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Optimizing a *Clostridium difficile* Screen for Intensive Care Unit Admissions

MARY KATHERINE NATOUR, BSN, RN, JENNIFER L SMITH, PhD, RN

BACKGROUND

- Clostridium difficile infection (CDI) is the most common healthcare-acquired diarrhea¹ and is associated with 14,000 deaths annually in the United States².
- CDI detected within the first 3 days of hospital admission is considered community-acquired and after 3 days is considered healthcare-acquired. This distinction determines whether treatment is reimbursable or not.
- Early detection enables healthcare workers to isolate and intervene promptly, preventing both spread and sequelae to improve patient outcomes
- Noncompliance with screening and low selectivity can directly cause harm to patients who present with CDI and patients who are exposed to that patient.

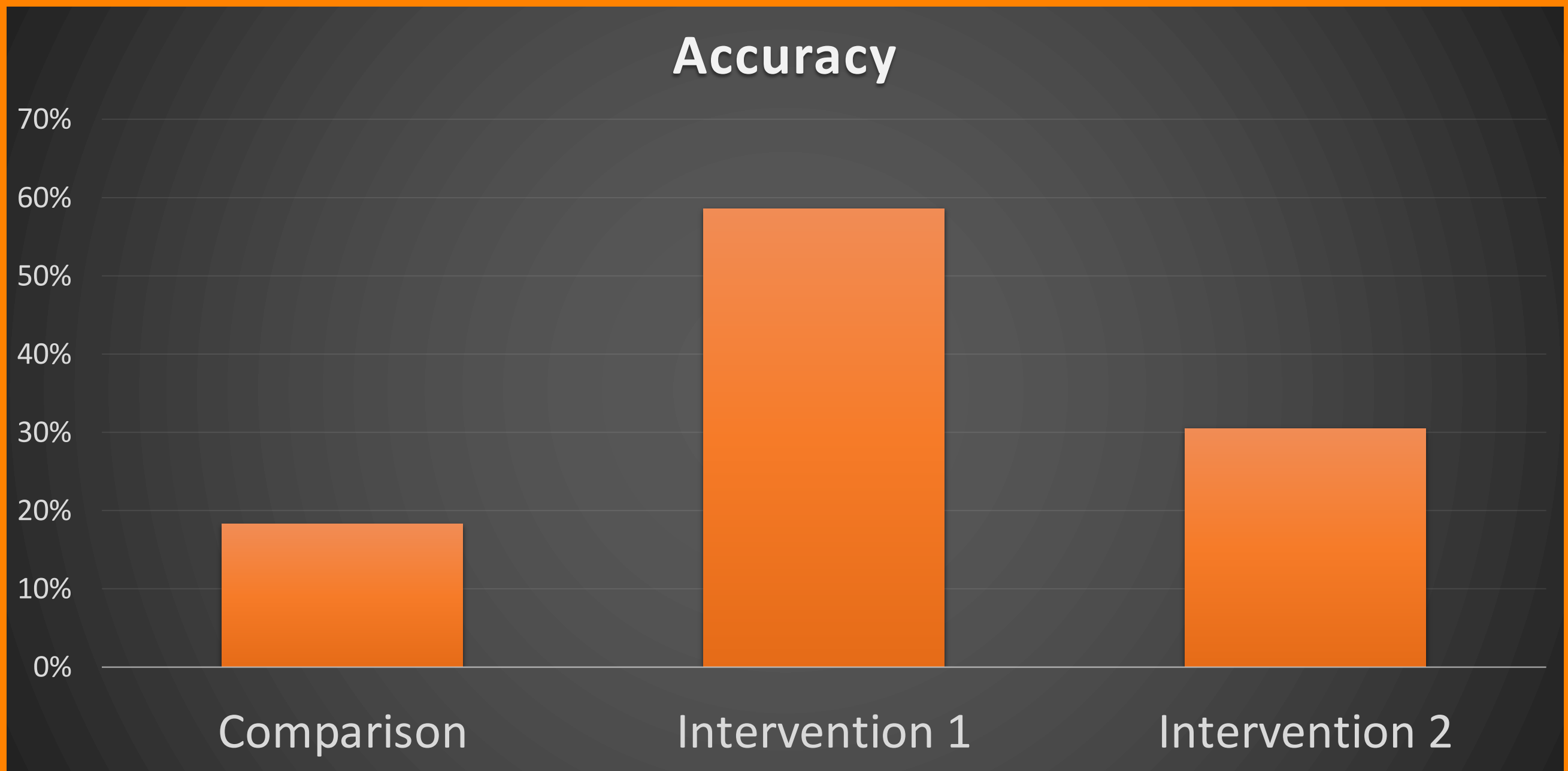
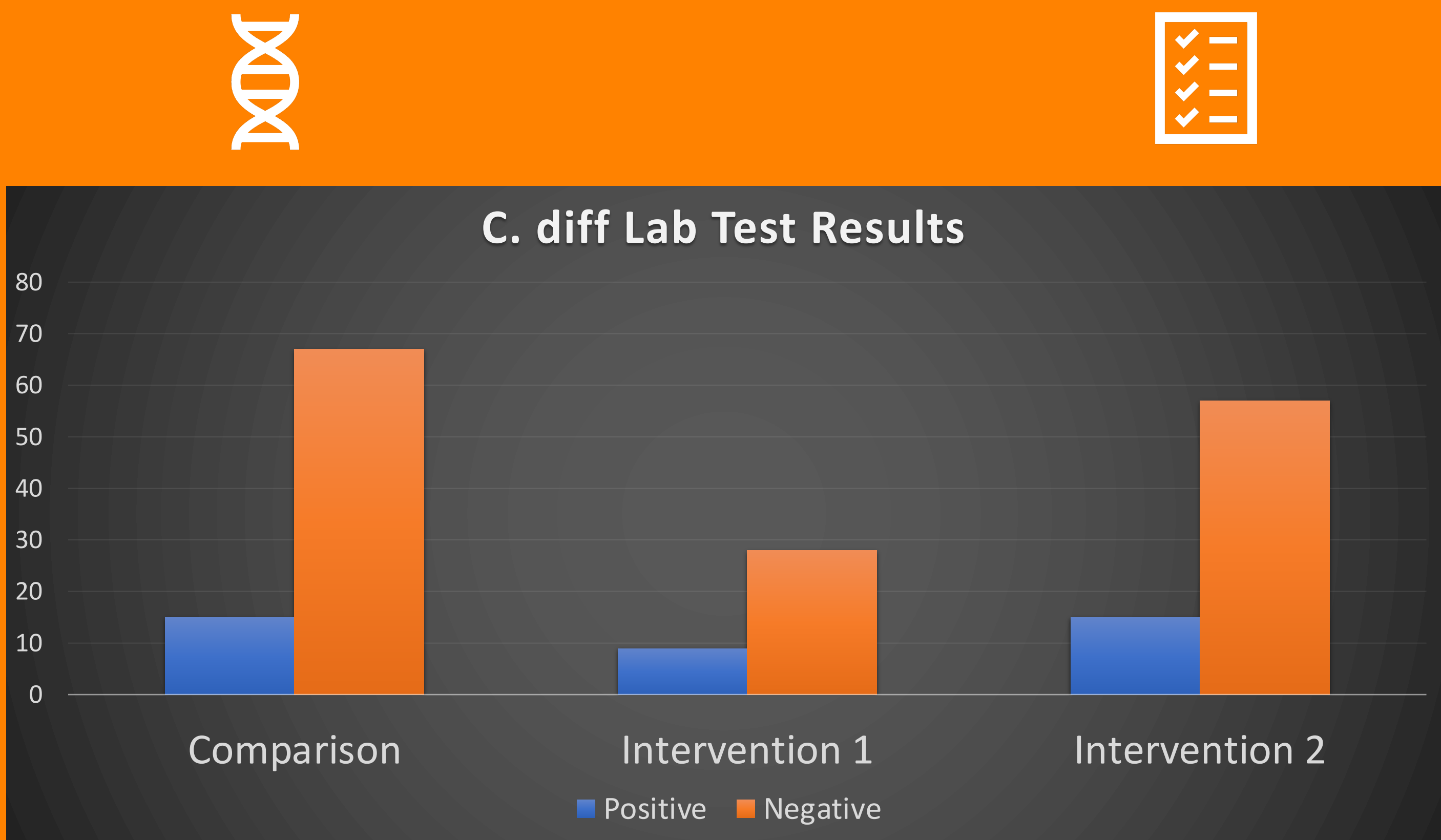
LOCAL PROBLEM

- The site for this evidence-based practice improvement project is a 73-bed ICU in a nonprofit hospital in downtown Knoxville
- Prior to the implementation of the practice change intervention, every patient with any loose stool in the previous 24 hours was selected for CDI isolation and testing. This over-selection led to compliance <50%³.
- The purpose of this project was to increase the specificity of the screening tool while
- The aims of the project were:
 - Maintain sensitivity of the current screening tool
 - Decrease unnecessary intervention and isolation by at least 2%

METHODS

- The Evidence-based Practice Improvement process model was used as the framework for this project.
- Literature search and critical appraisal demonstrated good and consistent evidence supporting use of multi-step screening for CDI and administration of CDI screening by bedside nursing staff
- CDI risk and confounding factors were collected during literature review to develop a clinical decision-making algorithm for CDI isolation and intervention.
- Outcome measures screening tool accuracy and selectivity were measured for a 3-month implementation period and compared against the current tool.
- Dissemination was performed to the ICU director and infection prevention committee at the project site

Excluding patients who had no risk factors and one or more confounding factors from CDI isolation and testing improved accuracy while maintaining sensitivity of the screening tool. In this sample, this creates an opportunity to spare ten patients from isolation and testing. It also saves the hospital \$11,000 in isolation measures⁵.



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INTERVENTIONS

- Patients who had one or more loose stool in the previous 24 hours flag the comparison screening tool. The patients who flagged this tool and were admitted to ICU were audited for selected risk and confounding factors
- Two different criteria were created based on the selected contextual factors
 1. All patients with at least 2 risk factors automatically flag the screening tool
 2. Patients with no risk factors and 1 or more confounding factors were excluded from CDI isolation and lab testing

Proposed *Clostridium difficile* screening algorithm for patients with at least one loose stool in the past 24 hours, to be administered for the first three mornings of admission

Risk Factors	Confounding Factors
<ul style="list-style-type: none">• Multi-antibiotic therapy• Proton pump inhibitor therapy• Fever >38°C• Unexplained leukocytosis	<ul style="list-style-type: none">• Presence of known gastrointestinal bleeding• Presence of laxative agents (including tube feed, osmotic and stimulant laxatives, prokinetics, lactulose, and kayexalate)• Chronic irritable bowel syndrome with diarrhea• Less than 3 loose stools in a 24-hour period

Screening for CDI interventions:
Any patient with no risk factors and 1 or more confounding factors should not receive CDI interventions.
Any patient with 2 or more risk factors, regardless of confounding factors, should receive CDI interventions.
Note: CDI interventions include sending a stool specimen for lab testing and placing the patient in contact enteric precautions until they receive a negative lab test result

RESULTS

- During the 3 months prior to implementation, 247 patients were selected for isolation and intervention, 32 of whom tested positive (12.9% accuracy)
- During the 3 months of prospective data collection:
 - The current tool determined 82 patients should be selected, 15 of whom were positive (18%)
 - The first intervention criteria determined 37 patients should be selected, 9 of whom were positive (58% accuracy, 60% relative selectivity)
 - The second intervention criteria determined 72 patients should be selected, 15 of whom were positive (31% accuracy, 100% relative selectivity)

CONCLUSIONS

- Accounting for contextual factors can improve CDI screening if done in such a way to improve accuracy while maintaining selectivity⁴.
- Excluding patients with no risk factors and 1 or more confounding factors improved the screening tool on both of those counts.