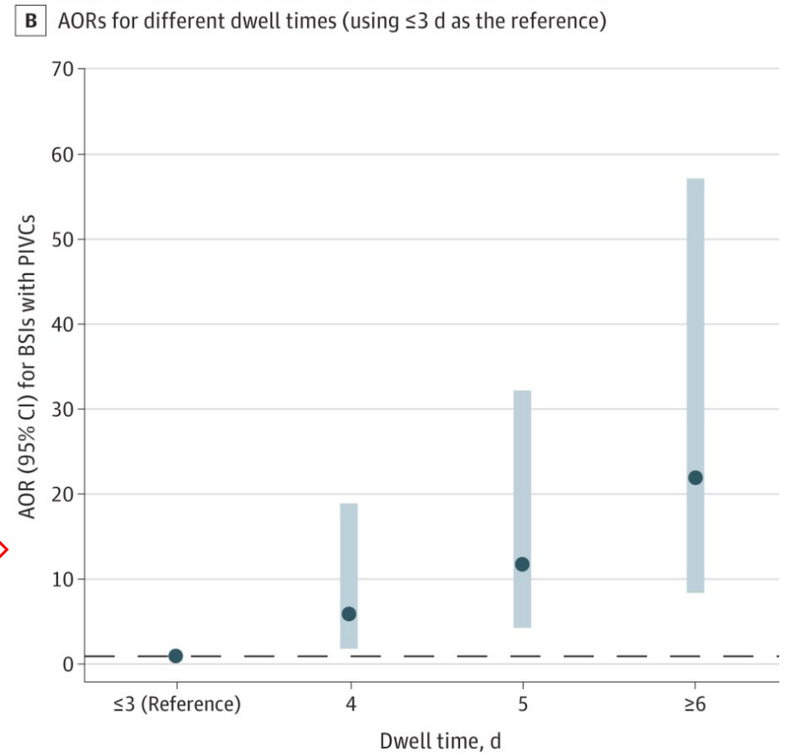
- ED is the main admission gateway;
- Invasive procedures
  - Urinary Catheter: inserted in ED in ~10% of admitted patients
  - PVC: inserted in ED in up to 50% of admitted patients





Infection Control & Hospital Epidemiology. 2018;39(8):1011-1012.

- **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

Med J Aust. 2013 Jun 3;198(10):551-3
J Hosp Infect. 2007 Sep;67(1):22-9.
CID, Volume 65, Issue 10, Nov 2017

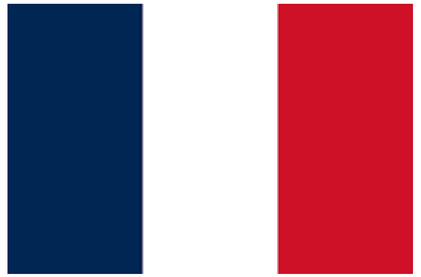
PVC-BSI Impact

- **Costs** (median)
  - €11’597 (8’479-23'759) for cases
  - €6’789 (4’019-10’764) for controls

+ €5’000

- **Lenght of hospital stay** (median)
  - 21 days for cases
  - 13 days for controls

+ 8d



J Hosp Infect, 2023, 135

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)

J Adv Nurs. 2025 Feb 10.
BMC Med Educ 2023;23(1):731

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

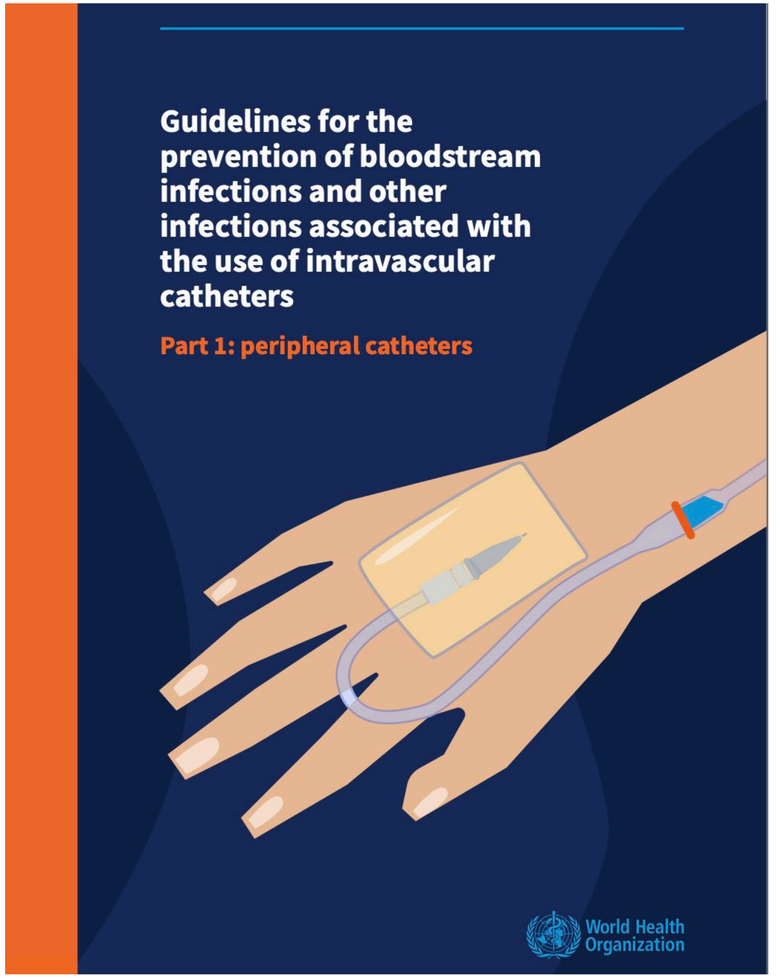
Guideline: prevention of PVC-BSI

INSERTION

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

MAINTENACE

REMOVAL

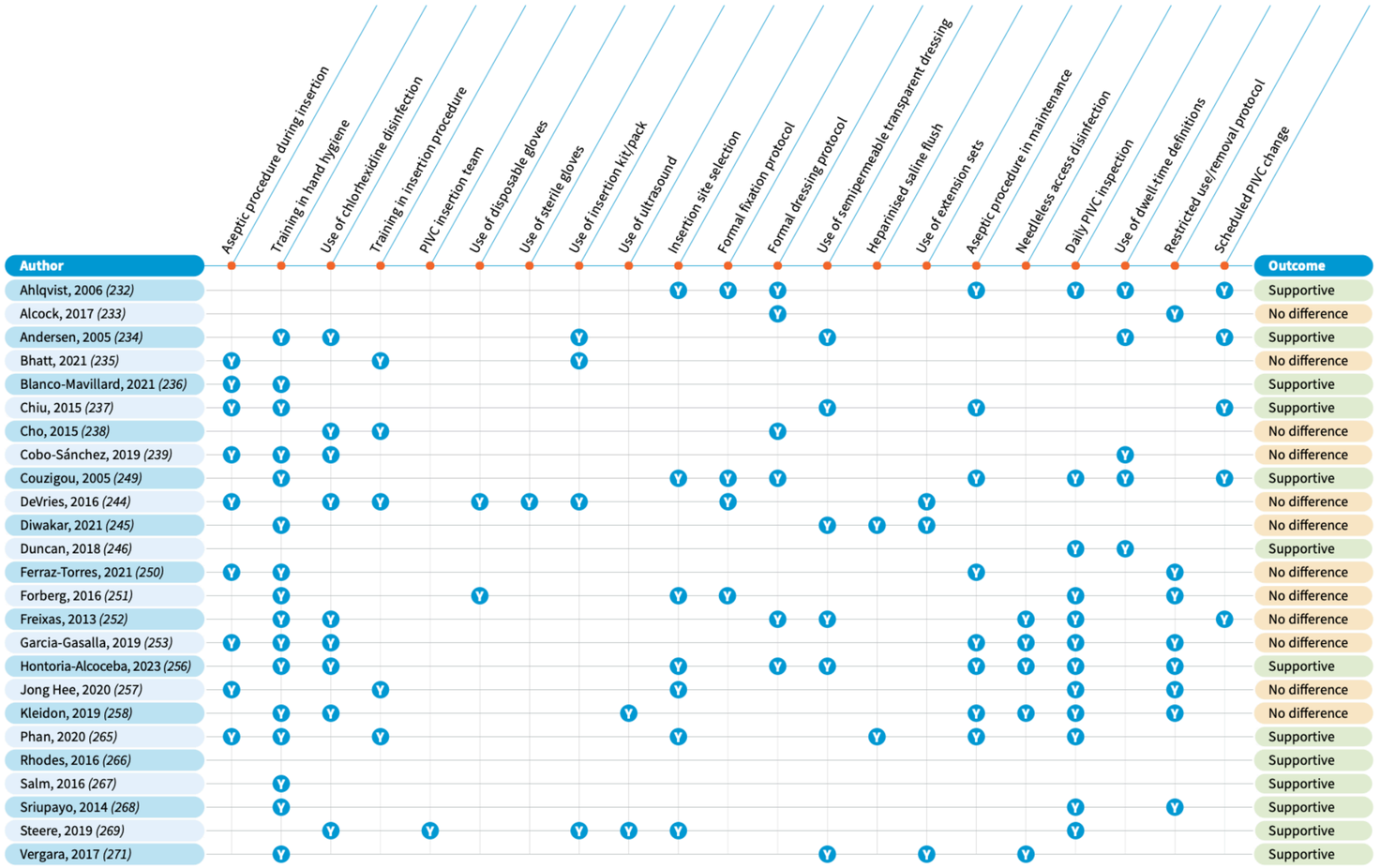


Journal of Hospital Infection, Volume 123, 67 - 73

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.



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.

Acad Emerg Med. 2024 Oct;31(10):1065-1067
Infect Dis Health 2019 Aug;24(3):152-168

Blood cultures contamination in ED

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

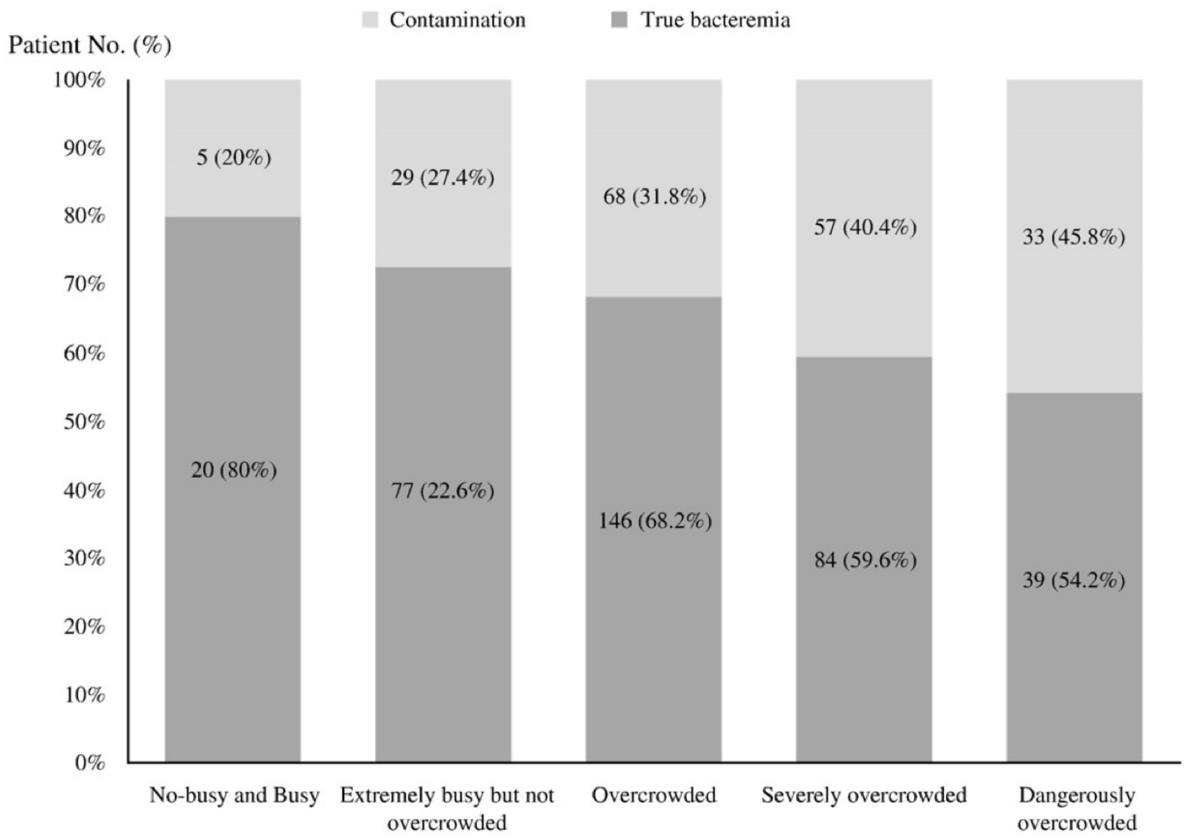
<u>Consequences:</u>

- **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**

Antimicrob Steward Healthc Epidemiol. 2024 Nov 11;4(1)
Clin Microbiol Rev 37:e00087-24.

BC contamination in ED: Causes

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



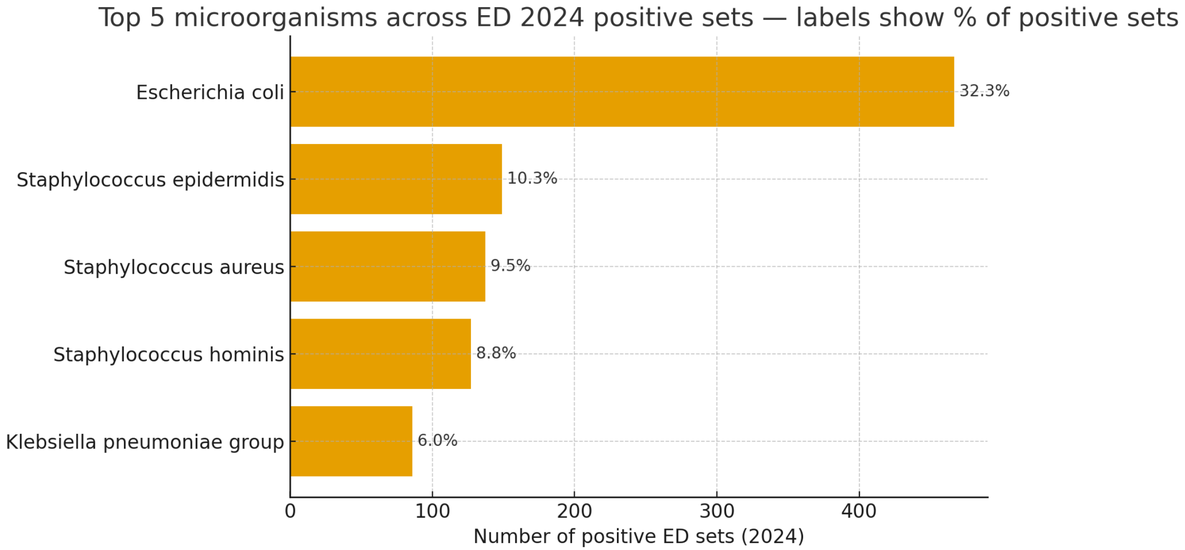
Am J Emerg Med, 30 (6) (2012), pp. 839-845

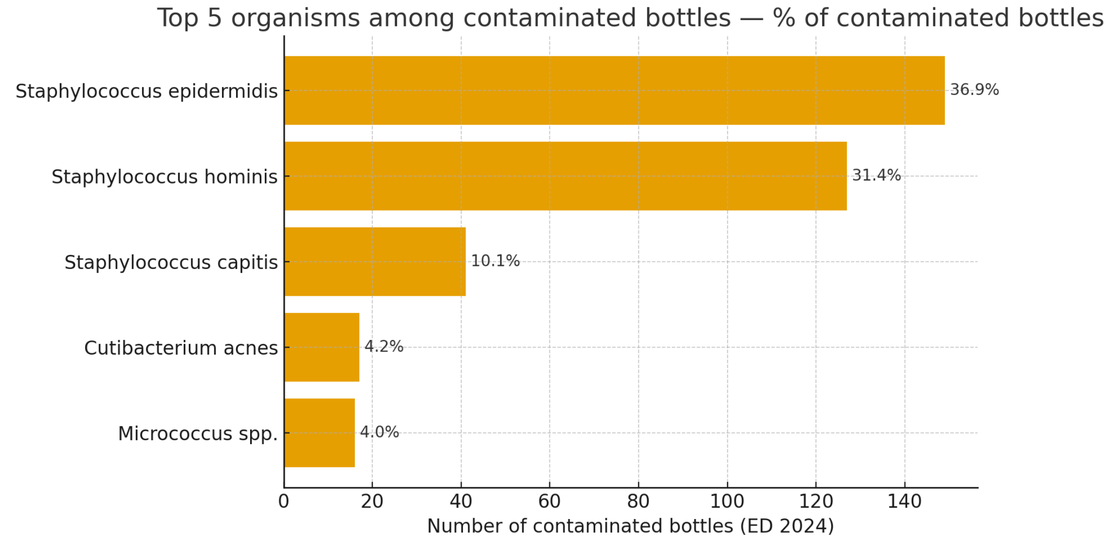
Blood culture EOC ED

6 ED 2024

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

CAVE: very dirty data!





Standard practice blood culture collection

- **TARGET CLSI ≤ 3% (≤ 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 disinfecton prior to inoculation (isopropyl alcohol)

Clin Microbiol Rev 2019 33:10.1128
Clin Bio 45 (2012) 999–1011

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!