CLOSTRIDIOIDES DIFFICILE IN ALLEGHENY COUNTY, 2006-2021

Background: What is *Clostridioides difficile* (*C. diff*)?

Clostridioides difficile (*C. diff)* is a bacterium that does not normally inhabit the gut, but when introduced, especially when good gut bacteria are disrupted, can cause *Clostridioides difficile* infection (CDI). According to the Centers for Disease Control and Prevention (CDC), CDI is the leading cause of diarrhea due to antibiotic use and is one of the more common infections in health care facilities in the U.S.[1] The bacteria cause an estimated half a million infections in the U.S. each year. It is common among those who have recently taken antibiotics, especially those who are 65 years of age or older, have recently stayed in a health care facility or nursing home, are immunocompromised, or have a previous history with CDI.[2]

How is *C. diff* transmitted?

C. diff is shed in feces, which can contaminate surfaces, and if ingested, may cause infection. Poor hand hygiene is a common cause of the disease being spread between people, especially if they did not wash their hands after using the toilet. When outside of the body, *C. diff* can live for a long time on surfaces.[3] *C. diff* cannot grow well and are unlikely to cause illness in people with typical gut bacteria, but when these "good bacteria" are disrupted, which may occur during antibiotic use, *C. diff* can cause problems.[2]

How often does CDI occur in Allegheny County?

CDI is not a reportable condition in Allegheny County, so the number of infections is unknown. The number of CDI related hospitalizations and deaths among residents has been decreasing since 2006 (Table 1, Table 2, Figure 1). In 2021, there were 912 total CDI-related hospitalizations and 29 CDI-related deaths. The risk of CDI hospitalization and death was higher for seniors and females (Table 3). The decrease we see in CDI-related hospitalizations and deaths in Allegheny County since 2006 may be due to improved infection control measures in health care facilities and more responsible use of antibiotics. These measures are recommended for prevention of CDI and its complications.

How is CDI prevented?

CDI can be prevented by practicing good hand and body hygiene, as well as responsible antibiotic use. The best protection against CDI is to maintain healthy gut bacteria that help stop *C. diff* from growing in the body. Cleaning surfaces is key to preventing *C. diff* in the environment. Health care professionals should also follow CDC CDI Prevention Strategies , which include engaging in more responsible use of antibiotics, developing systems to confirm and isolate persons with CDI and placing them on contact precautions, performing routine environmental cleanings to prevent CDI, and developing infrastructure to support CDI prevention. At home, good hand washing and cleaning common touchpoints are key to preventing CDI.[4,5,6]

Table 1. CDI-related hospitalizations per 1,000 discharges by year among Allegheny County residents, 2006-2021

Year	Total CDI-related discharges	CDI as primary diagnosis	CDI as secondary diagnosis	Total discharges	CDI-related discharges per 1,000 discharges
2006	3,502	835	2,667	204,622	17.1
2007	3,293	1,061	2,232	204,107	16.1
2008	3,453	1,098	2,355	202,502	17.1
2009	3,229	980	2,249	195,362	16.5
2010	2,787	825	1,962	186,293	15.0
2011	2,306	723	1,583	183,202	12.6
2012	2,143	677	1,466	176,849	12.1
2013	2,328	764	1,564	174,072	13.4
2014	2,214	736	1,478	169,046	13.1
2015	2,074	668	1,406	166,905	12.4
2016	1,990	601	1,389	164,219	12.1
2017	1,587	495	1,092	162,381	9.8
2018	1,471	469	1,002	159,246	9.2
2019	1,124	364	760	151,211	7.4
2020	882	249	633	134,591	6.6
2021	912	259	653	136,150	6.7

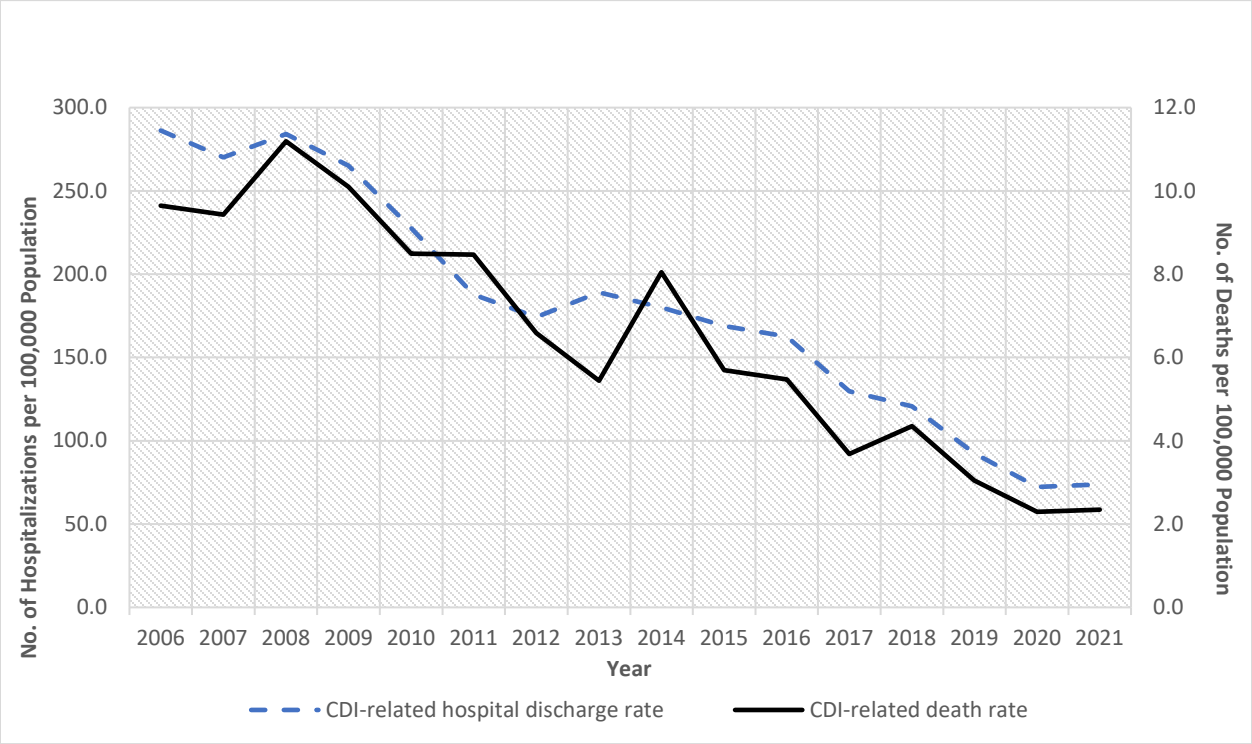
*Data source: Pennsylvania Health Care Cost Containment Council (PHC4) hospital discharge data. Note: We defined a CDI related hospitalization as one having an ICD code for CDI listed as the primary diagnosis or one of the first eight secondary diagnoses.

Table 2. CDI-related deaths per 1,000 deaths by year among Allegheny County residents, 2006-2021

Year	Total CDI-related deaths	CDI as underlying cause	CDI as contributing cause	Total deaths	CDI-related deaths per 1,000 deaths
2006	118	70	48	14,116	8.4
2007	115	70	45	13,934	8.3
2008	136	90	46	14,169	9.6
2009	123	78	45	13,619	9.0
2010	104	59	45	13,479	7.7
2011	104	62	42	13,847	7.5
2012	81	50	31	13,408	6.0
2013	67	37	30	13,512	5.0
2014	99	48	51	13,520	7.3
2015	70	42	28	13,894	5.0
2016	67	37	30	13,815	4.8
2017	45	29	16	14,133	3.2
2018	53	33	20	13,802	3.8
2019	37	18	19	13,632	2.7
2020	28	12	16	15,197	1.8
2021	29	12	17	15,256	1.9

*Data source: CDC Wonder. Note: We defined a CDI related death as any death with CDI listed as an underlying or contributing cause.

Figure 1. CDI-related hospitalizations and deaths per 100,000 population by year among Allegheny County residents, 2006-2021



*Data sources for rates: CDC Wonder (deaths), PHC4 (hospitalizations), and American Community Survey (ACS) single year population estimates

Table 3: Average annual rate of CDI-related hospitalizations and deaths by demographic characteristics among Allegheny County residents, 2006-2021

Characteristic	CDI-related discharges		CDI-related deaths	
	Average annual rate per 100,000 population	Relative Risk (95% CI)	Average annual rate per 100,000 population	Relative Risk (95% CI)
Age (in years)				
<65	70.8	REF	0.6	REF
≥65	687.8	9.7 (9.5-10.0)	32.5	57.5 (54.9-60.2)
Race				
White	186.2	REF	7.0	REF
Black	185.9	1.0 (0.8-1.2)	4.8	0.7 (0.5-1.8)
Sex				
Male	158.6	REF	5.8	REF
Female	199.8	1.3 (1.1-1.5)	7.2	1.2 (0.4-2.3)

*Data sources for rates: CDC Wonder (deaths), PHC4 (hospitalizations), and American Community Survey (ACS) single year population estimates. REF indicates the reference population – the group to which the risk is being compared

References:

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4. Weppner J, Gabet J, Linsenmeyer M, Yassin M, Galang G. *Clostridium difficile* Infection Reservoirs Within an Acute Rehabilitation Environment. Am J Phys Med Rehabil. 2021 Jan 1;100(1):44-47. doi: 10.1097/PHM.0000000000001579. PMID: 32889863.
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