

Supplementary Information

Identifying large-scale recombination and capsular switching events in *Streptococcus agalactiae* strains causing disease in adults in the United Kingdom between 2014 and 2015

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Supplementary Tables

Tables S1. Assembly statistics for 193 whole genome sequences used in this study.

Assembly statistics taken from QUAST analysis, all results reported are for contigs >=500bp.

Sample ID	ERA number	Assembly accession number	Assembled genome length	No. of contigs	length of largest contig (bp)	N50 (bp)
100414	ERR2560245	GCA_920937375	2359530	185	322105	109165
141439	ERR3531632	GCA_920937465	2025404	36	282949	111138
200682	ERR3531626	GCA_920937515	2235218	68	168472	79621
200683	ERR3531633	GCA_920937495	2048139	18	363701	213107
200684	ERR3531637	GCA_920937505	2055521	24	286179	121246
200690	ERR3531636	GCA_920937415	2042714	21	456519	179336
200693	ERR3531627	GCA_920937345	1964400	35	332173	92076
200694	ERR3531635	GCA_920937355	2076003	35	387800	94235
200696	ERR3531628	GCA_920937385	2013400	33	336548	92899
200697	ERR3531629	GCA_920937525	2029229	32	294450	93048
200698	ERR3531634	GCA_920937405	2061821	19	501932	275800
200699	ERR3531631	GCA_920937475	2113316	37	261420	80353
200702	ERR3531630	GCA_920937925	1999895	18	825426	263403
200706	ERR3531625	GCA_920937395	2052960	20	368886	209879
200710	ERR3589625	GCA_920937535	2022921	27	260511	142987
PHEGBS0041	ERR1742042	GCA_920937445	2055687	29	345110	110270
PHEGBS0042	ERR1742087	GCA_920937425	1993860	35	261499	140419
PHEGBS0044	ERR1742051	GCA_920937455	2080855	31	372108	115460
PHEGBS0047	ERR1741500	GCA_920937435	1995537	24	422800	123141
PHEGBS0048	ERR1741806	GCA_920937555	2064119	20	524213	152327
PHEGBS0049	ERR1741385	GCA_920937775	2014596	34	267633	135263
PHEGBS0052	ERR1741861	GCA_920937715	1986454	34	271787	92359
PHEGBS0054	ERR1742070	GCA_920937655	2035643	22	500651	152745
PHEGBS0060	ERR1741459	GCA_920984595	2067203	25	465676	145542
PHEGBS0061	ERR1741474	GCA_920937935	2121892	40	239669	115559
PHEGBS0066	ERR1741366	GCA_920937675	2005768	35	249543	124078
PHEGBS0067	ERR1741677	GCA_920937565	2074018	27	541324	129106
PHEGBS0068	ERR1741595	GCA_920937575	2181140	35	537406	170965
PHEGBS0070	ERR1742116	GCA_920938025	1985181	26	384866	195246

PHEGBS0071	ERR1742139	GCA_920937975	2115399	69	271485	56306
PHEGBS0072	ERR1741514	GCA_920937585	2068618	47	383569	90189
PHEGBS0080	ERR1741859	GCA_920937705	2032633	88	92771	42988
PHEGBS0081	ERR1741497	GCA_920938285	2052375	22	344927	179301
PHEGBS0082	ERR1741501	GCA_920937795	2066202	22	623892	173759
PHEGBS0084	ERR1741695	GCA_920937595	2162014	22	427702	131081
PHEGBS0086	ERR1741926	GCA_920937485	2047057	19	566092	468085
PHEGBS0090	ERR1742102	GCA_920937735	2133485	25	555418	119351
PHEGBS0091	ERR1741407	GCA_920937725	2192871	31	285443	150407
PHEGBS0092	ERR1741722	GCA_920937945	2162627	45	188493	103768
PHEGBS0095	ERR1741918	GCA_920937615	2028040	21	649906	195022
PHEGBS0097	ERR1741888	GCA_920937635	2157776	30	436280	109113
PHEGBS0098	ERR1741573	GCA_920937955	2114109	21	345272	120163
PHEGBS0100	ERR1741744	GCA_920937785	2079895	58	142136	68038
PHEGBS0106	ERR1742039	GCA_920937905	2006154	21	422759	151565
PHEGBS0117	ERR1741635	GCA_920937755	1996845	27	280548	124174
PHEGBS0121	ERR1741801	GCA_920937875	2020928	19	509200	120015
PHEGBS0122	ERR1741539	GCA_920937605	2014362	16	649976	215508
PHEGBS0123	ERR1742074	GCA_920937625	2027693	23	409959	137831
PHEGBS0127	ERR1741367	GCA_920937895	2055945	25	522317	125962
PHEGBS0128	ERR1742140	GCA_920937685	2058985	23	354729	159640
PHEGBS0132	ERR1741466	GCA_920938305	2248273	55	321926	74630
PHEGBS0134	ERR1741692	GCA_920937885	1960272	16	604929	240851
PHEGBS0135	ERR1741673	GCA_920937915	2111991	25	364461	137333
PHEGBS0139	ERR1741954	GCA_920937545	2085983	28	264960	129372
PHEGBS0144	ERR1741588	GCA_920937805	2034729	34	264205	92386
PHEGBS0145	ERR1741818	GCA_920937965	2128399	20	397935	157535
PHEGBS0151	ERR1741944	GCA_920937855	1981843	28	275506	114049
PHEGBS0152	ERR1742041	GCA_920937845	2041947	19	482420	263243
PHEGBS0153	ERR1741822	GCA_920937665	2050273	35	513939	121803
PHEGBS0154	ERR1741575	GCA_920937695	2031222	21	363662	213798
PHEGBS0156	ERR1741857	GCA_920937765	2149526	37	251765	116606
PHEGBS0164	ERR1741749	GCA_920937745	2053728	20	345271	190986
PHEGBS0170	ERR1742029	GCA_920937645	2013304	18	389473	151886
PHEGBS0171	ERR1741963	GCA_920937865	2131791	39	188287	82359
PHEGBS0176	ERR1742030	GCA_920938325	2055010	14	557767	233672
PHEGBS0188	ERR1741906	GCA_920938145	1995197	18	688163	138887
PHEGBS0193	ERR1742119	GCA_920937985	2039304	78	488568	139079
PHEGBS0194	ERR1741932	GCA_920984575	2094588	58	146249	53681
PHEGBS0206	ERR1741687	GCA_920938365	2166025	20	698963	199321
PHEGBS0207	ERR1741997	GCA_920938415	2102437	30	311394	161585
PHEGBS0219	ERR1741590	GCA_920938015	2014180	33	385922	114716
PHEGBS0230	ERR1741957	GCA_920938075	2000018	15	788662	252592
PHEGBS0237	ERR1742117	GCA_920938195	2062447	31	280309	99729
PHEGBS0243	ERR1741633	GCA_920938115	2043562	33	280454	92994
PHEGBS0246	ERR1741679	GCA_920938655	1968977	23	619252	176684
PHEGBS0248	ERR1742038	GCA_920938615	2042767	26	522377	145462
PHEGBS0252	ERR1741658	GCA_920938395	2104508	39	217813	99224
PHEGBS0253	ERR1741828	GCA_920938095	2116303	25	343732	133515
PHEGBS0265	ERR1741375	GCA_920938065	2032574	17	505921	164379
PHEGBS0266	ERR1741584	GCA_920938335	2158950	25	380390	135560
PHEGBS0267	ERR1741548	GCA_920938625	2014775	27	524006	105548
PHEGBS0270	ERR1742082	GCA_920938105	2032512	20	699553	158859
PHEGBS0275	ERR1742034	GCA_920937995	2043269	32	260499	91995
PHEGBS0283	ERR1741523	GCA_920938235	2041895	31	680187	102997

PHEGBS0286	ERR1741880	GCA_920938635	2102353	34	243834	102257
PHEGBS0287	ERR1742120	GCA_920938355	2022675	23	519633	132699
PHEGBS0288	ERR1741473	GCA_920938385	2159710	33	285123	111616
PHEGBS0295	ERR1741889	GCA_920938165	1965311	16	383540	221142
PHEGBS0296	ERR1741462	GCA_920938175	2141322	53	187402	63995
PHEGBS0300	ERR1741553	GCA_920938505	2041257	28	219972	115462
PHEGBS0306	ERR1741485	GCA_920938535	2090086	21	341391	191063
PHEGBS0308	ERR1741488	GCA_920938515	2196708	34	198658	107110
PHEGBS0318	ERR1741792	GCA_920938205	1999622	30	235807	92560
PHEGBS0320	ERR1741605	GCA_920938125	2119360	64	147168	48327
PHEGBS0336	ERR1741747	GCA_920938445	2014037	23	442764	149380
PHEGBS0337	ERR1741620	GCA_920938525	2088706	16	456155	299098
PHEGBS0355	ERR1741387	GCA_920938545	2010507	41	440120	92091
PHEGBS0359	ERR1741657	GCA_920938215	2121307	42	269427	96654
PHEGBS0360	ERR1742032	GCA_920938035	2053822	35	301380	76544
PHEGBS0367	ERR1742111	GCA_920938575	2014630	18	545026	155385
PHEGBS0368	ERR1742016	GCA_920938565	2054477	22	536362	119351
PHEGBS0372	ERR1741524	GCA_920938055	2141436	36	236840	95233
PHEGBS0373	ERR1741478	GCA_920938455	2054315	21	310516	141491
PHEGBS0377	ERR1741496	GCA_920938465	2012185	33	258776	91170
PHEGBS0378	ERR1741669	GCA_920938585	2104768	29	340979	114468
PHEGBS0380	ERR1741867	GCA_920938045	2026201	36	280827	94183
PHEGBS0382	ERR1741847	GCA_920938155	2060450	35	253225	118805
PHEGBS0383	ERR1741449	GCA_920938135	2038822	36	235651	91860
PHEGBS0389	ERR1741939	GCA_920938085	2013939	41	277651	87763
PHEGBS0390	ERR1741684	GCA_920938475	2229466	30	235526	104999
PHEGBS0393	ERR1741475	GCA_920938605	2141907	30	243431	157535
PHEGBS0394	ERR1741769	GCA_920938485	2089389	27	358893	148355
PHEGBS0398	ERR1741711	GCA_920938295	1988018	81	122438	42295
PHEGBS0399	ERR1741537	GCA_920938345	2104536	29	321549	84885
PHEGBS0401	ERR1741671	GCA_920938375	2028548	24	389536	152780
PHEGBS0407	ERR1741602	GCA_920938555	2037136	22	497031	118979
PHEGBS0408	ERR1741526	GCA_920938405	2107102	28	553837	97162
PHEGBS0411	ERR1742019	GCA_920938425	2132584	34	255247	113252
PHEGBS0416	ERR1741402	GCA_920938645	2001227	32	280573	95462
PHEGBS0428	ERR1741389	GCA_920938435	2120073	27	282551	147580
PHEGBS0429	ERR1741515	GCA_920938185	1995933	32	280722	120214
PHEGBS0446	ERR1741823	GCA_920938005	2100525	25	393662	169307
PHEGBS0447	ERR1741785	GCA_920938275	2007286	14	712860	136803
PHEGBS0448	ERR1741564	GCA_920938595	2102878	37	322662	153339
PHEGBS0450	ERR1741493	GCA_920938255	2048737	18	341394	191113
PHEGBS0463	ERR1742031	GCA_920938245	2152913	40	241901	95189
PHEGBS0464	ERR1741702	GCA_920938265	2073518	24	323754	193184
PHEGBS0465	ERR1741442	GCA_920938225	2005280	19	526411	152096
PHEGBS0467	ERR1741981	GCA_920938495	2369887	182	153218	32888
PHEGBS0476	ERR1741458	GCA_920938315	2079208	44	344370	94690
PHEGBS0480	ERR1741862	GCA_920938785	2048236	34	240044	92967
PHEGBS0483	ERR1741662	GCA_920939095	1961899	62	155038	47762
PHEGBS0491	ERR1741535	GCA_920939115	2046271	33	340400	117554
PHEGBS0492	ERR1741922	GCA_920938755	2185096	41	250829	115984
PHEGBS0493	ERR1741913	GCA_920938775	2058597	26	341389	115567
PHEGBS0501	ERR1741911	GCA_920938795	2003048	36	331270	91861
PHEGBS0503	ERR1741579	GCA_920939045	2074653	51	181045	83817
PHEGBS0509	ERR1741644	GCA_920939235	2152255	41	216372	122905
PHEGBS0512	ERR1741958	GCA_920938765	1950594	20	493601	141044

PHEGBS0513	ERR1741701	GCA_920938705	2022171	36	203067	92203
PHEGBS0518	ERR1741606	GCA_920939075	2096669	13	676614	471088
PHEGBS0520	ERR1741361	GCA_920938915	2122550	20	426683	153584
PHEGBS0524	ERR1741696	GCA_920939125	2037514	14	454928	230800
PHEGBS0527	ERR1742059	GCA_920939085	2018034	18	497655	263402
PHEGBS0532	ERR1741494	GCA_920939105	2092344	20	481015	290420
PHEGBS0533	ERR1741445	GCA_920938735	2067865	21	345357	155748
PHEGBS0539	ERR1741599	GCA_920938695	2065877	25	326493	139677
PHEGBS0547	ERR1741621	GCA_920938725	2019045	16	712625	124094
PHEGBS0549	ERR1741850	GCA_920939225	2049432	23	442401	114929
PHEGBS0551	ERR1741634	GCA_920939055	2063747	21	320648	141173
PHEGBS0552	ERR1741992	GCA_920939065	2068680	33	211892	152944
PHEGBS0554	ERR1741388	GCA_920938825	2170408	20	358371	201882
PHEGBS0555	ERR1741852	GCA_920938715	2038087	28	369057	114835
PHEGBS0556	ERR1741948	GCA_920984555	2065555	18	321233	211798
PHEGBS0559	ERR1741492	GCA_920984565	2104667	39	260697	91861
PHEGBS0561	ERR1741542	GCA_920984585	2042133	57	512647	91862
PHEGBS0566	ERR1741860	GCA_920939025	2110525	41	188728	102075
PHEGBS0567	ERR1741438	GCA_920938945	2146678	42	212845	83528
PHEGBS0568	ERR1741647	GCA_920938665	2077020	25	322975	121677
PHEGBS0575	ERR1741521	GCA_920938885	2156314	30	205589	113105
PHEGBS0577	ERR1741835	GCA_920939035	2156314	30	205589	113105
PHEGBS0581	ERR1741660	GCA_920938925	2196603	32	299937	98941
PHEGBS0586	ERR1741614	GCA_920939215	2014066	31	245811	96789
PHEGBS0589	ERR1741794	GCA_920938835	1997662	26	384071	102978
PHEGBS0592	ERR1741448	GCA_920939185	2061511	36	187233	83449
PHEGBS0593	ERR1741754	GCA_920939145	2133734	61	195821	79027
PHEGBS0595	ERR1741483	GCA_920939165	2109564	43	261494	110912
PHEGBS0598	ERR1741680	GCA_920938955	2191974	144	226421	78419
PHEGBS0599	ERR1741659	GCA_920938805	2087564	40	240216	96266
PHEGBS0608	ERR1741534	GCA_920939245	2193800	42	222835	78745
PHEGBS0610	ERR1742130	GCA_920938815	2018455	40	268329	91995
PHEGBS0616	ERR1742012	GCA_920939005	2054548	23	264386	132697
PHEGBS0618	ERR1741842	GCA_920939175	2037557	18	509111	315905
PHEGBS0622	ERR1741630	GCA_920938745	2116739	20	282488	162699
PHEGBS0623	ERR1741456	GCA_920938985	2002455	16	610192	146436
PHEGBS0624	ERR1741580	GCA_920939195	2128528	23	422783	193178
PHEGBS0625	ERR1742108	GCA_920939205	2021983	26	332982	123463
PHEGBS0626	ERR1741728	GCA_920938875	2093089	30	341537	144721
PHEGBS0627	ERR1741512	GCA_920938995	2108400	25	517430	138034
PHEGBS0630	ERR1741525	GCA_920938855	2086654	19	345179	182496
PHEGBS0635	ERR1741616	GCA_920938965	2158160	13	647134	231450
PHEGBS0639	ERR1741887	GCA_920939015	2146414	40	191783	79040
PHEGBS0643	ERR1741746	GCA_920938675	2146187	28	300200	116921
PHEGBS0648	ERR1741752	GCA_920938935	2052740	18	374106	180784
PHEGBS0654	ERR1741549	GCA_920938845	2002532	17	610122	156485
PHEGBS0657	ERR1741517	GCA_920938975	2081054	35	282212	104675
PHEGBS0658	ERR1741901	GCA_920938865	1977354	21	672968	135323
PHEGBS0662	ERR1741427	GCA_920938895	2179091	48	483415	97514
PHEGBS0663	ERR1741436	GCA_920938685	2103888	23	533819	149710
PHEGBS0664	ERR1742011	GCA_920938905	2126065	35	322486	89438
PHEGBS0667	ERR1741656	GCA_920939255	2079376	20	340964	157718
PHEGBS0670	ERR1742049	GCA_920939135	2117572	20	687499	169060
PHEGBS0738	ERR1741902	GCA_920939155	2126457	99	151596	48064

14 **Table S2. Summary of characteristics of 193 GBS whole genome sequences used in this study.** During 20 months of surveillance between
15 January 2014 and December 2015, a total of 193 GBS isolates causing disease in adults were whole genome sequenced. Isolates were grouped
16 into invasive and non-invasive disease-causing GBS based on the site of isolates (specimen column); isolates from blood (n=178), CSF (n=1),
17 aortic valve (n=1), amniotic membrane (n=1), placenta (n=3) were classed as invasive; and pus (n=2), throat swab (n=1), tissue (n=2), vaginal
18 swab (n=1), wound swab (n=1) and abscess (n=1) were classed as non-invasive; one isolates did not have information where it was isolated
19 from. Surface (alpha and beta like) proteins, *alp2*, *alp3*, *bca*, *cba*, *rib*, bacterial adhesin genes, *bibA* and *hvgA*, were detected. Novel STs identified
20 in this study are marked in bold. *uncertainty detected for reported ST for this isolate; # - clonal cluster was reassigned based on clustering from
21 phylogenetic analysis. F- female, M – male, n/a – information not available.

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Sample ID	ERA number	Serotype	ST	CC_MLST	CC_wgs#	alp2	alp3	bca	cba	rib	bibA	hvgA	Pilus island genes	Sex	Age group	Specimen	Region
PHEGBS0447	ERR1741785	la	ST1065	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI+2a	F	18-44	Blood	Greater London
PHEGBS0618	ERR1741842	la	ST1214	singleton	CC23	yes	no	no	no	no	no	no	PI-1+PI+2a	F	65-84	Blood	Yorkshire and the Humber
PHEGBS0134	ERR1741692	la	ST1218	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	45-64	Blood	Yorkshire and the Humber
PHEGBS0616	ERR1742012	la	ST24	CC498/CC24	CC23	no	no	yes	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Wales
PHEGBS0188	ERR1741906	la	ST24	CC498/CC24	CC23	no	no	yes	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Wales
PHEGBS0086	ERR1741926	la	ST1317	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	45-64	Wound swab	South East England
PHEGBS0663	ERR1741436	la	ST144	CC23	CC23	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0049	ERR1741385	la	ST144	CC23	CC23	no	no	no	no	yes	yes	no	PI-1+PI-2a	M	85+	Blood	North East England
PHEGBS0248	ERR1742038	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	South East England
PHEGBS0194	ERR1741932	la	ST7	singleton	CC8/CC10	no	no	yes	yes	no	no	no	PI-1+PI-2b	M	85+	Blood	South East England
PHEGBS0230	ERR1741957	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	85+	Blood	South East England
PHEGBS0044	ERR1742051	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Northern Ireland
PHEGBS0047	ERR1741500	la	ST24	CC498/CC24	CC23	no	no	yes	no	no	yes	no	PI-1+PI-2a	M	45-64	Blood	South West England
PHEGBS0547	ERR1741621	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	85+	Blood	Wales
PHEGBS0170	ERR1742029	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	85+	Blood	North West England
PHEGBS0503	ERR1741579	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	South East England
PHEGBS0320	ERR1741605	la	ST7	singleton	CC8/CC10	no	no	yes	yes	no	no	no	PI-1+PI-2b	F	65-84	Blood	Yorkshire and the Humber
PHEGBS0070	ERR1742116	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	65-84	Blood	South East England
PHEGBS0060	ERR1741459	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	85+	Blood	South East England
PHEGBS0283	ERR1741523	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	South East England
PHEGBS0048	ERR1741806	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	South West England
PHEGBS0193	ERR1742119	la	ST23	CC23	CC23	no	no	yes	no	yes	yes	no	PI-1+PI-2a	F	18-44	Blood	Scotland
PHEGBS0527	ERR1742059	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0300	ERR1741553	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0512	ERR1741958	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0265	ERR1741375	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
200702	ERR3531630	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	45-64	Blood	North West England
PHEGBS0123	ERR1742074	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0465	ERR1741442	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Aortic valve	Greater London
PHEGBS0407	ERR1741602	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	45-64	Blood	Greater London
PHEGBS0121	ERR1741801	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	East England
PHEGBS0539	ERR1741599	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Amniotic membrane	Wales
PHEGBS0106	ERR1742039	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	South East England
PHEGBS0095	ERR1741918	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	45-64	Blood	South West England
PHEGBS0623	ERR1741456	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	65-84	Blood	South East England
PHEGBS0654	ERR1741549	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	65-84	Blood	South East England
PHEGBS0295	ERR1741889	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	North East England
PHEGBS0267	ERR1741548	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Tissue	Scotland
PHEGBS0401	ERR1741671	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	East Midlands
PHEGBS0246	ERR1741679	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	Yorkshire and the Humber
PHEGBS0270	ERR1742082	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	Yorkshire and the Humber
PHEGBS0625	ERR1742108	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	Yorkshire and the Humber
PHEGBS0067	ERR1741677	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	18-44	Blood	East England
PHEGBS0152	ERR1742041	la	ST24	CC498/CC24	CC23	no	no	yes	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	North West England
PHEGBS0589	ERR1741794	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	East England
PHEGBS0336	ERR1741747	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	South East England

Table S2 (continued)

Sample ID	ERA number	Serotype	ST	CC_MLST	CC_wgs#	alp2	alp3	bca	cba	rib	bibA	hvgA	Pilus island genes	Sex	Age group	Specimen	Region
PHEGBS0367	ERR1742111	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	South East England
PHEGBS0518	ERR1741606	la	ST498	CC498/CC24	CC23	no	no	yes	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	East England
PHEGBS0658	ERR1741901	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	South East England
PHEGBS0287	ERR1742120	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	85+	Blood	North West England
PHEGBS0122	ERR1741539	la	ST23	CC23	CC23	no	no	no	no	no	yes	no	PI-1+PI-2a	M	85+	Blood	South West England
200693	ERR3531627	III	ST1219	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	M	65-84	Blood	South East England
141439	ERR3531632	lb	ST10	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	65-84	Blood	North East England
PHEGBS0393	ERR1741475	lb	ST12	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	65-84	Blood	Yorkshire and the Humber
PHEGBS0097	ERR1741888	lb	ST104	CC8/CC10	singleton	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	85+	Blood	Wales
PHEGBS0072	ERR1741514	lb	ST15	CC8/CC10	singleton	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	18-44	Blood	West Midlands
200706	ERR3531625	lb	ST12	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	45-64	Blood	Greater London
PHEGBS0670	ERR1742049	lb	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	45-64	Blood	Greater London
PHEGBS0145	ERR1741818	lb	ST12	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	65-84	Blood	Yorkshire and the Humber
PHEGBS0068	ERR1741595	lb	ST12	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	18-44	Blood	North West England
PHEGBS0667	ERR1741656	lb	ST12	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	65-84	Blood	South East England
PHEGBS0450	ERR1741493	lb	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	65-84	Blood	North West England
PHEGBS0061	ERR1741474	lb	ST8	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	45-64	Blood	South East England
PHEGBS0411	ERR1742019	lb	ST8	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	18-44	Blood	Greater London
PHEGBS0555	ERR1741852	lb	ST8	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	18-44	Blood	North West England
PHEGBS0382	ERR1741847	lb	ST8	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	65-84	Blood	Yorkshire and the Humber
200698	ERR3531634	lb	ST8	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	45-64	Blood	Wales
PHEGBS0135	ERR1741673	lb	ST8	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	65-84	Blood	South East England
PHEGBS0622	ERR1741630	lb	ST8	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	65-84	Blood	South East England
PHEGBS0428	ERR1741389	lb	ST8	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	85+	Blood	South East England
PHEGBS0568	ERR1741647	II	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	45-64	Blood	South East England
200683	ERR3531633	lb	ST8	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	65-84	Blood	Wales
PHEGBS0398	ERR1741711	II	ST1213	CC22/CC1213	CC22/CC1213	no	no	no	no	no	yes	no	PI-1+PI+2a	M	85+	Blood	North West England
PHEGBS0080	ERR1741859	II	ST22	CC22/CC1213	CC22/CC1213	no	no	no	no	no	yes	no	PI-1+PI+2a	M	65-84	Blood	Scotland
PHEGBS0154	ERR1741575	lb	ST9	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	65-84	Blood	not available
PHEGBS0151	ERR1741944	II	ST10	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	18-44	Blood	Yorkshire and the Humber
PHEGBS0308	ERR1741488	II	ST12	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	65-84	Blood	Yorkshire and the Humber
PHEGBS0549	ERR1741850	II	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0091	ERR1741407	II	ST12	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	45-64	Blood	North West England
PHEGBS0041	ERR1742042	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	Northern Ireland
PHEGBS0509	ERR1741644	II	ST12	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	18-44	Blood	Greater London
PHEGBS0139	ERR1741954	V	ST19	CC19	CC19	no	no	no	no	no	yes	no	PI-1+PI-2a	M	45-64	Blood	South East England
PHEGBS0127	ERR1741367	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	M	85+	Blood	Yorkshire and the Humber
PHEGBS0738	ERR1741902	V	ST19	CC19	CC19	no	no	no	no	no	yes	no	PI-1+PI-2a	M	45-64	Tissue	Greater London
PHEGBS0595	ERR1741483	V	ST19	CC19	CC19	no	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	Greater London
PHEGBS0608	ERR1741534	V	ST19	CC19	CC19	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0657	ERR1741517	V	ST19	CC19	CC19	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0132	ERR1741466	III	ST529	singleton	CC19	no	no	no	no	no	no	no	PI-1+PI-2a	F	45-64	Blood	Greater London
PHEGBS0171	ERR1741963	II	ST12	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	18-44	Blood	South West England
PHEGBS0491	ERR1741535	II	ST12	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	65-84	Blood	South East England
PHEGBS0639	ERR1741887	V	ST110	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	M	45-64	Blood	Greater London
PHEGBS0092	ERR1741722	II	ST12	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	65-84	Blood	Greater London
PHEGBS0390	ERR1741684	II	ST12	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	18-44	Blood	South West England
PHEGBS0360	ERR1742032	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	Greater London

Table S2 (continued).

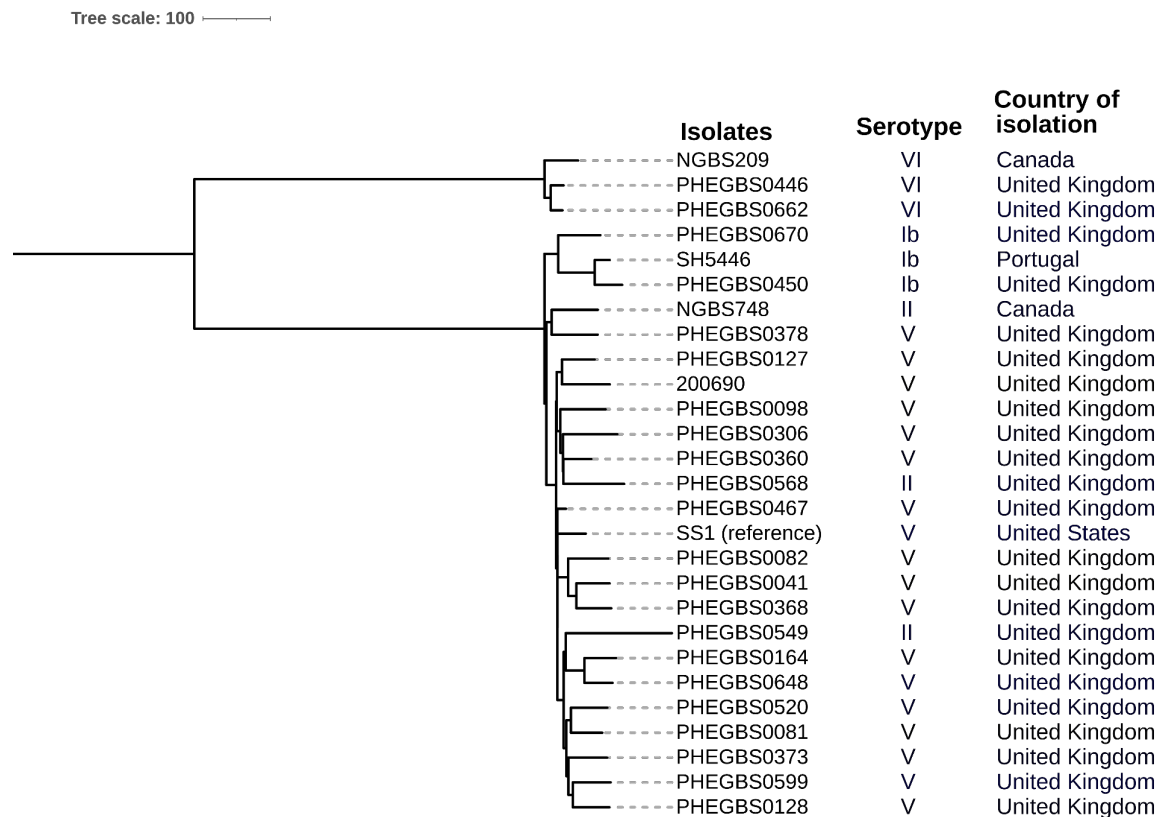
Sample ID	ERA number	Serotype	ST	CC_MLST	CC_wgs#	alp2	alp3	bca	cba	rib	bibA	hvgA	Pilus island genes	Sex	Age group	Specimen	Region
PHEGBS0581	ERR1741660	II	ST12	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	18-44	Blood	South West England
PHEGBS0153	ERR1741822	II	ST104	CC8/CC10	singleton	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	65-84	Blood	North West England
PHEGBS0598	ERR1741680	III	ST1316	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	65-84	Blood	Greater London
PHEGBS0253	ERR1741828	II	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Placenta	North West England
PHEGBS0586	ERR1741614	II	ST652	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	18-44	pus	Yorkshire and the Humber
PHEGBS0394	ERR1741769	II	ST9	CC8/CC10	CC8/CC10	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	45-64	Blood	South East England
PHEGBS0296	ERR1741462	III	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	M	45-64	Blood	East England
PHEGBS0566	ERR1741860	III	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	65-84	Blood	South East England
PHEGBS0575	ERR1741521	Ib	ST1220	CC8/CC10	CC17	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	18-44	pus	Wales
PHEGBS0567	ERR1741438	III	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	65-84	Abscess	South East England
PHEGBS0377	ERR1741496	III	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Blood	Scotland
PHEGBS0501	ERR1741911	III	ST1221	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	Wales
PHEGBS0476	ERR1741458	IV	ST1351	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	85+	Blood	South East England
PHEGBS0237	ERR1742117	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Placenta	South East England
PHEGBS0610	ERR1742130	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	South East England
PHEGBS0359	ERR1741657	III	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	85+	Blood	Yorkshire and the Humber
PHEGBS0286	ERR1741880	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	Wales
PHEGBS0643	ERR1741746	III	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	M	45-64	Blood	Greater London
PHEGBS0288	ERR1741473	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	85+	Blood	Wales
PHEGBS0052	ERR1741861	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	85+	Blood	South East England
PHEGBS0355	ERR1741387	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	Yorkshire and the Humber
PHEGBS0626	ERR1741728	III	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
200710	ERR3589625	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	Yorkshire and the Humber
PHEGBS0664	ERR1742011	III	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	M	65-84	n/a	Greater London
PHEGBS0243	ERR1741633	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	Yorkshire and the Humber
PHEGBS0372	ERR1741524	III	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Blood	East England
PHEGBS0480	ERR1741862	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	Greater London
PHEGBS0144	ERR1741588	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	Greater London
PHEGBS0492	ERR1741922	III	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	85+	Blood	East England
PHEGBS0524	ERR1741696	III	ST23	CC23	CC23	yes	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	Greater London
PHEGBS0275	ERR1742034	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	Greater London
PHEGBS0483	ERR1741662	III	ST1212	singleton	singleton	no	no	no	no	no	yes	no	PI-1+PI-2b	F	18-44	Blood	Greater London
PHEGBS0561	ERR1741542	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	Greater London
PHEGBS0559	ERR1741492	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	Greater London
PHEGBS0252	ERR1741658	III	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Blood	South East England
PHEGBS0416	ERR1741402	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	Greater London
PHEGBS0156	ERR1741857	III	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	45-64	Blood	West Midlands
PHEGBS0071	ERR1742139	III	ST19	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	M	45-64	Blood	North East England
200697	ERR3531629	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	Greater London
PHEGBS0176	ERR1742030	III	ST23	CC23	CC23	yes	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	South West England
PHEGBS0577	ERR1741835	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	85+	Blood	Greater London
PHEGBS0207	ERR1741997	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	85+	Blood	South West England
200694	ERR3531635	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	M	65-84	Blood	South East England
PHEGBS0513	ERR1741701	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	South West England
PHEGBS0389	ERR1741939	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	South East England
PHEGBS0117	ERR1741635	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	South East England
PHEGBS0380	ERR1741867	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	South East England
PHEGBS0593	ERR1741754	III	ST19*	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	M	18-44	Blood	North East England

Table S2 (continued).

Sample ID	ERA number	Serotype	ST	CC_MLST	CC_wgs#	alp2	alp3	bca	cba	rib	bibA	hvgA	Pilus island genes	Sex	Age group	Specimen	Region
PHEGBS0066	ERR1741366	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	65-84	Blood	South East England
PHEGBS0429	ERR1741515	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	85+	Blood	South East England
200682	ERR3531626	III	ST27	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Blood	South East England
PHEGBS0318	ERR1741792	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	85+	Blood	South West England
PHEGBS0383	ERR1741449	III	ST17	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	South East England
PHEGBS0408	ERR1741526	II	ST28	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
200696	ERR3531628	III	ST550	CC17	CC17	no	no	no	no	yes	no	yes	PI-1+PI-2b	F	18-44	Blood	Yorkshire and the Humber
PHEGBS0054	ERR1742070	III	ST283	singleton	singleton	no	no	yes	no	no	no	no	PI-1+PI+2a	M	65-84	Blood	North West England
PHEGBS0464	ERR1741702	II	ST28	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0624	ERR1741580	II	ST28	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0128	ERR1742140	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	Greater London
PHEGBS0599	ERR1741659	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	M	85+	Blood	Greater London
PHEGBS0373	ERR1741478	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	Wales
PHEGBS0520	ERR1741361	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	65-84	Blood	South East England
PHEGBS0219	ERR1741590	III	ST550	CC17	CC17	no	no	yes	no	yes	no	yes	PI-1+PI-2b	F	85+	Blood	South West England
PHEGBS0081	ERR1741497	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	85+	Blood	Yorkshire and the Humber
PHEGBS0552	ERR1741992	IX	ST1216	CC130/CC1216	CC130/CC1216	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	M	85+	Blood	Greater London
PHEGBS0042	ERR1742087	IX	ST130	CC130/CC1216	CC130/CC1216	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	65-84	Blood	Northern Ireland
PHEGBS0592	ERR1741448	IX	ST130	CC130/CC1216	CC130/CC1216	no	no	yes	yes	no	yes	no	PI-1 +PI-2a	F	65-84	Blood	Greater London
PHEGBS0630	ERR1741525	V	ST498	CC498/CC24	CC23	no	no	yes	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	South East England
PHEGBS0399	ERR1741537	II	ST28	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	65-84	Blood	Greater London
PHEGBS0337	ERR1741620	V	ST498	CC498/CC24	CC23	no	no	yes	no	no	yes	no	PI-1+PI-2a	M	85+	Blood	North West England
PHEGBS0648	ERR1741752	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Yorkshire and the Humber
PHEGBS0467	ERR1741981	V	ST1	CC1	CC1	no	yes	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Blood	Yorkshire and the Humber
PHEGBS0306	ERR1741485	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0554	ERR1741388	II	ST28	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Blood	North West England
PHEGBS0532	ERR1741494	II	ST28	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Blood	South West England
PHEGBS0551	ERR1741634	II	ST28	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	M	65-84	Blood	South West England
PHEGBS0378	ERR1741669	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0164	ERR1741749	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	M	45-64	Blood	South West England
PHEGBS0098	ERR1741573	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	M	18-44	Blood	South West England
PHEGBS0368	ERR1742016	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
200690	ERR3531636	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	85+	Blood	South West England
PHEGBS0082	ERR1741501	V	ST1	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	85+	Blood	South West England
PHEGBS0446	ERR1741823	VI	ST1	CC1	CC1	no	no	yes	no	no	no	no	PI-1+PI-2a	M	65-84	Blood	South East England
PHEGBS0662	ERR1741427	VI	ST1	CC1	CC1	no	no	yes	no	no	no	no	PI-1+PI-2a	F	45-64	Blood	North East England
PHEGBS0556	ERR1741948	II	ST28	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	M	65-84	Blood	South West England
PHEGBS0635	ERR1741616	V	ST26	CC26	CC26	no	no	no	no	yes	yes	no	PI-1+PI+2a	M	45-64	Throat swab	South East England
200684	ERR3531637	Ib	ST1215	singleton	CC1	no	yes	no	no	no	no	no	PI-1+PI-2a	M	65-84	Blood	South West England
PHEGBS0493	ERR1741913	V	ST1217	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	South West England
PHEGBS0090	ERR1742102	V	ST1314	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	M	45-64	CSF	North West England
100414	ERR2560245	V	ST1350	CC1	CC1	no	yes	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	South West England
200699	ERR3531631	III	ST861	CC19	CC19	no	no	no	no	yes	yes	no	PI-1+PI-2a	F	18-44	Vaginal swab	Yorkshire and the Humber
PHEGBS0266	ERR1741584	IV	ST136	CC1	CC1	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0533	ERR1741445	VI	ST14	CC1	CC1	no	no	no	no	no	yes	no	PI-1+PI-2b	F	18-44	Placenta	Wales
PHEGBS0463	ERR1742031	IV	ST196	CC1	CC1	no	no	no	no	no	yes	no	PI-1+PI-2a	F	18-44	Blood	Greater London
PHEGBS0448	ERR1741564	IV	ST196	CC1	CC1	no	no	no	no	no	yes	no	PI-1+PI-2a	F	65-84	Blood	South West England
PHEGBS0206	ERR1741687	IV	ST196	CC1	CC1	no	no	no	no	no	yes	no	PI-1+PI-2a	M	65-84	Blood	South West England
PHEGBS0627	ERR1741512	II	ST2	CC1	CC1	no	no	no	no	no	yes	no	PI-1+PI-2a	F	65-84	Blood	Yorkshire and the Humber
PHEGBS0100	ERR1741744	II	ST3	singleton	CC1	no	no	yes	no	no	no	no	PI-1+PI-2a	F	45-64	Blood	North East England
PHEGBS0084	ERR1741695	IV	ST459	CC1	CC1	no	no	no	no	no	yes	no	PI-1+PI-2a	F	85+	Blood	Greater London

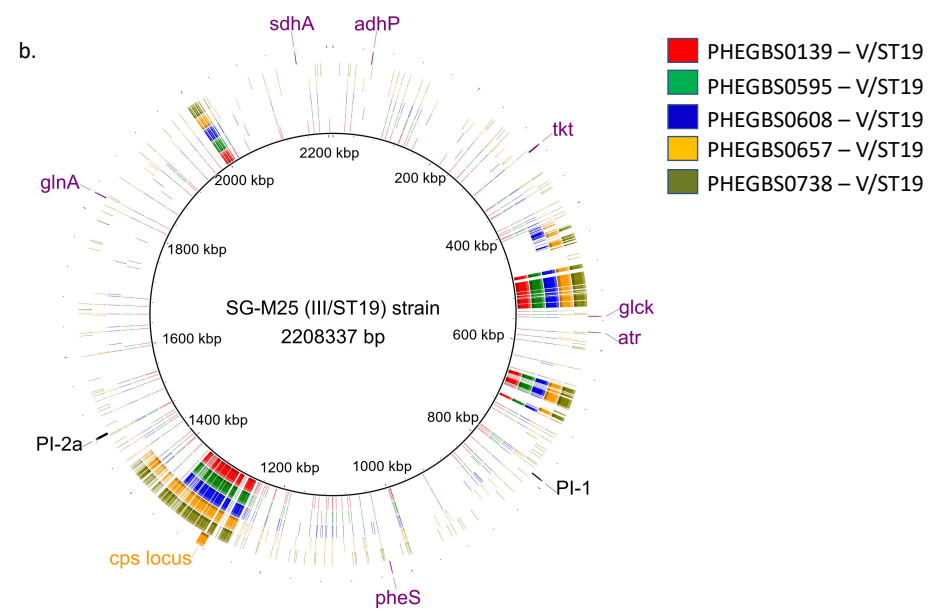
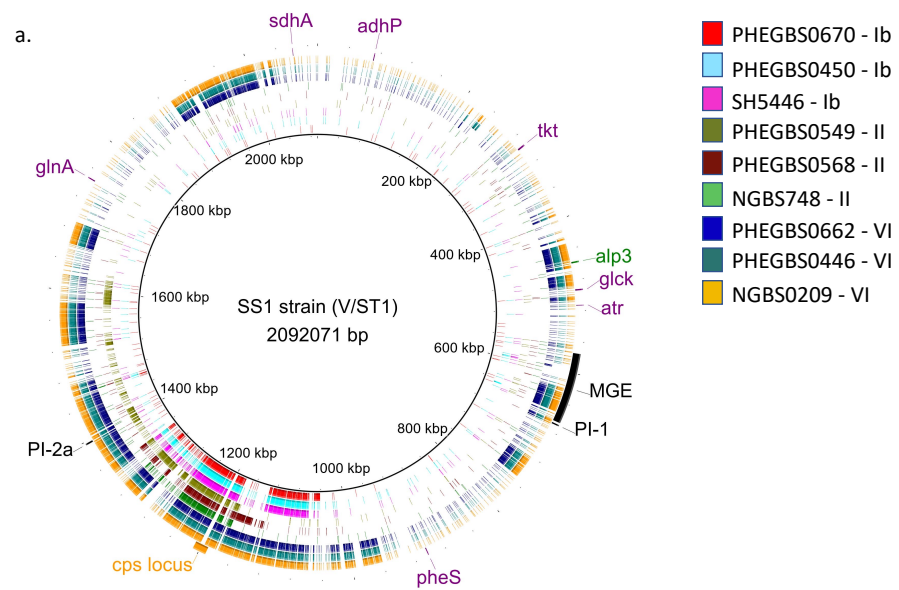
Supplementary Figures

Figure S1. Phylogenetic relationship between UK ST1 isolates and previously reported recombinant Portugal and Canadian ST1 non-serotype V isolates. Maximum likelihood phylogenetic tree of UK (n=23), Portugal (n=1, [1]) and Canada (n=2, [2]) GBS isolates based on 1,964 core SNPs with reference sequence SS1 (NZ_CP010867.1). Majority of UK ST1 isolates were serotype V (n=17), followed by serotype Ib, II and VI (n=2 per serotype), Portugal ST1 isolate (SH5446) was reported as serotype Ib, Canadian isolates (NGBS748) and (NGBS209) were serotypes II and VI, respectively. From left to right: mid-point rooted maximum likelihood phylogeny tree (with recombination regions removed), followed by information on serotype, and country of isolate origin. Tree scale indicates distance in SNPs.

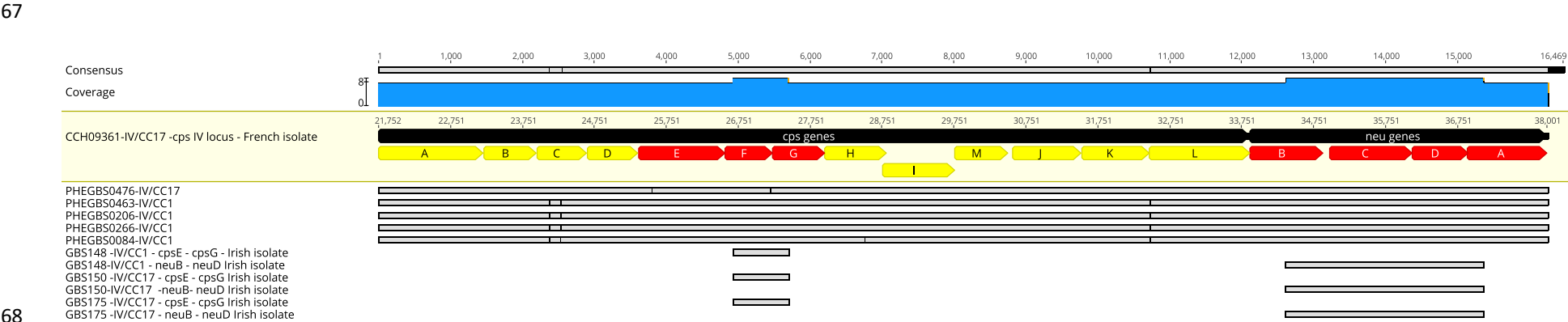


46 **Figure S2. Comparison of recombination events among selected GBS groups.** BRIG [3] was used to show Single Nucleotide
47 Polymorphisms (SNPs) distribution **(a) among ST1 serotypes Ib, II and VI.** ST1 isolates of serotype Ib (n=3), II (n=3) and VI (n=3) from UK,
48 Portugal and Canada were compared against reference strain SS1 (NZ_CP010867.1). From inner to outermost circle: inner circle (black line) is
49 reference SS1, then polymorphisms identified in each of the GBS isolates: serotype Ib (red – PHEGBS0670, UK; aqua - PHEGBS0450, UK;
50 and magenta – SH5446, Portugal [1]); serotype II (olive - PHEGBS0549, UK; purple - PHEGBS0568, UK; and teal – NGBS748, Canada [2]);
51 serotype VI (blue – PHEGBS662, UK; green – PHEGBS446, UK; and orange – NGBS209, Canada. **(b) among ST19 serotype V isolates.**
52 ST19 serotype V isolates (n=5) identified in the study were compared to the ST19 serotype III reference genome SG-M25 (NZ_CP021867.1).
53 From inner to outermost circle: inner circle (black line) is reference SG-M25, then polymorphisms identified in each of the GBS isolates.
54 Outermost circle indicates genome landmarks as follows: cps locus - capsular polysaccharide locus (in orange), *alp3* - alpha like surface
55 protein encoding gene (in green), seven multi-locus housekeeping genes (*adhP*, *atr*, *tkt*, *glcK*, *sdhA*, *glnA*, and *pheS*, in purple), MGE - Mobile
56 genetic elements and pilus island genes *PI-1* and *PI-2a* (in black).

57



59 **Figure S3: SNPs distribution in conserved *cpsE-cpsG* and *neuB-neuA* regions of *cpsIV* locus of CC1 and CC17 GBS isolates from**
 60 **Ireland, France and England and Wales.** Mapping, SNP calling, and visualization was performed by Geneious 11.0.5 using entire *cpsIV*
 61 sequences of current study CC1 and CC17 serotype IV isolates (PHEGBS0084, PHEGBS0206, PHEGBS0463, PHEGBS0448, PHEGBS0266
 62 and PHEGBS0476) and available partially (*cpsE*, *cpsG*, *neuB* and *neuA*) and fully sequenced (*cpsF*, *cpsG*, *neuC* and *neuD*) sequences of
 63 Irish CC1 and CC17 serotype IV isolates (GBS148, GBS150 and GBS175) [4] using a reference full *cpsIV* locus of French CC17 serotype IV
 64 isolate (CC209361) [5]. Different colours are used to highlight important landmarks in *cpsIV* locus of CC209361 with yellow representing *cps*(A-
 65 D, H-M) genes, red showing conserved *cps*(E,F,G) and *neu*(B, C, D and A) genes respectively. Grey region showing similarity whereas each
 66 vertical black line representing a single-nucleotide polymorphism (SNP) in each isolate against a reference *cpsIV* locus.



69

References

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