



13th March 2014

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Meticillin-resistant Staphylococcus aureus (MRSA) bacteraemia

Quarterly analyses of MRSA bacteraemia from mandatory surveillance in England: up to October-December 2013.

Meticillin-sensitive Staphylococcus aureus (MSSA) bacteraemia

Quarterly analyses of MSSA bacteraemia from mandatory surveillance in England: up to October-December 2013.

Escherichia coli (E. coli) bacteraemia

Quarterly analyses of *Escherichia coli* bacteraemia from mandatory surveillance in England: up to October-December 2013.

Clostridium difficile infection (CDI)

Quarterly analyses of *Clostridium difficile* infection from mandatory surveillance in England: up to October-December 2013.

Data sources, definitions, and links

Sources of data and definitions used for these analyses as well as listings of PHE and other national web pages.

Note: All references to quarterly data are based on calendar year definitions, and NOT financial year definitions (e.g. Q1 2009 refers to January-March 2009 and NOT to April-June 2009).

Citation

Public Health England. Quarterly Analyses: Mandatory MRSA, MSSA and *E. coli* Bacteraemia and CDI in England (up to October-December 2013). London: Public Health England, March 2014.

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Section 1: Epidemiological analyses of *Staphylococcus aureus* bacteraemia data

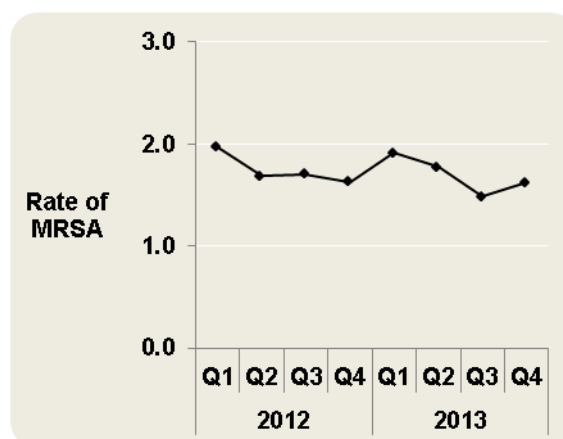
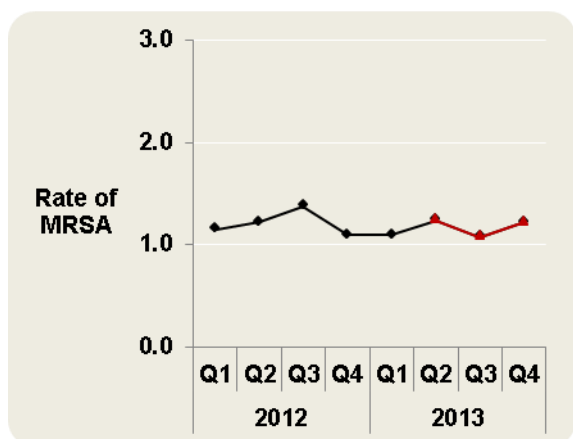
MRSA Bacteraemia

- From April 2013 all NHS organisations reporting positive cases of MRSA bacteraemia are required to complete a Post Infection Review (PIR)¹. MRSA bacteraemia cases from April 2013 are now published by PIR assignment rather than apportionment. This is reflected here.
- The total number of MRSA bacteraemia reports has remained static at 219 reports compared to the same period last year. In the intervening periods the total count of cases has ranged from 200 (Q3 2013) to 252 (Q1 2013).
- There has been a slight decrease between Q3 2013 and Q4 2013 for both Trust assigned and CCG assigned reports from 91 reports to 105 reports and from 109 reports to 114 reports respectively. The proportion of Trust assigned reports has shown little variation from Q2 2013 with approximately 45% of reports being Trust assigned.

Figure 1: Quarterly rates of MRSA bacteraemia, January 2012- December 2013

a) Trust apportioned/assigned* rate (per 100,000 bed-days)

b) All reports (per 100,000 population)



***Note:** From Q2 2013, MRSA cases have been reported by assignment rather than apportionment. This is reflected in Figure 1a where Trust assigned rates (per 100,000 bed days) are presented in red from Q2 2013 to Q4 2013. Please refer to Table 1b for trust assigned reported cases and rates.

¹ Please refer to http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1317138536251 for more information

Table 1a: MRSA bacteraemia counts and rates by quarter, July 2010 – December 2013

Year and quarter		Trust apportioned reports	Trust apportioned rates (per 100,000 bed-days)	All reports	All reports rates (per 100,000 population)
2010	Q3	186	2.09	396	2.98
	Q4	155	1.75	331	2.49
2011	Q1	149	1.72	333	2.54
	Q2	148	1.71	319	2.41
	Q3	103	1.21	266	1.99
	Q4	105	1.21	269	2.01
2012	Q1	117	1.31	262	1.97
	Q2	94	1.10	224	1.68
	Q3	96	1.13	229	1.70
	Q4	92	1.08	219	1.63
2013	Q1	116	1.32	252	1.91
	Q2	N/A	N/A	237	1.78
	Q3	N/A	N/A	200	1.48
	Q4	N/A	N/A	219	1.62

Table 1b: MRSA bacteraemia counts and rates by PIR assignment, April 2013-December 2013

Year and quarter		Trust assigned reports	Trust assigned rates (per 100,000 bed-days)	CCG assigned reports	CCG assigned rates (per 100,000 population)
2013	Q2	107	1.24	130	0.97
	Q3	91	1.08	109	0.81
	Q4	105	1.22	114	0.85

MSSA Bacteraemia

- Trust apportioned and population rates have remained relatively stable over the 8 quarters. A decline of 11.1% Trust apportioned rates has been noted between Q1 2013 and Q4 2013 from 7.71 to 6.87 per 100,000 bed-days. The population rates over the same period displayed a smaller decline of 4.1% from 17.11 to 16.41 per 100,000 population (Figure 2), suggesting overall rates have not varied greatly.
- The highest Trust apportioned rate was in Q3 2011 with 8.55 per 100,000 bed-days whilst the lowest was in the recent quarter Q4 2013 with 6.87 per 100,000 bed-days. The highest population rate was seen in Q2 2013 with 17.46 per 100,000 population, whilst the lowest was in Q3 2012 with 15.85 per 100,000 population.
- Although there is slight fluctuation in the number of reports between the quarters, there are no substantial increases (Table 2).

Figure 2: Quarterly rates of MSSA bacteraemia, January 2012- December 2013

a) Trust apportioned rate (per 100,000 bed-days) b) All reports (per 100,000 population)

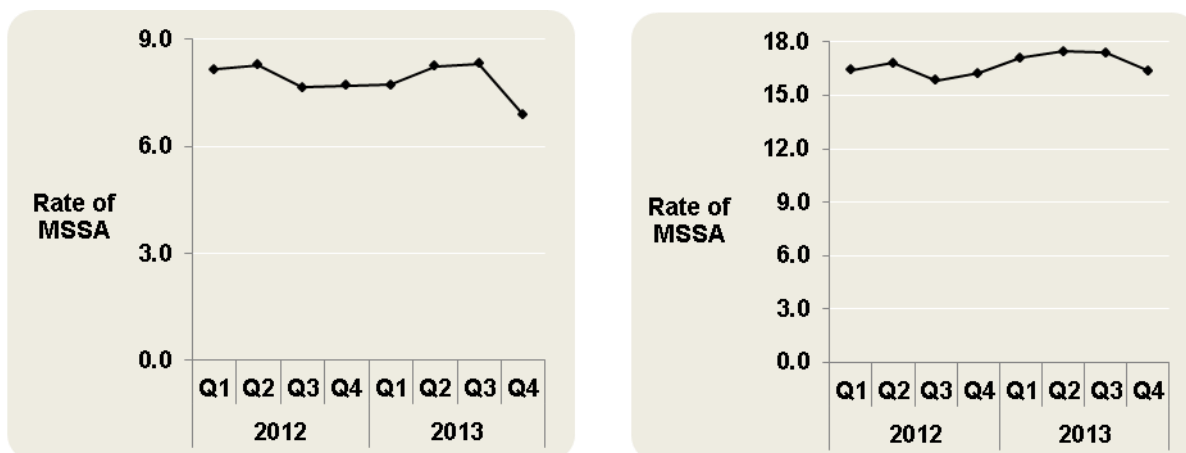


Table 2: MSSA bacteraemia counts and rates by quarter, January 2011- December 2013

Year and quarter		Trust apportioned reports	Trust apportioned rates (per 100,000 bed-days)	All reports	All reports rates (per 100,000 population)
2011	Q1	735	8.46	2,199	16.79
	Q2	698	8.08	2,191	16.55
	Q3	725	8.55	2,226	16.63
	Q4	703	8.12	2,167	16.19
2012	Q1	728	8.16	2,183	16.41
	Q2	711	8.29	2,238	16.83
	Q3	648	7.64	2,131	15.85
	Q4	663	7.71	2,185	16.25
2013	Q1	678	7.73	2,257	17.11
	Q2	710	8.25	2,328	17.46
	Q3	701	8.32	2,344	17.38
	Q4	591	6.87	2,212	16.41

Section 2: Epidemiological analyses of *Escherichia coli* bacteraemia data

- Mandatory *E.coli* bacteraemia surveillance commenced in June 2011. The rate of *E.coli* bacteraemia has been stable over the last eight quarters. There has been a slight rate decrease in the most recent quarter, Q4 2013, in line with the same trend seen in the same quarter in 2012. Since the commencement of *E.coli* bacteraemia surveillance, Q3 2013 demonstrates the highest rate of 66.82 per 100,000 population, while the lowest was 57.63 per 100,000 population in Q1 2013 (Figure 3).
- There was little variation in the number of reports from quarter to quarter; in line with the rates. The highest number of reports was seen in Q3 2013 with 9,009 reports, while the lowest was observed in Q1 2013 with 7,602 reports (Table 3).

Figure 3: Quarterly rates of *E. coli* bacteraemia reports per 100,000 population, January 2012 – December 2013

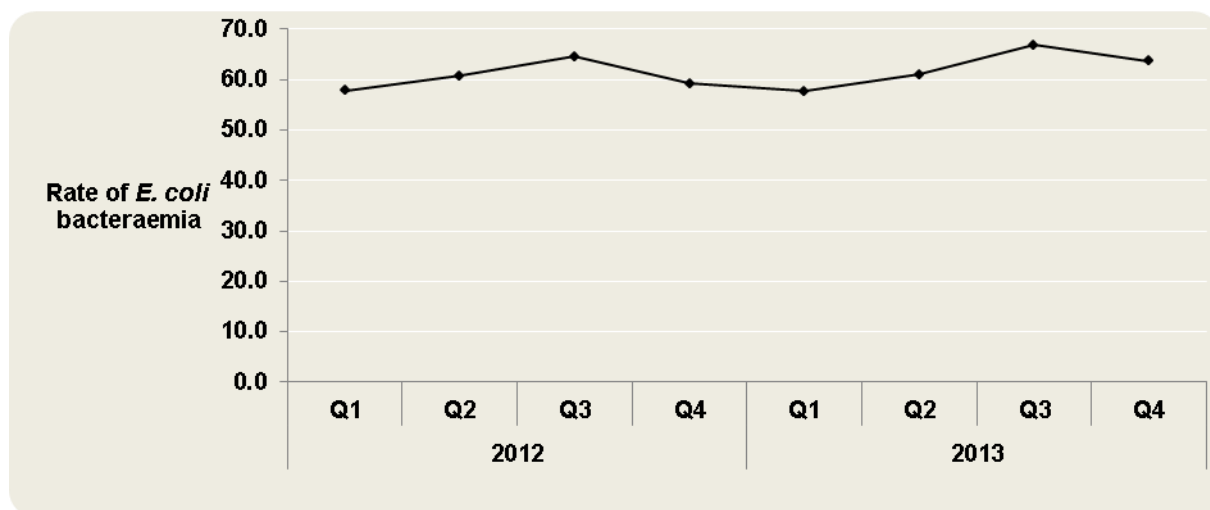


Table 3: Quarterly counts and rates of all *E. coli* bacteraemia reports by quarter, July 2011 – December 2013

Year and quarter	Total <i>E. coli</i> bacteraemia reports	Rate (per 100,000 population)
2011 Q3	8,275	61.82
2011 Q4	8,098	60.50
2012 Q1	7,698	57.88
2012 Q2	8,074	60.71
2012 Q3	8,676	64.52
2012 Q4	7,957	59.18
2013 Q1	7,602	57.63
2013 Q2	8,133	60.98
2013 Q3	9,009	66.82
2013 Q4	8,592	63.72

Section 3: Epidemiological analyses of *Clostridium difficile* data

- Between Q1 2012 and Q4 2013, the rate of Trust apportioned cases per 100,000 bed days has decreased by 20.3% from 18.07 to 14.41. Over the same period, the rate of total CDI cases per 100,000 population declined by 12.3% from 28.64 to 25.12 (Figure 4).
- The total number of CDI reports has decreased by 12% when compared to the same period last year – from 3,756 reports in Q4 2012 to 3,299 reports in Q4 2013. This is part of a gradual decrease of 44% since Q3 2010 when there were 5,909 reports (Table 4).
- Trust apportioned reports have declined by 53% between Q3 2010 and Q4 2013, from 2,632 reports to 1,239 reports respectively (Table 4).

Figure 4: Quarterly rates of *C. difficile* infection in patients aged 2 years and over, January 2012- December 2013

a) Trust apportioned reports (per 100,000 bed-days) b) All reports (per 100,000 population)

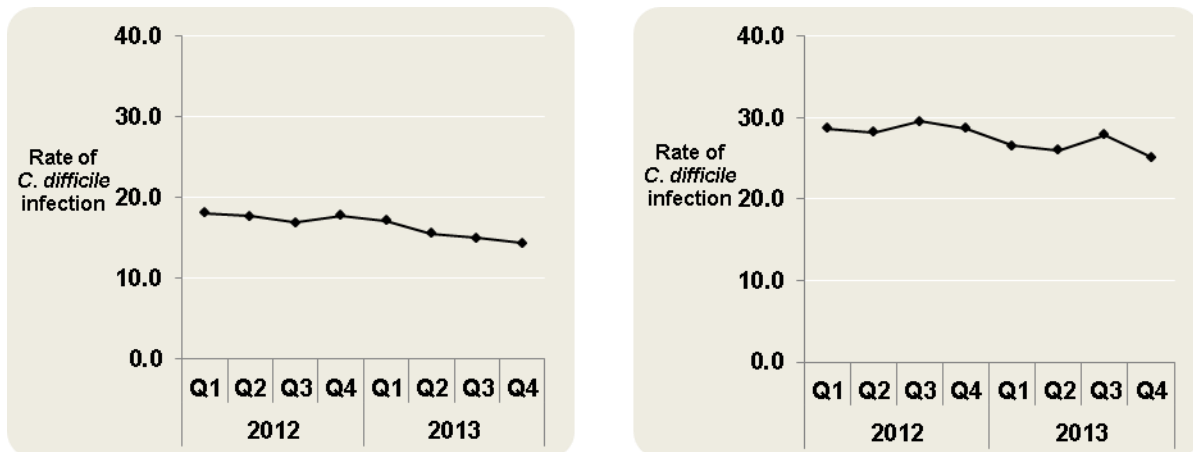


Table 4: *C. difficile* infection counts and rates in patients aged 2 years and over by quarter, July 2010 – December 2013

Year and quarter		Trust apportioned reports	Trust apportioned rates (per 100,000 bed-days)	All reports	All reports rates (per 100,000 population)
2010	Q3	2,632	29.64	5,909	45.69
	Q4	2,431	27.37	4,984	38.54
2011	Q1	2,358	27.14	4,833	37.87
	Q2	2,206	25.53	4,967	38.49
	Q3	2,046	24.12	4,994	38.28
	Q4	1,824	21.07	4,350	33.34
2012	Q1	1,613	18.07	3,711	28.64
	Q2	1,517	17.68	3,656	28.22
	Q3	1,433	16.91	3,870	29.54
	Q4	1,527	17.76	3,756	28.67
2013	Q1	1,503	17.14	3,412	26.55
	Q2	1,343	15.60	3,382	26.03
	Q3	1,269	15.05	3,663	27.89
	Q4	1,239	14.41	3,299	25.12

Appendix

Bed-day data

For *S. aureus* (MRSA and MSSA) bacteraemia and CDI, the average bed-day activity reported by acute Trusts via KH03 returns is used to derive the bed-day denominator for acute Trust incidence rates. Financial year (FY) bed-day data was used as a denominator for all the quarters in that financial year i.e. FY bed-day data was converted into quarterly data for 2009/10 and 2010/11 and used as the denominator (FY2009/10 bed-day data was used for the Q2 2009, Q3 2009, Q4 2009 and Q1 2010 surveillance data numerators). As of Q2 2011, bed-day data has been available on a quarterly basis and has been used as such for Q2 2011 to Q3 2013. Q4 2013 bed-day data was not available at the time of writing this report, bed-day data for the same quarter of the previous year (Q4 2012) was used for surveillance data for this quarter. These data are available at: <http://www.england.nhs.uk/statistics/statistical-work-areas/bed-availability-and-occupancy/bed-data-overnight/> Historically Hospital Episode Statistics (HES) data was used for CDI rate calculation in order to allow the exclusion of patients aged under two from the denominator. Given the minimal impact of patients aged under two on overall rates it seemed prudent to use a single denominator across organisms.

Population data

National incidence rates are calculated using 2010, 2011 and 2012 mid-year resident population estimates which are based on the 2011 census for England (2013 estimates are based on 2012 mid-year estimates). These are available at: <http://www.statistics.gov.uk/statbase/Product.asp?vlnk=15106>

Definitions

Apportioning and assignment of reports:

- **MRSA bacteraemia PIR assigned reports:** As of the 1st of April 2013, all MRSA bacteraemia cases reported via the HCAI Data Capture System (DCS) are assigned to either an acute Trust or a CCG through the completion of a Post Infection Review (PIR). A case is deemed to be Trust assigned where the completed PIR indicates that an acute Trust is the organisation best placed to ensure that any lessons learned are actioned. Further information on the PIR process can be found on the following webpage: <http://www.england.nhs.uk/ourwork/patientsafety/zero-tolerance/>
- **MSSA bacteraemia Trust apportioned reports:** The analysis of Trust apportioned and all other reports is based on the criteria applied to MRSA bacteraemia.
- **CDI Trust apportioned reports:** include patients who are (i) in-patients, day-patients, emergency assessment patients or not known; AND (ii) have had a specimen taken at an acute Trust or not known; AND (iii) specimen is **4 or more** days after date of admission (admission date is considered day '1').
- **Total reports:** These are all the cases reported by an acute Trust. They consist of Trust apportioned reports and reports NOT apportioned to the acute Trust.

Episode duration:

- The length of a patient episode is defined as 14 days for MRSA, MSSA and *E. coli* bacteraemia and 28 days for CDI, with the date of specimen being considered day '1'.

Incidence calculations:

- **MRSA, MSSA and *E. coli* bacteraemia, and CDI population incidence (episodes per 100,000 population years):**
 - This incidence is calculated on an annualised basis to allow comparisons with the PHE's annually published data and is calculated as follows:
=100,000* (# episodes/mid-year England population) * (# days in year/# days in quarter).
- **MRSA and MSSA bacteraemia, and CDI Trust apportioned incidence:**
 - This incidence is calculated using KH03 average bed day activity (see *Bed-day data* above) and is calculated as follows:
=100,000*[# episodes/ (average KH03 bed day * # days in surveillance quarter)]

Quarters:

- Q1= January-March; Q2=April-June; Q3=July-September; Q4=October-December