

Culture Clash:

A Comparison of Approach to Blood Culture Diagnostic Stewardship across 3 Emergency Departments in a Healthcare Network

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Disclosures

The authors have nothing to disclose.

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Background:

Blood culture utilization

Blood cultures (BCx) are the gold standard to diagnose bloodstream infections.

- Timely collection tied to core measures

Overuse of BCx in conditions with low probability of bacteremia^{1,2,3}

Costs associated with BCx contamination^{3,4}

Contamination rates typically higher in emergency departments (ED)⁵

¹Long B, Koyfman A. J Emerg Med. 2016;51:529–539.

²Coburn B, Morris AM, Tomlinson G, Detsky AS. JAMA. 2012;308(5):502–511.

³Fabre V, Klein E, Salinas AB, et al. J Clin Microbiol. 2020;58:10–1128.

⁴Dempsey C, Skoglund E, Muldrew KL, Garey KW. Am J Infect Control. 2019;47:963–967.

⁵Boal M, Barton MJ, Zimmerman PA. Australas Emerg Care. 2020;23:157–165.



Background:

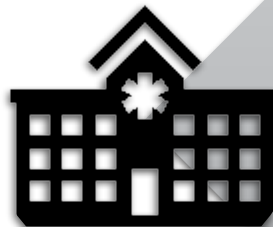
Costs of BCx contamination



Pharmacy charges between \$210 and \$12,611 per patient



Laboratory charges between \$2,397 and \$11,152 per patient



Hospital LOS increases ranged from 1-22 days.



Background

Application of BCx algorithms

- Studies have demonstrated that interventions aimed at optimizing blood culture use can lead to ***significant reductions*** in blood culture rates ***without affecting sepsis quality metrics or mortality.***^{1,2}
 - Applied to diverse care settings
 - Including studies in the Emergency Department^{3,4}

¹Valeria Fabre, Sima L Sharara, Alejandra B Salinas, et al. *Clinical Infectious Diseases*, Volume 71, Issue 5, 1 September 2020, Pages 1339–1347.

²Seidelman JL, Moehring R, Gettler E, et al. *Infect Control Hosp Epidemiol*. 2024 Apr;45(4):452-458.

³Pawlowicz A, Holland C, Zou B, et al. *Gen Int Med ClinInnov*1.

⁴Theophanous R, Ramos J, Calland AR, et al. *Am J Infect Control*. 2024 Sep;52(9):985-991.



Objectives

- Compare the effects of a BCx algorithm on BCx rates (BCx/100 ED visits) using 2 approaches:
 1. **Intensive intervention approach:** individualized feedback on BCx appropriateness, modifications to EHR
 2. **Passive educational approach:** group-level BCx appropriateness feedback on a small sample of BCx

Methods

ED 1

(Intensive intervention)

- Algorithm
- ED providers reviewed BCx weekly
- Provided feedback to ordering providers
- BCx removed from order sets for low-risk clinical scenarios

ED 2

(Passive education)

- Algorithm
- Pharmacist reviewed 5 BCx events per week
- Feedback provided to ED leadership

ED 3

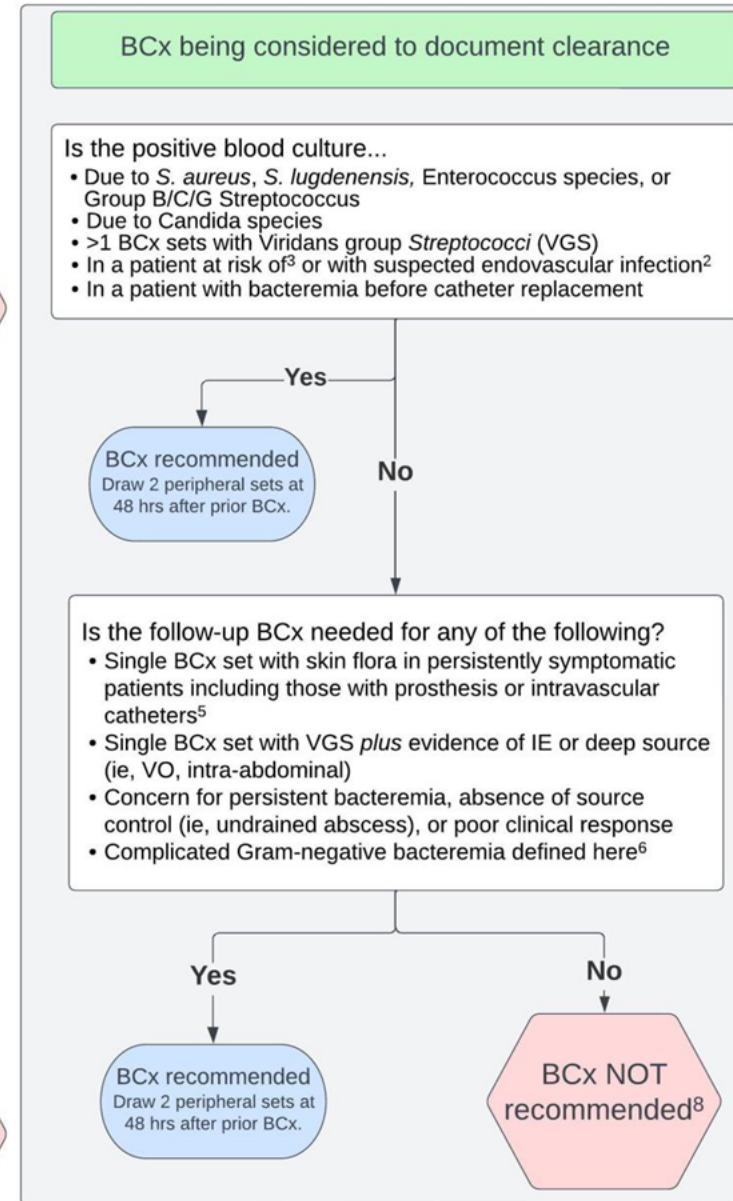
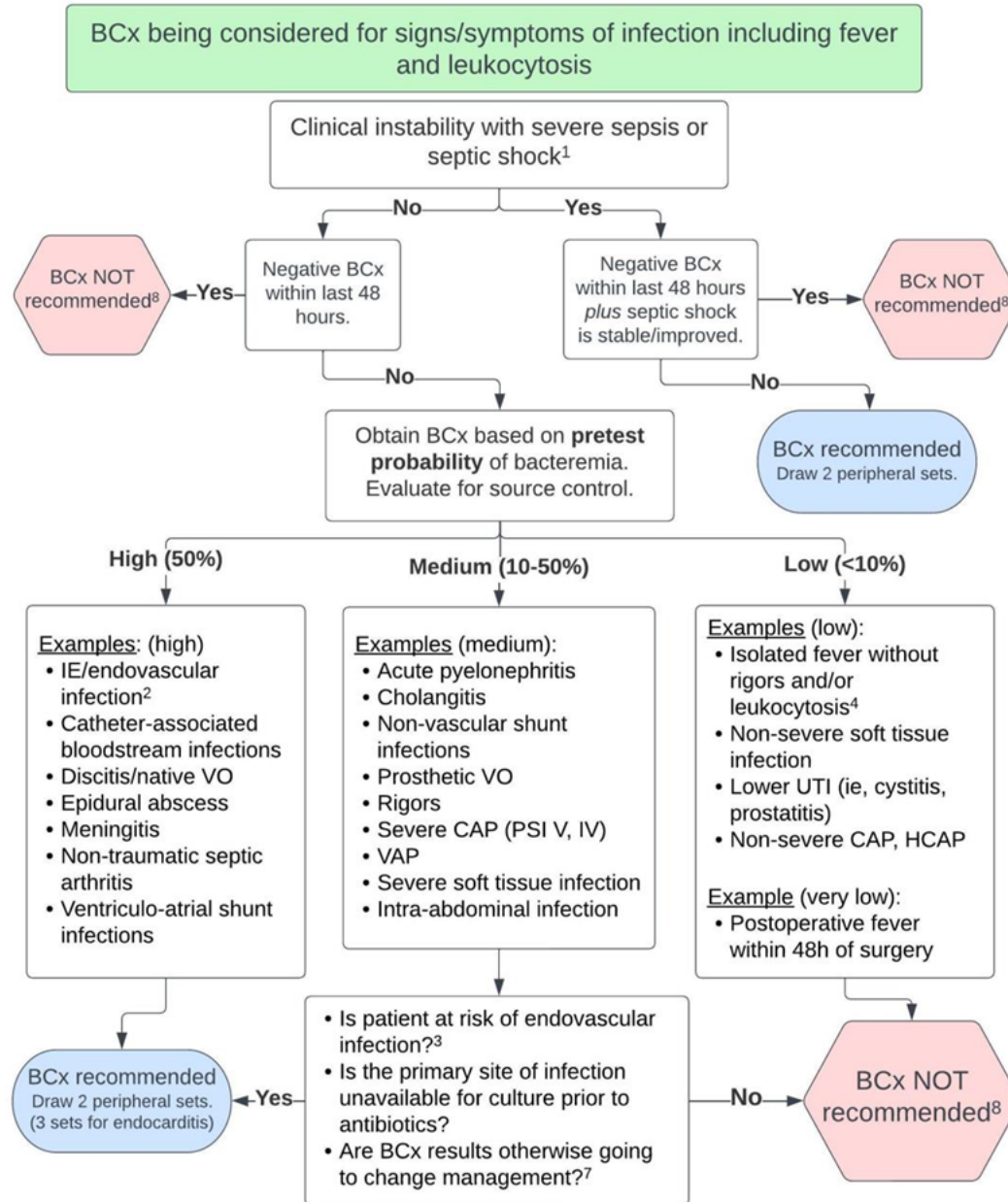
(Control)

- No intervention

Methods

- Pre- and post-intervention study
 - Pre-intervention period: 12/2020-11/2022
 - Post-intervention period: 12/2022-2/29/2024
- Primary outcome: blood culture event rate
 - Blood culture events per 100 ED visits
 - Compared using interrupted time series
- Academic level 1 trauma center and 2 community hospitals

Indications for Blood Culture Collection in Immunocompetent Adults



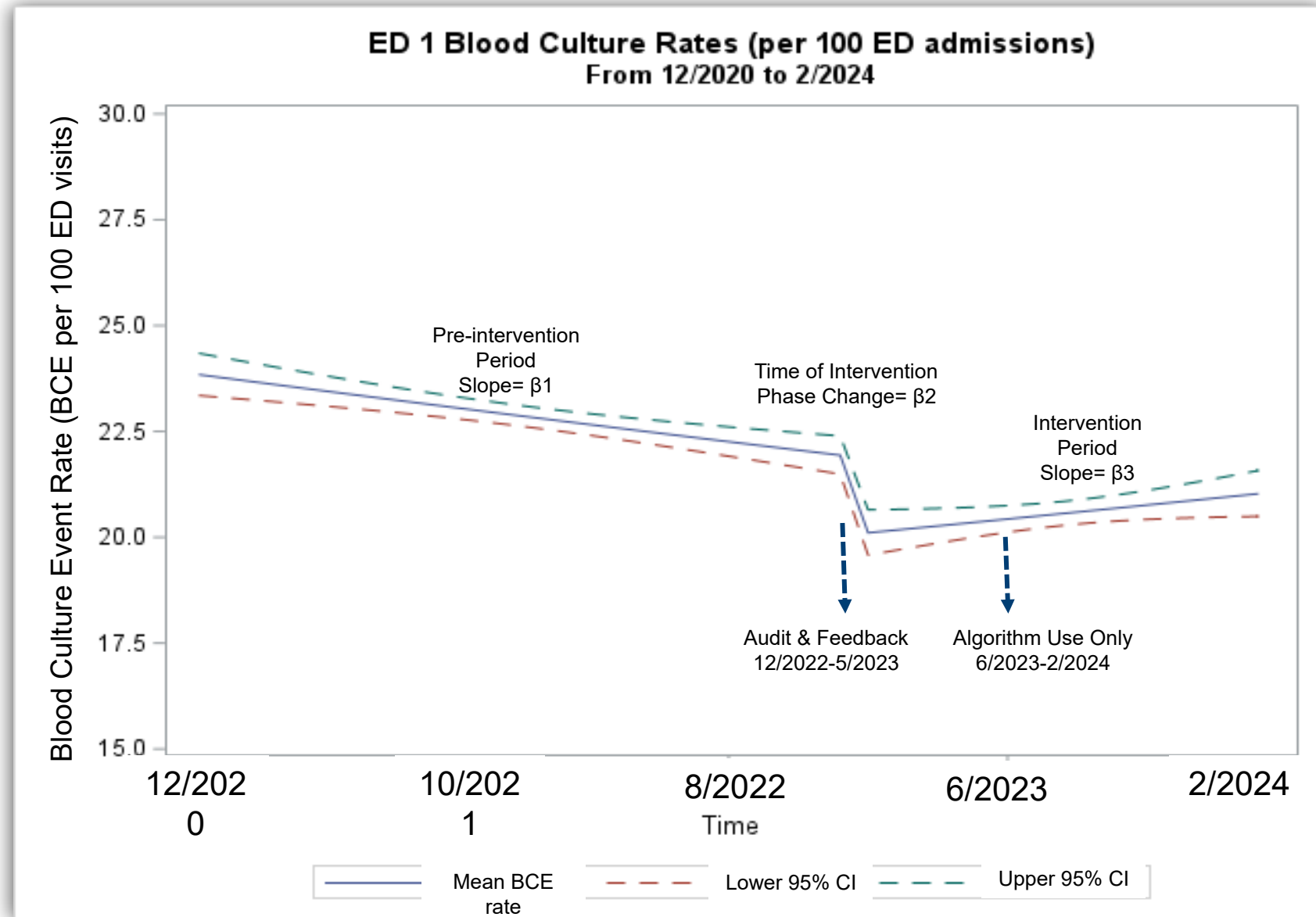
Reference: Fabre et al. *Clin Infect Dis* 2020; 71 (5): 1339-1347.

Abbreviations: BCx, blood culture; IE, infective endocarditis; CAP, community-acquired pneumonia; HCAP, healthcare associated pneumonia; PSI, pneumonia severity index; UTI, urinary tract infection; VAP, ventilator-associated pneumonia; VO, vertebral osteomyelitis; VGS, viridans Group Streptococcus

Results

ED 1

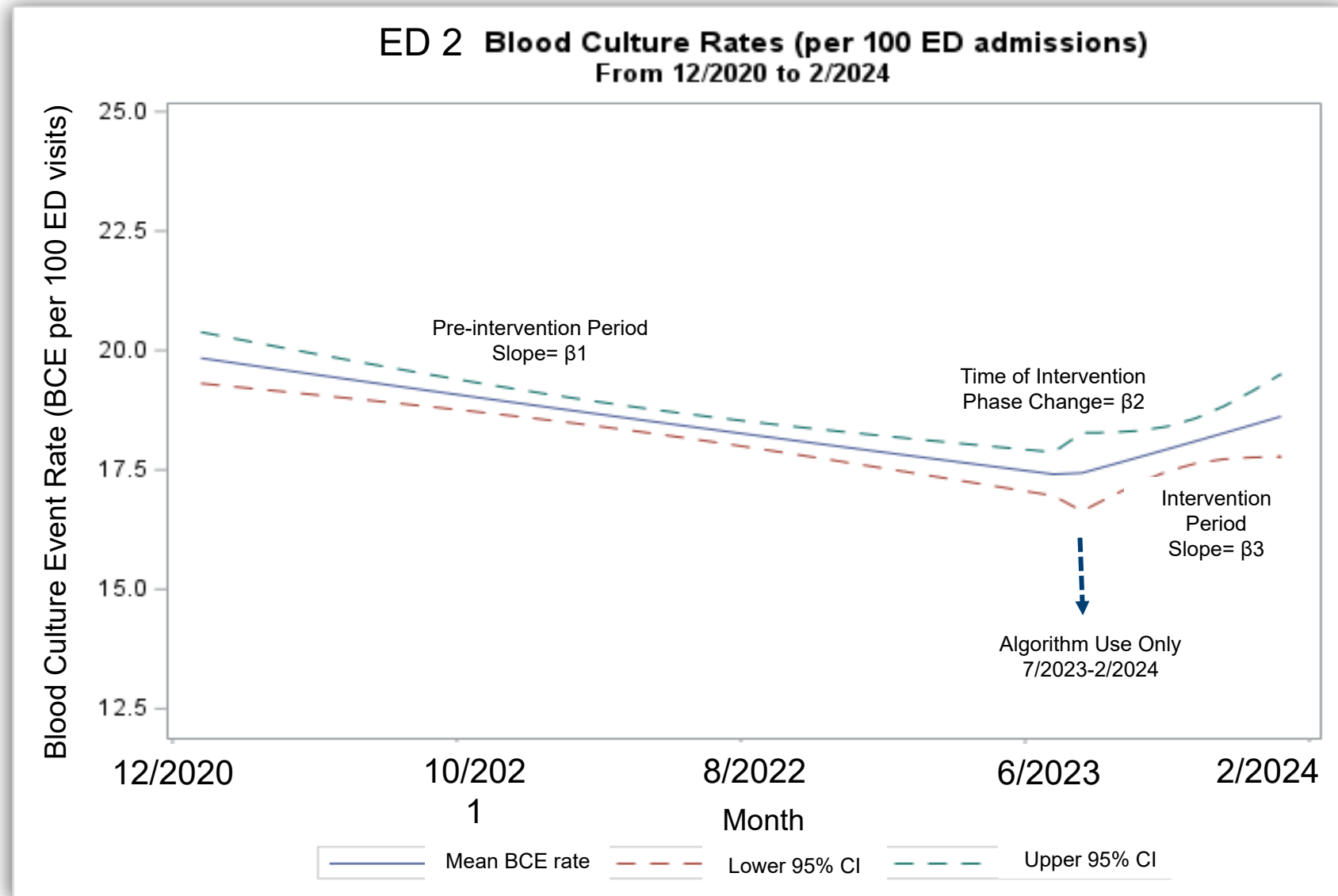
IRR 0.8 (95% CI 0.74, 0.86)



Results

ED 2

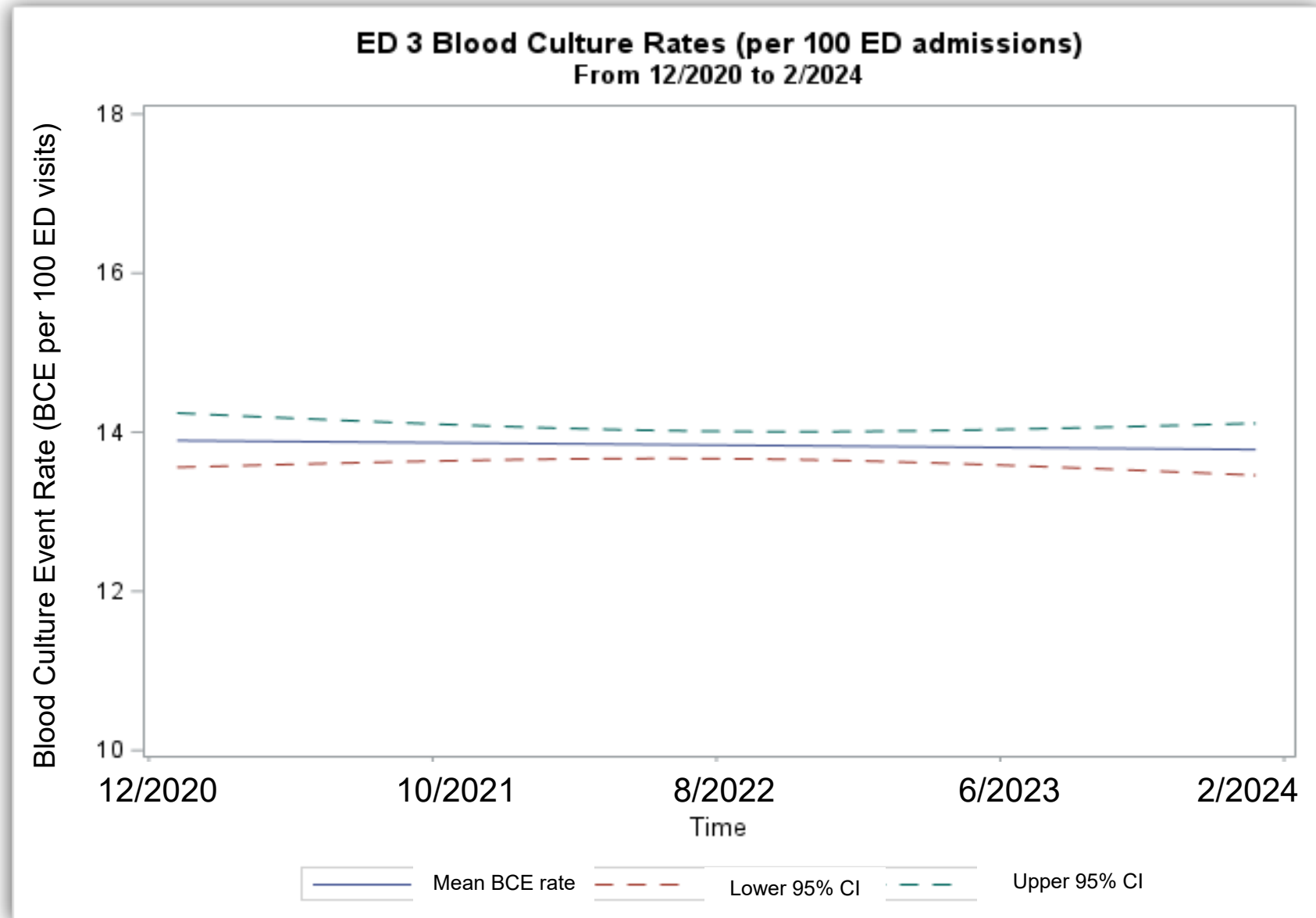
IRR 1.1 (95% CI 1.01, 1.19)



Results

ED 3

No change



Conclusions

- Intensive intervention had the most impact on BCx stewardship.
- Even the ED with the intensive intervention suffered drift towards increasing BCx utilization rates after the intervention.
- Sustainability can be improved by “hardwiring” stewardship into the electronic medical record.

Conclusions

- Limitations: retrospective, single healthcare system, comparison among hospital types
- Next steps: use of the algorithm in other patient populations, methods to make implementation sustainable



Questions or comments?

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