

Supplementary table 1: All the 460 *S. aureus* genomes with the NCBI provided identifier numbers, strain names that were included in this study.

Sr. #	Strain	Assembly
1	NCTC_8325	GCA_000013425.1
2	RF122	GCA_000009005.1
3	ST398	GCA_000009585.1
4	N315	GCA_000009645.1
5	Mu50	GCA_000009665.1
6	Mu3	GCA_000010445.1
7	Newman	GCA_000010465.1
8	MW2-1	GCA_000011265.1
9	MRSA252	GCA_000011505.1
10	MSSA476	GCA_000011525.1
11	COL	GCA_000012045.1
12	USA300_FPR3757	GCA_000013465.1
13	JH9	GCA_000016805.1
14	TCH1516	GCA_000017085.1
15	JH1	GCA_000017125.1
16	ED98	GCA_000024585.1
17	04-02981	GCA_000025145.2
18	TW20	GCA_000027045.1
19	JKD6159	GCA_000144955.1
20	JKD6008	GCA_000145595.1
21	TCH60	GCA_000159535.2
22	55_2053	GCA_000160335.2
23	O46	GCA_000189455.3
24	T0131	GCA_000204665.1
25	ED133	GCA_000210315.1
26	M013	GCA_000237125.1
27	LGA251	GCA_000237265.1
28	11819-97	GCA_000239235.1
29	VC40	GCA_000245495.1
30	ECT-R_2	GCA_000253135.1
31	HO_5096_0412	GCA_000284535.1
32	08BA02176	GCA_000296595.1
33	ST228-1	GCA_000382965.1
34	ST228-2	GCA_000382985.1
35	ST228-3	GCA_000383005.1
36	CA-347	GCA_000412775.1
37	Bmb9393	GCA_000418345.1
38	Tager_104	GCA_000452385.2
39	6850	GCA_000462955.1
40	CN1	GCA_000463055.1
41	SA957	GCA_000470845.1
42	SA40	GCA_000470865.1
43	Z172	GCA_000485885.1
44	USA300-ISMMMS1	GCA_000568455.1
45	502A	GCA_000597965.1
46	FDAARGOS_5	GCA_000626615.3
47	H-EMRSA-15	GCA_000695215.1
48	UA-S391_USA300	GCA_000695875.1
49	XN108	GCA_000709475.1
50	SA268	GCA_000737615.1
51	2395_USA500	GCA_000746505.1
52	ATCC_25923	GCA_000756205.1
53	Gv69	GCA_000769575.1
54	FORC_001	GCA_000772025.1
55	29b_MRSA	GCA_000815045.1
56	31b_MRSA	GCA_000815085.1
57	33b	GCA_000815125.1

58	26b_MRSA	GCA_000815165.1
59	25b_MRSA	GCA_000815205.1
60	27b_MRSA	GCA_000815245.1
61	DAR4145	GCA_000828035.1
62	ILRI_Eymole1_1	GCA_000953255.1
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64	ST228-5	GCA_000967345.1
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66	ST228-7	GCA_000967385.1
67	ST228-8	GCA_000967405.1
68	FCFHV36	GCA_000969225.1
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70	FDAARGOS_6	GCA_001018655.2
71	TCH_959	GCA_001018685.2
72	FDAARGOS_10	GCA_001018725.2
73	NRS137	GCA_001018735.2
74	NRS149	GCA_001018775.2
75	FDAARGOS_15	GCA_001018805.2
76	NRS271	GCA_001018835.2
77	NRS153	GCA_001018845.2
78	NRS133	GCA_001018915.2
79	NRS143	GCA_001018975.2
80	FDAARGOS_43	GCA_001019125.2
81	FDAARGOS_48	GCA_001019205.2
82	FDAARGOS_1	GCA_001019255.2
83	NRS70	GCA_001019305.2
84	NRS484	GCA_001019395.2
85	NRS146	GCA_001019415.2
86	NRS1	GCA_001019435.2
87	NRS120	GCA_001019485.2
88	FDAARGOS_40	GCA_001019495.2
89	Mw2-2	GCA_001019535.2
90	HPV107	GCA_001019575.2
91	M121	GCA_001021875.1
92	CA15	GCA_001021895.1
93	RKI4	GCA_001027045.1
94	DSM_20231	GCA_001027105.1
95	CA12	GCA_001045795.2
96	HUV05	GCA_001045995.2
97	V2200	GCA_001046095.2
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99	USA300_2014_C02	GCA_001183725.2
100	HOU1444-VR	GCA_001278745.1
101	SA564	GCA_001281145.1
102	GR2	GCA_001296985.1
103	BA01611	GCA_001298325.2
104	JS395	GCA_001307235.1
105	XQ	GCA_001444345.1
106	MS4	GCA_001456215.1
107	NCTC13435	GCA_001457495.1
108	RIVM1295	GCA_001465635.1
109	RIVM1607	GCA_001465675.1
110	RIVM3897	GCA_001465755.1
111	Gv51	GCA_001515665.1
112	Be62	GCA_001515685.1
113	Gv88	GCA_001515705.1
114	HC1340	GCA_001515745.1
115	HC1335	GCA_001515765.1
116	FDA209P	GCA_001548295.1
117	MI	GCA_001548415.1
118	TMUS2126	GCA_001549655.1

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126	ST20130942	GCA_001611365.1
127	ST20130943	GCA_001611385.1
128	ST20130938	GCA_001611405.1
129	RIVM6519	GCA_001618305.1
130	ZJ5499	GCA_001640885.1
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132	NCCP14562	GCA_001640925.1
133	V521	GCA_001641025.1
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135	08-02300	GCA_001656075.1
136	5118_N	GCA_001717645.3
137	2148_N	GCA_001717665.2
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140	1625_C01	GCA_001717725.2
141	2148_C01	GCA_001717975.3
142	FORC_027	GCA_001725965.1
143	3020_C01	GCA_001735655.2
144	FORC_026	GCA_001879545.1
145	SA40TW	GCA_001880265.1
146	LA-MRSA_ST398	GCA_001887075.1
147	HG001	GCA_001900185.1
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150	UCI62	GCA_001975005.1
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156	USA300-SUR12	GCA_002000625.1
157	USA300-SUR13	GCA_002000645.1
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159	USA300-SUR16	GCA_002000705.1
160	USA300-SUR17	GCA_002000725.1
161	USA300-SUR18	GCA_002000745.1
162	USA300-SUR19	GCA_002000765.1
163	USA300-SUR20	GCA_002000785.1
164	USA300-SUR21	GCA_002000805.1
165	USA300-SUR22	GCA_002000825.1
166	USA300-SUR23	GCA_002000845.1
167	USA300-SUR24	GCA_002000865.1
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171	C2406	GCA_002088995.1
172	293G	GCA_002089035.2
173	GD5	GCA_002089055.1
174	GD705	GCA_002089075.2
175	GD1677	GCA_002089095.2
176	GD1539	GCA_002089115.2
177	M92	GCA_002097595.2
178	FORC_039	GCA_002140115.1
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180	Seattle_1945-2	GCA_002202095.1
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185	Newman_D2C	GCA_002310395.1
186	NYU_Newman	GCA_002310435.1
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188	JH4899	GCA_002356675.1
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193	CFSAN007850	GCA_002633805.1
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204	K5	GCA_002952015.1
205	FORC59	GCA_003010875.1
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207	CFSAN018749	GCA_003030065.1
208	CFSAN064037	GCA_003030085.1
209	CFSAN018750	GCA_003030225.1
210	CFSAN007896	GCA_003031425.1
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217	AR461	GCA_003073715.1
218	AR464	GCA_003073755.1
219	AR462	GCA_003073775.1
220	SVH7513	GCA_003111725.1
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223	IT4-R	GCA_003185005.1
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231	AR_0471	GCA_003193765.1
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233	AR_0467	GCA_003193885.1
234	AR_0225	GCA_003193965.1
235	AR_0469	GCA_003194005.1
236	AR_0215	GCA_003194025.1
237	CHU15-056	GCA_003194405.1
238	AR_0226	GCA_003203595.1
239	AR_0468	GCA_003203615.1
240	AR_0228	GCA_003203635.1

241	AR_0222	GCA_003203655.1
242	AR_0220	GCA_003203675.1
243	CMRSA-3	GCA_003264775.1
244	CMRSA-6	GCA_003264815.1
245	AR_475	GCA_003288395.1
246	AR_474	GCA_003330905.1
247	E16SA093	GCA_003342735.1
248	F17SA003	GCA_003342775.1
249	FORC_061	GCA_003347055.1
250	FORC_062	GCA_003351925.1
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252	187	GCA_003354565.1
253	629	GCA_003354585.1
254	422	GCA_003354605.1
255	468	GCA_003354625.1
256	128	GCA_003354645.1
257	165	GCA_003354665.1
258	277	GCA_003354685.1
259	61	GCA_003354705.1
260	143	GCA_003354725.1
261	466	GCA_003354745.1
262	191	GCA_003354765.1
263	85	GCA_003354785.1
264	54	GCA_003354805.1
265	45	GCA_003354865.1
266	164	GCA_003354885.1
267	78	GCA_003354905.1
268	135	GCA_003354925.1
269	545	GCA_003354945.1
270	546	GCA_003354965.1
271	628	GCA_003354985.1
272	WCH-SK2	GCA_003394105.1
273	199	GCA_003425545.1
274	28	GCA_003425835.1
275	82	GCA_003425885.1
276	64	GCA_003425915.1
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279	NX-T55	GCA_003432345.1
280	QD-CD9	GCA_003432365.1
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283	JMUB1273	GCA_003573855.1
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285	USA300-SUR2	GCA_003595385.1
286	USA300-SUR3	GCA_003595405.1
287	USA300-SUR4	GCA_003595425.1
288	USA300-SUR5	GCA_003595445.1
289	USA300-SUR6	GCA_003595465.1
290	USA300-SUR7	GCA_003595485.1
291	USA300-SUR8	GCA_003595505.1
292	JP080	GCA_003609855.1
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299	TUM9458	GCA_003945405.1
300	TUM9463	GCA_003945425.1
301	PMB_81-4	GCA_003952625.1

302	O267	GCA_003955945.1
303	PMB_64-1	GCA_003957315.1
304	USA_100	GCA_003991015.1
305	PCFH-226	GCA_004026165.1
306	PCFA-221	GCA_004026185.1
307	LAC	GCA_004118995.1
308	M51	GCA_004136235.1
309	M48	GCA_004136255.1
310	S57	GCA_004136655.1
311	VB31683	GCA_004153365.1
312	C3948	GCA_004193875.1
313	H489	GCA_004193895.1
314	592	GCA_004208595.1
315	04-002	GCA_004421085.1
316	C8879	GCA_004614295.1
317	JK3137	GCA_004614315.1
318	O217	GCA_004771335.1
319	B119	GCA_004771515.1
320	O408	GCA_004771975.1
321	O331	GCA_004772055.1
322	O55	GCA_004772175.1
323	O268	GCA_004772215.1
324	WCUH29	GCA_004785995.1
325	O82	GCA_004797195.1
326	R46	GCA_005705635.1
327	Lr6	GCA_005705815.1
328	P10	GCA_005706035.1
329	Lr2	GCA_005706855.1
330	R50	GCA_005707015.1
331	Lr12	GCA_005707215.1
332	Lr3	GCA_005707335.1
333	Co152-A5	GCA_005885975.1
334	J01	GCA_005889995.1
335	JKD6004	GCA_005890015.1
336	D592-HR	GCA_005890035.1
337	GD487	GCA_005931015.1
338	GD1108	GCA_005931035.1
339	GD1696	GCA_005931055.1
340	D592	GCA_005954685.1
341	aureus	GCA_006088835.1
342	ATCC_12600	GCA_006094915.1
343	S15	GCA_006158985.1
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345	FDAARGOS_766	GCA_006364775.1
346	JRA307	GCA_007185035.1
347	JKD6004-DR	GCA_007410625.1
348	BB155	GCA_900004855.1
349	NZAK3	GCA_900017775.1
350	Sa_Newman_UoM	GCA_900092595.1
351	AUS0325	GCA_900096745.1
352	Clinical_isolate	GCA_900129335.1
353	NZ15MR0322	GCA_900155335.1
354	24117-WT	GCA_900323905.1
355	1549-WT	GCA_900323925.1
356	1549-REV	GCA_900323955.1
357	1549-SCV	GCA_900323965.1
358	24117-REV	GCA_900324045.1
359	24117-SCV	GCA_900324065.1
360	1_1439	GCA_900324205.1
361	3_LA_115	GCA_900324215.1
362	7_4623	GCA_900324225.1

363	5_3949	GCA_900324235.1
364	8_LA_272	GCA_900324245.1
365	2_LA_86	GCA_900324255.1
366	9_LA_281	GCA_900324265.1
367	6_LA_232	GCA_900324275.1
368	4_LA_208	GCA_900324285.1
369	16_LA_309	GCA_900324295.1
370	13_LA_301	GCA_900324305.1
371	12_LA_293	GCA_900324315.1
372	14_5418	GCA_900324325.1
373	15_LA_305	GCA_900324335.1
374	17_LA_343	GCA_900324345.1
375	10_5235	GCA_900324355.1
376	19_LA_388	GCA_900324365.1
377	20_LA_415	GCA_900324385.1
378	21_LA_436	GCA_900324405.1
379	22_LA_562	GCA_900324415.1
380	NCTC13394	GCA_900474525.1
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382	NCTC13137	GCA_900474555.1
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389	NCTC13140	GCA_900474725.1
390	NCTC13395	GCA_900474735.1
391	NCTC10344	GCA_900474755.1
392	NCTC11940	GCA_900475055.1
393	NCTC8325	GCA_900475245.1
394	NCTC13277	GCA_900478245.1
395	JKD6009	GCA_900607245.1
396	BPH2019	GCA_900607255.1
397	BPH2003	GCA_900607265.1
398	BPH2070	GCA_900607275.1
399	BPH3244	GCA_900607285.1
400	BPH2869	GCA_900607295.1
401	BPH2056	GCA_900607305.1
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403	BPH2819	GCA_900620225.1
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405	BPH2947	GCA_900620245.1
406	BPH2986	GCA_900620255.1
407	NCTC8317	GCA_900635095.1
408	NCTC13142	GCA_900635245.1
409	NCTC12233	GCA_900635265.1
410	NCTC7121	GCA_900635285.1
411	NCTC4137	GCA_900635305.1
412	NCTC9555	GCA_900635315.1
413	NCTC11965	GCA_900635335.1
414	NCTC4163	GCA_900635505.1
415	NCTC13616	GCA_900635905.1
416	NCTC7988	GCA_900636335.1
417	NCTC5661	GCA_900636355.1
418	NCTC1803	GCA_900636695.1
419	NCTC13811	GCA_900637155.1
420	71193	GCA_000258685.1
421	M1	GCA_000367745.1
422	No_10	GCA_002356655.1
423	NMR08	GCA_002407105.1

424	NRS384	GCA_002993865.1
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428	13420	GCA_003194105.1
429	101110051-1	GCA_003194145.1
430	101110041-3	GCA_003194165.1
431	0201753-2	GCA_003194185.1
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434	ch22	GCA_003350605.1
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436	SA003	GCA_004001345.1
437	NF25	GCA_004119935.1
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439	NRRL_B-41012	GCA_005153985.1
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441	MN8	GCA_000160195.1
442	FDAARGOS_140	GCA_001471715.2
443	O11	GCA_000189435.3
444	NRS107	GCA_001019275.2
445	ST20130939	GCA_001611425.1
446	V605	GCA_001641045.1
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452	2288	GCA_004368035.1
453	NCTC13552	GCA_900635255.1
454	NCTC5660	GCA_900635275.1
455	NCTC6131	GCA_900636395.1
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457	SA17_S6	GCA_000934205.1
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