EUCAST EUROPEAN COMMITTEE ON ANTIMICROBIAL SUSCEPTIBILITY TESTING

European Society of Clinical Microbiology and Infectious Diseases

Clinical breakpoints, epidemiological cut-off (ECOFF) values and EUCAST disk diffusion methodology for *Campylobacter jejuni* and *Campylobacter coli*

There are no clinical data relating MIC to outcome or Pk/Pd analysis indicating appropriate clinical breakpoints for *Campylobacter jejuni* and *Campylobacter coli*. It is therefore proposed that clinical breakpoints in human medicine should be based on epidemiological cut-off (ECOFF) values.

Proposed EUCAST ECOFFs for antimicrobial agents used in human and/or veterinary medicine are listed in the MIC distribution tables below. EUCAST MIC distributions are comprised of both veterinary and human clinical data from several sources worldwide.

MIC distributions and ECOFFs for *Campylobacter jejuni*

Agent	MIC (mg/L)																ECOFF (mg/L)
	≤0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	≥512	
Amoxicillin	0	0	0	0	1	1	17	27	89	135	19	40	72	0	0	0	16
Ampicillin	0	0	0	3	6	29	143	223	172	83	78	55	12	1	3	0	8
Azithromycin	507	2705	3382	1277	247	12	17	4	1	4	0	1	1	103	0	0	0.25
Chloramphenicol	0	0	0	0	0	0	3	249	263	81	17	1	0	0	0	0	16
Ciprofloxacin	9	231	3405	3931	948	158	32	13	100	939	730	368	84	27	0	0	0.5
Clindamycin	0	215	1978	3772	1792	310	73	20	16	23	27	35	0	0	0	0	0.5
Doxycycline	0	12	130	282	46	41	13	35	52	132	142	62	0	0	0	0	0.5
Erythromycin	0	2	33	607	3178	3692	2516	982	188	15	3	0	6	117	0	0	4
Florfenicol	0	1	1	8	49	1881	5849	1385	211	29	5	1	0	0	0	0	4
Gentamicin	0	7	20	625	3593	6264	708	35	1	2	0	2	41	0	0	0	2
Nalidixic acid	0	0	0	0	0	2	37	125	6424	1808	273	74	253	1888	153	6	16
Streptomycin	0	0	0	0	7	220	537	28	3	1	5	2	5	4	2	0	4
Telithromycin	1	3	8	94	1109	3499	3046	1358	169	40	93	0	0	0	0	0	4
Tetracycline	0	0	391	2030	1675	564	286	82	30	51	129	568	1271	2114	55	22	1

MIC distributions and bar charts for *C. jejuni* are also available at:
http://mic.eucast.org/Eucast2/SearchController/search.jsp?action=performSearch&BeginIndex=0&Micdif=mic&NumberIndex=50&Antib=-1&Specium=204

MIC distributions and ECOFFs for *Campylobacter coli*

Agent	MIC (mg/L)																ECOFF (mg/L)
	≤0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	≥512	
Amoxicillin	0	0	0	0	7	37	120	204	170	153	7	10	92	0	0	0	8
Ampicillin	0	0	0	0	10	30	91	211	368	266	42	69	111	10	0	0	8
Azithromycin	19	350	1085	705	198	18	6	0	0	0	0	0	1	186	0	0	0.5
Chloramphenicol	0	0	0	0	0	0	2	448	612	316	40	0	0	0	0	0	16
Ciprofloxacin	0	24	567	2130	1210	248	35	5	50	257	451	169	17	2	0	0	0.5
Clindamycin	0	10	112	654	1120	383	142	62	77	60	42	21	0	0	0	0	1
Doxycycline	0	1	13	180	69	44	23	20	69	234	245	135	17	0	0	0	1
Erythromycin	0	1	4	89	474	727	1205	778	658	299	57	34	111	675	0	0	8
Florfenicol	0	0	1	0	0	209	1712	596	49	1	0	0	0	0	0	0	4
Gentamicin	0	3	7	49	1113	2930	834	111	2	1	1	1	62	0	0	0	2
Nalidixic acid	0	0	0	0	0	0	17	57	1776	1543	331	87	249	581	105	0	16
Streptomycin	0	0	0	0	0	194	567	120	9	1	4	3	0	0	0	0	4
Telithromycin	0	0	0	0	0	0	66	110	58	23	102	257	92	66	120	0	4
Tetracycline	0	0	14	235	677	344	192	68	17	16	22	85	233	1201	113	0	2

MIC distributions and bar charts for *C. coli* are also available at:
http://mic.eucast.org/Eucast2/SearchController/search.jsp?action=performSearch&BeginIndex=0&Micdif=mic&NumberIndex=50&Antib=-1&Specium=205

Proposed EUCAST clinical breakpoints, based on ECOFFs, for agents that are used to treat patients with prolonged or severe infections are shown in the table below.

Proposed EUCAST clinical breakpoints for *Campylobacter jejuni* and *Campylobacter coli*

Antimicrobial agent	*Campylobacter jejuni*		*Campylobacter coli*	
	S≤ (mg/L)	R> (mg/L)	S≤ (mg/L)	R> (mg/L)
Ciprofloxacin	0.5	0.5	0.5	0.5
Doxycycline	1	1	1	1
Erythromycin	4	4	8	8
Tetracycline	2	2	2	2

Comments
Comments on the proposed ECOFFs and clinical breakpoints, together with supporting documentation if appropriate, should be sent before 14 September 2012 to the EUCAST Scientific Secretary (derek.brown222@btinternet.com).

Additional MIC distributions for any agent with *C. jejuni* and/or *C. coli* are also welcome. Please send data, together with details of the method used, to the EUCAST Scientific Secretary (derek.brown222@btinternet.com).

EUCAST disk diffusion methodology (for information)

The EUCAST disk diffusion methodology for *C. jejuni* and *C. coli* is a result of collaboration among several laboratories in Europe. Method development was performed in collaboration with the Netherlands Central Veterinary Institute and the Finland National Institute for Health and Welfare, and included investigation of variation in media, incubation temperature, incubation period and different reading instructions.

The suggested methodology has been evaluated in several laboratories in Europe and the inhibition zone distributions on the EUCAST database contain combined veterinary and human clinical data from several data sources. The following laboratories participated in the evaluation: Clinical Microbiology, Halmstad, Sweden; Clinical Microbiology, Kalmar, Sweden; Clinical Microbiology, Linköping, Sweden; Clinical Microbiology Unilabs, Skövde, Sweden; Clinical Microbiology, Västerås, Sweden; Dr. Mustafa and Dr. Richter OG, Salzburg, Austria; Federal Institute for Risk Assessment, Berlin, Germany; Fimlab Laboratory Oy, Tampere, Finland; Institute for Hygiene, Graz, Austria; Institute of Public Health, Zadar, Croatia; Laboratorij za Klinično Mikrobiologijo , Nova Gorica, Slovenia; Laboratorio Central de Veterinaria, Madrid, Spain; Laboratory of Gastrointestinal Pathogens, Health Protection Agency, Colindale, London, UK; Microbiology Musgrove Park Hospital, Taunton, UK; Mikrobiologian Laboaratorio, Pori, Finland; National Food and Veterinary Risk Assessment Institute, Vilnius, Lithuania; National Reference Laboratory for Campylobacter, Graz, Austria; State Veterinary and Food Institute, Dolny Kubin, Slovakia; University of Turku, Finland; Veterinary and Food Laboratory, Tartu, Estonia.

EUCAST disk diffusion methodology for *Campylobacter jejuni* and *Campylobacter coli*

Medium	Mueller-Hinton agar with 5% defibrinated horse blood and 20 mg/L β-NAD (MH-F) The MH-F plates should be dried prior to inoculation to reduce swarming (at 20-25°C overnight, or at 35°C, with the lid removed, for 15 min).
Inoculum	McFarland 0.5
Incubation	Microaerobic environment 41 ± 1°C 24 hours ± 30 minutes (Some *C. coli* isolates may not have sufficient growth after 24 h incubation. These are re-incubated immediately and inhibition zones read after a total of 40-48 h incubation).
Reading	Standard EUCAST reading instructions are used: Read MH-F plates from the front with the lid removed and with reflected light. Zone edges should be read at the point of complete inhibition as judged by the naked eye with the plate held about 30 cm from the eye.

EUCAST zone diameter distributions for *C. jejuni* are available at:
http://mic.eucast.org/Eucast2/SearchController/search.jsp?action=performSearch&BeginIndex=0&Micdif=dif&NumberIndex=50&Antib=-1&Specium=204

EUCAST zone diameter distributions for *C. coli* are available at:
http://mic.eucast.org/Eucast2/SearchController/search.jsp?action=performSearch&BeginIndex=0&Micdif=dif&NumberIndex=50&Antib=-1&Specium=205&Discstrength=-1

EUCAST proposed zone diameter ECOFFs for *Campylobacter jejuni* and *Campylobacter coli*

Antimicrobial agent (disk content)	***Campylobacter jejuni***	***Campylobacter coli***
	Proposed ECOFF (mm)	**Proposed ECOFF (mm)**
Ciprofloxacin (5 µg)	26	26
Erythromycin (15 µg)	22	20
Tetracycline* (30 µg)	30	30

*Doxycycline susceptibility is inferred from tetracycline