Impact of a stool multiplex PCR rapid diagnostic test on antibiotic prescribing in patients hospitalized with diarrhea of suspected infectious etiology

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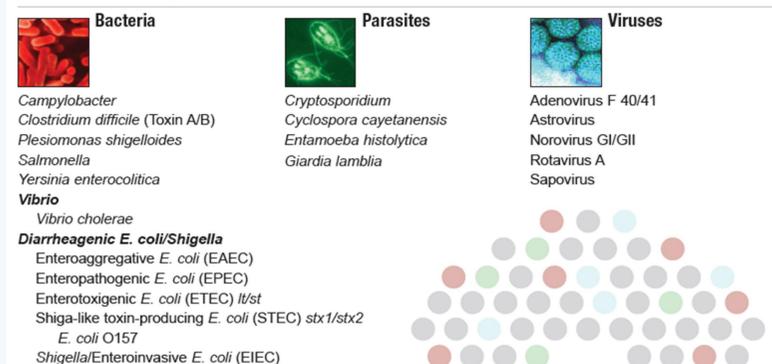Phone: 303-602-6986

ID Week poster #213

Background

❖ Rapid diagnostic tests are being increasingly utilized in clinical practice, but their impact on clinical care has not been adequately described.

❖ In December 2014, the FilmArray® Gastrointestinal (GI) Panel (Stool PCR) was implemented at Denver Health.

FilmArray® Gastrointestinal Panel
1 Test. 22 Targets. All in about an hour.

Bacteria
Campylobacter
Clostridium difficile (Toxin A/B)
Plesiomonas shigelloides
Salmonella
Yersinia enterocolitica
Vibrio
 Vibrio cholerae
Diarrheagenic E. coli/Shigella
 Enteroaggregative E. coli (EAEC)
 Enteropathogenic E. coli (EPEC)
 Enterotoxigenic E. coli (ETEC) lt/st
 Shiga-like toxin-producing E. coli (STEC) stx1/stx2
  E. coli O157
 Shigella/Enteroinvasive E. coli (EIEC)

Parasites
Cryptosporidium
Cyclospora cayetanensis
Entamoeba histolytica
Giardia lamblia

Viruses
Adenovirus F 40/41
Astrovirus
Norovirus GI/GII
Rotavirus A
Sapovirus

Objectives

❖ To assess the diagnostic yield of the Stool PCR

❖ To evaluate the effect of the Stool PCR on antimicrobial management in patients hospitalized with diarrhea of suspected infectious etiology
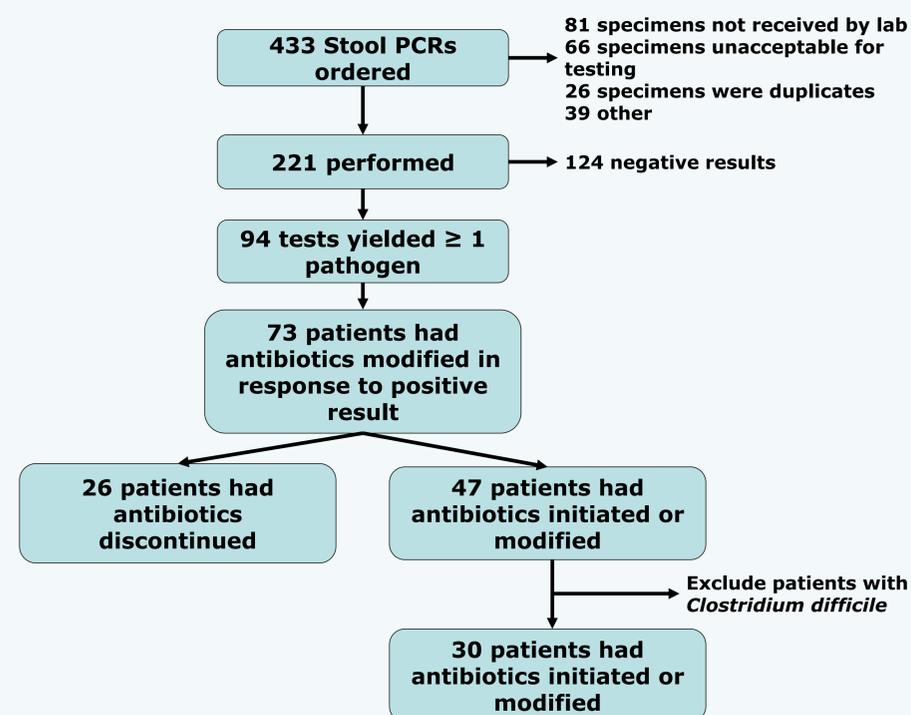
Methods

❖ Retrospective cohort study

❖ All inpatients who had Stool PCR ordered between December 2014 and February 2016 were identified from our hospital data warehouse.

❖ We performed manual chart review of each case where the Stool PCR detected a pathogen to determine clinical management.

❖ The primary outcome of interest was the frequency of initiation, change, or discontinuation of antimicrobial therapy based on the Stool PCR result.
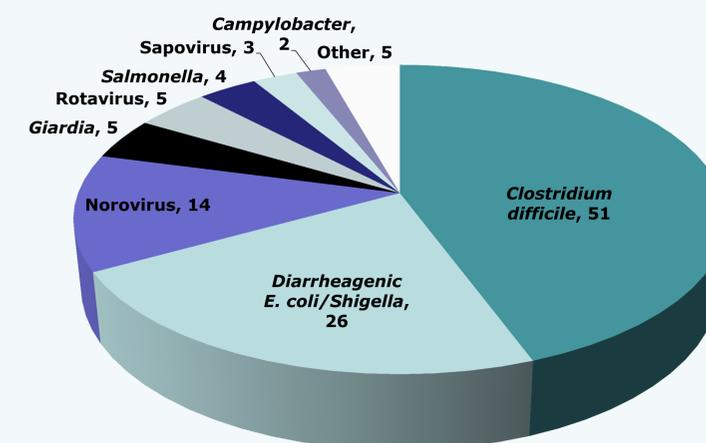
Results

Demographics, n= 94

Male	62 (66%)
Age, median (IQR)	53 (43-64)
Diabetes	25 (27%)
HIV	14 (15%)
Inflammatory bowel disease	5 (5%)
Immunosuppression	18 (19%)
Length of stay, median (IQR)	5 (3-10)

433 Stool PCRs ordered →
81 specimens not received by lab
66 specimens unacceptable for testing
26 specimens were duplicates
39 other

221 performed → 124 negative results

94 tests yielded ≥ 1 pathogen

73 patients had antibiotics modified in response to positive result

26 patients had antibiotics discontinued

47 patients had antibiotics initiated or modified → Exclude patients with *Clostridium difficile*

30 patients had antibiotics initiated or modified

Pathogens detected by Stool PCR

Pie chart:
- Clostridium difficile, 51
- Diarrheagenic E. coli/Shigella, 26
- Norovirus, 14
- Giardia, 5
- Rotavirus, 5
- Salmonella, 4
- Sapovirus, 3
- Campylobacter, 2
- Other, 5

Patients with Stool PCR+ for Clostridium difficile, n=51

Azithromycin 3 (6%)	Levofloxacin 10 (19%)	Vancomycin PO 34 (67%)
Cefazolin 3 (6%)	Metronidazole 36 (71%)	Other 8 (16%)
Cefepime 8 (16%)	Piperacillin/tazobactam 6 (12%)	
Ceftriaxone 17 (33%)	Vancomycin IV 16 (31%)	

Patients with Stool PCR+ for bacteria or parasite, excluding Clostridium difficile, n=25

Azithromycin 6 (24%)	Fluconazole 3 (12%)	Vancomycin IV 7 (28%)
Cefepime 8 (32%)	Levofloxacin 17 (68%)	Other 6 (24%)
Ceftriaxone 9 (36%)	Metronidazole 16 (64%)	
Ciprofloxacin 3 (12%)	TMP/SMX 6 (24%)	

Patients with Stool PCR+ for virus only, n=15

Cefepime 2 (13%)	Piperacillin/tazobactam 3 (20%)	Other 6 (40%)
Metronidazole 5 (33%)	Vancomycin IV 3 (20%)	

Conclusions

❖ In hospitalized patients, the use of a multiplex stool PCR diagnostic test led to a change in antibiotic prescribing in 17% of cases in which it was ordered and 78% of cases in which a pathogen was identified.

❖ When a pathogen was identified by Stool PCR, antibiotics were discontinued in 28% of cases. Antibiotics were initiated or modified in 50% of cases.

❖ **Limitation**: This study did not address appropriateness of antibiotic management. Additionally, antibiotics prescribed may have been for infections other than infectious diarrhea.

❖ **Future direction**: Our antimicrobial stewardship program can focus on appropriate use of antibiotics in patients with a pathogen identified by Stool PCR including minimizing use of broad spectrum antibiotics in patients with *Clostridium difficile* as well as optimal treatment of other pathogens detected by Stool PCR.