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Emergence of Erythromycin-Resistant Invasive Group A *Streptococcus*, West Virginia, USA, 2020–2021

Appendix

Appendix Table 1. Isolate collection information

Patient #	emm- type	Age (yr)	Sex	Homeless	IVDU	Source of infection	Specimen	ICU	Surgery (No.)
1	emm1	71	male	no	no	Respiratory	Blood	no	no
2	emm1	86	female	no	no	Respiratory	Sterile fluid	yes	no
3	emm2	67	male	no	no	SSTI	Blood	no	no
4	emm11	46	female	no	yes	SSTI	Extremity	no	yes
5	emm11	24	female	no	yes	Deep neck	Neck aspirate	no	no
6	emm11	33	male	no	no	SSTI	Extremity	no	yes
7	emm11	41	male	no	no	SSTI	Gluteal/perirectal or inguinal	no	yes
8	emm11	59	male	no	no	SSTI	Extremity	no	no
9	emm11	50	male	no	yes	SSTI	Extremity	no	yes
10	emm11	43	male	yes	yes	Endovascular	Blood	yes	yes
11	emm11	35	male	no	yes	SSTI	Gluteal/perirectal or inguinal	no	yes
12	emm12	47	male	no	no	unknown	Blood	no	no
13	emm197	60	male	no	no	SSTI	Gluteal/perirectal or inguinal	no	no
14	emm22	30	female	unknown	yes	Endovascular	Blood	no	no
15	emm28	60	male	no	no	SSTI	Blood	yes	no
16	emm75	28	female	no	no	Ocular	Sterile fluid	no	no
17	emm77	50	male	yes	yes	unknown	Blood	no	no
18	emm77	32	female	no	yes	Respiratory	Sterile fluid	yes	yes
19	emm81	30	male	no	yes	Endovascular	Blood	no	no
20	emm81	34	female	yes	yes	SSTI	Extremity	yes	yes
21	emm81	59	male	yes	no	SSTI	Extremity	yes	yes (13)
22	emm82	25	male	no	yes	Endovascular	Blood	no	no
23	emm83	59	female	unknown	unknown	unknown	Blood	yes	no
24	emm83	42	female	no	yes	SSTI	Gluteal/perirectal or inguinal	no	yes
25	emm83	51	male	no	yes	SSTI	Extremity	no	yes (4)
26	emm87	36	female	no	no	Deep neck	Neck aspirate	no	no
28	emm89	71	female	no	no	Respiratory	Sterile fluid	yes	yes
29	emm89	66	male	no	no	SSTI	Extremity	no	no
30	emm89	46	male	no	no	SSTI	Extremity	no	yes
31	emm89	59	male	unknown	no	SSTI	Extremity	no	no
32	emm92	44	female	unknown	yes	SSTI	Extremity	no	no
34	emm92	48	female	yes	yes	SSTI	Extremity	no	yes (4)
37	emm92	62	male	no	no	SSTI	Blood	no	yes
38	emm92	63	male	no	no	SSTI	Blood	no	no
40	emm92	25	male	no	yes	Endovascular	Blood	yes	yes
41	emm92	26	male	no	yes	SSTI	Extremity	no	no
42	emm92	35	male	unknown	yes	Deep neck	Neck aspirate	no	yes
43	emm92	37	male	no	yes	SSTI	Extremity	no	yes

Patient #	<i>emm</i> -type	Age (yr)	Sex	Homeless	IVDU	Source of infection	Specimen	ICU	Surgery (No.)
45	<i>emm92</i>	28	male	no	yes	Deep neck	Neck aspirate	no	yes
46	<i>emm92</i>	42	male	no	yes	SSTI	Extremity	yes	yes
47	<i>emm92</i>	23	male	yes	yes	SSTI	Extremity	no	no
48	<i>emm92</i>	78	female	no	no	SSTI	Sterile fluid	yes	yes
49	<i>emm92</i>	29	male	no	yes	Endovascular	Blood	yes	yes
50	<i>emm92</i>	23	female	no	yes	SSTI	Extremity	no	yes
51	<i>emm92</i>	42	male	no	yes	SSTI	Extremity	yes	no
54	<i>emm92</i>	51	male	no	no	Deep neck	Neck aspirate	no	yes
55	<i>emm92</i>	28	female	unknown	yes	unknown	Blood	no	no
56	<i>emm92</i>	31	male	no	yes	SSTI	Extremity	no	yes
57	<i>emm92</i>	23	female	unknown	yes	SSTI	Extremity	no	no
58	<i>emm92</i>	42	female	yes	yes	SSTI	Extremity	no	no
59	<i>emm92</i>	71	female	no	no	Deep neck	Blood	yes	no
60	<i>emm92</i>	35	female	no	yes	SSTI	Extremity	no	yes
61	<i>emm92</i>	83	female	no	no	SSTI	Blood	no	no
62	<i>emm92</i>	39	male	no	yes	SSTI	Extremity	no	no
63	<i>emm92</i>	23	female	no	yes	SSTI	Extremity	no	yes
64	<i>emm92</i>	45	male	unknown	unknown	Deep neck	Neck aspirate	no	no
65	<i>emm92</i>	34	female	unknown	yes	SSTI	Extremity	no	yes
66	<i>emm92</i>	60	male	yes	yes	SSTI	Extremity	no	no
27*	<i>emm89</i>	55	male	no	no	SSTI	Blood	no	no
27*	<i>emm89</i>	55	same	same	same	same	Extremity	same	same
33*	<i>emm92</i>	33	female	no	yes	SSTI	Blood	no	yes
33*	<i>emm92</i>	same	same	same	same	same	Extremity	same	same
35*	<i>emm92</i>	47	male	no	no	SSTI	Extremity	same	yes (3)
35*	<i>emm92</i>	same	same	same	same	same	Blood	same	same
36*	<i>emm92</i>	58	female	no	no	SSTI	Extremity	yes	yes (8)
36*	<i>emm92</i>	same	same	same	same	same	Blood	same	same
39*	<i>emm92</i>	34	female	no	yes	Deep neck	Sterile fluid	yes	yes
39*	<i>emm92</i>	same	same	same	same	same	Neck aspirate	same	same
44*	<i>emm92</i>	30	female	no	yes	SSTI	Extremity	no	yes (4)
44*	<i>emm92</i>	same	same	same	same	same	Extremity	same	same
52*	<i>emm92</i>	44	male	yes	yes	SSTI	Extremity		yes
52*	<i>emm92</i>	44	same	same	same	same	same	same	same
53*	<i>emm92</i>	40	male	no	yes	Endovascular	Blood	no	no
53*	<i>emm92</i>	40	same	same	same	same	Blood	yes	yes
53*	<i>emm92</i>	same	same	same	same	same	Gluteal/perirectal or inguinal	same	same
53*	<i>emm92</i>	same	same	same	same	same	Extremity	same	same

*Replicate isolates

Appendix Table 2. Primers used for detection of *emm*-type and erythromycin (*erm*) resistance genes

Gene(s)	Primer	Sequence	Reference
<i>emm</i>	1b For	5'-TATTCGCTTAGAAAATTAA-3'	(1)
	2 Rev	5'-AAACAAGCTAAAGAAGCTTGC-3'	(1)
<i>ermA</i> (TR)	TR For 3	5'-ACATCTAAAAAGCATGTAAAGG-3'	(2)
	TR Rev 3	5'-CTTCAGCACCTGTCTTAATTG-3'	(2)
<i>ermB</i> (AM)	AM For	5'-GAAAAGGTACTCAACCAAATA-3'	(3)
	AM Rev	5'-AGTAACGGTACTTAAATTGTTTAC-3'	(3)
<i>ermT</i>	T For	5'-CCGCCATTGAAATAGATCCT-3'	(4)
	T Rev	5'-GCTTGATAAAAATTGGTTTTTGGGA-3'	(4)
<i>mefA/E</i>	A/E For	5'-CAGTATCATTAACTACTAGTGC-3'	(3)
	A/E Rev	5'-TTCTTCTGGTACTAAAAGTGG-3'	(3)

Appendix Table 3. Predominant *emm*-type by county

Co. of Residence	<i>emm</i> -type	Predominant <i>emm</i> -type per county	
		no. of isolates	Total no. of isolates
Allegheny, MD	<i>emm1</i>	1	1
Doddridge	<i>emm11</i>	1	1
Fayette	<i>emm89</i>	1	1
Garrett, MD	<i>emm89</i>	2	3
Grant	<i>emm92</i>	1	1
Greene, PA	<i>emm92</i>	2	3
Hardy	<i>emm92</i>	1	1
Harrison	<i>emm92</i>	10	11
Jackson	<i>emm92</i>	2	2
Jefferson	<i>emm81</i>	1	1
Marion	<i>emm92</i>	6	12
Marshall	<i>emm81</i>	1	1
Mercer	<i>emm92</i>	1	1
Mineral	<i>emm22</i>	1	1
Monongalia	<i>emm92</i>	8	12
Nicholas	<i>emm92</i>	1	1
Non-WV/PA*	<i>emm92</i>	1	1
Pendleton	<i>emm11</i>	1	1
Preston	<i>emm11/89 (1 of each)</i>	2	2
Raleigh	<i>emm92</i>	1	1
Randolph	<i>emm12</i>	1	1
Washington, PA	<i>emm92</i>	1	1
Webster	<i>emm1</i>	1	1
Wetzel	<i>emm75</i>	1	1
Wood	<i>emm83</i>	2	3
Wyoming	<i>emm11</i>	1	1

*Isolate collected from visiting patient with a Midwestern U.S. residence

References

1. Beall B, Facklam R, Thompson T. Sequencing *emm*-specific PCR products for routine and accurate typing of group A streptococci. *J Clin Microbiol.* 1996;34:953–8. [PubMed](https://doi.org/10.1128/jcm.34.4.953-958.1996)
<https://doi.org/10.1128/jcm.34.4.953-958.1996>
2. Seppälä H, Skurnik M, Soini H, Roberts MC, Huovinen P. A novel erythromycin resistance methylase gene (*ermTR*) in *Streptococcus pyogenes*. *Antimicrob Agents Chemother.* 1998;42:257–62.
[PubMed](https://doi.org/10.1128/AAC.42.2.257) <https://doi.org/10.1128/AAC.42.2.257>
3. Sutcliffe J, Grebe T, Tait-Kamradt A, Wondrack L. Detection of erythromycin-resistant determinants by PCR. *Antimicrob Agents Chemother.* 1996;40:2562–6. [PubMed](https://doi.org/10.1128/AAC.40.11.2562)
<https://doi.org/10.1128/AAC.40.11.2562>
4. Woodbury RL, Klammer KA, Xiong Y, Bailiff T, Glennen A, Bartkus JM, et al.; Active Bacterial Core Surveillance Team. Plasmid-Borne *erm(T)* from invasive, macrolide-resistant *Streptococcus pyogenes* strains. *Antimicrob Agents Chemother.* 2008;52:1140–3. [PubMed](https://doi.org/10.1128/AAC.01352-07)
<https://doi.org/10.1128/AAC.01352-07>