and 54% were women. On chart review, 149 patients (33%) received an antibiotic, of whom 126 had a positive rapid strep result. Thus, based on chart review, 23 subjects (5%) diagnosed with pharyngitis received antibiotics inappropriately. Amoxicillin or penicillin was prescribed for 100 of the 126 children (79%) with a positive rapid strep test. Of the 126 children with a positive test, 114 (90%) received the correct antibiotic: amoxicillin, penicillin, or an appropriate alternative antibiotic due to b-lactam allergy. Duration of treatment was correct for all 126 children. Using the electronic algorithm, the proportion of inappropriate prescribing was 28 of 450 (6%). The test characteristics of the electronic algorithm (compared to gold standard chart review) for identification of inappropriate antibiotic prescribing were sensitivity (99%, 422 of 427); specificity (100%, 23 of 23); positive predictive value (82%, 23 of 28); and negative predictive value (100%, 422 of 422). **Conclusions:** For children with pharyngitis, an electronic algorithm for identification of inappropriate antibiotic prescribing is highly accurate. Future work should validate this approach in other settings and develop and evaluate the impact of an audit and feedback intervention based on this tool.

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Poster Presentation

Development of National Infection Control and Prevention Guidelines in Georgia, 2017–2019

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Background: In 2015, the Ministry of Internally Displaced Persons from the Occupied Territories, Labor, Health and Social Affairs (MoLHSA) of Georgia identified infection prevention and control (IPC) as a top priority. Infection control legislation was adopted and compliance was made mandatory for licensure. Participation in the universal healthcare system requires facilities to have an IPC program and infrastructure. To support facilities to improve IPC, MoLHSA and the National Center for Disease Control and Public Health (NCDC) requested assistance from the US CDC to revise the 2009 National IPC guidelines, which were translated versions of international guidelines and not adapted to the Georgian context. **Methods:** An IPC guideline technical working group (TWG), comprising clinical epidemiologists, IPC nurses, head nurses, and infectious diseases doctors from the NCDC, academic and healthcare organizations and the CDC was formed to lead the development of the national IPC guidelines. Additionally, an IPC steering committee was established to review and verify the guidelines' compliance with applicable decrees and regulations. The TWG began work in April 2017 and was divided into 4 subgroups, each responsible for developing specific guideline topics. A general IPC guideline template for low- and middle-income countries was used to develop 7 of the guidelines. Additional reference materials and international guidelines were used to develop all the guidelines. Drafts were shared with the subgroups and the steering committee during 2 workshops to discuss unresolved technical issues and to validate the guidelines. **Results:** The revised guidelines consist of 18 topics. In addition to standard precautions (eg, hand hygiene, personal protective equipment, injection safety, etc) and transmission-based precautions, the guideline topics include laundry, environmental cleaning and disinfection, decontamination and sterilization, occupational health and safety, biosafety in clinical laboratory, blood bank and transfusion services, intensive care unit, emergency room, and mortuary. They do not include healthcare-associated infection surveillance or organism-specific guidance. To supplement the guidelines, a separate implementation manual was developed. The guidelines were approved by MoLHSA in October 2019. The TWG continues to be engaged in IPC activities, assisting with guideline rollout, training, and monitoring, and drafting the National IPC strategy and action plans. **Conclusions:** The Georgian Ministry of Health developed national IPC guidelines using local experts. This model can be replicated in other low- and middle-income countries that lack country-specific IPC guidelines. It can also be adapted to develop facility-level guidelines and standard operating procedures.

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Diagnostic Stewardship Effectively Reduces Healthcare-Onset *Clostridioides difficile* Infections and Concurrent Laxative Use

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Background: *Clostridioides difficile* infection (CDI) accounts for >500,000 community-, nursing-, and hospital-acquired infections (HAIs), as well as 15,000–30,000 deaths, and >$4.8 billion in the United States annually. *C. difficile* toxin B gene nucleic acid amplification testing (NAAT) cannot distinguish between active CDI and colonization, particularly in the setting of laxative use or enteral feeding. Lack of judicious testing can result in the incorrect diagnosis of CDI, unnecessary CDI treatment, increased costs, and falsely augmented HAI rates. Like many healthcare facilities, the VA San Diego Healthcare System (VASDHS) solely utilizes *C. difficile* NAAT for CDI diagnosis. The aim of this study was to implement and evaluate a facility-wide initiative at the VASDHS to reduce healthcare onset, healthcare facility associated CDI (HO-HCFA CDI), including

Table 1. Characteristics of HO-HCFA CDI Cases at the VASDHS for FY 2015 through FY 2018*

	FY 2015 N=44	FY 2016 N=36	FY 2017 N=34	FY 2018 N=13	P Value †	P Value‡
Age, Median (IQR), y	69 (17.5)	69 (8)	67 (11.5)	71 (11)	0.50	0.10
Gender						
Male	42 (95.5)	35 (97.2)	32 (94.1)	13 (100)	0.59	0.52
Female	2 (4.5)	1 (2.8)	2 (5.9)	0 (0)		
Clinical Characteristics						
Diabetes Mellitus	17 (38.6)	11 (30.6)	12 (35.3)	5 (38.4)	0.63	0.55
End Stage Renal Disease	4 (9.1)	2 (5.6)	5 (14.7)	1 (7.6)	0.68	0.46
Previous History of *C. difficile* Infection	6 (13.6)	8 (22.2)	6 (17.6)	2 (15.4)	0.59	0.61
Clear Escalation of Laxative Use Within 24-48 Hrs of Testing	20 (45.5)	14 (38.9)	11 (32.3)	4 (30.1)	0.60	0.27
Tube Feeds Within 48 Hrs of Testing	7 (15.9)	1 (2.8)	5 (14.7)	1 (7.7)	0.41	0.46
Antibiotic Use Within 3 months of Testing	36 (81.8)	31 (86.1)	30 (88.2)	10 (76.9)	0.56	0.29
PPI Use	26 (59.1)	21 (58.3)	16 (47.1)	1 (7.7)	**0.001**	**0.01**
Immunosuppression§	8 (18.2)	7 (19.4)	10 (29.4)	4 (30.8)	0.26	0.60
CDI Characteristics						
Positive *C. difficile* Toxin B Gene NAAT per month, Median (IQR)	3.5 (4)	3.0 (4)	2.5 (3)	1.0 (2)	**0.005**	**0.02**
Severity						
Non-Severe	17 (38.6)	15 (41.7)	14 (41.2)	7 (58.3) ‖	0.43	0.68
Severe	19 (43.2)	15 (41.7)	12 (35.3)	3 (25.0) ‖		
Fulminant	8 (18.2)	6 (16.7)	8 (23.5)	2 (16.7) ‖		
Treatment						
Metronidazole only	17 (38.6)	15 (41.7)	9 (26.5)	3 (23.1)	0.25	0.57
Vancomycin only	12 (27.3)	6 (16.7)	12 (35.3)	7 (53.8)	0.10	0.32
Vancomycin AND metronidazole	14 (31.8)	14 (38.9)	13 (38.2)	3 (23.1)	0.41	0.27
Fidaxomicin	1 (2.3)	0 (0)	0 (0)	0 (0)	-	-
IVIg	1 (2.3)	0 (0)	0 (0)	0 (0)	-	-
Fecal Microbiota Transplant	0 (0)	0 (0)	0 (0)	0 (0)	-	-
Not Treated	0 (0)	1 (2.8)	0 (0)	0 (0)	-	-
Cost, Median (IQR), $	257 (183)	184 (179)	184 (203)	101 (117)	**0.005**	**0.02**

*Data is represented as number (%) of *N* unless otherwise specified. †Comparisons pre- and post-implementation of all interventions to reduce HO-HCFA CDI case incidence (comparing FY 2015 to FY 2018). ‡Comparisons pre- and post-implementation of the *C. difficile* test ordering algorithm (comparing FY 2017 to FY 2018). Categorical variables were compared using χ^2 analysis and the Fisher exact test for small cell counts. Numeric variables were compared using ANOVA, Mann-Whitney U and Kruskal-Wallis tests. $P < 0.05$ was considered to be significant for all statistical tests. §Immunosuppression was defined as any patient on systemic corticosteroids, immunomodulator or biologic therapy, and/or treated with chemotherapy within 3 months of CDI diagnosis. ‖Percentage calculated out of *N* -1 due to lack of laboratory data for a single case. *C. difficile* infection severity is based on criteria in the "Clinical Practice Guidelines for *Clostridium difficile* Infection in Adults and Children: 2017 Update by the Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA)." Abbreviations: IQR = interquartile range, y = years, IVIg = intravenous immunoglobulin.

the use of a test ordering algorithm. **Methods:** From fiscal year (FY) 2015–2018, various measures were implemented including a hand hygiene initiative, reduction in fluoroquinolone usage, prompt isolation of patients with CDI, thorough terminal cleaning of rooms, and, lastly, a test-ordering algorithm starting FY2018. A retrospective study was performed to assess VASDHS HO-HCFA CDI case incidence, risk factors for infection, laxative or enteral feeding use at the time of testing, and CDI treatment. **Results:** Patient demographic data, medical history, CDI history, laxative use, treatment, and cost of CDI treatment were reviewed. From 2015 to 2018, 127 cases of HO-HCFA CDI were identified. The total number of HO-HCFA CDI cases and medication cost for CDI treatment were dramatically reduced from 2017 to 2018 following implementation of the test-ordering algorithm (Table 1, Fig. 1). This trend corresponded to a significant reduction in median HO-HCFA CDI cases per month ($P = .02$), medication cost of CDI treatment ($P = .02$), and proton pump inhibitor (PPI) use at the time of testing ($P = .01$). The number of positive HO-HCFA CDI cases associated with laxative use or escalation at the time of CDI testing (accounting for those on chronic laxatives) also decreased across the study period—most dramatically from 2015 vs 2016 (20 vs 14) and 2017 vs 2018 (11 vs 4) (Table 1). **Conclusions:** At the VASDHS, diagnostic stewardship of *C. difficile* NAAT with the use of a test-ordering algorithm significantly reduced HO-HCFA CDI incidence and

41 Suppl 1 2020

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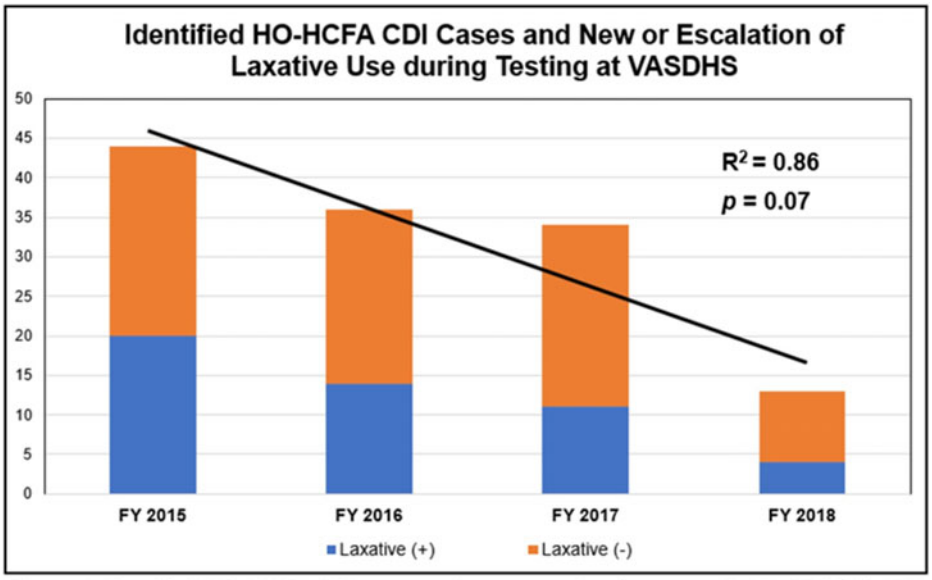

Figure 1. Identified HO-HCFA CDI cases and concurrent laxative use at the VASDHS for FY 2015 through 2018. The most dramatic reduction in HO-CDI cases and laxative use/escalation during testing was noted in FY 2018 following the implementation of a C. difficile test ordering algorithm that incorporated diagnostic criteria and recommended the exclusion of patients on laxatives from testing. Trendline for total HO-HCFA CDI cases per FY ($p = 0.07$, $R^2 = 0.86$).

Fig. 1.

treatment cost. This trend also corresponded with significantly less PPI use at the time of testing and reduced detection of colonization among patients with laxative-induced diarrhea. Diagnostic stewardship may serve as an effective tool to correctly diagnose and treat HO-HCFA CDI, while significantly reducing treatment costs.

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Diagonal Interventions in Infection Prevention: Successful Collaboratives to Decrease CLABSI at a VA Health Care System

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Background: Vertical interventions in public health are disease focused, whereas horizontal interventions are systems based. The new concept of "diagonal interventions" merging these 2 approaches is also applicable to infection prevention (IP). During fiscal year (FY) 2016, our facility identified 14 central-line–associated blood stream infections (CLABSIs), resulting in a rate of 1.44 cases per 1,000 catheter days, twice that of FY2015 (0.75 cases per 1,000 catheter days). **Methods:** Focusing on a horizontal "systems building" approach, the IP team used previously developed informal relationships to mobilize a formal multidisciplinary team comprised of IP, nursing educators, the intravenous therapy team, and frontline staff. Initially charged with implementation of disinfecting caps for needleless connectors, the IP team capitalized on this multidisciplinary resource to launch a multifaceted communication and education campaign supporting CLABSI-specific interventions. For vertical interventions, an IP risk assessment revealed variations in care and maintenance of central lines and the need for staff education. A literature search was conducted to identify evidence-based strategies for reducing CLABSIs, leading to the development of a nursing-led bundle of the following elements: (1) education on CDC hand hygiene guidelines, (2) central-line competency validation and assessment for nurses on hire and annually, (3) standardized processes across all wards for central-line dressing changes ("timed on Tuesdays"), and (4) a pilot program for disinfecting caps on 3 inpatient wards. The IP team identified CLABSIs using standard NHSN definitions. Catheter days were obtained on each inpatient ward. Unit-specific rates were calculated per 1,000 catheter days. Mann-Kendall Test was used to assess rate trends over time, whereas the Fisher exact test was used for rate comparisons. A $P < .05$ was considered significant. **Results:** CLABSI rates decreased from 1.44 in FY2016 to 0.12 in FY2019 (Kendall $\tau = -0.5$; $P < .001$) (Fig. 1). During the 3-month pilot phase of disinfecting caps, no CLABSIs were identified on 3 intervention wards versus 3 CLABSIs on control wards (rate, 0 vs 2.57; $P = .27$) and 1 CLABSI in the 3-month baseline period prior to the intervention (0 vs 0.40; $P > .99$). Disinfecting caps were expanded house-wide beginning in FY2018. The multidisciplinary team evolved into a sustained collaborative ("Scrub Club") meeting biweekly. They have now broadened their focus to quality improvement initiatives for multiple healthcare-associated infections (HAIs). **Conclusions:** The IP team has traditionally utilized vertical