757. Evaluating Use of the New ICD-10 Codes for *Clostridioides difficile* Infection in the Premier U.S. Hospital Discharge Database

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Session: P-36. HAI: C. difficile

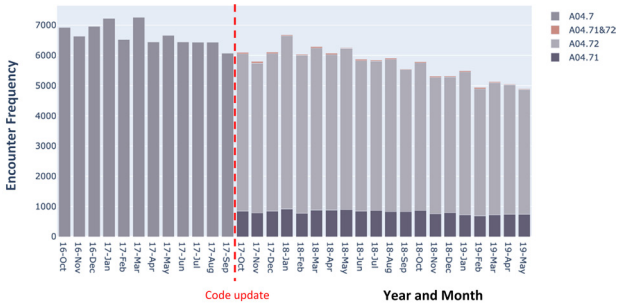
Background. The single ICD-10 code for Clostridioides difficile infection (CDI) A04.7 was replaced in Oct 2017 with two codes delineating "recurrent CDI" (rCDI, A04.71) and "nonrecurrent CDI" (nrCDI, A04.72). This study aims to evaluate and validate use of the new ICD-10 codes for CDI among inpatient encounters at hospitals contributing to the Premier Healthcare Database (PHD).

Methods. This retrospective study included inpatient encounters with a CDI-related ICD code between Oct 2016-May 2019 in the PHD. Trends in CDI-related ICD coding were examined pre- and post- the Oct 2017 code update. Post Oct 2017, CDI-related inpatient encounters were characterized by clinical, facility, and provider variables, and whether coding was concordant or discordant to the 2017 IDSA guidelines 'within 60-days (2 months) from index CDI episode' time window for capturing rCDI. Multivariable regression examined variables associated with concordant coding.

Results. There was widespread adoption of the new CDI codes across hospitals in the PHD in Oct 2017. Post-Oct 2017, a total of 21,446 CDI-related encounters met sample selection criteria. About 67% of rCDI encounters and 25% of nrCDI encounters were coded concordantly. In the overall sample, the rCDI vs. nrCDI-coded encounters ($p< 0.05$) had higher proportions with emergency room admission, admitted by a gastroenterologist or infectious disease specialist, and receiving fidaxomicin, bezlotoxumab or FMT. Trends in inpatient characteristics for rCDI vs. nrCDI-coded encounters did not differ by coding concordance status. In regression analyses, encounters coded concordantly were significantly more likely to be for rCDI (OR 5.67), a non-elective admission (OR 1.17-1.42), or prescribed fidaxomicin (OR 1.11), or FMT (OR 1.29).

Conclusion. There was no delay in transition to the new CDI-related ICD codes across hospitals in the PHD. Important for disease management, drug treatment trends for encounters coded as rCDI vs. nrCDI were consistent with guideline-recommendations for CDI. Coding concordance status based on the IDSA 60-day time window for identifying rCDI did not affect direction of observed trends in descriptive analyses, suggesting that other validation methods maybe needed.

Encounter Frequency



Inpatient Encounter Frequency by ICD code type pre- and post- 2017 code update at Hospitals contributing to the Premier Healthcare Database

Frequency Table

Frequency of recurrent CDI (rCDI) and Non-Recurrent CDI (nrCDI) by Clinical, Facility and Provider Characteristics

Variables*	Overall (n=21446)			Concordant (n=9070)			Discordant (n=12376)		
	rCDI only	nrCDI only	p-value	rCDI within 60 days	nrCDI after 60 days	p-value	rCDI after 60 days	nrCDI within 60 days	p-value
ICU admission			<0.001			<0.001			<0.001
No	7650 (87.81%)	10633 (83.50%)		5100 (87.51%)	2614 (80.63%)		2550 (88.42%)	8019 (84.48%)	
Yes	1062 (12.19%)	2101 (16.50%)		728 (12.49%)	628 (19.37%)		334 (11.58%)	1473 (15.52%)	
AHRQ Elixhauser Comorbidity Score (mean, SD)	8.65, 9.23	8.33, 9.31	0.009	8.7, 9.23	8.8, 9.37	0.12	8.55, 9.25	8.17, 9.29	0.06
Discharge Type			<0.001			0.56			<0.001
Home	5480 (62.90%)	7134 (56.02%)		3589 (61.58%)	1955 (60.30%)		1891 (65.57%)	5179 (54.56%)	
Healthcare facility (Hospice, SNF, transferred)	3213 (36.88%)	5548 (43.57%)		2228 (38.23%)	1283 (39.57%)		985 (34.15%)	4265 (44.93%)	
Expired	5 (0.06%)	32 (0.25%)		3 (0.05%)	1 (0.03%)		2 (0.07%)	31 (0.33%)	
Unknown/others	14 (0.16%)	20 (0.16%)		8 (0.14%)	3 (0.09%)		6 (0.21%)	17 (0.18%)	
Admitting Physician Specialty			<0.001			<0.001			<0.001
Gastroenterology	27 (0.31%)	27 (0.21%)		14 (0.24%)	11 (0.34%)		13 (0.45%)	16 (0.17%)	
Hospitalist	3533 (40.55%)	4569 (35.88%)		2316 (39.74%)	1196 (36.89%)		1217 (42.20%)	3373 (35.53%)	
Infectious Diseases	41 (0.47%)	47 (0.37%)		30 (0.52%)	10 (0.31%)		11 (0.38%)	37 (0.39%)	
Internal Medicine	13 (0.15%)	36 (0.28%)		9 (0.15%)	8 (0.25%)		4 (0.14%)	28 (0.30%)	
Oncologist	76 (0.87%)	226 (1.77%)		49 (0.84%)	71 (2.19%)		27 (0.94%)	155 (0.16%)	
Other	5022 (57.64%)	7829 (61.48%)		3410 (58.51%)	1946 (60.02%)		1612 (55.89%)	5883 (61.80%)	

*CDI diagnosis assessed using ICD-10 codes for rCDI (A04.71) and nrCDI (A04.72)

Resource and Cost Table

Healthcare resource use and costs associated with recurrent CDI (rCDI) and Non-Recurrent CDI (nrCDI)

Variables	Overall (n=21446)			Concordant (n=9070)			Discordant (n= 12376)		
	rCDI only (n=8712)	nrCDI only (n=12734)	p-value	rCDI within 60 days	nrCDI after 60 days	p-value	rCDI after 60 days	nrCDI within 60 days	p-value
HEALTHCARE RESOURCE USE	n (%)	n (%)		n (%)	n (%)		n (%)	n (%)	
Length of Hospital Stay (n,%)									
Overall, med [SD]	6 [4, 9]	6 [3, 10]	0.06	6 [4, 10]	6 [4, 10]	0.57	6 [4, 9]	6 [3, 10]	0.63
1-2 day	1068 (12.26%)	1918 (15.06%)	<0.001	714 (12.25%)	414 (12.77%)	0.55	354 (12.27%)	1504 (15.84%)	<0.001
3-7 days	4467 (51.27%)	6130 (48.14%)		2939 (50.43%)	1598 (49.29%)		1528 (52.98%)	4532 (47.75%)	
>7 days	3177 (36.47%)	4686 (36.80%)		2175 (37.32%)	1230 (37.94%)		1002 (34.74%)	3456 (36.41%)	
CDI Treatment (n,%)									
Single Agent			<0.001			<0.001			<0.001
fidaxomicin (FDX) only	267 (3.06%)	121 (0.95%)		189 (3.24%)	19 (0.51%)		78 (2.70%)	102 (1.07%)	
metronidazole (MTZ) only	143 (1.64%)	739 (5.80%)		97 (1.66%)	166 (4.44%)		46 (1.60%)	573 (6.04%)	
Oral vancomycin (VAN) only	3730 (42.81%)	6596 (51.80%)		2439 (41.85%)	1644 (43.93%)		1291 (44.76%)	4952 (52.17%)	
Combo treatments									
FDX and MTZ	706 (8.10%)	289 (2.27%)		486 (8.34%)	88 (2.35%)		220 (7.63%)	201 (2.12%)	
Oral VAN and FDX	557 (6.39%)	241 (1.89%)		373 (6.40%)	88 (2.35%)		184 (6.38%)	153 (1.61%)	
Oral VAN and MTZ	2963 (34.01%)	3745 (29.41%)		2021 (34.68%)	1020 (27.26%)		942 (32.66%)	2725 (28.71%)	
Adjunctive therapies			0.31			0.51			0.62
bezlotoxumab	15 (0.17%)	5 (0.04%)		9 (0.15%)	1 (0.03%)		6 (0.21%)	4 (0.04%)	
FMT	206 (2.36%)	30 (0.24%)		140 (2.40%)	7 (0.19%)		66 (2.29%)	23 (0.24%)	
HEALTHCARE COST**									
Total Cost per encounter (median)			<0.001			<0.001			<0.001
Total	$10,450.18	$10,755.44	0.61	$10,490.28	$11,503.87	<0.001	$10,376.66	$10,506.31	0.52
Hospital services	$6,572.97	$6,500.55	0.03	$6,652.00	$6,873.00	0.046	$6,408.00	$6,351.00	0.095
Medical procedures	$633.46	$867.45	<0.001	$634.82	$913.13	<0.001	$630.31	$844.95	<0.001
Supply and equipment	$83.62	$124.54	<0.001	$88.85	$168.90	<0.001	$75.69	$109.21	0.001
Drugs	$1,208.10	$1,089.68	<0.001	$1,218.88	$1,241.49	0.105	$1,186.43	$1,053.13	<0.001
Diagnostics	$1,009.27	$991.91	<0.001	$998.39	$1,155.52	<0.001	$1,029.18	$933.05	<0.001

*CDI diagnosis assessed using ICD-10 codes for rCDI (A04.71) and nrCDI (A04.72)
FMT – Fecal Microbiota Transfer

Regression Table

Regression of concordance status of ICD coding on clinical, facility, and provider characteristics

Variables	OR	95% CI	*p-value*
ICD-code for CDI			
Non-recurrent	REF	REF	
Recurrent	5.67	[5.32, 6.03]	<0.001
Admission Type			
Elective	REF	REF	
Emergency	1.69	[1.49, 1.91]	<0.001
Urgent	1.42	[1.23, 1.64]	<0.001
Trauma Center	1.35	[0.68, 2.68]	0.4
Unknown	2.21	[1.53, 3.19]	<0.001
ICU Admission	1.17	[1.07, 1.27]	<0.001
Length of Stay	1.01	[1.00, 1.01]	<0.001
Treatment			
vancomycin	1.09	[1.00, 1.19]	0.06
fidaxomicin	1.11	[1.01, 1.23]	0.03
metronidazole	1.05	[0.99, 1.12]	0.13
bezlotoxumab	0.54	[0.22, 1.36]	0.19
FMT	1.29	[1.17, 1.42]	<0.001

R-squared = 0.132; Coding Concordance (1=concordant, 0=discordant)

Disclosures. **Abhishek Deshpande, MD, PhD**, **Merck & Co., Inc** (Consultant, Shareholder)**The Clorox Company** (Grant/Research Support) **Yiyun Chen, PhD**, **Merck & Co., Inc** (Employee) **Eugenia Boye-Codjoe, MPH**, **Merck & Co., Inc** (Employee) **Engels N. Obi, PhD**, **Merck & Co.** (Employee, Shareholder)

758. Increased Prevalence of *Clostridioides difficile* Infection During the COVID-19 Pandemic Among Hospitalized Veterans in South Texas, USA

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Session: P-36. HAI: C. difficile

Background. *Clostridioides difficile* infection (CDI) continues to be a major global public health concern, particularly during the ongoing SARS-CoV-2 coronavirus disease 2019 (COVID-19) pandemic. Despite new social distancing guidelines and enhanced infection control procedures (e.g., masking, hand hygiene) being implemented since the beginning of COVID-19, little evidence indicates whether these changes have influenced the prevalence of CDI hospitalizations. This study aims to measure CDI prevalence before and during the COVID-19 pandemic in a local cohort of U.S. Veterans.

Methods. This was a cross-sectional study of all Veterans presenting to the South Texas Veterans Health Care System in San Antonio, Texas from Jan 1, 2019 to Apr 30, 2021. Monthly laboratory confirmed CDI events were collected overall and categorized as the following: hospital-onset, healthcare facility-associated (HO-HCFA-CDI), community-onset, healthcare facility-associated CDI (CO-HCFA-CDI), and community-associated CDI (CA-CDI). Monthly confirmed COVID-19 cases were also collected. CDI prevalence was calculated as CDI events per 10,000 bed days of care (BDOC) and was compared between pre-pandemic (Jan 2019-Feb 2020) and pandemic (Mar 2020-Apr 2021) periods.

Results. A total of 285 CDI events, 920 COVID-19 cases, and 104,220 BDOC were included in this study. The overall CDI rate increased from 20.33 per 10,000 BDOC pre-pandemic to 34.51 per 10,000 during the pandemic ($p< 0.0001$). This was driven primarily by a rise in CO-HCFA-CDI rates (0.95 vs 2.52 per 10,000 BDOC; $p< 0.0001$) during the pandemic, followed by increases in CA-CDI (15.58 vs. 18.61 per 10,000 BDOC; $p< 0.0001$) and HO-HCFA-CDI (2.66 vs. 5.43 per 10,000 BDOC; $p< 0.0001$). Lastly, CDI rates have tripled since the start of the pandemic (March-Apr 2020) compared to the current year (March-Apr 2021) (14.69 vs. 43.76 per 10,000 BDOC).

Conclusion. Overall, CDI prevalence increased during the COVID-19 pandemic, driven mostly by an increase in CO-HCFA-CDI. As COVID-19 rates increased, CDI rates also increased, likely due to greater healthcare exposures and antibiotic use. Continued surveillance of COVID-19 and CDI is warranted to further decrease infection rates

Disclosures. **All Authors**: No reported disclosures

759. Impact of *Clostridium difficile (CD)* Nucleic Acid Amplification Test (NAAT) Approval on Hospital-Onset *C. difficile* Infection (HO-CDI): A Diagnostic Stewardship Intervention.

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Background. NAAT is highly sensitive in detecting toxigenic CD but if used inappropriately can lead to overdiagnosis and financial penalties. Despite diligent infection control (IC) measures, HO-CDI rates at our hospital remained above target benchmarks. We implemented mandatory CD testing approval to decrease HO-CDI rates.

Methods. On 7/1/2019, we implemented CD testing approval for stool samples collected after admission day 3 in our 129-bed community hospital. An algorithm instructed providers about approval granted by IC 7 days-a-week. The micro-lab would not process samples unless pre-approved. We prospectively collected data on demographics, ICU, laxative, antibiotic use, CDI signs/symptoms, prior CDI and outcomes (length of stay, in-hospital death) and estimated unadjusted relative risk ratios comparing those whose test was approved vs not approved. We also performed an interrupted time series analysis to assess the trend change of CD testing and HO-CDI per 1000 patient days (x 1000-PD) in the 18 months following the intervention (7/2019 - 12/2020) compared to the pre-intervention period (01/2018 - 6/2019). Lastly, using the National Healthcare Safety Network criteria, we calculated pre and post-intervention Standard Infection Ratios (SIR).

Results. A total of 72 samples required CD testing authorization; 65 (90%) were approved. Baseline demographics, in-hospital death and length of stay were similar in both groups, but approved patients were 4 times as likely to have ≥ 3 loose stools in 24h compared to not approved. The number of CD tests was 13 at baseline with a decrease of 6 tests in the 1st month of intervention (95% CI: -10.0, - 1.35), followed by an insignificant decline in the monthly trend (-0.14; 95%CI: -0.49, 0.20). There were 22 HO-CDI pre-intervention and 10 post-intervention. Pre-intervention, incidence of HO-CDI was 0.51 cases x 1000-PD and increased every month by 0.11 (95% CI: 0.07,0.16). In July 2019, there was a significant decline of 1.16 case x 1000-PD (95% CI: -1.99, -0.33), followed by monthly decline (-0.16; 95% CI: -0.23, -0.09). Our calculated SIR after the intervention decreased to 0.77 from 1.03.

Table 1. Baseline characteristic and outcomes of patients that required C. difficile NAAT testing after day 3 of hospital admission between July 2019 and December 2020.

	Total N=72	Not Approved[1] N=7	Approved N=65	Unadjusted Relative Risk (95%CI)
	mean (std dev)			
Age (years)	67.2 (15.2)	62.5 (24.3)	67.7 (14.3)	1.00 (0.99,1.01)
Total length of stay (days)	18.8 (17.1)	19.5 (20.5)	18.8 (16.9)	1.00 (0.99,1.00)
Time of test from admission (days)	9.4 (7.3)	13.8 (12.8)	9.0 (6.6)	0.99 (0.97,1.01)
		N (Col %)		
Gender				
Male	29 (41%)	3 (50%)	26 (40%)	Referent
Female	42 (59%)	3 (50%)	39 (60%)	1.03 (0.89,1.20)
ICU				
No	52 (72%)	5 (71%)	47 (72%)	Referent
Yes	20 (28%)	2 (29%)	18 (28%)	0.99 (0.84,1.18)
Laxative or stool softener in last 24h				
No	65 (90%)	6 (86%)	59 (91%)	Referent
Yes	9 (10%)	1 (14%)	6 (9%)	0.94 (0.69,1.29)
Elevated WBC				
No	38 (53%)	5 (71%)	33 (51%)	Referent
Yes	34 (47%)	2 (29%)	32 (49%)	1.08 (0.93,1.25)
Fever in last 24 hours				
No	53 (74%)	7 (100%)	46 (71%)	Referent
Yes	19 (26%)	0 (0%)	19 (29%)	-
Antibiotics in the last 7 days				
No	11 (15%)	3 (43%)	8 (12%)	Referent
Yes	61 (86%)	4 (57%)	57 (88%)	1.28 (0.89,1.86)
Diarrhea on admission				
No	52 (72%)	5 (71%)	47 (72%)	Referent
Yes	20 (28%)	2 (29%)	18 (28%)	0.99 (0.84,1.18)
>= 3 loose stool in 24 hours				
No	8 (11%)	6 (86%)	2 (3%)	Referent
Yes	64 (89%)	1 (14%)	63 (97%)	3.94 (1.17,13.19)
Prior Hx of C. difficile				
No	62 (87%)	4 (67%)	58 (89%)	Referent
Yes	9 (13%)	2 (33%)	7 (11%)	0.83 (0.58,1.19)
Already tested for C. difficile this admission				
No	65 (92%)	5 (83%)	60 (92%)	Referent
Yes	6 (8%)	1 (17%)	5 (8%)	0.90 (0.63,1.30)
In hospital death or hospice				
No	62 (87%)	6 (100%)	56 (86%)	Referent
Yes	9 (13%)	0 (0%)	9 (14%)	-

[1]Insufficient data available for one patient in this group

Trends of CD testing and HO-CDI in the pre-intervention and post-intervention period

Figure 1A. Trend of C. difficile testing after hospital day 3 in the pre-intervention period (January 2018 – June 2019) and post-intervention period (July 2019 – December 2020)

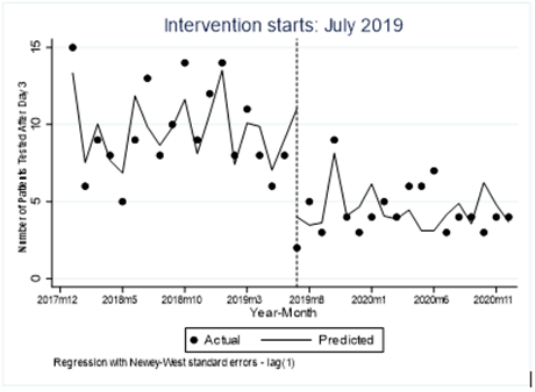
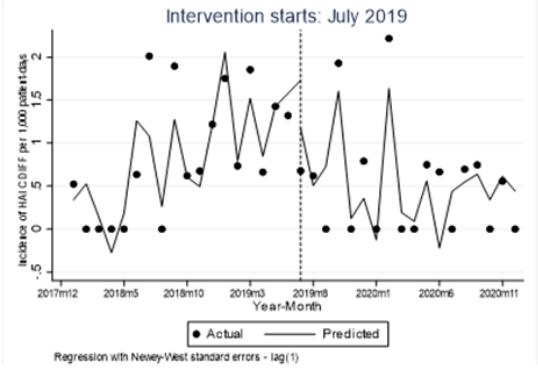


Figure 1B. Trend of HO-CDI incidence in the pre-intervention period (January 2018 – June 2019) and post-intervention period (July 2019 – December 2020)



Model notes: Models accounted for grand mean centered monthly proportion of patients who female, monthly proportion of patients who were in the ICU, monthly average patient age, and seasonality as well as a single lag.