Public Health England

# Quarterly Epidemiological Commentary: Mandatory MRSA, MSSA and *E. coli* bacteraemia, and *C. difficile* infection data (up to April–June 2013)

**12th September 2013**

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### *Data sources, definitions, and links*

Sources of data and definitions used for these analyses as well as listings of HPA 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).

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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.

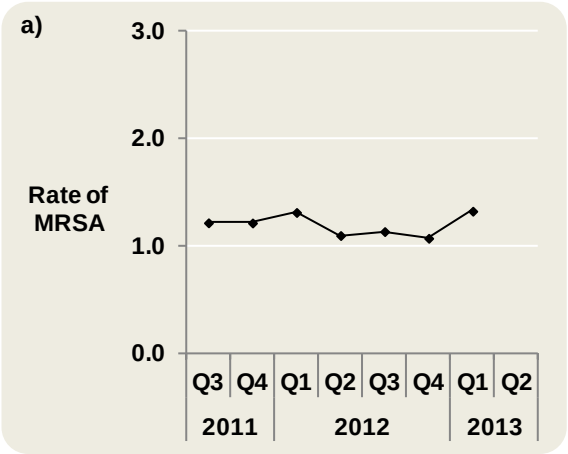
- Between Q3 2011 and Q1 2013, the rate of Trust apportioned cases per 100,000 bed-days increased by 9%, from 1.21 to 1.32. From Q3 2011 to Q2 2013 the rate of total MRSA cases per 100,000 population declined by 11% from 1.99 to 1.78.

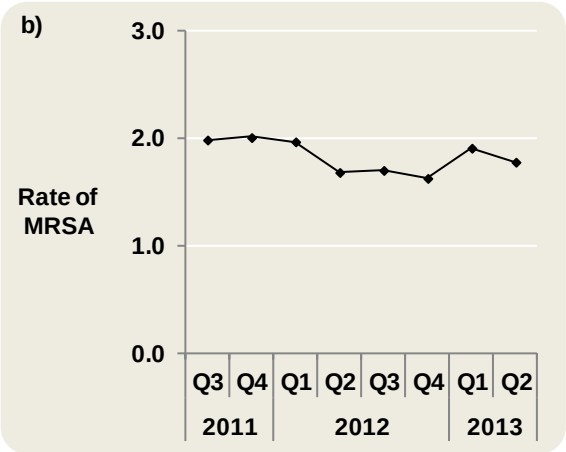
- Trust apportioned reports show a 58% reduction between Q1 2010 (279 reports) and Q1 2013 (116 reports). Q1 2013 Trust apportioned reports represent a static trend compared to the same period last year (116 and 117 cases, respectively).

- The total number of MRSA bacteraemia reports has shown a small increase of 6% when compared to the same period last year – from 224 in Q2 2012 to 237 in Q2 2013.

**Figure 1: Quarterly rates of MRSA bacteraemia, July 2011- June 2013**

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




[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, January 2010- March 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 | Q1 | 279 | 3.01 | 483 | 3.75 |
| | Q2 | 198 | 2.25 | 421 | 3.24 |
| | Q3 | 186 | 2.09 | 396 | 3.01 |
| | Q4 | 155 | 1.75 | 331 | 2.53 |
| 2011 | Q1 | 149 | 1.72 | 333 | 2.44 |
| | Q2 | 148 | 1.71 | 319 | 2.01 |
| | 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 | 1.07 | 219 | 1.63 |
| 2013 | Q1 | 116 | 1.32 | 252 | 1.91 |
| | Q2 | N/A | N/A | 237 | 1.78 |

**Table 1b: MRSA bacteraemia counts and rates by PIR assignment, April 2013-June 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 | 106 | 1.24 | 131 | 0.98 |

## MSSA Bacteraemia

- Both Trust apportioned and population rates have remained relatively stable over the 8 quarters, however there has been a slight steady increase in these rates between Q3 2011 and Q2 2013. The MSSA Trust apportioned and the population rates have increased by 8.2% (from 7.64 to 8.27 per 100,000 bed-days) and 10.1% (from 15.85 to 17.46 per 100,000 population) respectively (Figure 2).

- Correspondingly, the highest Trust apportioned rate was in Q3 2011 with 8.55 per 100,000 bed-days whilst the lowest was in Q3 2012 with 7.64 per 100,000 bed-days. The highest population rate was in the most recent quarter, 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, July 2011- June 2013**

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

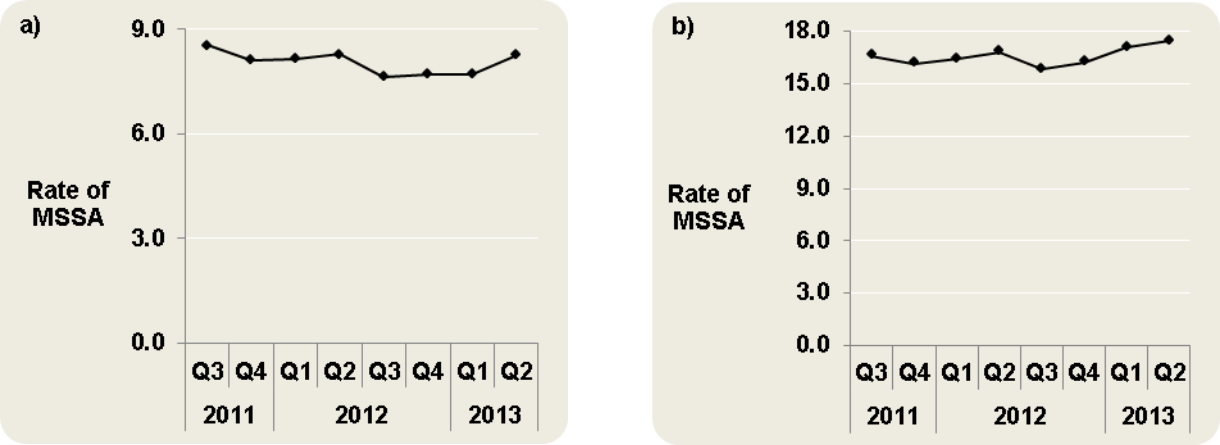



**Table 2: MSSA bacteraemia counts and rates by quarter, July 2011- June 2013**

| 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 | 2199 | 16.79 |
| | **Q2** | 698 | 8.08 | 2191 | 16.55 |
| | **Q3** | 725 | 8.55 | 2226 | 16.63 |
| | **Q4** | 703 | 8.12 | 2167 | 16.19 |
| **2012** | **Q1** | 728 | 8.16 | 2183 | 16.41 |
| | **Q2** | 711 | 8.29 | 2238 | 16.83 |
| | **Q3** | 648 | 7.64 | 2131 | 15.85 |
| | **Q4** | 663 | 7.71 | 2186 | 16.26 |
| **2013** | **Q1** | 677 | 7.72 | 2256 | 17.10 |
| | **Q2** | 710 | 8.27 | 2328 | 17.46 |

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

- Mandatory *E.coli* bacteraemia surveillance commenced in June 2011. The rate of *E.coli* bacteraemia was stable over the eight quarters; the highest rate was 64.52 per 100,000 population in Q3 2012, 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 2012 with 8,676 reports, while the lowest was observed in Q1 2013 with 7,601 reports (Table 3).

**Figure 3: Quarterly rates of *E. coli* bacteraemia reports per 100,000 population, July 2011 – June 2013**

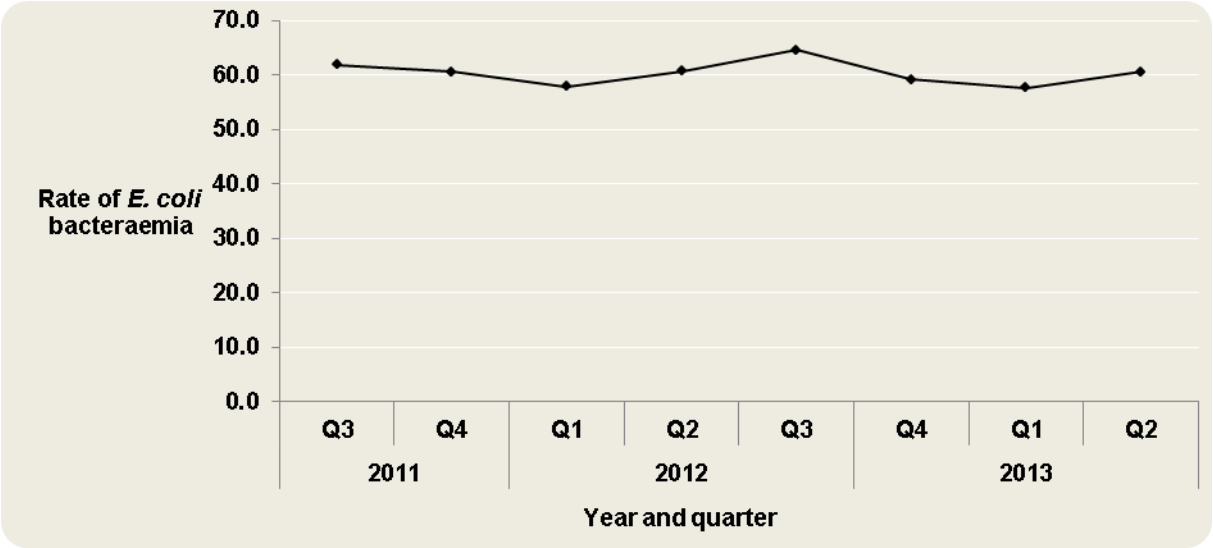



**Table 3: Quarterly counts and rates of all *E. coli* bacteraemia reports by quarter, July 2011 – June 2013**

| Year and quarter | | Total *E. coli* bacteraemia reports | Rate (per 100,000 population) |
|---|---|---|---|
| 2011 | Q3 | 8,275 | 61.82 |
| | Q4 | 8,098 | 60.50 |
| 2012 | Q1 | 7,698 | 57.88 |
| | Q2 | 8,074 | 60.71 |
| | Q3 | 8,676 | 64.52 |
| | Q4 | 7,957 | 59.18 |
| 2013 | Q1 | 7,601 | 57.63 |
| | Q2 | 8,075 | 60.55 |

## Section 3: Epidemiological analyses of *Clostridium difficile* data

- Between Q3 2011 and Q2 2013, the rate of Trust apportioned cases per 100,000 bed days has decreased by 35.8%, from 24.12 to 15.48. Over the same period, the rate of total CDI cases per 100,000 population declined by 32.4% from 38.28 to 25.88 (Figure 4).

- The total number of CDI reports has decreased by 8% when compared to the same period last year – from 3,656 reports in Q2 2012 to 3,362 reports in Q2 2013. This is part of a gradual decrease of 47% since Q1 2010 when there were 6,341 reports.

- Trust apportioned reports have declined by 62% between Q1 2010 and Q2 2013, where there were 3,489 reports and 1,328 reports respectively. Trust apportioned reports also present a 12% decline between Q1 2013 and Q2 2013, from 1,503 reports to 1,328 reports respectively.

**Figure 4: Quarterly rates of *C. difficile* infection in patients aged 2 years and over, July 2011- June 2013**

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

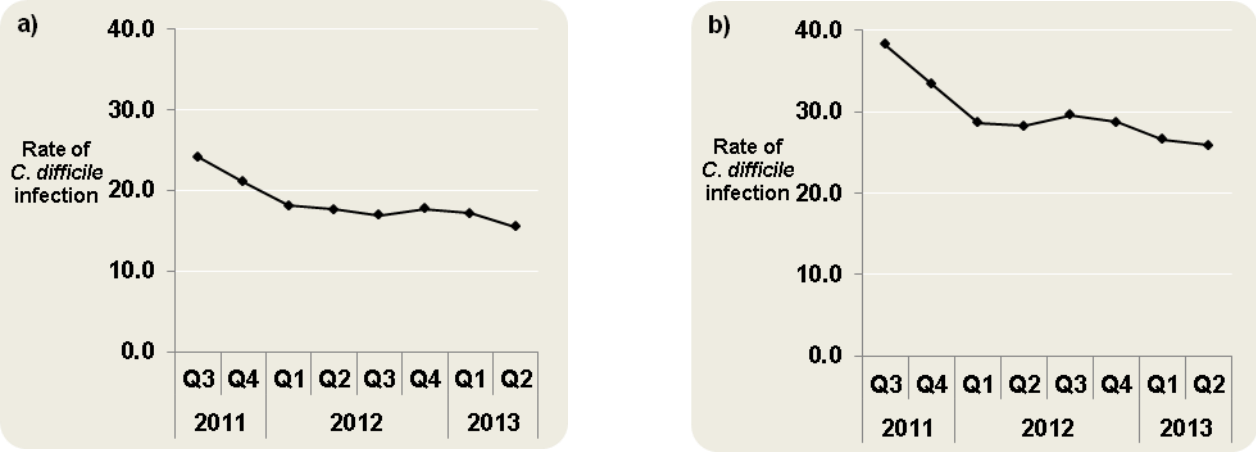


**Table 4: *C. difficile* infection counts and rates in patients aged 2 years and over by quarter, January 2010 – June 2013**

| Year and quarter | | Trust apportioned reports | Trust apportioned rates (per 100,000 bed-days) | All reports | All reports rates (per 100,000 population) |
|---|---|---|---|---|---|
| **2010** | **Q1** | 3,489 | 37.68 | 6,341 | 50.12 |
| | **Q2** | 2,996 | 34.11 | 5,981 | 46.76 |
| | **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** | 1,516 | 17.67 | 3,656 | 28.22 |
| | **Q3** | 1,433 | 16.91 | 3,870 | 29.54 |
| | **Q4** | 1,525 | 17.74 | 3,756 | 28.67 |
| **2013** | **Q1** | 1,503 | 17.14 | 3,412 | 26.55 |
| | **Q2** | 1,328 | 15.48 | 3,362 | 25.88 |

# 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 2012. Q2 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 (Q2 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 Trust apportioned reports*:** The analysis of Trust apportioned and all other reports is based on the model outlined by the National Quality Board.
  This includes 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 **3 or more days** after date of admission (or admission date is null), where the day of admission is day '1'.

  ***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 HPA'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