

## Electronic Supplementary Material

**Article title:** Epidemiology and Risk Factors of *Clostridioides difficile* Infections in Germany: A Health Claims Data Analysis

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**Table S1** CDI incidence rates for females per the main case definition and stratified by age group, 2013–2017

Age group (in years)	2013			2014			2015			2016			2017		
	Incident CDI cases	Total person–time under risk (person-years-)	Incidence rate per 100,000 persons-years (95% CI)	Incident CDI cases	Total person–time under risk (person-years-)	Incidence rate per 100,000 persons-years (95% CI)	Incident CDI cases	Total person–time under risk (person-years-)	Incidence rate per 100,000 persons-years (95% CI)	Incident CDI cases	Total person–time under risk (person-years-)	Incidence rate per 100,000 persons-years (95% CI)	Incident CDI cases	Total person–time under risk (person-years-)	Incidence rate per 100,000 persons-years (95% CI)
Overall (18–≥85)	2,414	1,631,821	148 (142–154)	2,366	1,638,768	144 (139–150)	2,392	1,645,910	145 (140–151)	2,168	1,650,783	131 (126–137)	2,020	1,646,879	123 (117–128)
18–<50	111	766,605	14 (12–17)	147	755,943	19 (16–23)	130	748,236	17 (15–21)	128	740,536	17 (14–21)	105	726,183	14 (12–18)
50–59	130	297,263	44 (37–52)	137	304,127	45 (38–53)	139	309,569	45 (38–53)	134	312,314	43 (36–51)	125	315,257	40 (33–47)
60–64	96	136,625	70 (57–86)	119	136,742	87 (72–104)	115	134,744	85 (70–102)	97	133,075	73 (59–89)	76	131,933	58 (45–72)
65–69	142	101,331	140 (118–165)	121	106,001	114 (95–136)	137	113,798	120 (101–142)	157	125,187	125 (107–147)	145	130,366	111 (94–131)
70–74	231	116,796	198 (173–225)	260	113,911	228 (201–258)	227	107,949	210 (184–239)	224	99,276	226 (197–257)	184	96,184	191 (165–221)
75–79	407	94,449	431 (390–475)	432	100,913	428 (389–470)	449	105,556	425 (387–467)	357	108,085	330 (297–366)	334	109,448	305 (273–340)
80–84	547	63,114	867 (796–942)	482	63,065	764 (698–836)	482	66,079	729 (666–798)	442	69,513	636 (578–698)	434	73,756	588 (534–646)
≥85	750	55,638	1,348 (1,253–1,448)	668	58,066	1,150 (1,065–1,241)	713	59,978	1,189 (1,103–1,279)	629	62,796	1,002 (925–1,083)	617	63,752	968 (893–1,047)
≥65	2,077	431,328	482 (461–503)	1,963	441,957	444 (425–464)	2,008	453,360	443 (424–463)	1,809	464,858	389 (371–408)	1,714	473,506	362 (345–380)
≥70	1,935	329,996	586 (561–613)	1,842	335,956	548 (524–574)	1,871	339,562	551 (526–577)	1,652	339,671	486 (463–510)	1,569	343,140	457 (435–480)
≥75	1,704	213,201	799 (762–838)	1,582	222,045	712 (678–748)	1,644	231,612	710 (676–745)	1,428	240,394	594 (564–626)	1,385	246,956	561 (532–591)

CDI *Clostridioides difficile* infection, CI confidence interval

**Table S2** CDI incidence rates for males per the main case definition and stratified by age group 2013–2017

Age group (in years)	2013			2014			2015			2016			2017		
	Incident CDI cases	Total person–time under risk (person-years-)	Incidence rate per 100,000 persons-years (95% CI)	Incident CDI cases	Total person–time under risk (person-years-)	Incidence rate per 100,000 persons-years (95% CI)	Incident CDI cases	Total person–time under risk (person-years-)	Incidence rate per 100,000 persons-years (95% CI)	Incident CDI cases	Total person–time under risk (person-years-)	Incidence rate per 100,000 persons-years (95% CI)	Incident CDI cases	Total person–time under risk (person-years-)	Incidence rate per 100,000 persons-years (95% CI)
Overall (18–≥85)	2,095	1,559,662	134 (129–140)	2,001	1,566,186	128 (122–133)	2,162	1,577,562	137 (131–143)	1,826	1,585,510	115 (110–121)	1,839	1,578,328	117 (111–122)
18–<50	107	784,468	14 (11–16)	100	777,049	13 (10–16)	110	775,095	14 (12–17)	92	771,891	12 (10–15)	92	756,296	12 (10–15)
50–59	133	296,752	45 (38–53)	146	303,721	48 (41–57)	137	311,009	44 (37–52)	136	315,191	43 (36–51)	161	318,816	50 (43–59)
60–64	98	120,686	81 (66–99)	118	121,629	97 (80–116)	150	122,711	122 (103–143)	120	124,339	97 (80–115)	130	125,720	103 (86–123)
65–69	158	94,253	168 (143–196)	149	94,368	158 (134–185)	178	97,273	183 (157–212)	162	105,461	154 (131–179)	152	108,511	140 (119–164)
70–74	334	111,341	300 (269–334)	335	107,974	310 (278–345)	310	100,387	309 (275–345)	232	89,783	258 (226–294)	208	84,103	247 (215–283)
75–79	420	80,811	520 (471–571)	406	87,130	466 (422–514)	458	91,954	498 (453–546)	383	94,199	407 (367–449)	370	95,346	388 (350–430)
80–84	449	44,602	1,007 (916–1,104)	378	45,225	836 (754–924)	415	48,233	860 (780–947)	364	51,784	703 (633–779)	371	55,566	668 (601–739)
≥85	396	26,749	1,480 (1,338–1,634)	369	29,090	1,268 (1,142–1,405)	404	30,899	1,307 (1,183–1,441)	337	32,863	1,025 (919–1,141)	355	33,970	1,045 (939–1,160)
≥65	1,757	357,755	491 (468–515)	1,637	363,787	450 (428–472)	1,765	368,747	479 (457–502)	1,478	374,090	395 (375–416)	1,456	377,496	386 (366–406)
≥70	1,599	263,502	607 (577–637)	1,488	269,419	552 (525–581)	1,587	271,473	585 (556–614)	1,316	268,629	490 (464–517)	1,304	268,985	485 (459–512)
≥75	1,265	152,161	831 (786–878)	1,153	161,444	714 (674–757)	1,277	171,087	746 (706–788)	1,084	178,846	606 (571–643)	1,096	184,881	593 (558–629)

CDI *Clostridioides difficile* infection, CI confidence interval

**Table S3** Annual cumulative incidence of CDI stratified by CDI case definition, 2013–2017

Study year	Fully insured persons <sup>a</sup> N	Main case definition		Broad case definition		Strict case definition	
		Incident CDI patients n	Incident CDI patients per 100,000 persons (95%CI)	Incident CDI patients n	Incident CDI patients per 100,000 persons (95%CI)	Incident CDI patients n	Incident CDI patients per 100,000 persons (95%CI)
2013	3,256,861	4,289	132 (128–136)	5,660	174 (169–178)	4,278	131 (127–135)
2014	3,265,477	4,127	126 (123–130)	5,622	172 (168–177)	4,123	126 (122–130)
2015	3,290,465	4,295	131 (127–134)	5,894	179 (175–184)	4,289	130 (126–134)
2016	3,329,496	3,766	113 (110–117)	5,119	154 (150–158)	3,761	113 (109–117)
2017	3,298,162	3,630	110 (107–114)	4,928	149 (145–154)	3,625	110 (106–114)

CDI *Clostridioides difficile* infection, CI confidence interval

<sup>a</sup> Based on insured persons  $\geq 18$  years old with continuous insurance in the previous year and at least one day insurance in the first quarter of the respective year

**Table S4** Cumulative CDI incidence for females per the main case definition and stratified by age group, 2013–2017

Age group (in years)	2013			2014			2015			2016			2017		
	Incident CDI patients	Fully insured persons <sup>a</sup>	Incident CDI patients per 100,000 persons (95% CI)	Incident CDI patients	Fully insured persons <sup>a</sup>	Incident CDI patients per 100,000 persons (95% CI)	Incident CDI patients	Fully insured persons <sup>a</sup>	Incident CDI patients per 100,000 persons (95% CI)	Incident CDI patients	Fully insured persons <sup>a</sup>	Incident CDI patients per 100,000 persons (95% CI)	Incident CDI patients	Fully insured persons <sup>a</sup>	Incident CDI patients per 100,000 persons (95% CI)
Overall (18–≥85)	2,306	1,665,075	138 (133–144)	2,243	1,669,798	134 (129–140)	2,261	1,680,326	135 (129–140)	2,039	1,694,468	120 (115–126)	1,898	1,682,324	113 (108–118)
18–<50	109	783,339	14 (11–17)	142	771,818	18 (15–22)	127	764,859	17 (14–20)	119	764,516	16 (13–19)	100	743,719	13 (11–16)
50–59	125	301,060	42 (35–49)	126	307,854	41 (34–49)	130	314,631	41 (35–49)	130	319,479	41 (34–48)	121	320,158	38 (31–45)
60–64	94	138,313	68 (55–83)	112	138,223	81 (67–97)	104	136,350	76 (62–92)	94	135,446	69 (56–85)	69	133,579	52 (40–65)
65–69	130	102,353	127 (106–151)	113	106,906	106 (87–127)	128	114,886	111 (93–132)	142	126,580	112 (94–132)	136	131,541	103 (87–122)
70–74	221	118,060	187 (163–214)	250	115,054	217 (191–246)	216	109,184	198 (172–226)	206	100,364	205 (178–235)	176	97,249	181 (155–210)
75–79	385	96,162	400 (361–442)	406	102,495	396 (359–437)	415	107,174	387 (351–426)	332	109,551	303 (271–337)	315	111,129	283 (253–317)
80–84	519	65,236	796 (729–867)	456	64,963	702 (639–769)	454	68,072	667 (607–731)	409	71,282	574 (520–632)	403	75,908	531 (480–585)
≥85	723	60,552	1,194 (1,109–1,284)	638	62,485	1,021 (943–1,103)	687	65,170	1,054 (977–1,136)	607	67,250	903 (832–977)	578	69,041	837 (770–908)
≥65	1,978	442,363	447 (428–467)	1,863	451,903	412 (394–431)	1,900	464,486	409 (391–428)	1,696	475,027	357 (340–374)	1,608	484,868	332 (316–348)
≥70	1,848	340,010	544 (519–569)	1,750	344,997	507 (484–532)	1,772	349,600	507 (484–531)	1,554	348,447	446 (424–469)	1,472	353,327	417 (396–438)
≥75	1,627	221,950	733 (698–770)	1,500	229,943	652 (620–686)	1,556	240,416	647 (615–680)	1,348	248,083	543 (515–573)	1,296	256,078	506 (479–534)

*CDI Clostridioides difficile* infection, *CI* confidence interval

<sup>a</sup> Based on insured females ≥18 years old with continuous insurance in the previous year and at least one day insurance in the first quarter of the respective year

**Table S5** Cumulative CDI incidence for males per the main case definition and stratified by age group, 2013–2017

Age group (in years)	2013			2014			2015			2016			2017		
	Incident CDI patients	Fully insured persons <sup>a</sup>	Incident CDI patients per 100,000 persons (95% CI)	Incident CDI patients	Fully insured persons <sup>a</sup>	Incident CDI patients per 100,000 persons (95% CI)	Incident CDI patients	Fully insured persons <sup>a</sup>	Incident CDI patients per 100,000 persons (95% CI)	Incident CDI patients	Fully insured persons <sup>a</sup>	Incident CDI patients per 100,000 persons (95% CI)	Incident CDI patients	Fully insured persons <sup>a</sup>	Incident CDI patients per 100,000 persons (95% CI)
Overall (18–≥85)	1,983	1,591,786	125 (119–130)	1,884	1,595,679	118 (113–124)	2,034	1,610,139	126 (121–132)	1,727	1,635,028	106 (101–111)	1,732	1,615,838	107 (102–112)
18–<50	101	800,539	13 (10–15)	94	791,606	12 (10–15)	106	789,464	13 (11–16)	87	800,031	11 (9–13)	88	775,531	11 (9–14)
50–59	126	301,302	42 (35–50)	141	307,378	46 (39–54)	132	316,202	42 (35–50)	129	322,835	40 (33–47)	145	323,731	45 (38–53)
60–64	95	122,428	78 (63–95)	112	123,298	91 (75–109)	138	124,636	111 (93–131)	110	126,941	87 (71–104)	123	127,623	96 (80–115)
65–69	150	95,452	157 (133–184)	140	95,596	146 (123–173)	168	98,779	170 (145–198)	154	107,507	143 (122–168)	147	110,229	133 (113–157)
70–74	311	113,167	275 (245–307)	311	109,787	283 (253–317)	291	102,333	284 (253–319)	216	91,609	236 (205–269)	193	85,716	225 (195–259)
75–79	396	82,893	478 (432–527)	385	89,225	431 (389–477)	423	94,394	448 (406–493)	359	96,619	372 (334–412)	345	97,810	353 (316–392)
80–84	423	46,682	906 (822–997)	353	47,165	748 (672–831)	386	50,425	765 (691–846)	348	53,863	646 (580–718)	348	57,938	601 (539–667)
≥85	381	29,323	1,299 (1,172–1,437)	348	31,624	1,100 (988–1,222)	390	33,906	1,150 (1,039–1,270)	324	35,623	910 (813–1,014)	343	37,260	921 (826–1,023)
≥65	1,661	367,517	452 (430–474)	1,537	373,397	412 (391–433)	1,658	379,837	437 (416–458)	1,401	385,221	364 (345–383)	1,376	388,953	354 (335–373)
≥70	1,511	272,065	555 (528–584)	1,397	277,801	503 (477–530)	1,490	281,058	530 (504–558)	1,247	277,714	449 (424–475)	1,229	278,724	441 (417–466)
≥75	1,200	158,898	755 (713–799)	1,086	168,014	646 (608–686)	1,199	178,725	671 (633–710)	1,031	186,105	554 (521–589)	1,036	193,008	537 (505–570)

*CDI Clostridioides difficile* infection, *CI* confidence interval

<sup>a</sup> Based on insured males ≥18 years old with continuous insurance in the previous year and at least one day insurance in the first quarter of the respective year