

Real-time Computerized Flagging of Potential *Clostridium difficile* Infection Agrees with National Health and Safety Network LabID Case Identification

Kristina Bajema, MD¹, Adam Alter, MD¹, Chris Dale, MD, MPH², and James Leggett, MD¹
 (1) Providence Portland Medical Center, Portland, OR (2) Providence Health & Services

Background

- *Clostridium difficile* infection (CDI) is associated with excess morbidity, mortality, and cost and is used in public quality reporting.
- The National Health and Safety Network (NHSN) LabID surveillance CDI definition may allow more standardized and efficient CDI case identification but is still labor intensive.
- We undertook a retrospective cohort study to test if a real-time computerized CDI LabID flag (RTCflag) agreed with the NHSN LabID case identification.

Methods

- Intervention: RTCflag was developed to mirror the NHSN LabID CDI case definition.
- Study site: 483-bed teaching hospital
- Population: RTCflag positive or primary discharge diagnosis of CDI patients matched 1:1 with controls.
- Duration: One year
- Each medical record was independently abstracted by two researchers blinded to the case-control status of the patients. Discrepancies were reviewed by a three researcher panel to achieve consensus.
- Kappa calculated on first two investigator ascertainment.

Results

- 147 RTCflag or primary discharge diagnosis CDI cases were matched to 147 controls.
- 120 patients had LabID CDI on chart abstraction and 174 patients did not.

Patient Characteristics by Chart Review According to *Clostridium difficile* Status

	<i>C. difficile</i> Positive (n = 120)	<i>C. difficile</i> Negative (n = 174)	Total (n = 294)	P value
Age (years), mean (SD)	65.8 (17.5)	65.5 (18.4)	65.6 (18.0)	0.90
Male, n (%)	50 (41.7)	67 (38.5)	117 (39.8)	0.60
Ever in the ICU, n (%)	22 (18.3)	23 (13.2)	45 (15.3)	0.20
In-hospital death, n (%)	11 (9.2)	6 (3.4)	17 (5.8)	0.04
Length of stay (days), median (IQR)	6 (4, 12)	4 (2, 5)	5 (3, 8)	< 0.01
Readmitted within 30 days, n (%)	8 (6.7)	5 (2.9)	13 (4.4)	0.10
Real-time computerized <i>C. diff</i> flag positive, n (%)	104 (86.7)	0 (0)	104 (35.3)	< 0.01

References

- Eyre, DW et al. Diverse sources of *C. difficile* infection identified on whole-genome sequencing. *NEJM* 2013; 369(13):1195-1205.
- Gase, KA et al. Comparison of 2 *Clostridium difficile* surveillance methods: National healthcare safety network's laboratory-identified event report module versus clinical infection surveillance. *Infect Control Hosp Epidemiol* 2013; 34(3):284-290.
- McDonald, LC et al. Recommendations for surveillance of *Clostridium difficile*-associated disease. *Infect Control Hosp Epidemiol* 2007; 28(2):140-145.

Comparison of Real-time Computer Based *Clostridium difficile* Ascertainment with Chart Review

	<i>C. difficile</i> Positive by Chart Review	<i>C. difficile</i> Negative by Chart Review	
<i>C. difficile</i> Positive by Real-Time Flag	104	0	n = 104
<i>C. difficile</i> Negative by Real-Time Flag	16	174	n = 190
	n = 120	n = 174	

Sensitivity: 86.7% Positive Predictive Value: 100%
 Specificity: 100% Negative Predictive Value: 91.6%

Kappa 0.88 (95% CI 0.77 - 1.0, P < 0.01)

Conclusions

- A real-time computerized flag can identify NHSN LabID CDI events.
- Computerized flags have the potential to optimize infection prevention and disease surveillance efforts across health systems, geographic areas, or networks.
- Significant work is needed to optimize the function of computerized flags. There is currently no gold standard.

