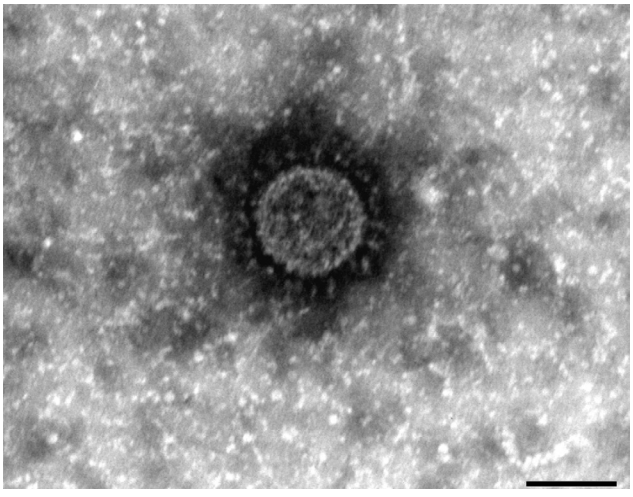

Figure. Electron micrograph of a new chimeric swine enteric coronavirus (SeCoV/GER/L00930/2012), Germany, 2012. Scale bar indicates 100 nm.

panel A, http://wwwnc.cdc.gov/EID/article/22/7/16-0179-Techapp1.pdf). The chimeric nature of the virus strain was confirmed by RT-PCR with primers spanning possible recombination sites and analysis of overlapping reads from next-generation sequencing.

Annotation of the sequence of SeCoV/GER/L00930/2012 performed on the basis of SeCoV/Italy/213306/2009 identified a similar putative coding sequence with a TGEV backbone and a spike coding sequence similar to that for PEDV (online Technical Appendix panel B). Downstream of the spike protein–coding open reading frame (ORF), an additional hypothetical ORF was identified in both SeCoV sequences. The coded amino acid sequences (27 aa in the virus from Germany and 30 aa in the virus from Italy) resembled an N- and C-terminally truncated TGEV nonstructural protein 3a. The difference of 3 aa between the 2 strains is the result of a 10-bp deletion at the 3′-end of the hypothetical ORF, which shifted the stop 3 codons to the 5′- end (online Technical Appendix Figure, panel B) in SeCoV/GER/L00930/2012. This deletion is apparently located within the potential 3′ recombination site (online Technical Appendix Figure, panel B).

It is tempting to speculate that SeCoV/Italy/213306/2009 is a precursor of SeCoV/GER/L00930/2012, and that other members of this novel genotype are still undetected. These viruses might be targets of secondary mutation and recombination events. Therefore, more chimeric CoVs should be identified to determine the potential origin of the recombination event.

In conclusion, we detected an enteric CoV that resembled the TGEV/PEDV chimeric virus reported by Boniotti et al. (*1*). Although these findings support the notion that CoV genomes are subject to mutations and recombination events, problems in disease diagnosis can be foreseen. In countries where porcine epidemic diarrhea, transmissible gastroenteritis, or both of these diseases are reportable, correct diagnosis and reporting might be difficult. Thus, diagnosticians should be aware of possible recombinants of swine CoVs. Diagnostic problems can be prevented by use of a double-check strategy with techniques specific for different genome regions. Apart from diagnostic obstacles, the effect of virus recombinations in terms of virulence and organ tropism is unknown and needs further investigations.

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Colistin-Resistant *mcr-1*–Positive Pathogenic *Escherichia coli* in Swine, Japan, 2007–2014

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To the Editor: Colistin is an old-generation antimicrobial agent; however, because it is one of the few agents that remain effective against multidrug-resistant gram-negative bacteria (e.g., carbapenem-resistant *Pseudomonas aeruginosa* and *Enterobacteriaceae*), its clinical usefulness is being increasingly recognized (*1*). Previous reports have described the mechanisms of colistin resistance (*2*) as being chromosomally mediated and not associated with horizontal gene transfer. However, from 2011 through 2014, a plasmid-encoded colistin-resistance gene, *mcr-1*, was identified in colistin-resistant *Escherichia coli* isolated in

China, particularly from animals. Specifically, *mcr-1*–positive isolates were found in 21% of healthy swine at slaughter, 15% of marketed pork and chicken meat, and 1% of hospitalized human patients (*3*). A study of *E. coli* isolated from healthy cattle, swine, and chickens in Japan during 2000–2014 found only 2 (0.02%) of 9,308 isolates positive for *mcr-1* (*4*). We report the rates at which *mcr-1* was detected in our stored collection of *E. coli* isolates from diseased swine (swine with diarrhea or edema disease), hereafter referred to as swine-pathogenic *E. coli*.

We recently analyzed swine-pathogenic *E. coli* strains isolated from diseased swine throughout Japan during 1991–2014 (*5*). We analyzed all swine disease-associated *E. coli* strains isolated from the 23 Livestock Hygiene Service Centers in Japan (including prefectures that covered 75% of total swine production in Japan in 2014) and sent to the National Institute of Animal Health for diagnostic purposes during 1991–2014. Among the 967 strains examined, 684 (71%) belonged to *E. coli* serogroup O139, O149, O116, or OSB9.

In the study reported here, we investigated these 684 strains for susceptibility to colistin and for *mcr-1* carriage. The strains from the 4 predominant serogroups (online Technical Appendix Table, http://wwwnc.cdc.gov/EID/article/22/7/16-0234-Techapp1.pdf) can be considered representative of swine-pathogenic *E. coli* strains isolated from farm animals, but not food products, in Japan. MICs were determined by using the agar dilution method according to the recommendations of the Clinical and Laboratory Standards Institute (*6*). The presence of *mcr-1* was detected by PCR (*3*).

Among the 684 strains examined, colistin MICs exhibited a bimodal distribution of 0.25–128 μg/mL and peaked at 0.5 and 16 μg/mL (online Technical Appendix Figure). According to the European Committee on Antimicrobial Susceptibility Testing criterion (*7*), in which isolates with an MIC of ≥4 μg/mL are considered colistin resistant, 309 (45%) of the 684 strains were classified as colistin resistant. The gene *mcr-1* was detected in 90 (13%) strains, and the MICs for these *mcr-1*–positive strains ranged from 8 to 128 μg/mL (online Technical Appendix Figure). Among the 309 colistin-resistant strains, *mcr-1*–positive and *mcr-1*–negative isolates had the same 50% and 90% MICs, 16 and 32 μg/mL, respectively. These results indicate that a high proportion of swine-pathogenic *E. coli* in Japan are resistant to colistin, that *mcr-1* has already been widely disseminated among these strains, and that the level of colistin resistance mediated by *mcr-1* is similar to that mediated by *mcr-1*–independent mechanisms.

In 2004, colistin-resistant *E. coli* already represented 77% of the isolates, and the positivity rates varied from year to year (26%–82%) (Figure). First detection of *mcr-1*–positive strains was in 2007, and the proportion of *mcr-1*–positivity has risen, especially since 2009 (Figure). During 2013–2014, approximately half of the strains isolated were *mcr-1* positive (Figure), and most colistin-resistant strains isolated during these 2 years carried *mcr-1* (85% and 62% in 2013 and 2014, respectively). Of note, the rates of *mcr-1*–positive strains among the 4 serogroups isolated from 2010 through 2014 did not differ significantly (χ^2 test): 22 (20%) of 110 in O139, 38 (38%) of 100 in O149, 19 (26%) of 73 in O116, and 6 (32%) of 19 in OSB9. This finding suggests that the sharp rise in the proportion of *mcr-1*–positive strains has been driven by plasmid-mediated horizontal gene transfer, not by the expansion of a specific clone.

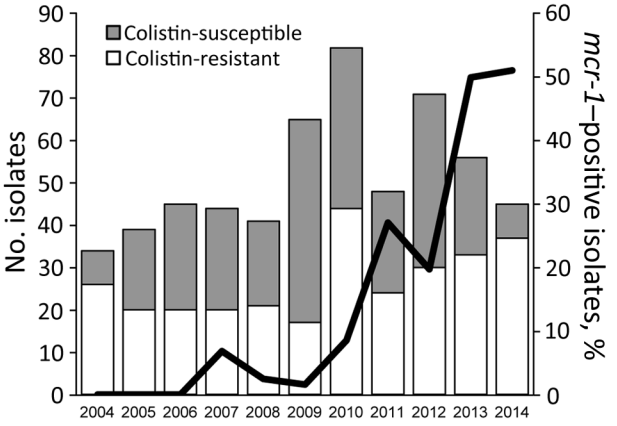

Figure. Changes in the numbers of colistin-susceptible and colistin-resistant *Escherichia coli* isolated from swine with diarrhea or edema disease, Japan, 2004–2014. The line shows the changes in proportion of *mcr-1*–positive isolates among the total isolates for each year.

In Japan, rates of isolation of colistin-resistant and *mcr-1*–positive *E. coli* strains from healthy animals are low, 1.00% and 0.02% of 9,308 strains examined, respectively (*4*). These low rates may be the result of the prudent use of colistin in Japan. During 2000–2007 in Japan, colistin use in swine did not increase significantly (*8*). However, our data show that *mcr-1* has recently been disseminated among swine-pathogenic *E. coli* in Japan, which might be associated with the use of colistin to treat disease in swine. Although *mcr-1*–positive bacteria have not yet been isolated from humans in Japan (*4*), the sharp increase in swine-pathogenic *E. coli* in animal strains implies a risk for transmission of *mcr-1* from these strains to human-pathogenic bacteria, a serious concern for human medicine. More active surveillance of *mcr-1*–positive colistin-resistant bacteria in human and animal environments is needed.

Acknowledgments

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Yellow Fever in a Worker Returning to China from Angola, March 2016

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To the Editor: Yellow fever is disease caused by a flavivirus that is transmitted to humans and nonhuman primates through the bites of infected mosquitoes. In 2013, an estimated 130,000 persons in Africa experienced fever with jaundice or hemorrhage associated with yellow fever; ≈78,000 of these infections were fatal (*1*).

Recently, an outbreak of yellow fever was reported in Angola (*2*). This serious viral disease affects persons living in and visiting tropical regions of Africa and Central and South America (*3*). No case of yellow fever had been confirmed in China until this year (*3*). With the increased population movement between Africa and China, the risk for yellow fever in China is increasing.

In March 2016, a 34-year-old man who had recently returned to China from Angola sought medical treatment at the Shanghai Public Health Clinical Center in Shanghai, China. He reported a 4-day history of malaise, myalgia, weakness, nausea, vomiting, and fever reaching 38.8°C. The patient had been treated with several antimicrobial drugs when he was in Angola, but symptoms did not resolve. He had no history of immunodeficiency or immune-inhibitory drug use. No endocrine, metabolic, or autoimmune abnormalities were found.

Nine years earlier, the patient had undergone cardiac valve replacement for rheumatoid heart disease and was currently receiving warfarin therapy. Because his treating physicians were concerned about the potential effect of yellow fever vaccine on the patient's international normalized ratio (ratio of reference to measured prothrombin times), the patient traveled to Africa for work without receiving vaccination for yellow fever.

Physical examination revealed a temperature of 37°C. Neither rash nor jaundice were evident. Blood examination revealed a low leukocyte count (1.66×10^9 cells/L [reference range $3.50–9.50 \times 10^9$ cells/L]), a low absolute lymphocyte count (0.92×10^9 cells/L [$1.1–3.2 \times 10^9$ cells/L), a normal erythrocyte count (4.60×10^{12} cells/L [$4.30–5.80 \times 10^{12}$ cells/L]), and a low platelet count (43×10^9 platelets/L [$125–350 \times 10^9$ platelets/L). The patient had low levels of circulating CD3+ cells (540/mL [690–2,540/mL) and CD8+ cells (97/mL [190–1,140/mL]) and normal levels of CD4+ T-cells.

C-reactive protein level was 4.31 mg/L (reference range 0–3.0 mg/L), lactate dehydrogenase was 1,086 U/L (109–245 U/L), alanine aminotransferase was 882 U/L (7–40 U/L), total bilirubin was 13.5 μmol/L (0–17 μmol/L), and direct bilirubin was 7.4 μmol/L (0–5.4 μmol/L). The patient had normal levels of thyroid-stimulating hormone, and no DNA, nuclear, or thyroglobulin antibodies were detected.

Test results for HIV, malaria, and dengue virus infection were negative. Serum and urine samples were positive for yellow fever virus and negative for dengue and

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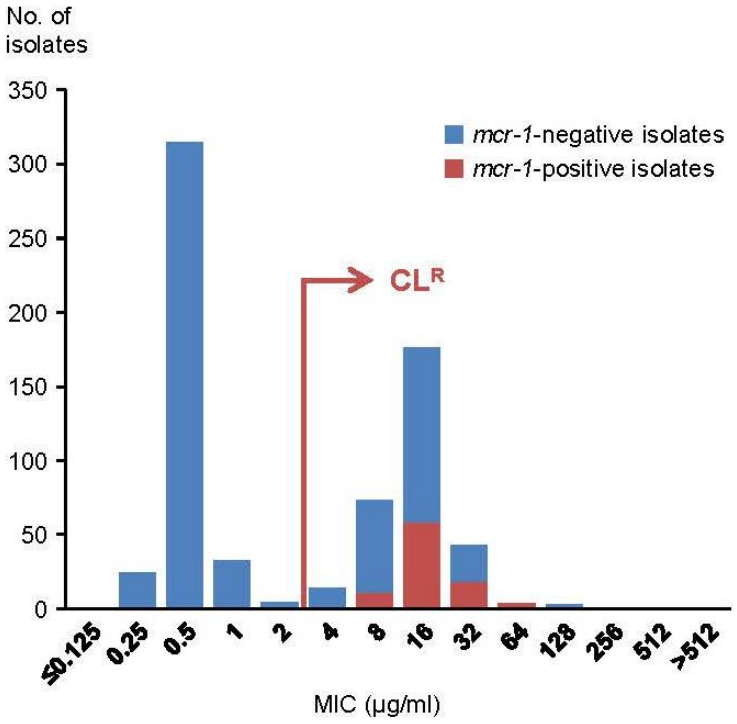
Colistin-Resistant *mcr-1*–Positive Pathogenic *Escherichia coli* in Swine, Japan, 2007–2014

Technical Appendix



Technical Appendix Figure. Distribution of the MICs of colistin for the 684 *E. coli* isolates from diseased swine in Japan between 1991 and 2014. Because the breakpoint MIC of colistin for Enterobacteriaceae has not yet been published by the CLSI (*1*), isolates with an MIC of ≥4 μg/ml were considered colistin resistant according to the EUCAST (*2*) criteria, as indicated by the red arrow. The numbers of isolates presenting each MIC are indicated with bars; *mcr-1*-negative and *mcr-1*-positive isolates are shown in blue and red, respectively. There were three and two isolates with MICs of 64 and 128 μg/ml, respectively. The MICs of colistin for the *E. coli* ATCC 25922 and *Pseudomonas aeruginosa* ATCC 27853 reference strains (0.5 and 1 μg/mL, respectively) were within the quality control ranges established by CLSI (0.25−2 and 0.5−4 μg/mL, respectively) (*1*).

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Technical Appendix Table. Information of *E. coli* isolates used in study of *mcr-1*-Positive Colistin-Resistant Pathogenic *Escherichia coli* in Swine, Japan, 2007–2014

	mcr-1	Susceptibility to colistin			Characteristic features of isolates		
Strain name	carriage*	MIC (g/mL)	Resistance†	O serogroup‡	Year	Prefecture	Reported case
E1125	+	128	R	O149	2013	T	Diarrhea
E1410	−	128	R	O116	2011	D	Diarrhea
E0610	+	64	R	O116	2012	L	Diarrhea
E0611	+	64	R	O116	2012	L	Diarrhea
E1046	+	64	R	O149	2012	H	Diarrhea
E0107	+	32	R	O116	2008	D	Diarrhea
E0658	+	32	R	O139	2010	G	Edema disease
E0912	+	32	R	O139	2013	B	Edema disease
E0924	+	32	R	O149	2013	B	Diarrhea
E0961	+	32	R	O139	2013	P	Edema disease
E1037	+	32	R	O116	2011	H	Diarrhea
E1043	+	32	R	O149	2011	H	Diarrhea
E1065	+	32	R	O149	2013	H	Diarrhea
E1128	+	32	R	O116	2013	T	Diarrhea
E1129	+	32	R	O116	2013	T	Diarrhea
E1131	+	32	R	O116	2014	T	Diarrhea
E1264	+	32	R	O149	2014	I	Diarrhea
E1266	+	32	R	O149	2014	E	Diarrhea
E1267	+	32	R	O149	2014	E	Diarrhea
E1268	+	32	R	O149	2014	E	Diarrhea
E1314	+	32	R	O149	2014	I	Diarrhea
E1401	+	32	R	O116	2011	D	Diarrhea
E1514	+	32	R	O139	2013	P	Edema disease
E0057	−	32	R	O139	2010	M	Diarrhea
E0254	−	32	R	O139	2007	S	Edema disease
E0383	−	32	R	O116	2005	F	Diarrhea
E0389	−	32	R	O116	2006	F	Diarrhea
E0392	−	32	R	O116	2008	F	Diarrhea
E0393	−	32	R	O116	2008	F	Diarrhea
E0400	−	32	R	O116	2009	F	Diarrhea
E0517	−	32	R	O139	2005	C	Edema disease
E0546	−	32	R	O139	2000	F	Edema disease
E0881	−	32	R	O139	2004	B	Edema disease
E0882	−	32	R	O139	2004	B	Edema disease
E0883	−	32	R	O139	2004	B	Edema disease
E0884	−	32	R	O139	2004	B	Edema disease
E1057	−	32	R	O139	2012	H	Edema disease
E1213	−	32	R	OSB9	2005	I	Diarrhea
E1214	−	32	R	OSB9	2006	I	Diarrhea
E1271	−	32	R	O116	2014	E	Diarrhea
E1272	−	32	R	O116	2014	E	Diarrhea
E1274	−	32	R	O116	2014	E	Diarrhea
E1275	−	32	R	O116	2014	E	Diarrhea
E1277	−	32	R	O116	2014	E	Diarrhea
E1278	−	32	R	O116	2014	E	Diarrhea
E1280	−	32	R	O116	2014	E	Diarrhea
E1282	−	32	R	O116	2014	E	Diarrhea
E0103	+	16	R	O116	2007	D	Diarrhea
E0105	+	16	R	O116	2007	D	Diarrhea
E0403	+	16	R	O116	2010	F	Diarrhea
E0404	+	16	R	O116	2011	F	Diarrhea

	mcr-1	Susceptibility to colistin			Characteristic features of isolates		
Strain name	carriage*	MIC (g/mL)	Resistance†	O serogroup‡	Year	Prefecture	Reported case
E0569	+	16	R	O149	2012	F	Diarrhea
E0662	+	16	R	O149	2011	G	Diarrhea
E0663	+	16	R	O149	2012	G	Diarrhea
E0664	+	16	R	O149	2012	G	Diarrhea
E0669	+	16	R	O149	2012	G	Diarrhea
E0685	+	16	R	O139	2010	G	Edema disease
E0688	+	16	R	O139	2010	G	Edema disease
E0692	+	16	R	O149	2011	G	Diarrhea
E0693	+	16	R	O149	2011	G	Diarrhea
E0694	+	16	R	O149	2011	G	Diarrhea
E0695	+	16	R	O149	2011	G	Diarrhea
E0696	+	16	R	O149	2012	G	Diarrhea
E0697	+	16	R	O149	2012	G	Diarrhea
E0714	+	16	R	O139	2013	E	Edema disease
E0715	+	16	R	O139	2013	E	Edema disease
E0716	+	16	R	O139	2013	E	Edema disease
E0717	+	16	R	O139	2013	E	Edema disease
E0908	+	16	R	O139	2013	B	Edema disease
E0909	+	16	R	O139	2013	B	Edema disease
E0910	+	16	R	O139	2013	B	Edema disease
E0911	+	16	R	O139	2013	B	Edema disease
E0938	+	16	R	O116	2013	B	Diarrhea
E0962	+	16	R	O139	2013	P	Edema disease
E1036	+	16	R	O149	2011	H	Diarrhea
E1052	+	16	R	O116	2012	H	Diarrhea
E1053	+	16	R	O116	2012	H	Diarrhea
E1062	+	16	R	O149	2013	H	Diarrhea
E1070	+	16	R	O149	2013	H	Diarrhea
E1104	+	16	R	O139	2010	J	Edema disease
E1122	+	16	R	O149	2013	T	Diarrhea
E1145	+	16	R	O139	2011	W	Edema disease
E1190	+	16	R	O139	2013	A	Edema disease
E1191	+	16	R	O139	2013	A	Edema disease
E1221	+	16	R	OSB9	2010	I	Diarrhea
E1235	+	16	R	O139	2013	I	Diarrhea
E1265	+	16	R	O149	2014	I	Diarrhea
E1310	+	16	R	O149	2014	I	Diarrhea
E1337	+	16	R	O116	2014	N	Diarrhea
E1346	+	16	R	OSB9	2014	J	Edema disease
E1348	+	16	R	OSB9	2014	J	Edema disease
E1349	+	16	R	OSB9	2014	J	Edema disease
E1350	+	16	R	OSB9	2014	J	Edema disease
E1409	+	16	R	O116	2011	D	Diarrhea
E1422	+	16	R	O116	2012	D	Diarrhea
E1516	+	16	R	O149	2014	U	Diarrhea
E1517	+	16	R	O149	2014	U	Diarrhea
E1518	+	16	R	O149	2014	U	Diarrhea
E1519	+	16	R	O149	2014	U	Diarrhea
E1520	+	16	R	O149	2014	U	Diarrhea
E1521	+	16	R	O149	2014	U	Diarrhea
E1522	+	16	R	O149	2014	U	Diarrhea
E1523	+	16	R	O149	2014	U	Diarrhea
E1524	+	16	R	O149	2014	U	Diarrhea
E1525	+	16	R	O149	2014	U	Diarrhea
E0002	−	16	R	O139	2007	I	Edema disease
E0003	−	16	R	O139	2007	I	Edema disease
E0005	−	16	R	O139	2008	I	Edema disease
E0006	−	16	R	O139	2009	I	Edema disease
E0007	−	16	R	O139	2009	I	Edema disease
E0043	−	16	R	O139	2010	M	Diarrhea
E0044	−	16	R	O139	2010	M	Diarrhea
E0045	−	16	R	O139	2010	M	Diarrhea
E0046	−	16	R	O139	2010	M	Diarrhea
E0047	−	16	R	O139	2010	M	Diarrhea
E0048	−	16	R	O139	2010	M	Diarrhea
E0049	−	16	R	O139	2010	M	Diarrhea
E0050	−	16	R	O139	2010	M	Diarrhea
E0051	−	16	R	O139	2010	M	Diarrhea

	mcr-1	Susceptibility to colistin			Characteristic features of isolates		
Strain name	carriage*	MIC (g/mL)	Resistance†	O serogroup‡	Year	Prefecture	Reported case
E0052	−	16	R	O139	2010	M	Diarrhea
E0053	−	16	R	O139	2010	M	Diarrhea
E0054	−	16	R	O139	2010	M	Diarrhea
E0055	−	16	R	O139	2010	M	Diarrhea
E0056	−	16	R	O139	2010	M	Diarrhea
E0058	−	16	R	O139	2010	M	Diarrhea
E0059	−	16	R	O139	2010	M	Diarrhea
E0124	−	16	R	O139	2009	D	Diarrhea
E0217	−	16	R	O139	2010	L	Diarrhea
E0218	−	16	R	O139	2010	L	Diarrhea
E0219	−	16	R	O139	2010	L	Diarrhea
E0220	−	16	R	O139	2010	L	Diarrhea
E0234	−	16	R	O139	1991	S	Edema disease
E0237	−	16	R	O139	1992	S	Edema disease
E0250	−	16	R	O139	2004	S	Edema disease
E0251	−	16	R	O139	2005	S	Edema disease
E0252	−	16	R	O139	2005	S	Edema disease
E0259	−	16	R	O139	2005	S	Edema disease
E0260	−	16	R	O139	2005	S	Edema disease
E0408	−	16	R	O139	2004	F	Diarrhea
E0414	−	16	R	O139	2007	F	Diarrhea
E0449	−	16	R	O139	2005	C	Edema disease
E0459	−	16	R	OSB9	2006	C	Diarrhea
E0460	−	16	R	OSB9	2006	C	Diarrhea
E0461	−	16	R	OSB9	2006	C	Diarrhea
E0540	−	16	R	O139	1996	F	Edema disease
E0543	−	16	R	O139	1998	F	Edema disease
E0550	−	16	R	O139	2006	F	Edema disease
E0587	−	16	R	O139	2012	L	Edema disease
E0588	−	16	R	O139	2012	L	Edema disease
E0633	−	16	R	O116	2007	G	Diarrhea
E0635	−	16	R	O116	2007	G	Diarrhea
E0636	−	16	R	O116	2007	G	Diarrhea
E0637	−	16	R	O116	2007	G	Diarrhea
E0638	−	16	R	O116	2007	G	Diarrhea
E0643	−	16	R	O116	2007	G	Diarrhea
E0673	−	16	R	O139	2005	R	Edema disease
E0677	−	16	R	O116	2007	G	Diarrhea
E0686	−	16	R	O139	2010	G	Edema disease
E0687	−	16	R	O139	2010	G	Edema disease
E0866	−	16	R	O139	1995	B	Edema disease
E0867	−	16	R	O139	1995	B	Edema disease
E0871	−	16	R	O139	2002	B	Edema disease
E0872	−	16	R	O139	2002	B	Edema disease
E0874	−	16	R	O139	2004	B	Edema disease
E0875	−	16	R	O139	2004	B	Edema disease
E0876	−	16	R	O139	2004	B	Edema disease
E0877	−	16	R	O139	2004	B	Edema disease
E0878	−	16	R	O139	2004	B	Edema disease
E0879	−	16	R	O139	2004	B	Edema disease
E0880	−	16	R	O139	2004	B	Edema disease
E0888	−	16	R	O139	2005	B	Edema disease
E0889	−	16	R	O139	2005	B	Edema disease
E0890	−	16	R	O139	2006	B	Edema disease
E0891	−	16	R	O139	2006	B	Edema disease
E0892	−	16	R	O139	2006	B	Edema disease
E0893	−	16	R	O139	2008	B	Edema disease
E0894	−	16	R	O139	2008	B	Edema disease
E0898	−	16	R	O139	2009	B	Diarrhea
E0901	−	16	R	O139	2011	B	Edema disease
E0902	−	16	R	O139	2011	B	Edema disease
E0903	−	16	R	O139	2011	B	Edema disease
E0906	−	16	R	O139	2013	B	Edema disease
E0907	−	16	R	O139	2013	B	Edema disease
E0920	−	16	R	O149	2004	B	Diarrhea
E0921	−	16	R	O149	2004	B	Diarrhea
E0922	−	16	R	O149	2004	B	Diarrhea
E0923	−	16	R	O149	2004	B	Diarrhea

	mcr-1	Susceptibility to colistin			Characteristic features of isolates		
Strain name	carriage*	MIC (g/mL)	Resistance†	O serogroup‡	Year	Prefecture	Reported case
E0975	−	16	R	OSB9	2005	H	Diarrhea
E0987	−	16	R	O139	2006	H	Edema disease
E1055	−	16	R	O149	2012	H	Diarrhea
E1066	−	16	R	O149	2013	H	Diarrhea
E1091	−	16	R	O139	2006	J	Edema disease
E1093	−	16	R	O139	2006	J	Edema disease
E1095	−	16	R	O139	2007	J	Edema disease
E1099	−	16	R	O139	2008	J	Edema disease
E1101	−	16	R	O139	2009	J	Edema disease
E1102	−	16	R	O139	2009	J	Edema disease
E1103	−	16	R	O139	2009	J	Edema disease
E1109	−	16	R	O139	2014	J	Edema disease
E1110	−	16	R	O139	2014	J	Edema disease
E1114	−	16	R	OSB9	2010	T	Diarrhea
E1187	−	16	R	O139	2012	A	Edema disease
E1188	−	16	R	O139	2012	A	Edema disease
E1206	−	16	R	OSB9	2003	I	Diarrhea
E1210	−	16	R	OSB9	2004	I	Diarrhea
E1211	−	16	R	OSB9	2004	I	Diarrhea
E1212	−	16	R	OSB9	2004	I	Diarrhea
E1220	−	16	R	O139	2009	I	Edema disease
E1222	−	16	R	OSB9	2011	I	Diarrhea
E1225	−	16	R	O139	2012	I	Edema disease
E1241	−	16	R	O139	2003	I	Edema disease
E1253	−	16	R	O139	1998	I	Edema disease
E1257	−	16	R	O139	1998	I	Edema disease
E1258	−	16	R	O139	2004	I	Edema disease
E1259	−	16	R	O139	2004	I	Edema disease
E1269	−	16	R	O139	2013	E	Edema disease
E1270	−	16	R	O139	2013	E	Edema disease
E1273	−	16	R	O116	2014	E	Diarrhea
E1276	−	16	R	O116	2014	E	Diarrhea
E1279	−	16	R	O116	2014	E	Diarrhea
E1281	−	16	R	O116	2014	E	Diarrhea
E1385	−	16	R	O116	2010	D	Diarrhea
E1388	−	16	R	O116	2010	D	Diarrhea
E0951	+	8	R	O139	2012	V	Edema disease
E0993	+	8	R	O149	2007	H	Diarrhea
E1012	+	8	R	OSB9	2009	H	Diarrhea
E1059	+	8	R	OSB9	2012	H	Diarrhea
E1127	+	8	R	O149	2013	T	Diarrhea
E1143	+	8	R	O116	2011	W	Diarrhea
E1232	+	8	R	O116	2013	I	Diarrhea
E1233	+	8	R	O116	2013	I	Diarrhea
E1391	+	8	R	O139	2010	D	Edema disease
E1443	+	8	R	O116	2013	D	Diarrhea
E0004	−	8	R	O139	2009	I	Edema disease
E0008	−	8	R	O139	2009	I	Edema disease
E0095	−	8	R	O139	2006	D	Edema disease
E0099	−	8	R	O116	2007	D	Diarrhea
E0391	−	8	R	O116	2008	F	Diarrhea
E0398	−	8	R	O116	2009	F	Diarrhea
E0462	−	8	R	OSB9	2006	C	Diarrhea
E0464	−	8	R	OSB9	2007	C	Diarrhea
E0478	−	8	R	O149	2008	C	Diarrhea
E0479	−	8	R	O149	2008	C	Diarrhea
E0507	−	8	R	O149	2010	C	Diarrhea
E0508	−	8	R	O149	2010	C	Diarrhea
E0509	−	8	R	O149	2010	C	Diarrhea
E0510	−	8	R	O149	2010	C	Diarrhea
E0511	−	8	R	O149	2010	C	Diarrhea
E0512	−	8	R	O149	2010	C	Diarrhea
E0513	−	8	R	O149	2010	C	Diarrhea
E0535	−	8	R	O139	2006	O	Edema disease
E0548	−	8	R	O139	2005	F	Edema disease
E0565	−	8	R	O149	2005	F	Diarrhea
E0634	−	8	R	O116	2007	G	Diarrhea
E0639	−	8	R	O116	2007	G	Diarrhea

Strain name	*mcr-1* carriage*	Susceptibility to colistin		O serogroup‡	Characteristic features of isolates		
		MIC (g/mL)	Resistance†		Year	Prefecture	Reported case
E0640	−	8	R	O116	2007	G	Diarrhea
E0675	−	8	R	O139	2005	R	Edema disease
E0678	−	8	R	O116	2008	G	Diarrhea
E0733	−	8	R	O116	2006	E	Diarrhea
E0742	−	8	R	O116	2006	E	Diarrhea
E0743	−	8	R	O116	2006	E	Diarrhea
E0744	−	8	R	O116	2006	E	Diarrhea
E0873	−	8	R	O139	2004	B	Edema disease
E0885	−	8	R	O139	2005	B	Edema disease
E0886	−	8	R	O139	2005	B	Edema disease
E0887	−	8	R	O139	2005	B	Edema disease
E0895	−	8	R	O139	2008	B	Edema disease
E0896	−	8	R	O139	2008	B	Edema disease
E0897	−	8	R	O139	2008	B	Edema disease
E0940	−	8	R	O139	2008	V	Edema disease
E0959	−	8	R	O139	2012	P	Edema disease
E0960	−	8	R	O139	2012	P	Edema disease
E1019	−	8	R	O149	2010	H	Diarrhea
E1040	−	8	R	O149	2011	H	Diarrhea
E1041	−	8	R	O149	2011	H	Diarrhea
E1097	−	8	R	O139	2008	J	Edema disease
E1100	−	8	R	O139	2009	J	Edema disease
E1106	−	8	R	O139	2010	J	Edema disease
E1107	−	8	R	O139	2010	J	Edema disease
E1108	−	8	R	O139	2011	J	Edema disease
E1113	−	8	R	O139	2010	T	Edema disease
E1115	−	8	R	O139	2011	T	Edema disease
E1116	−	8	R	O149	2011	T	Diarrhea
E1180	−	8	R	O139	2012	A	Edema disease
E1183	−	8	R	O139	2012	A	Edema disease
E1184	−	8	R	O139	2012	A	Edema disease
E1185	−	8	R	O139	2012	A	Edema disease
E1186	−	8	R	O139	2012	A	Edema disease
E1209	−	8	R	OSB9	2004	I	Diarrhea
E1215	−	8	R	OSB9	2006	I	Diarrhea
E1243	−	8	R	O139	2003	I	Edema disease
E1245	−	8	R	O139	2003	I	Edema disease
E1252	−	8	R	O149	1997	I	Diarrhea
E1254	−	8	R	O149	1997	I	Diarrhea
E1260	−	8	R	O149	2004	I	Diarrhea
E1303	−	8	R	O139	2012	I	Others/unknown
E0117	−	4	R	O116	2009	D	Diarrhea
E0549	−	4	R	O139	2005	F	Edema disease
E0648	−	4	R	O116	2008	G	Diarrhea
E0674	−	4	R	O139	2005	R	Edema disease
E0679	−	4	R	O116	2008	G	Diarrhea
E0680	−	4	R	O116	2008	G	Diarrhea
E0681	−	4	R	O116	2008	G	Diarrhea
E0682	−	4	R	O116	2008	G	Diarrhea
E0737	−	4	R	O149	2004	E	Diarrhea
E1035	−	4	R	O149	2011	H	Diarrhea
E1056	−	4	R	O149	2012	H	Diarrhea
E1262	−	4	R	O149	2009	I	Diarrhea
E1296	−	4	R	O149	2009	I	Diarrhea
E0131	−	2	S	O139	2010	D	Diarrhea
E0672	−	2	S	O139	2004	R	Edema disease
E0969	−	2	S	O149	2003	H	Diarrhea
E0970	−	2	S	O149	2003	H	Diarrhea
E0022	−	1	S	O139	2009	A	Edema disease
E0125	−	1	S	O116	2009	D	Diarrhea
E0226	−	1	S	O149	2005	S	Diarrhea
E0233	−	1	S	O149	2007	S	Diarrhea
E0387	−	1	S	O116	2006	F	Diarrhea
E0409	−	1	S	O139	2004	F	Diarrhea
E0465	−	1	S	OSB9	2007	C	Diarrhea
E0467	−	1	S	OSB9	2007	C	Diarrhea
E0468	−	1	S	OSB9	2007	C	Diarrhea
E0469	−	1	S	OSB9	2007	C	Diarrhea

Strain name	*mcr-1* carriage*	Susceptibility to colistin		O serogroup‡	Characteristic features of isolates		
		MIC (g/mL)	Resistance†		Year	Prefecture	Reported case
E0470	−	1	S	OSB9	2007	C	Diarrhea
E0471	−	1	S	OSB9	2007	C	Diarrhea
E0472	−	1	S	OSB9	2007	C	Diarrhea
E0475	−	1	S	OSB9	2008	C	Diarrhea
E0477	−	1	S	O149	2008	C	Diarrhea
E0481	−	1	S	O139	2009	C	Edema disease
E0490	−	1	S	O149	2009	C	Diarrhea
E0498	−	1	S	OSB9	2010	C	Diarrhea
E0499	−	1	S	OSB9	2010	C	Diarrhea
E0502	−	1	S	O139	2008	C	Edema disease
E0505	−	1	S	OSB9	2010	C	Diarrhea
E0506	−	1	S	OSB9	2010	C	Diarrhea
E0514	−	1	S	OSB9	2010	C	Diarrhea
E0520	−	1	S	OSB9	2007	C	Diarrhea
E1061	−	1	S	O149	2013	H	Diarrhea
E1223	−	1	S	O116	2011	I	Diarrhea
E1237	−	1	S	O149	2014	I	Diarrhea
E1389	−	1	S	O116	2010	D	Diarrhea
E1395	−	1	S	O116	2011	D	Diarrhea
E1402	−	1	S	O116	2011	D	Diarrhea
E1415	−	1	S	O149	2012	D	Diarrhea
E1454	−	1	S	O116	2014	D	Diarrhea
E0001	−	0.5	S	O139	2007	I	Edema disease
E0009	−	0.5	S	O139	2009	A	Edema disease
E0010	−	0.5	S	O139	2009	A	Edema disease
E0011	−	0.5	S	O139	2009	A	Edema disease
E0017	−	0.5	S	O139	2009	A	Edema disease
E0018	−	0.5	S	O139	2009	A	Edema disease
E0019	−	0.5	S	O139	2009	A	Edema disease
E0020	−	0.5	S	O139	2009	A	Edema disease
E0021	−	0.5	S	O139	2009	A	Edema disease
E0023	−	0.5	S	O139	2009	A	Edema disease
E0024	−	0.5	S	O139	2009	A	Edema disease
E0025	−	0.5	S	O139	2009	A	Edema disease
E0026	−	0.5	S	O139	2009	A	Edema disease
E0027	−	0.5	S	O139	2009	A	Edema disease
E0092	−	0.5	S	O149	2006	D	Diarrhea
E0098	−	0.5	S	O149	2007	D	Diarrhea
E0101	−	0.5	S	O116	2007	D	Diarrhea
E0102	−	0.5	S	O116	2007	D	Diarrhea
E0108	−	0.5	S	O116	2008	D	Diarrhea
E0110	−	0.5	S	O116	2008	D	Diarrhea
E0111	−	0.5	S	O139	2008	D	Edema disease
E0113	−	0.5	S	O116	2009	D	Diarrhea
E0115	−	0.5	S	O139	2009	D	Others/unknown
E0116	−	0.5	S	O116	2009	D	Diarrhea
E0121	−	0.5	S	O116	2009	D	Diarrhea
E0126	−	0.5	S	O149	2009	D	Others/unknown
E0127	−	0.5	S	O116	2010	D	Diarrhea
E0128	−	0.5	S	O139	2010	D	Edema disease
E0129	−	0.5	S	O149	2010	D	Others/unknown
E0132	−	0.5	S	O116	2010	D	Diarrhea
E0221	−	0.5	S	O149	1993	S	Diarrhea
E0222	−	0.5	S	O149	1993	S	Diarrhea
E0223	−	0.5	S	O149	1994	S	Diarrhea
E0224	−	0.5	S	O149	1994	S	Diarrhea
E0225	−	0.5	S	O149	1995	S	Diarrhea
E0227	−	0.5	S	O149	2004	S	Diarrhea
E0228	−	0.5	S	O149	2004	S	Diarrhea
E0229	−	0.5	S	O149	2005	S	Diarrhea
E0230	−	0.5	S	O149	2005	S	Diarrhea
E0231	−	0.5	S	O149	2006	S	Diarrhea
E0232	−	0.5	S	O149	2006	S	Diarrhea
E0238	−	0.5	S	O139	1993	S	Diarrhea
E0241	−	0.5	S	O139	1995	S	Edema disease
E0243	−	0.5	S	O139	1997	S	Diarrhea
E0258	−	0.5	S	O139	2005	S	Edema disease
E0348	−	0.5	S	O149	1993	K	Diarrhea

Strain name	*mcr-1* carriage*	Susceptibility to colistin		O serogroup‡	Characteristic features of isolates		
		MIC (g/mL)	Resistance†		Year	Prefecture	Reported case
E0349	−	0.5	S	O149	1993	K	Diarrhea
E0350	−	0.5	S	O149	1994	K	Diarrhea
E0351	−	0.5	S	O149	1994	K	Diarrhea
E0352	−	0.5	S	O149	1994	K	Diarrhea
E0353	−	0.5	S	O149	1994	K	Diarrhea
E0354	−	0.5	S	O149	1994	K	Diarrhea
E0355	−	0.5	S	O149	1994	K	Diarrhea
E0356	−	0.5	S	O149	1994	K	Diarrhea
E0357	−	0.5	S	O149	1994	K	Diarrhea
E0358	−	0.5	S	O149	1994	K	Diarrhea
E0359	−	0.5	S	O149	1994	K	Diarrhea
E0360	−	0.5	S	O149	1994	K	Diarrhea
E0361	−	0.5	S	O149	1994	K	Diarrhea
E0362	−	0.5	S	O149	1995	K	Diarrhea
E0363	−	0.5	S	O149	1995	K	Diarrhea
E0364	−	0.5	S	O149	1995	K	Diarrhea
E0365	−	0.5	S	O149	1995	K	Diarrhea
E0366	−	0.5	S	O149	1995	K	Diarrhea
E0367	−	0.5	S	O149	1995	K	Diarrhea
E0368	−	0.5	S	O149	1995	K	Diarrhea
E0369	−	0.5	S	O149	1995	K	Diarrhea
E0370	−	0.5	S	O149	1995	K	Diarrhea
E0371	−	0.5	S	O149	1995	K	Diarrhea
E0372	−	0.5	S	O149	1996	K	Diarrhea
E0373	−	0.5	S	O149	1996	K	Diarrhea
E0374	−	0.5	S	O149	1996	K	Diarrhea
E0375	−	0.5	S	O149	1996	K	Diarrhea
E0376	−	0.5	S	O149	1996	K	Diarrhea
E0377	−	0.5	S	O149	1997	K	Diarrhea
E0378	−	0.5	S	O149	1997	K	Diarrhea
E0379	−	0.5	S	O149	1997	K	Diarrhea
E0380	−	0.5	S	O149	1997	K	Diarrhea
E0381	−	0.5	S	O116	2005	F	Diarrhea
E0382	−	0.5	S	O116	2005	F	Diarrhea
E0384	−	0.5	S	O116	2005	F	Diarrhea
E0385	−	0.5	S	O116	2006	F	Diarrhea
E0388	−	0.5	S	O116	2006	F	Diarrhea
E0394	−	0.5	S	O116	2008	F	Diarrhea
E0396	−	0.5	S	O116	2009	F	Diarrhea
E0397	−	0.5	S	O116	2009	F	Diarrhea
E0399	−	0.5	S	O116	2009	F	Diarrhea
E0406	−	0.5	S	O116	2011	F	Diarrhea
E0407	−	0.5	S	O116	2011	F	Diarrhea
E0410	−	0.5	S	O116	2006	F	Diarrhea
E0416	−	0.5	S	O116	2009	F	Diarrhea
E0450	−	0.5	S	O149	2005	C	Diarrhea
E0451	−	0.5	S	OSB9	2006	C	Diarrhea
E0452	−	0.5	S	O149	2006	C	Diarrhea
E0453	−	0.5	S	O149	2006	C	Diarrhea
E0454	−	0.5	S	O149	2006	C	Diarrhea
E0455	−	0.5	S	O149	2006	C	Diarrhea
E0456	−	0.5	S	O149	2006	C	Diarrhea
E0457	−	0.5	S	O149	2006	C	Diarrhea
E0458	−	0.5	S	O149	2006	C	Diarrhea
E0463	−	0.5	S	O149	2006	C	Diarrhea
E0466	−	0.5	S	OSB9	2007	C	Diarrhea
E0473	−	0.5	S	O149	2008	C	Diarrhea
E0474	−	0.5	S	O149	2008	C	Diarrhea
E0480	−	0.5	S	O139	2009	C	Edema disease
E0491	−	0.5	S	O149	2009	C	Diarrhea
E0492	−	0.5	S	O149	2009	C	Diarrhea
E0493	−	0.5	S	O149	2009	C	Diarrhea
E0494	−	0.5	S	O149	2009	C	Diarrhea
E0500	−	0.5	S	OSB9	2010	C	Diarrhea
E0501	−	0.5	S	OSB9	2010	C	Diarrhea
E0503	−	0.5	S	O139	2008	C	Edema disease
E0504	−	0.5	S	OSB9	2010	C	Diarrhea
E0515	−	0.5	S	O149	2005	C	Diarrhea

	mcr-1	Susceptibility to colistin			Characteristic features of isolates		
Strain name	carriage*	MIC (g/mL)	Resistance†	O serogroup‡	Year	Prefecture	Reported case
E0518	−	0.5	S	OSB9	2005	C	Diarrhea
E0519	−	0.5	S	OSB9	2007	C	Diarrhea
E0541	−	0.5	S	O139	1997	F	Edema disease
E0542	−	0.5	S	O139	1997	F	Edema disease
E0544	−	0.5	S	O139	1998	F	Edema disease
E0545	−	0.5	S	O139	1999	F	Edema disease
E0547	−	0.5	S	O139	2003	F	Edema disease
E0554	−	0.5	S	O149	1997	F	Diarrhea
E0555	−	0.5	S	O149	1998	F	Diarrhea
E0556	−	0.5	S	O149	1998	F	Diarrhea
E0557	−	0.5	S	O149	1998	F	Diarrhea
E0560	−	0.5	S	O149	1999	F	Diarrhea
E0561	−	0.5	S	O149	2000	F	Diarrhea
E0562	−	0.5	S	O149	2003	F	Diarrhea
E0563	−	0.5	S	O149	2003	F	Diarrhea
E0564	−	0.5	S	O149	2004	F	Diarrhea
E0566	−	0.5	S	O149	2005	F	Diarrhea
E0567	−	0.5	S	O149	2008	F	Diarrhea
E0568	−	0.5	S	O149	2008	F	Diarrhea
E0589	−	0.5	S	O149	2012	L	Diarrhea
E0590	−	0.5	S	O149	2012	L	Diarrhea
E0595	−	0.5	S	O116	2012	L	Diarrhea
E0602	−	0.5	S	O139	2012	L	Edema disease
E0603	−	0.5	S	O139	2012	L	Edema disease
E0605	−	0.5	S	O139	2012	L	Edema disease
E0607	−	0.5	S	O116	2012	L	Diarrhea
E0608	−	0.5	S	O116	2012	L	Diarrhea
E0609	−	0.5	S	O116	2012	L	Diarrhea
E0613	−	0.5	S	O116	2012	L	Diarrhea
E0614	−	0.5	S	O116	2012	L	Diarrhea
E0615	−	0.5	S	O116	2012	L	Diarrhea
E0622	−	0.5	S	O139	2012	A	Edema disease
E0623	−	0.5	S	O139	2012	A	Edema disease
E0624	−	0.5	S	O139	2012	A	Edema disease
E0625	−	0.5	S	O139	2012	A	Edema disease
E0626	−	0.5	S	O149	2003	G	Diarrhea
E0627	−	0.5	S	O149	2003	G	Diarrhea
E0630	−	0.5	S	O149	2003	G	Diarrhea
E0631	−	0.5	S	O149	2003	G	Diarrhea
E0653	−	0.5	S	O116	2009	G	Diarrhea
E0660	−	0.5	S	O149	2011	G	Diarrhea
E0676	−	0.5	S	O139	2005	R	Edema disease
E0683	−	0.5	S	O116	2009	G	Diarrhea
E0684	−	0.5	S	O116	2009	G	Diarrhea
E0689	−	0.5	S	O149	2011	G	Diarrhea
E0690	−	0.5	S	O149	2011	G	Diarrhea
E0691	−	0.5	S	O149	2011	G	Diarrhea
E0721	−	0.5	S	O116	2012	E	Diarrhea
E0722	−	0.5	S	O116	2012	E	Diarrhea
E0726	−	0.5	S	O149	2009	E	Diarrhea
E0727	−	0.5	S	O149	2009	E	Diarrhea
E0739	−	0.5	S	O116	2012	E	Diarrhea
E0747	−	0.5	S	O149	2004	E	Diarrhea
E0779	−	0.5	S	O149	2013	Q	Diarrhea
E0780	−	0.5	S	O149	2013	Q	Diarrhea
E0781	−	0.5	S	O149	2013	Q	Diarrhea
E0782	−	0.5	S	O149	2013	Q	Diarrhea
E0865	−	0.5	S	O139	1995	B	Edema disease
E0868	−	0.5	S	O139	1997	B	Edema disease
E0870	−	0.5	S	O139	1999	B	Edema disease
E0899	−	0.5	S	OSB9	2011	B	Diarrhea
E0900	−	0.5	S	OSB9	2011	B	Diarrhea
E0913	−	0.5	S	O149	1999	B	Diarrhea
E0914	−	0.5	S	O149	1999	B	Diarrhea
E0915	−	0.5	S	O149	2000	B	Diarrhea
E0916	−	0.5	S	O149	2001	B	Diarrhea
E0917	−	0.5	S	O149	2001	B	Diarrhea
E0918	−	0.5	S	O149	2004	B	Diarrhea

Strain name	*mcr-1* carriage*	Susceptibility to colistin		O serogroup‡	Characteristic features of isolates		
		MIC (g/mL)	Resistance†		Year	Prefecture	Reported case
E0919	−	0.5	S	O149	2004	B	Diarrhea
E0929	−	0.5	S	O116	2008	B	Diarrhea
E0930	−	0.5	S	O116	2010	B	Diarrhea
E0931	−	0.5	S	O116	2010	B	Diarrhea
E0932	−	0.5	S	O116	2010	B	Diarrhea
E0933	−	0.5	S	O116	2010	B	Diarrhea
E0934	−	0.5	S	O116	2010	B	Diarrhea
E0935	−	0.5	S	O116	2012	B	Diarrhea
E0936	−	0.5	S	O116	2012	B	Diarrhea
E0937	−	0.5	S	O116	2012	B	Diarrhea
E0939	−	0.5	S	O149	2007	V	Diarrhea
E0941	−	0.5	S	O149	2008	V	Diarrhea
E0944	−	0.5	S	O149	2009	V	Diarrhea
E0945	−	0.5	S	O139	2009	V	Edema disease
E0948	−	0.5	S	O139	2010	V	Others/unknown
E0950	−	0.5	S	O139	2012	V	Edema disease
E0963	−	0.5	S	O139	2013	P	Edema disease
E0965	−	0.5	S	O149	2013	P	Diarrhea
E0966	−	0.5	S	O149	2013	P	Diarrhea
E0967	−	0.5	S	O149	2013	P	Diarrhea
E0968	−	0.5	S	O149	2003	H	Diarrhea
E0971	−	0.5	S	OSB9	2005	H	Diarrhea
E0972	−	0.5	S	O149	2005	H	Diarrhea
E0973	−	0.5	S	O149	2005	H	Diarrhea
E0974	−	0.5	S	OSB9	2005	H	Diarrhea
E0977	−	0.5	S	O149	2005	H	Diarrhea
E0980	−	0.5	S	O149	2006	H	Diarrhea
E0981	−	0.5	S	O149	2006	H	Diarrhea
E0982	−	0.5	S	O149	2006	H	Diarrhea
E0983	−	0.5	S	O149	2006	H	Diarrhea
E0985	−	0.5	S	O149	2006	H	Diarrhea
E0988	−	0.5	S	OSB9	2007	H	Diarrhea
E0989	−	0.5	S	O149	2007	H	Diarrhea
E0990	−	0.5	S	O149	2007	H	Diarrhea
E0994	−	0.5	S	OSB9	2007	H	Diarrhea
E0998	−	0.5	S	O149	2008	H	Diarrhea
E0999	−	0.5	S	O149	2008	H	Diarrhea
E1000	−	0.5	S	O149	2009	H	Diarrhea
E1001	−	0.5	S	O149	2009	H	Diarrhea
E1004	−	0.5	S	O149	2009	H	Diarrhea
E1006	−	0.5	S	O149	2009	H	Diarrhea
E1008	−	0.5	S	O116	2009	H	Diarrhea
E1009	−	0.5	S	O149	2009	H	Diarrhea
E1010	−	0.5	S	O149	2009	H	Diarrhea
E1011	−	0.5	S	O116	2009	H	Diarrhea
E1013	−	0.5	S	O149	2009	H	Diarrhea
E1014	−	0.5	S	O149	2010	H	Diarrhea
E1016	−	0.5	S	O149	2010	H	Diarrhea
E1018	−	0.5	S	O149	2010	H	Diarrhea
E1020	−	0.5	S	OSB9	2010	H	Diarrhea
E1021	−	0.5	S	O149	2010	H	Diarrhea
E1022	−	0.5	S	O149	2010	H	Diarrhea
E1023	−	0.5	S	O149	2010	H	Diarrhea
E1024	−	0.5	S	O149	2010	H	Diarrhea
E1025	−	0.5	S	O149	2010	H	Diarrhea
E1026	−	0.5	S	O149	2010	H	Diarrhea
E1027	−	0.5	S	O149	2010	H	Diarrhea
E1028	−	0.5	S	O149	2010	H	Diarrhea
E1029	−	0.5	S	O149	2010	H	Diarrhea
E1030	−	0.5	S	O149	2011	H	Diarrhea
E1033	−	0.5	S	O149	2011	H	Diarrhea
E1034	−	0.5	S	O149	2011	H	Diarrhea
E1038	−	0.5	S	O149	2011	H	Diarrhea
E1045	−	0.5	S	O149	2012	H	Diarrhea
E1049	−	0.5	S	O149	2012	H	Diarrhea
E1051	−	0.5	S	O149	2012	H	Diarrhea
E1054	−	0.5	S	O149	2012	H	Diarrhea
E1058	−	0.5	S	O149	2012	H	Diarrhea

Strain name	*mcr-1* carriage*	Susceptibility to colistin		O serogroup‡	Characteristic features of isolates		
		MIC (g/mL)	Resistance†		Year	Prefecture	Reported case
E1060	−	0.5	S	O149	2013	H	Diarrhea
E1077	−	0.5	S	O139	1996	J	Edema disease
E1078	−	0.5	S	O139	1996	J	Edema disease
E1079	−	0.5	S	O139	1996	J	Edema disease
E1080	−	0.5	S	O139	1996	J	Edema disease
E1081	−	0.5	S	O139	1996	J	Edema disease
E1083	−	0.5	S	O139	1997	J	Edema disease
E1084	−	0.5	S	O139	1997	J	Edema disease
E1085	−	0.5	S	O139	1998	J	Edema disease
E1086	−	0.5	S	O139	1999	J	Edema disease
E1087	−	0.5	S	O139	1999	J	Edema disease
E1088	−	0.5	S	O139	1999	J	Edema disease
E1090	−	0.5	S	O139	2001	J	Edema disease
E1092	−	0.5	S	O139	2006	J	Edema disease
E1094	−	0.5	S	O139	2006	J	Edema disease
E1096	−	0.5	S	O139	2008	J	Edema disease
E1098	−	0.5	S	O139	2008	J	Edema disease
E1105	−	0.5	S	O139	2010	J	Edema disease
E1111	−	0.5	S	O139	2014	J	Edema disease
E1117	−	0.5	S	O139	2011	T	Edema disease
E1142	−	0.5	S	O116	2010	W	Diarrhea
E1144	−	0.5	S	O139	2011	W	Edema disease
E1146	−	0.5	S	O139	2013	W	Edema disease
E1147	−	0.5	S	O139	2013	W	Edema disease
E1172	−	0.5	S	O139	2014	E	Others/unknown
E1178	−	0.5	S	OSB9	2005	H	Diarrhea
E1179	−	0.5	S	O139	2012	H	Edema disease
E1181	−	0.5	S	O139	2012	A	Edema disease
E1182	−	0.5	S	O139	2012	A	Edema disease
E1192	−	0.5	S	O139	2013	A	Edema disease
E1193	−	0.5	S	O139	2013	A	Edema disease
E1217	−	0.5	S	OSB9	2008	I	Diarrhea
E1218	−	0.5	S	OSB9	2008	I	Diarrhea
E1226	−	0.5	S	O139	2012	I	Edema disease
E1227	−	0.5	S	O139	2012	I	Edema disease
E1249	−	0.5	S	O139	1999	I	Edema disease
E1250	−	0.5	S	O149	1999	I	Diarrhea
E1251	−	0.5	S	O139	2000	I	Edema disease
E1255	−	0.5	S	O149	1999	I	Diarrhea
E1256	−	0.5	S	O149	1999	I	Diarrhea
E1286	−	0.5	S	OSB9	2003	I	Diarrhea
E1313	−	0.5	S	O149	2014	I	Diarrhea
E1387	−	0.5	S	O139	2010	D	Edema disease
E1390	−	0.5	S	O116	2010	D	Diarrhea
E1392	−	0.5	S	O116	2011	D	Diarrhea
E1396	−	0.5	S	O149	2011	D	Diarrhea
E1397	−	0.5	S	O116	2011	D	Diarrhea
E1398	−	0.5	S	O116	2011	D	Diarrhea
E1400	−	0.5	S	O116	2011	D	Diarrhea
E1412	−	0.5	S	O116	2011	D	Diarrhea
E1413	−	0.5	S	O116	2011	D	Diarrhea
E1414	−	0.5	S	O116	2012	D	Diarrhea
E1419	−	0.5	S	O149	2012	D	Diarrhea
E1420	−	0.5	S	O149	2012	D	Diarrhea
E1425	−	0.5	S	O139	2012	D	Edema disease
E1428	−	0.5	S	O149	2012	D	Diarrhea
E1429	−	0.5	S	O139	2012	D	Edema disease
E1438	−	0.5	S	O116	2013	D	Diarrhea
E1439	−	0.5	S	O139	2013	D	Edema disease
E1440	−	0.5	S	O116	2013	D	Diarrhea
E1441	−	0.5	S	O149	2013	D	Diarrhea
E1449	−	0.5	S	O149	2014	D	Diarrhea
E1450	−	0.5	S	O139	2014	D	Edema disease
E1453	−	0.5	S	O116	2014	D	Diarrhea
E1515	−	0.5	S	O139	2013	P	Edema disease
E0242	−	0.25	S	O139	1997	S	Edema disease
E0516	−	0.25	S	OSB9	2005	C	Diarrhea
E0551	−	0.25	S	O139	2009	F	Edema disease

Strain name	*mcr-1* carriage*	Susceptibility to colistin		O serogroup‡	Characteristic features of isolates		
		MIC (g/mL)	Resistance†		Year	Prefecture	Reported case
E0552	−	0.25	S	O149	1996	F	Diarrhea
E0553	−	0.25	S	O149	1996	F	Diarrhea
E0558	−	0.25	S	O149	1999	F	Diarrhea
E0559	−	0.25	S	O149	1999	F	Diarrhea
E0586	−	0.25	S	O139	2012	L	Edema disease
E0718	−	0.25	S	O139	2013	E	Edema disease
E0719	−	0.25	S	O139	2013	E	Edema disease
E0720	−	0.25	S	O139	2013	E	Edema disease
E0728	−	0.25	S	O149	2007	E	Diarrhea
E0729	−	0.25	S	O149	2007	E	Diarrhea
E0731	−	0.25	S	O149	2006	E	Diarrhea
E0732	−	0.25	S	O149	2006	E	Diarrhea
E0740	−	0.25	S	O149	2007	E	Diarrhea
E0741	−	0.25	S	O149	2007	E	Diarrhea
E0869	−	0.25	S	O139	1998	B	Edema disease
E0964	−	0.25	S	O139	2013	P	Edema disease
E1015	−	0.25	S	O149	2010	H	Diarrhea
E1075	−	0.25	S	O139	1996	J	Edema disease
E1076	−	0.25	S	O139	1996	J	Edema disease
E1082	−	0.25	S	O139	1997	J	Edema disease
E1089	−	0.25	S	O139	2000	J	Edema disease

*+, *mcr-1*-positive isolate; −, *mcr-1*–negative isolate.
†R, colistin-resistant isolate; S, colistin-susceptible isolate.
‡SB9, *Shigella boydii* type 9.