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than toxin EIAs to detect colonization rather than true disease. Limited data indicate patients positive by toxin EIA (toxin+) have worse outcomes than those positive by NAAT (NAAT+) only, suggesting toxin EIA detects true infection more often than NAAT. We used multisite CDI surveillance data from the Centers for Disease Control and Prevention's Emerging Infections Program to compare clinical course and outcomes between toxin+ and NAAT+ only patients.

Methods. A case was defined as a positive *C. difficile* test in a person ≥ 1 year old with no positive tests in the prior 8 weeks. Cases detected during 2014–2015 by a testing algorithm using toxin EIA and NAAT were classified as toxin+ or NAAT+ only. Medical charts were reviewed. Death data were obtained from state death registries. Multivariable logistic regression models were used to compare CDI recurrence and 90-day mortality between the two groups, adjusting for age, sex, race, Charlson comorbidity index, and receipt of oral vancomycin. For the outcome of recurrence, we also adjusted for history of CDI in the prior 6 months.

Results. Of 4,878 cases, 2160 (44%) were toxin+ and 2,718 (56%) were NAAT+ only. Toxin+ cases were more likely than NAAT+ only cases to be ≥ 65 years old (48% vs. 38%; $P < 0.0001$), have white blood cells $\geq 15,000/\mu\text{L}$ ($483/1,539$ [31%] vs. $423/1,978$ [21%]; $P < 0.0001$), and have received oral vancomycin ≤ 3 days of diagnosis (32% vs. 29%; $P = 0.03$). Comparing toxin+ to NAAT+ only cases, 21% vs. 11% had a recurrence ($P < 0.0001$), of which 71% vs. 33% had a toxin+ recurrence ($P < 0.0001$), and 10% vs. 9% died ≤ 90 days of diagnosis ($P = 0.12$). In multivariable analysis, a toxin+ result was associated with recurrence (adjusted odds ratio [aOR]: 1.89, 95% CI: 1.61–2.22) but not with 90-day mortality (aOR: 0.99; 95% CI: 0.81–1.22).

Conclusion. Toxin+ CDI is more severe by some markers and more likely to recur as toxin+. However, there was no difference in adjusted mortality, which may reflect an effect on mortality in NAAT+ only cases from mild CDI, receipt of unnecessary CDI treatment, or other factors.

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491. Clinical Manifestations and Outcomes of *Clostridium difficile* Infection in Long-Term Care Patients: An 8-Year Retrospective Cohort Study

Suganya Chandramohan, MD¹; Amar Krishna, MD¹; Parminder Viridi, MD¹; Jordon Polistico, MD²; Nikhila Thammineni, MD¹; Anupamdeep Singh Mehar, MD¹; Angad Singh Gill, MD¹; Aleena Saleem, MD¹; Ibtehaj Javed, MD¹; Dania Qaryoute, MD¹; Daniel Deporre, MS²; Pingping Zhang, MS Statistics³; Kirstin Heinrich, MPH⁴; Elisa Gonzalez, MSc⁴ and Teena Chopra, MD, MPH¹; ¹Division of Infection Control and Hospital Epidemiology, Detroit Medical Center, Detroit, Michigan, ²Wayne State University School of Medicine, Detroit, Michigan, ³Vaccines Medical Development and Scientific/Clinical Affairs, Pfizer Inc., Collegeville, Pennsylvania, ⁴Health Economics and Outcomes Research, Pfizer, Inc., Collegeville, Pennsylvania

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Background. Residents of long-term care facilities (LTCF) have high risk of *Clostridium difficile* infection (CDI) and its associated adverse outcomes. We describe the clinical characteristics and outcomes of CDI in LTCF patients admitted to an acute care (AC) hospital.

Methods. This is a descriptive retrospective study of CDI patients admitted to Detroit Medical Center (DMC) from LTCF from January 2009 to December 2017. Patients identified through chart review as having CDI on admission or within 48 hours of admission and without recent AC hospitalization in the prior 4 weeks were included. CDI and CDI severity were defined based on 2017 clinical consensus guidelines. Definitions: CDI—Either presence of diarrhea or evidence of ileus or megacolon and either presence of *C. difficile* toxin in stool or evidence of pseudomembranous colitis. Severe CDI—Presence of white blood counts $\geq 15,000$ and serum creatinine > 1.5 mg/dL. Complicated CDI—Presence of either toxic megacolon, sepsis, systemic inflammatory response syndrome, colonic perforation, or requiring ICU admission. Demographics, medical conditions, laboratory results, prior 60-day antibiotic use, CDI treatment, and outcomes were collected. Patients' follow-up extended 90 days; however, data were limited to hospital charts from index admission or readmission to the same hospital.

Results. Among the 85 patients who met the inclusion criteria, 45 (53%) were female, the mean age was 76 (SD: 16), and the median Charlson index score was 6 (range: 4–8). The common source of prior 60-day antimicrobial exposure was β -lactam/ β -lactamase inhibitors (39%), Flagyl (15%), vancomycin (18%). The majority of patients were treated with flagyl (71%), 41% with vancomycin and 17% with concurrent or sequential flagyl and vancomycin. Majority of CDI patients (56%) experienced severe CDI with 25% experiencing complicated CDI. During the 90-day follow-up period, 32% of patients required readmission (within 30 days of discharge) for recurrent CDI and 15% of patients died in the hospital.

Conclusion. CDI patients admitted to DMC from LTCF experience considerable clinical burden. Further research is warranted toward understanding the burden of CDI among LTCF patients admitted to AC facilities.

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492. Long-Term Outcomes of *Clostridium difficile* Infection Among Medicare Beneficiaries

Kelly M. Hatfield, MSPH¹; James Baggs, PhD¹; Lisa G. Winston, MD^{2,3}; Erin Parker, MPH⁴; Brittany Martin, MPH³; James I. Meek, MPH⁴; Danyel Olson, MS, MPH⁴; Monica M. Farley, MD, FIDSA^{2,5}; Andrew Revis, MPH⁶; Stacy Holzbauer, DVM, MPH^{7,8}; Maria Bye, MPH⁷; Lucy Wilson, MD, ScM⁹; Rebecca Perlmutter,

MPH⁹; Erin C. Phipps, DVM, MPH¹⁰; Rebecca Pierce, PhD, MS, BSN¹¹; Valerie L.S. Ocampo, RN, MPH¹¹; Marion A. Kainer, MBBS, MPH¹²; Miranda Smith, MPH¹²; L. Clifford McDonald, MD¹; John A. Jernigan, MD, MS¹ and Alice Guh, MD, MPH¹; ¹Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia, ²Medicine, University of California, San Francisco and Zuckerberg San Francisco General Hospital and Trauma Center, San Francisco, California, ³California Emerging Infections Program, Oakland, California, ⁴Connecticut Emerging Infections Program, Yale School of Public Health, New Haven, Connecticut, ⁵Department of Medicine, Emory University School of Medicine and Atlanta VA Medical Center, Atlanta, Georgia, ⁶Georgia Emerging Infections Program, Atlanta, Georgia, ⁷Minnesota Department of Health, Saint Paul, Minnesota, ⁸Division of State and Local Readiness, Office of Public Health Preparedness and Response, Centers for Disease Control and Prevention, Atlanta, Georgia, ⁹Maryland Department of Health, Baltimore, Maryland, ¹⁰New Mexico Emerging Infections Program, University of New Mexico, Albuquerque, New Mexico, ¹¹Acute and Communicable Disease Prevention, Oregon Health Authority, Portland, Oregon, ¹²Tennessee Department of Health, Nashville, Tennessee

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Background. *Clostridium difficile* infection (CDI) is a common healthcare-associated infection, particularly among older adults. We used laboratory-confirmed CDI surveillance data from 8 states participating in the Centers for Disease Control and Prevention's Emerging Infections Program linked to claims data for Centers for Medicare and Medicaid Services (CMS) beneficiaries to measure variation in 1-year outcomes associated with CDI.

Methods. A CDI case was defined as a positive *C. difficile* stool test in 2014 in a person without a positive test in the prior 8 weeks. Cases aged ≥ 65 years were linked to their CMS beneficiary ID using unique combinations of date of birth, sex, and zip code. Each case was matched to five control beneficiaries who did not link to any case and were residents of the same catchment area. Inclusion criteria were continuous fee-for-service Medicare for the entire study period (1 year before and after event date), and no hospitalization or skilled nursing facility stay with an ICD-9-CM code for CDI in the year prior to their match date. Multivariable logistic regression models were used to compare mortality and hospitalization for 1 year following the event date between beneficiaries with and without CDI, adjusting for age, sex, race, catchment area, chronic conditions, number of hospitalizations in the prior year, and hospitalization status at the time of and 7 days preceding the event date.

Results. Of 5,097 cases aged ≥ 65 , 3,082 (60%) were linked to a CMS ID, and 1,832 (59%) met inclusion criteria. In crude analysis, 34% of beneficiaries with CDI died within 1 year, compared with 5% of beneficiaries without CDI. Beneficiaries with CDI were also more likely to be hospitalized in the subsequent year (54% vs. 17%). Beneficiaries with CDI had a higher adjusted odds of death (adjusted OR 3.01, 95% CI: 2.46, 3.69) and hospitalization within 1 year (adjusted OR 1.93, 95% CI: 1.65, 2.25) than those without CDI.

Conclusion. Older adults with CDI were three times more likely to die in the year following infection and nearly two times more likely to be hospitalized compared with those without CDI, revealing independent long-term risk of poor outcomes. This excess morbidity and mortality supports the need to develop novel CDI prevention strategies for this population.

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493. Development of a Simple *Clostridium difficile* Infection Clinical Risk Prediction Tool for Medical Inpatients

Winnie Ma, BSc (Pharm), ACPR¹; Torey Lau, BSc (Pharm), ACPR²; Vivian Leung, BSc (Pharm), PharmD, ACPR³; Victoria Su, BSc (Pharm), PharmD, ACPR⁴; Joseph Puyat, PhD, MSc, MA (Psych)⁵ and Stephen Shalansky, BSc (Pharm), ACPR, Pharm.D¹; ¹Pharmacy, St. Paul's Hospital, Vancouver, BC, Canada, ²University of British Columbia Faculty of Medicine, Vancouver, BC, Canada, ³Pharmacy, Surrey Memorial Hospital, Surrey, BC, Canada, ⁴St. Paul's Hospital, Vancouver, BC, Canada, ⁵Centre for Health Evaluation and Outcome Sciences, Vancouver, BC, Canada

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Background. Prevention of *Clostridium difficile* infection (CDI) remains a significant healthcare challenge. Risk prediction tools can potentially identify high-risk patients and allow for early prophylactic interventions. Various tools have been studied but none have been widely adopted. Our objective was to develop a simple risk prediction tool to identify medicine inpatients at high risk for developing primary CDI.

Methods. We conducted a retrospective, single-centre case-control study including patients admitted to the internal medicine service at our institution with a positive *C. difficile* polymerase chain reaction assay in loose stool. Controls were randomly selected from the same population. Risk factors for CDI were identified using univariate and multivariate logistic regression analyses. A model was created using variables that minimized Akaike Information Criterion and yielded higher area under the curve values.

Results. A total of 314 patients were included (157 with CDI and 157 controls). Variables included in the final 5-point, 3-variable risk prediction tool were age, modified Horn's index and antibiotic use within 3 months. The tool demonstrated good discrimination with a C statistic of 0.79 and model optimism of 0.04 based on a bootstrap sample of 2,000 replicates.

Conclusion. Our simple 3-variable risk prediction tool based on age, disease severity and recent antibiotic use facilitates rapid bedside assessment by clinicians to