
UK Renal Registry 14th Annual Report: Chapter 12 Epidemiology of Staphylococcus Aureus Bacteraemia Amongst Patients Receiving Dialysis for Established Renal Failure in England in 2009 to 2011: a joint report from the Health Protection Agency and the UK Renal Registry

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Key Words

Bacteraemia · Dialysis · Established renal failure · Health Protection Agency · Staphylococcus · Vascular access

Summary

- From April 2009–2010 there were 77 confirmed episodes of MRSA bacteraemia at a median rate of 0.25 per 100 prevalent dialysis patients.
- This number decreased to 61 episodes between April 2010–2011 at a median rate of 0 per 100 prevalent dialysis patients.
- Overall there has been an 82% reduction in absolute episodes since the first year of mandatory reporting in 2007.
- The incidence of bacteraemia in patients with a central venous catheter was approximately six fold higher than in those with an AV fistula.
- From January 1st to 30th June 2011 there were 160 episodes of MSSA bacteraemia with a rate of 1.06 episodes per 100 dialysis patients.
- The incidence of MSSA in patients with a central venous catheter was again six fold higher than in those with an AV fistula.
- Overall rates of MRSA bacteraemia in dialysis patients continued to fall although there remained variation between centres.
- Initial data from the early days of MSSA reporting suggested high rates of infection and an even greater variation between centres.

Table 12.1. Number of MRSA bacteraemia and the proportion of records shared with and completed by the renal centre in patients with established renal failure reported to the MRSA Healthcare Associated Infection Data Capture System

Records	MRSA bacteraemia 1/04/2009 to 31/03/2010			MRSA bacteraemia 1/04/2010 to 31/03/2011			
	Number	%	Total number	Number	%	Total number	
Rejected	Shared & completed	0	0.0	10	0	0.0	4
	Shared, not completed	10	11.5		2	3.1	
	Not shared	0	0.0		2	3.1	
Accepted	Shared & completed	10	11.5	77	16	24.6	61
	Shared, not completed	52	59.8		29	44.6	
	Not shared	15	17.2		16	24.6	
Total	87			65			

provide validation within the necessary time frame (London Royal Free, Brighton, Portsmouth, Dudley, Shrewsbury). In these instances all episodes of MRSA bacteraemia attributed to these centres were included.

Access and modality data

Figure 12.1 and table 12.2 provide breakdowns by modality and access. There were two patients reported to be on peritoneal dialysis at the time of the MRSA episode although one of these patients had a temporary venous catheter in-situ. The remainder were all haemodialysis patients. There were 15 patients where modality and access type were not recorded either because they were not available or because the data was not validated by the renal centre in time.

In total 37 patients had a tunnelled venous catheter in-situ at the time of bacteraemia while 19 were dialysing via an arteriovenous fistula, four via an arteriovenous graft, two were end-stage renal failure patients dialysing via a temporary venous catheter and one patient had a peritoneal dialysis catheter in-situ (table 12.2).

If it is assumed a 25% usage of venous catheters for the prevalent dialysis population [2, 3] the relative risk of MRSA bacteraemia can be estimated to be approximately six fold higher in patients with a venous catheter compared with those dialysing via an AVF.

Individual episodes

In total 68 patients had an MRSA bacteraemia. Fifty-nine had a single episode whilst nine patients had two

Table 12.2. Type of renal access in patients with established renal failure where record shared and completed, 1st April 2009 to 31st March 2010

Renal access type	MRSA bacteraemia 1/04/2009 to 31/03/2010			MRSA bacteraemia 1/04/2010 to 31/03/2011			
	Number	%	Access class	Number	%	Access class	
Unknown	0			0			
Haemodialysis	Other	1		0			
	AVF	19	30.6	37.1	11	32.3	35.5
	AVG	4	6.5		1	3.2	
	NTC	2	3.2	62.9	1	3.2	64.5
	TC	37	59.7		22	61.3	
	Unknown	14		26			
Total	77			61			
Total known access	62			31			

AVF = arteriovenous fistula
 AVG = arteriovenous graft
 NTC = non-tunnelled catheter
 TC = tunnelled catheter

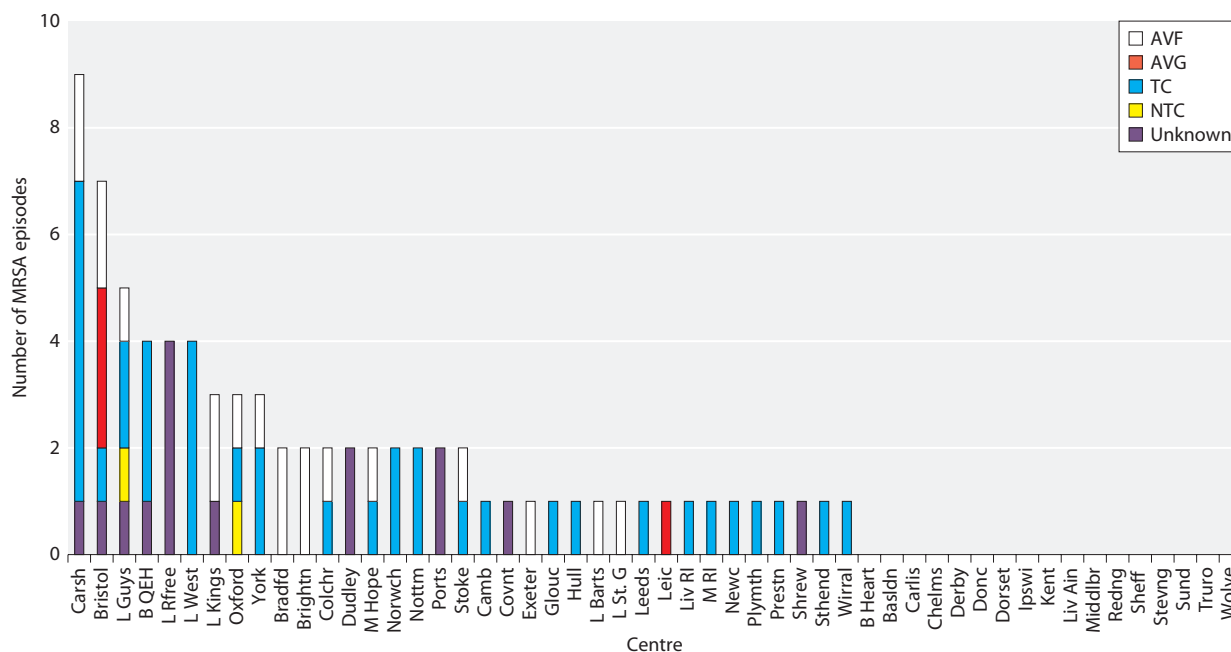


Fig. 12.1. Number of MRSA bacteraemia episodes by access type and renal centre: 1/04/2009 to 31/03/2010

Stacked bars, coded by access type for each English renal centre

AVF = arteriovenous fistula

AVG = arteriovenous graft

NTC = non-tunnelled catheter

TC = tunnelled catheter

separate bacteraemias accounting for the remaining 18 episodes (table 12.3).

Centre level data

The absolute number of MRSA episodes per centre are detailed in figure 12.1. The median absolute number of episodes per centre was one (range 0 to 9). Seventeen centres recorded no episodes of MRSA bacteraemia. The highest number of episodes in an individual centre was nine at St. Helier (Carshalton). Figure 12.1 also provides data on the type of access in use at the time of each episode of MRSA by renal centre.

The normalised centre-specific rates are based on the number of prevalent patients receiving dialysis in each renal centre at the end of 2009 as reported to the UKRR. Using the number of prevalent haemodialysis patients as the denominator the median rate was 0.30 with a range of 0 to 1.72 per 100 prevalent haemodialysis patients per year (table 12.4). Using the total number of prevalent dialysis patients as the denominator, the median rate was 0.25 with a range of 0 to 1.72 per 100 prevalent dialysis patients per year.

Figure 12.2 illustrates the MRSA rates per 100 prevalent HD patients for each renal centre. Finally in

Table 12.3. Episodes by recurrence

Episodes per patient	1/04/2009 to 31/03/2010		1/04/2010 to 31/03/2011	
	Number	Total	Number	Total
1	59	59	57	57
2	9	18	2	4
3	0	0	0	0
4	0	0	0	0
Total	68	77	59	61

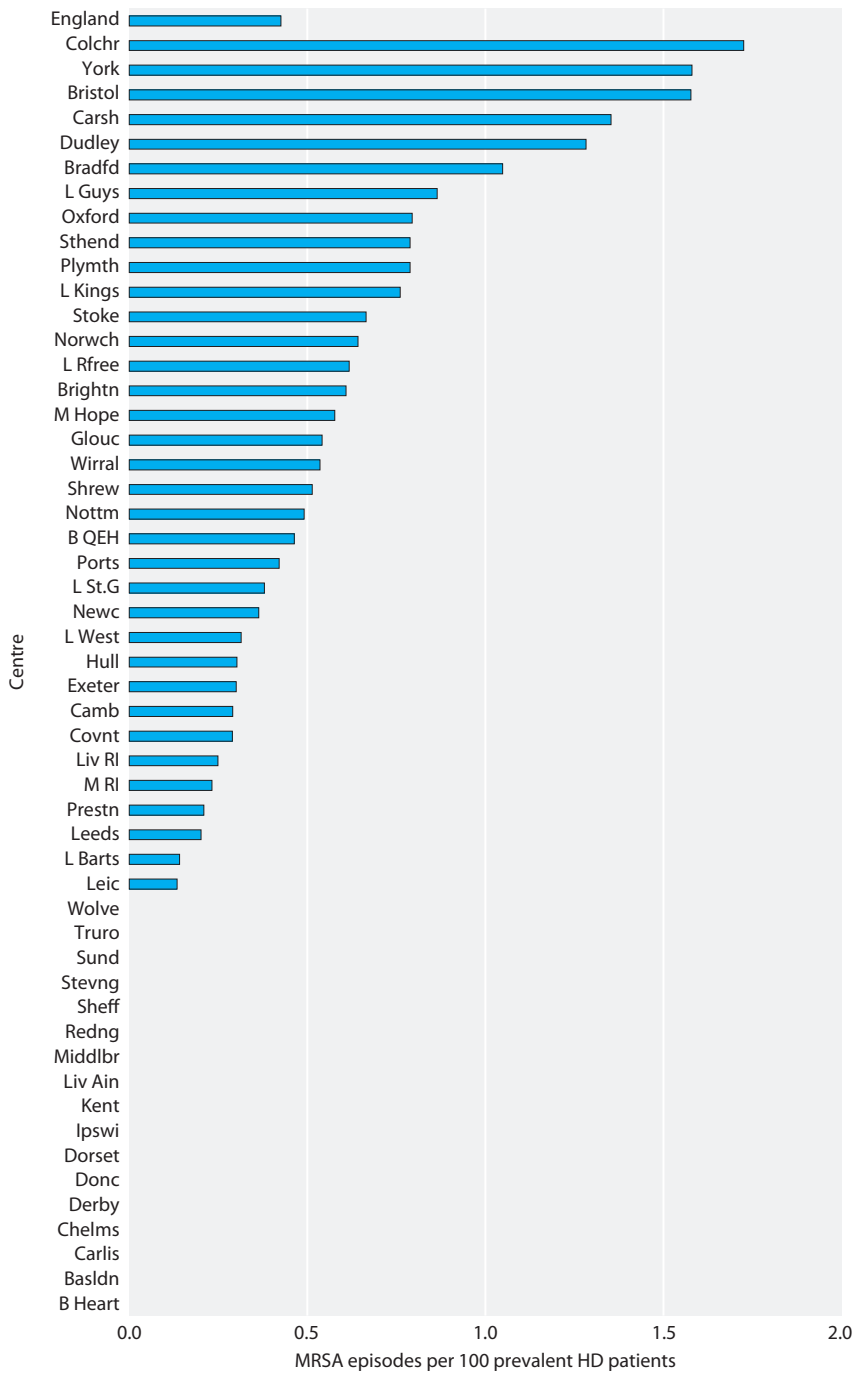


Fig. 12.2. MRSA bacteraemia rate per 100 prevalent HD patients by renal centre: 1/4/2009 to 31/3/2010
 For each centre the rate per 100 prevalent HD patients as reported 31/12/2009 is provided.
 The overall rate for England is provided at the top of the graph

order to adjust for variation in precision of estimated rate, the rate of bacteraemia per 100 prevalent haemodialysis patients for each centre has been plotted against the centre size in a funnel plot (figure 12.3). No centre had a rate in excess of 2 per 100 prevalent haemodialysis patients per year and no centre exceeded the upper 99% confidence line in the funnel plot (figure 12.3).

Organisational results: 2010–2011

Between 1st April 2010 and 31st March 2011 a total of 65 episodes of MRSA bacteraemia were identified as possibly being associated with ERF requiring dialysis (table 12.1) Forty-seven records were shared and of these 16 were completed via the portal system giving a completion rate of 34%. Of these episodes, two were

Table 12.4. Centre specific data for episodes of MRSA bacteraemia by access type, 1/04/2009 to 31/03/2010

Centre	Prevalent patients on 31/12/2009					MRSA bacteraemia episodes (1/04/2009 to 31/03/2010)						Rates	
	HD	PD	Dialysis	Tx	All	Total	AVF	AVG	NTC	TC	UK ^a	HD	Dialysis
B Heart	432	33	465	157	622	0	0	0	0	0	0	0.00	0.00
B QEH	865	159	1,024	797	1,821	4	0	0	0	3	1	0.46	0.39
Basldn	143	28	171	43	214	0	0	0	0	0	0	0.07	0.06
Bradfd	191	34	225	197	422	2	2	0	0	0	0	1.05	0.89
Brightn	329	86	415	322	737	2	2	0	0	0	0	0.61	0.48
Bristol	444	75	519	704	1,223	7	2	3	0	1	1	1.58	1.35
Camb	345	39	384	556	940	1	0	0	0	1	0	0.29	0.26
Carlis	66	15	81	122	203	0	0	0	0	0	0	0.00	0.00
Carsh	666	123	789	513	1,302	9	2	0	0	6	1	1.35	1.14
Chelms	118	37	155	70	225	0	0	0	0	0	0	0.00	0.00
Colchr	116		116		116	2	1	0	0	1	0	1.72	1.72
Covnt	347	82	429	365	794	1	0	0	0	0	1	0.29	0.23
Derby	247	87	334	85	419	0	0	0	0	0	0	0.00	0.00
Donc	121	33	154	42	196	0	0	0	0	0	0	0.00	0.00
Dorset	228	58	286	266	552	0	0	0	0	0	0	0.00	0.00
Dudley	156	56	212	80	292	2	0	0	0	0	2	1.28	0.94
Exeter	334	70	404	327	731	1	1	0	0	0	0	0.30	0.25
Glouc	185	43	228	138	366	1	0	0	0	1	0	0.54	0.44
Hull	332	74	406	319	725	1	0	0	0	1	0	0.30	0.25
Ipswi	110	43	153	155	308	0	0	0	0	0	0	0.00	0.00
Kent	337	69	406	338	744	0	0	0	0	0	0	0.00	0.00
L Barts	712	188	900	738	1,638	1	1	0	0	0	0	0.14	0.11
L Guys	579	50	629	882	1,511	5	1	0	1	2	1	0.86	0.79
L Kings	395	85	480	306	786	3	2	0	0	0	1	0.76	0.63
L Rfree	649	70	719	827	1,546	4	0	0	0	0	4	0.62	0.56
L St. G	264	63	327	334	661	1	1	0	0	0	0	0.38	0.31
L West	1,277	36	1,313	1,412	2,725	4	0	0	0	4	0	0.31	0.30
Leeds	499	106	605	743	1,348	1	0	0	0	1	0	0.20	0.17
Leic	751	166	917	818	1,735	1	0	1	0	0	0	0.13	0.11
Liv Ain	139	7	146		146	0	0	0	0	0	0	0.00	0.00
Liv RI	403	89	492	731	1,223	1	0	0	0	1	0	0.25	0.20
M Hope	347	119	466	318	784	2	1	0	0	1	0	0.58	0.43
M RI	433	103	536	900	1,436	1	0	0	0	1	0	0.23	0.19
Middlbr	295	20	315	392	707	0	0	0	0	0	0	0.00	0.00
Newc	276	54	330	567	897	1	0	0	0	1	0	0.36	0.30
Norwch	312	58	370	221	591	2	0	0	0	2	0	0.64	0.54
Nottm	408	111	519	437	956	2	0	0	0	2	0	0.49	0.39
Oxford	378	104	482	838	1,320	3	1	0	1	1	0	0.79	0.62
Plymth	127	42	169	285	454	1	0	0	0	1	0	0.79	0.59
Ports	476	95	571	730	1,301	2	0	0	0	0	2	0.42	0.35
Prestn	480	78	558	381	939	1	0	0	0	1	0	0.21	0.18
Redng	269	85	354	264	618	0	0	0	0	0	0	0.04	0.03
Sheff	600	72	672	544	1,216	0	0	0	0	0	0	0.00	0.00
Shrew	195	29	224	113	337	1	0	0	0	0	1	0.51	0.45
Stevng	379	29	408	172	580	0	0	0	0	0	0	0.00	0.00
Sthend	127	20	147	60	207	1	0	0	0	1	0	0.79	0.68
Stoke	301	72	373	267	640	2	1	0	0	1	0	0.66	0.54
Sund	178	28	206	162	368	0	0	0	0	0	0	0.00	0.00
Truro	153	28	181	139	320	0	0	0	0	0	0	0.00	0.00
Wirral	187	35	222		222	1	0	0	0	1	0	0.53	0.45
Wolve	300	51	351	126	477	0	0	0	0	0	0	0.03	0.03
York	190	16	206	115	321	3	1	0	0	2	0	1.58	1.46
England	18,191	3,353	21,544	19,418	40,962	77	19	4	2	37	15	0.42	0.36

^aUK – unknown

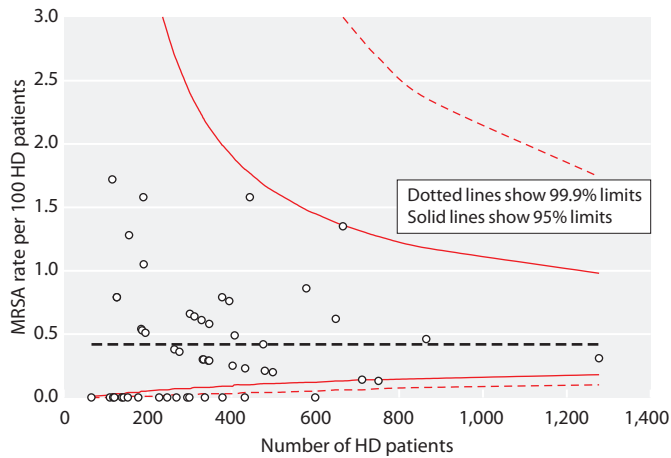


Fig. 12.3. Funnel plot of the MRSA rate per 100 HD patients by centre: 1/4/2009 to 31/3/2010

excluded as the patient was not in end stage renal failure, one was a duplicate record and one patient was not known to the centre they were attributed to. In total there were 61 episodes of MRSA bacteraemia in this time period.

There were only two instances of the same patient with two separate episodes of MRSA bacteraemia, one

at University Hospital Birmingham and another at Southport and Ormskirk hospital (table 12.3).

Access and modality data

All patients whose data were validated were receiving haemodialysis for ERF. There were 30 patients where it was not possible to verify the mode of access (table 12.2). Of the remaining 31, 22 dialysed via a tunnelled venous catheter, 11 via an arteriovenous fistula, one via an arteriovenous graft and one via a non-tunnelled catheter. Overall, the rate of bacteraemia was 5.75 times higher in patients with a venous catheter compared to those with an AVF (table 12.2).

Centre level data

Figure 12.4 shows the number of MRSA episodes by centre. Twenty-nine centres reported no episodes of MRSA within the time period.

Figure 12.5 and table 12.5 detail the normalised centre specific rates and are based on the number of patients receiving RRT at the end of 2010. Using the number of prevalent haemodialysis patients as the denominator the median rate was 0.0 with a range of 0 to 2.15 per 100 prevalent haemodialysis patients. Using the total number of

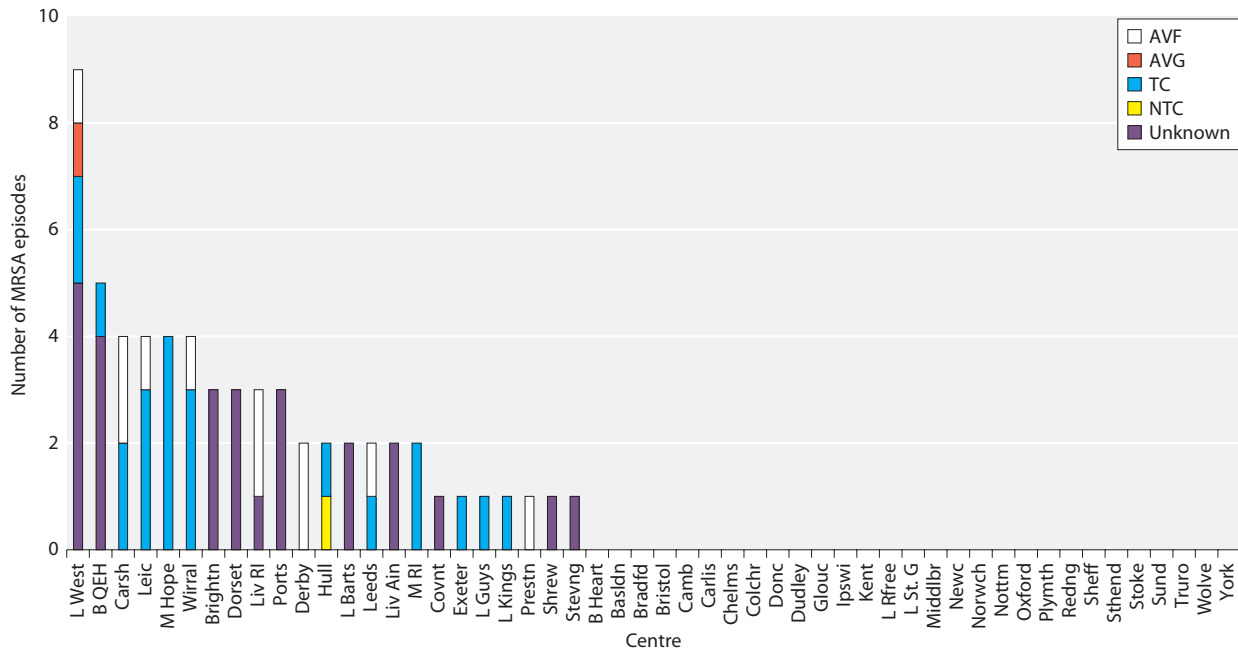


Fig. 12.4. Number of MRSA bacteraemia episodes by access and renal centre: 1/04/2010 to 31/3/2011

Stacked bars, coded by access type for each English renal centre

- AVF = arteriovenous fistula
- AVG = arteriovenous graft
- NTC = non-tunnelled catheter
- TC = tunnelled catheter

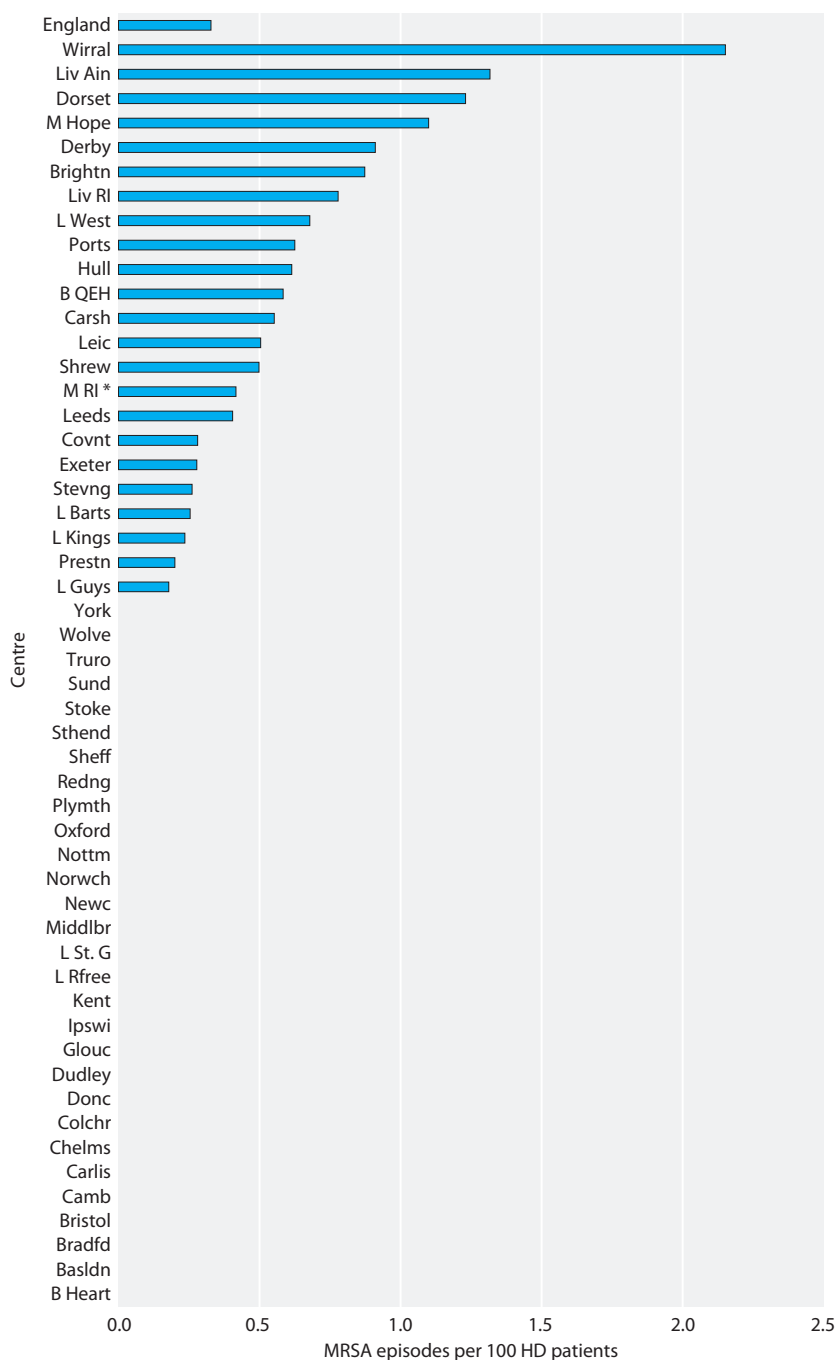


Fig. 12.5. MRSA bacteraemia rate per 100 prevalent HD patients by renal centre: 1/4/2010 to 31/3/2011
 For each centre the rate per 100 prevalent HD patients as reported 31/12/2010 is provided
 The overall rate for England is provided at the top of the graph

prevalent dialysis patients as the denominator, the median rate was 0.0 with a range of 0 to 1.79 per 100 prevalent dialysis patients per year. Only Arrows Park hospital (Wirral) had a rate greater than 2 per 100 prevalent haemodialysis patients. No renal centre exceeded the 99% upper confidence limit from the funnel plot (figure 12.6) and only Sheffield plotted above the 95% upper confidence limit, but it would be expected by chance that three centres would fall outside the 95% limits.

Comparison with previous reports

Between 2008/2009 and 2009/2010 there was a 52% drop in the absolute number of MRSA episodes and then a further drop of 24% between 2009/2010 and 2010/2011. Overall since the first year of reporting (2007) there has been an 82% reduction in absolute episodes (figure 12.7). The median centre specific rate declined from 0.64 episodes per 100 prevalent haemodialysis

Table 12.5. Centre specific data for episodes of MRSA bacteraemia by access type, 1/04/2010 to 31/03/2011

Centre	Prevalent patients on 31/12/2010					MRSA bacteraemia episodes (1/04/2010 to 31/03/2011)						Rates	
	HD	PD	Dialysis	Tx	All	Total	AVF	AVG	NTC	TC	UK ^a	HD	Dialysis
B Heart	426	43	469	163	632	0	0	0	0	0	0	0.00	0.00
B QEH	858	153	1,011	833	1,844	5	0	0	0	1	4	0.58	0.49
Basldn	138	25	163	51	214	0	0	0	0	0	0	0.00	0.00
Bradfd	185	37	222	233	455	0	0	0	0	0	0	0.00	0.00
Brightn	344	87	431	339	770	3	0	0	0	0	3	0.87	0.70
Bristol	460	62	522	728	1,250	0	0	0	0	0	0	0.00	0.00
Camb	349	35	384	604	988	0	0	0	0	0	0	0.00	0.00
Carlis	60	13	73	130	203	0	0	0	0	0	0	0.00	0.00
Carsh	726	103	829	548	1,377	4	2	0	0	2	0	0.55	0.48
Chelms	123	35	158	80	238	0	0	0	0	0	0	0.00	0.00
Colchr	120		120		120	0	0	0	0	0	0	0.00	0.00
Covnt	358	84	442	402	844	1	0	0	0	0	1	0.28	0.23
Derby	220	101	321	138	459	2	2	0	0	0	0	0.91	0.62
Donc	147	24	171	51	222	0	0	0	0	0	0	0.00	0.00
Dorset	244	55	299	286	585	3	0	0	0	0	3	1.23	1.00
Dudley	158	62	220	83	303	0	0	0	0	0	0	0.00	0.00
Exeter	361	77	438	347	785	1	0	0	0	1	0	0.28	0.23
Glouc	191	41	232	145	377	0	0	0	0	0	0	0.00	0.00
Hull	326	67	393	332	725	2	0	0	1	1	0	0.61	0.51
Ipswi	116	35	151	165	316	0	0	0	0	0	0	0.00	0.00
Kent	360	71	431	362	793	0	0	0	0	0	0	0.00	0.00
L Barts	791	190	981	797	1,778	2	0	0	0	0	2	0.25	0.20
L Guys	565	47	612	1,006	1,618	1	0	0	0	1	0	0.18	0.16
L Kings	427	94	521	316	837	1	0	0	0	1	0	0.23	0.19
L Rfree	677	71	748	891	1,639	0	0	0	0	0	0	0.00	0.00
L St. G	283	56	339	339	678	0	0	0	0	0	0	0.00	0.00
L West	1,329	37	1,366	1,496	2,862	9	1	1	0	2	5	0.68	0.66
Leeds	496	98	594	789	1,383	2	1	0	0	1	0	0.40	0.34
Leic	795	169	964	844	1,808	4	1	0	0	3	0	0.50	0.41
Liv Ain	152	7	159		159	2	0	0	0	0	2	1.32	1.26
Liv RI	386	85	471	767	1,238	3	2	0	0	0	1	0.78	0.64
M Hope	364	124	488	349	837	4	0	0	0	4	0	1.10	0.82
M RI	481	88	569	983	1,552	2	0	0	0	2	0	0.42	0.35
Middlbr	286	22	308	403	711	0	0	0	0	0	0	0.00	0.00
Newc	270	54	324	564	888	0	0	0	0	0	0	0.00	0.00
Norwch	319	54	373	242	615	0	0	0	0	0	0	0.00	0.00
Nottm	416	88	504	468	972	0	0	0	0	0	0	0.00	0.00
Oxford	381	110	491	872	1,363	0	0	0	0	0	0	0.00	0.00
Plymth	134	46	180	279	459	0	0	0	0	0	0	0.00	0.00
Ports	481	102	583	750	1,333	3	0	0	0	0	3	0.62	0.51
Prestn	504	63	567	401	968	1	1	0	0	0	0	0.20	0.18
Redng	260	86	346	290	636	0	0	0	0	0	0	0.00	0.00
Sheff	611	66	677	577	1,254	0	0	0	0	0	0	0.00	0.00
Shrew	201	22	223	114	337	1	0	0	0	0	1	0.50	0.45
Stevng	385	36	421	185	606	1	0	0	0	0	1	0.26	0.24
Sthend	126	18	144	68	212	0	0	0	0	0	0	0.00	0.00
Stoke	295	73	368	267	635	0	0	0	0	0	0	0.00	0.00
Sund	176	33	209	160	369	0	0	0	0	0	0	0.00	0.00
Truro	153	29	182	153	335	0	0	0	0	0	0	0.00	0.00
Wirral	186	37	223		223	4	1	0	0	3	0	2.15	1.79
Wolve	315	72	387	131	518	0	0	0	0	0	0	0.00	0.00
York	152	24	176	161	337	0	0	0	0	0	0	0.00	0.00
England	18,667	3,311	21,978	20,682	42,660	61	11	1	1	22	26	0.33	0.28

^aUK – unknown

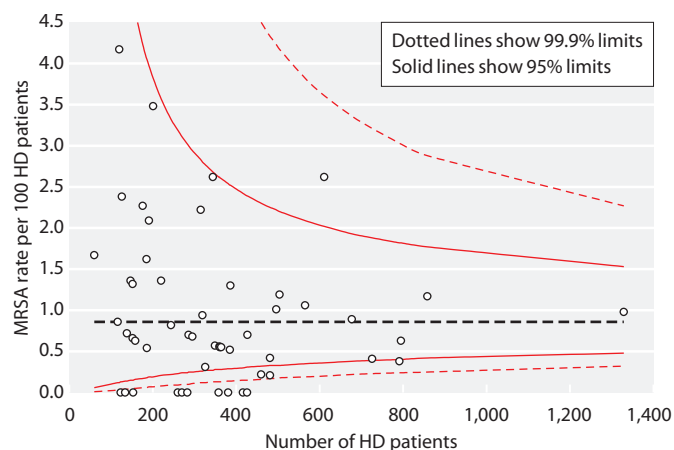


Fig. 12.6. Funnel plot of the MRSA rate per 100 HD patients by renal centre: 1/04/2010 to 31/03/2011

patients in 2008/2009 to 0.30 per 100 prevalent haemodialysis patients in 2009/2010 and again to 0.0 in 2010/2011. The median rate per 100 prevalent dialysis patients declined from 0.55 to 0.25 to 0.0 over the same period.

Methicillin Sensitive Staphylococcus Aureus

The time period between 1st January 2011 and 30th June 2011 represented the first six months of mandatory reporting of Methicillin Sensitive Staphylococcus Aureus (MSSA) bacteraemia. Data were collected using the same process of sharing and validation described above. These data are likely to be an incomplete data set given the transition to mandatory MSSA reporting is still ongoing.

In total 170 episodes of MSSA bacteraemia were identified as being associated with patients in ERF (table 12.6). Ninety were shared and a further 80 were allocated by direct contact with the clinical lead for the each renal centre. Twenty-four were completed via the web portal

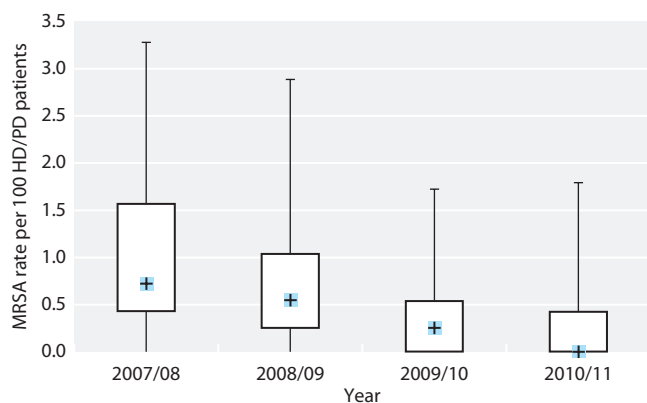


Fig. 12.7. Box and whisker plot of MRSA rates by renal centre per 100 prevalent HD/PD patients by reporting year

Table 12.6. Number of MSSA bacteraemia and the proportion of records shared with and completed by the renal centre in patients with established renal failure reported to the MRSA Healthcare Associated Infection Data Capture System, 1/01/2011 to 30/06/2011

Records	MSSA bacteraemia (1/01/2011 to 30/06/2011)			
	Number	%	Total number	
Rejected	Shared & completed	0	0.0	9
	Shared, not completed	2	1.2	
	Not shared	7	4.1	
Accepted	Shared & completed	24	14.1	161
	Shared, not completed	64	37.6	
	Not shared	73	42.9	
Total		170		

system giving a completion rate of 27% (24/90) among shared records. Following validation from the individual renal centres, a further nine episodes were excluded giving a total number of 161 MSSA bacteraemia episodes in this six month period. Of the excluded patients, four were not in ERF, three were not known to the renal centre they were allocated to, one was excluded as a paediatric patient and one excluded as the centre they were allocated to was not a renal centre.

Access and modality data

It was possible to obtain access data on 92 of these episodes (table 12.7). In total there were 60 episodes where the patient was dialysing through a tunnelled venous catheter, 28 where the patient was dialysing via an arteriovenous fistula, two episodes involving an AV graft and two associated with a temporary line. In the remaining patients it was not possible to verify their mode of access within the timeframe of this report. Episodes by renal centre, coded for access are demonstrated in figure 12.8.

The risk of an MSSA bacteraemia was 6.1 fold higher in patients dialysing via a venous catheter.

Centre level data

The normalised centre specific rates based on the dialysis population at the end of 2010 demonstrate considerable variation (figure 12.9). Overall the median number of episodes per 100 prevalent haemodialysis patients was 1.27 with a rate of 1.06 per 100 prevalent dialysis patients per year. The range across centres was

Table 12.7. Type of renal access in patients in established renal failure where record shared and completed for the MSSA bacteraemia, 1/01/2011 to 30/06/2011

Renal access type	MSSA bacteraemia (1/01/2011 to 30/06/2011)		
	Number	%	Total number
Unknown	0		
Haemodialysis			
Other	0		
AVF	28	30.4	32.6
AVG	2	2.2	
NTC	2	2.2	67.4
TC	60	65.2	
Unknown	68		
Total	160		
Total known access	92		

AVF = arteriovenous fistula
 AVG = arteriovenous graft
 NTC = non-tunnelled catheter
 TC = tunnelled catheter

0.0 to 7.7. Ten centres did not report any episodes of MSSA bacteraemia, although this may be because dialysis details for MSSA episodes were not being reported to the mandatory system by that laboratory. Sixteen centres

reported an incidence in excess of 2 per 100 prevalent dialysis patients.

Discussion

Infection remained a leading cause of death in dialysis patients and was exceeded only by cardiovascular disease. Type of access can itself be a major factor either by acting as a portal of entry and becoming the primary source of a bacteraemia or by the catheter becoming colonised as a result of another infective episode (i.e. skin and soft tissue, pneumonia). Dialysis patients continue to be at increased risk of MRSA bacteraemia.

This is the third and fourth years of the full working of reporting via the Health Protection Agency of MRSA bacteraemias, also presented here are the first six months of reporting of MSSA.

As shown in figure 12.7, the reported figures represent a significant decline in MRSA rates in patients with ERF on dialysis compared with previous years. The decline has continued year on year with an overall reduction of 82% since 2008. Similar declines have been reported in other hospital patients. The cause of this decline has

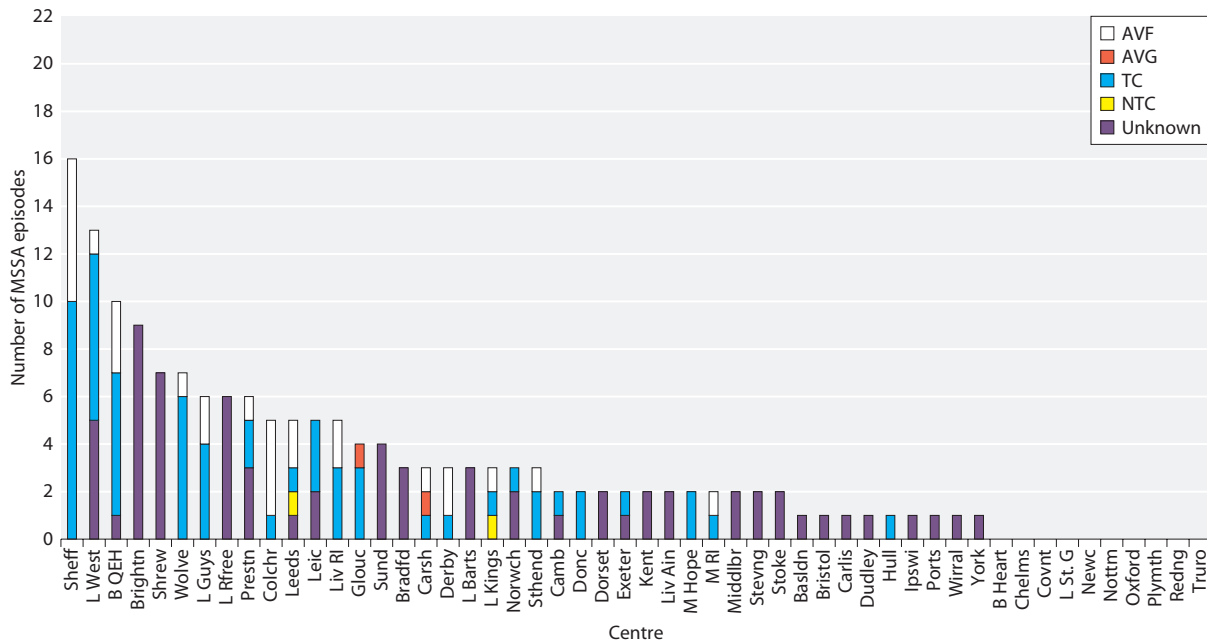


Fig. 12.8. Number of MSSA bacteraemia episodes by access and renal centre: 1/01/2011 to 30/06/2011

Stacked bars, coded by access type for each English renal centre

AVF = arteriovenous fistula
 AVG = arteriovenous graft
 NTC = non-tunnelled catheter
 TC = tunnelled catheter

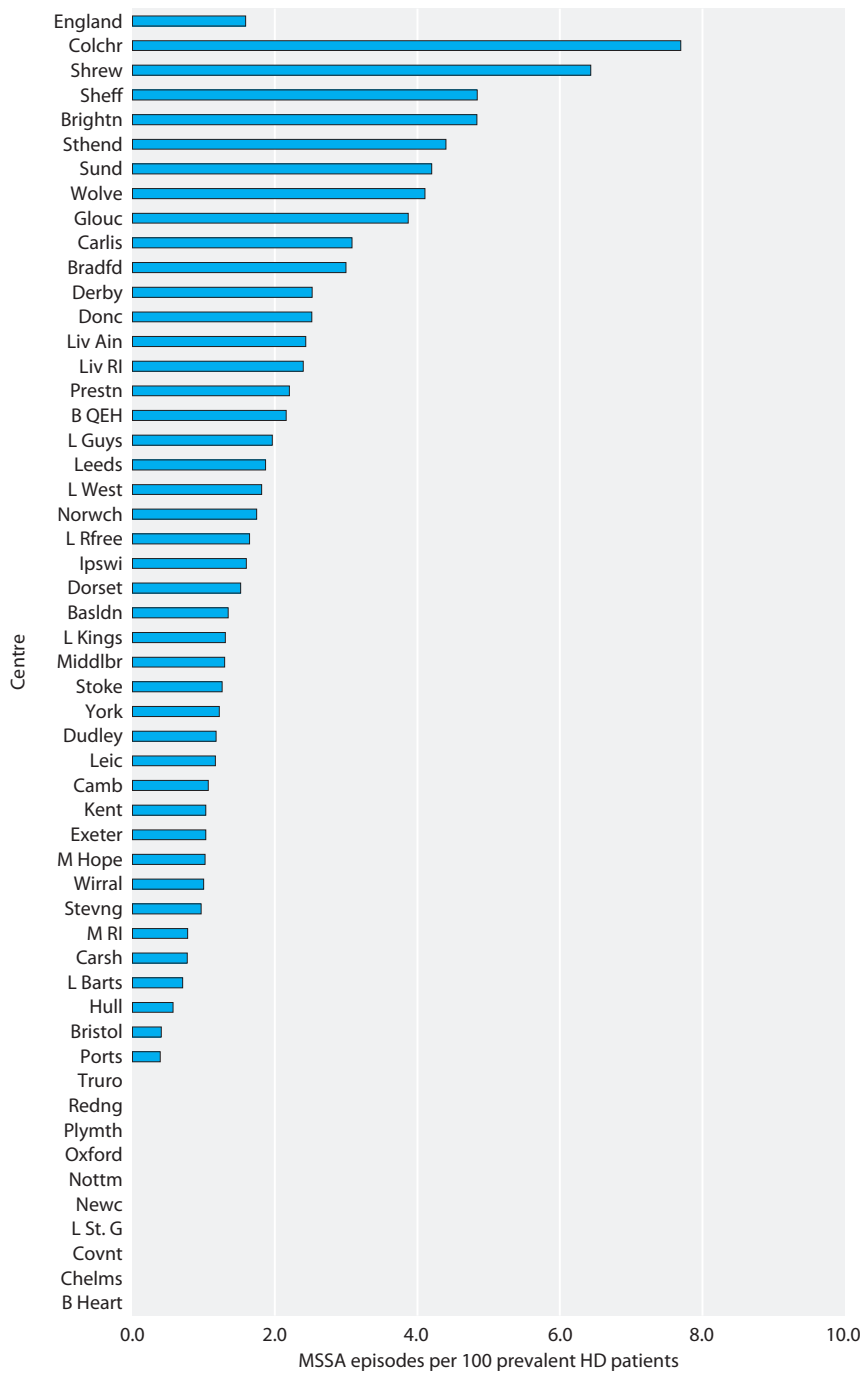


Fig. 12.9. MSSA bacteraemia rate per 100 prevalent HD patients by renal centre: 1/01/2011 to 30/06/2011
 For each centre the rate per 100 prevalent HD patients as reported 31/12/2010 is provided
 The overall rate for England is provided at the top of the graph

not been analysed in this study but is likely to be multi-factorial. The adoption of national screening and surveillance programmes, reduction in the use of venous catheters and increasing usage of antimicrobial locks all may have contributed.

The data on MSSA bacteraemia represent the first efforts at surveillance and therefore there is no comparable data available to give an idea of rates. In addition,

only the first six months of 2011 are given but if the data are extrapolated this would indicate 320 cases of MSSA per year. There is a noticeably higher incidence of MSSA infection when compared with recently reported MRSA rates suggesting that MSSA bacteraemia continues to be a significant problem amongst ERF patients.

The reasons for the discrepancy are not analysed in this report. Whilst one would expect a higher rate of MSSA it

would be reasonable to extrapolate from the first six months of the year that there were nearly 320 MSSA infections among dialysis patients in 2011. As this is the first year of the surveillance system there may be an element of reporting bias. *Staphylococcus aureus* is recognised as a major cause of vascular device-associated infection and the success of MRSA screening and eradication programmes may have favoured the elimination of MRSA strains but left patients still vulnerable to infection by MSSA. It is also noticeable that some centres with little or no MRSA may have a high incidence of MSSA bacteraemia. Further work is needed to demonstrate the overall trend of MSSA bacteraemia amongst dialysis patients.

Conclusion

The third and fourth years of mandatory reporting of MRSA have continued to show a decline in infection

rates in renal centres in England with an overall drop of over 80% since 2008. The first six months of mandatory MSSA reporting show a higher rate of infection and more data are required to understand the risks and trends amongst ERF patients.

Infection remains a considerable cause of morbidity and mortality amongst ERF patients and the presence of a tunnelled venous catheter continues to be a considerable risk factor for developing bacteraemia.

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