



UK Health
Security
Agency

Quarterly epidemiological commentary

Mandatory Gram-negative bacteraemia,
MRSA, MSSA and *C. difficile* infections
data (up to April to June 2021)

October 2021

Contents

Data included in this quarterly epidemiological commentary	3
COVID-19 and this data	3
Further information	4
Epidemiological analyses of Gram-negative bacteraemia data.....	6
<i>E. coli</i> bacteraemia	6
<i>Klebsiella</i> spp. bacteraemia.....	9
<i>Pseudomonas aeruginosa</i> bacteraemia	11
Epidemiological analyses of <i>Staphylococcus aureus</i> bacteraemia data	13
MRSA bacteraemia	13
MSSA bacteraemia.....	15
Epidemiological analyses of <i>Clostridioides difficile</i> infection data	17
Appendix	20
Bed-day data	20
Population data	21
Definitions.....	21
About the UK Health Security Agency	24

Data included in this quarterly epidemiological commentary

This document contains quarterly, national-level epidemiological commentaries for Meticillin-resistant *Staphylococcus aureus* (MRSA), Meticillin-sensitive *Staphylococcus aureus* (MSSA), *Escherichia coli* (*E. coli*), *Klebsiella* spp. and *Pseudomonas aeruginosa* (*P. aeruginosa*) bacteraemia and *Clostridioides difficile* infection (CDI). This includes analyses on counts and incidence rates of all cases and hospital-onset (previously referred to as trust-apportioned) cases of MRSA, MSSA, *E. coli*, *Klebsiella* spp. and *P. aeruginosa* bacteraemia and CDI.

All data tables associated with this report are included in an [OpenDocument spreadsheet](#). Revisions to data included are covered by a data-specific [revisions and correction policy](#).

Citation to UK Health Security Agency (UKHSA), healthcare associated infections (HCAI) and antimicrobial resistance (AMR) division is required.

Citation: UK Health Security Agency. Quarterly epidemiology commentary: mandatory MRSA, MSSA and Gram-negative bacteraemia and *C. difficile* infection in England (up to April to June 2021) London: UK Health Security Agency, October 2021.

COVID-19 and this data

The coronavirus (COVID-19) pandemic has had an effect on the number of infection cases of both bacteraemia (particularly due to *E. coli*) and CDI. In general, counts of all reported cases during the financial year 2020 to 2021 were lower than would be expected, while counts of hospital-onset *Klebsiella* and *P. aeruginosa* cases increased exceeding previous counts observed in this setting. Analysis of voluntary laboratory surveillance data also showed a reduction in the total number of cases of other bloodstream infections during this period, so the phenomenon was not limited to the species covered by the mandatory surveillance. As the voluntary surveillance shows similar trends to the mandatory surveillance scheme, it would appear that the low counts were not a specific ascertainment problem in the mandatory programme.

In response to the pandemic, elective procedures in hospitals were initially cancelled or delayed, although some activity resumed between COVID-19 waves. As a result, the beds occupied overnight; the denominator used for hospital-onset infection rates, was much lower than would otherwise be expected over these periods. In some instances, increasing rates of hospital-onset infection have been observed, despite a decrease in the counts of infections.

Further information

This publication forms part of the range of National Statistics outputs routinely published by UKHSA which include monthly and annual reports on the mandatory surveillance of MRSA, MSSA and *E. coli*, *Klebsiella* spp. and *P. aeruginosa* bacteraemia and CDI.

Annual report output

Further epidemiological analyses by financial year can be found in UKHSA's [annual epidemiological commentary](#).

Monthly report outputs

The following reports are produced by UKHSA on a monthly basis.

MRSA bacteraemia

Counts of all reported, hospital-onset cases, community-onset cases, healthcare associated and community associated MRSA bacteraemia by organisation.

MSSA bacteraemia

Counts of all reported, hospital-onset cases, community-onset cases, healthcare associated and community associated MSSA bacteraemia by organisation.

E. coli bacteraemia

Counts of all reported, hospital-onset cases, community-onset cases, healthcare associated and community associated *E. coli* bacteraemia by organisation.

Klebsiella spp. bacteraemia

Counts of all reported, hospital-onset cases, community-onset cases, healthcare associated and community associated *Klebsiella* spp. bacteraemia by organisation.

P. aeruginosa bacteraemia

Counts of all reported, hospital-onset cases, community-onset cases, healthcare associated and community associated *P. aeruginosa* bacteraemia by organisation.

CDI

Counts of all reported, hospital-onset cases, community-onset cases, healthcare associated and community associated CDI by organisation.

Data for this report was extracted from UKHSA's HCAI data capture system (DCS) on 6 September 2021.

Epidemiological analyses of Gram-negative bacteraemia data

E. coli bacteraemia

The incidence rate of all reported *E. coli* bacteraemia has increased each year since the initiation of the mandatory surveillance of *E. coli* bacteraemia in July 2011 until start of the COVID-19 pandemic (January to March 2020 figure 1a). This increase was primarily driven by community-onset cases (table S1a). Since the start of the pandemic, the number and incidence rates of total reported and community-onset cases has fallen but still remains higher than at the start of *E. coli* surveillance. In contrast, the incidence rate of hospital-onset cases remained relatively stable during the same period, although a sharp reduction was observed in the most recent quarter (April to June 2021 figure 1b).

Between July to September 2011 and April to June 2021, the count of cases and the incidence rate of all reported cases of *E. coli* bacteraemia increased by 17.6% from 8,275 cases to 9,729 and from 61.8 to 69.2 cases per 100,000 population. Similarly, over the same period, the count of community-onset cases increased by 29.2% from 6,279 to 8,112, while the incidence rate increased by 23.0% from 46.9 to 57.7 cases per 100,000 population. Over the same period, the count of hospital-onset cases decreased by 19.0% from 1,996 to 1,617. This corresponded to a decrease in the incidence rate of hospital-onset cases by 12.3% from 23.6 per 100,000 bed-days to 20.7.

When comparing the most recent quarter (April to June 2021) to the same period in the previous year (April to June 2020) there is a 15.7% increase in the count and rate of all reported cases from 8,409 to 9,729 and from 59.8 to 69.2 per 100,000 population. Community-onset *E. coli* bacteraemia cases increased by 14.7% from 7,072 to 8,112, with the community-onset incidence rate increasing by the same percentage (14.7% from 50.3 per 100,000 population to 57.7 figure 1a and 1b, table S1).

In April to June 2021, the hospital-onset *E. coli* bacteraemia cases increased by 20.9% from 1,337 to 1,617 compared to April to June 2020. However, incidence rate decreased by 13.8% from 24.0 to 20.7 per 100,000 bed-days compared to the same period. It is important that these figures are interpreted with caution. In the period since January to March 2020, the total count of hospital-onset *E. coli* bacteraemia cases have been lower than what was observed in the pre-pandemic period, this was most obvious in April to June 2020. During this period the rate of hospital-onset cases stayed approximately the same, suggesting the rate of declines in both overnight bed-days (hospital activity) and hospital-onset cases was similar. In April to June 2021, the number of hospital-onset cases has increased while the incidence rate of these cases declined compared to the same period in the previous year. The decline in incident rates but not

counts of cases is due to a partial return of the typical number of overnight bed-days in April to June 2021 compared to the unusually low levels in April to June 2020.

Comparing the most recent quarter with April to June 2019, which is a more typical period prior to the COVID-19 pandemic, shows a 11.4% decrease in total cases and the rate from 10,964 to 9,729 and from 78.1 to 69.2 cases per 100,000 population. Community-onset cases decreased 10.3% from 9,044 to 8,112 while the rate declined 10.5% from 64.5 to 57.7 cases per 100,000 population. Finally, hospital-onset cases decreased by 15.8% compared over the same period from 1,920 to 1,617, while the hospital-onset rate fell by 6.9% from 22.2 to 20.7 cases per 100,000 bed-days (figure 1a and 1b).

There is evidence of seasonality in the incidence of all-reported *E. coli* bacteraemia cases, with the highest rates observed between July to September of each year, although, care is required in interpreting 2020/2021 and 2021/2022 due to the reduction in cases and hospital activity.

Figure 1a: Quarterly rates of all reported *E. coli* bacteraemia: July to September 2011 to April to June 2021

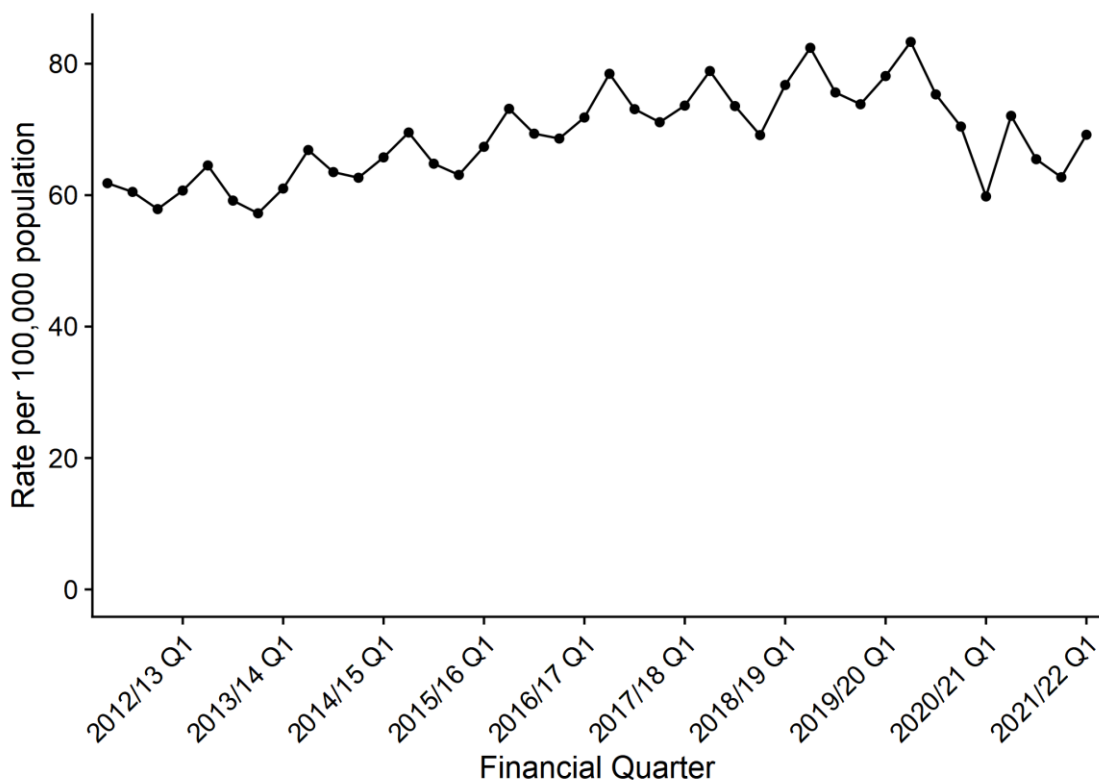
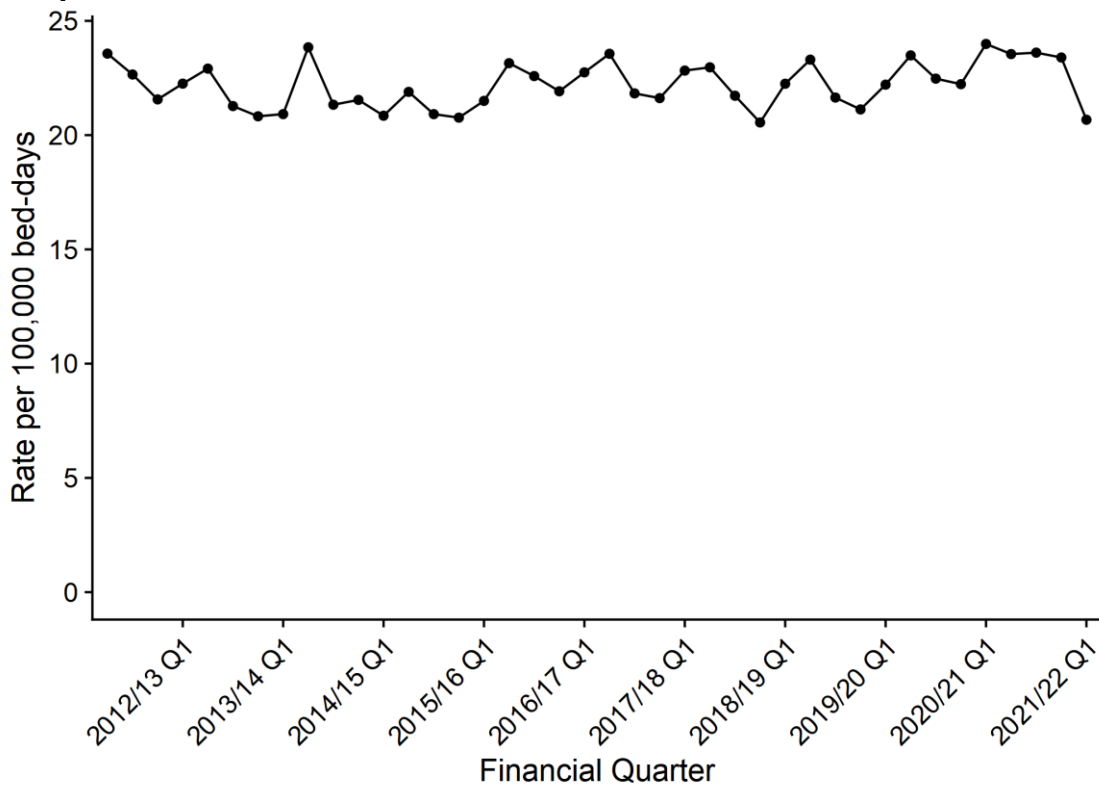


Figure 1b: Quarterly rates of hospital-onset *E. coli* bacteraemia: July to September 2011 to April to June 2021



Klebsiella spp. bacteraemia

Between April to June 2017 and April to June 2021, there was a 10.3% increase in the count of all reported *Klebsiella* spp. bacteraemia cases from 2,348 to 2,590 and an 8.8% increase in the incidence rate from 16.9 to 18.4 cases per 100,000 population (figure 2a). The count of community-onset cases also increased by 8.0% from 1,678 to 1,813 cases, while the incidence rate increased by 6.6% from 12.1 to 12.9 cases per 100,000 population respectively. Over the same period, the count of hospital-onset cases increased by 16.0% from 670 to 777 cases, while the rate increased by 28.2% from 7.8 to 9.9 cases per 100,000 bed-days (figure 2b). Hospital-onset *Klebsiella* spp. counts and rates increased between July to September 2020 and January to March 2021. Both counts and rates were higher than ever reported prior to the pandemic, and peaked at 15.5 cases per 100,000 bed-days in the quarter January to March 2021. The specific drivers of this increase are still being investigated, but these trends coincided with increased incidence of COVID-19. Data for the most recent quarter suggests that the count and rate of hospital-onset infection may be returning to the levels observed prior to the pandemic. This development is currently under investigation.

The large increases in hospital-onset counts and rates should be taken into account when comparing to the same period in the previous year (April to June 2020). As a result, a comparison to the same period in 2019 (April to June 2019), which is a more typical year prior to the pandemic, shows a 1.7% increase in the count of all reported cases from 2,546 to 2,590, with a corresponding increase in rate of 1.5% from 18.1 to 18.4 per 100,000 population. Community-onset *Klebsiella* spp. cases had little change (1,798 to 1,813), with rates remaining stable at 12.8 per 100,000 population. Hospital-onset *Klebsiella* spp. cases increased by 3.9% from 748 to 777 corresponding to a sharp increase in incidence of 14.8% from 8.7 to 9.9 per 100,000 bed-days (table S2).

During April to June 2021 71.7% (1,857/2,590) of all reported *Klebsiella* spp. bacteraemia were caused by *Klebsiella pneumoniae*, an increase from 69.9% in the same quarter in the previous year (April to June 2020). Over the same period, the percentage of cases caused by *Klebsiella oxytoca* was 18.4% (477/2,590) in April to June 2021 from 17.6% in the same quarter in the previous year (April to June 2020). During the period where there were observed increases in the counts and rates of hospital-onset *Klebsiella* spp., the increase was generally proportional among all species as they all followed broadly the same trend. The exception to this was *K. oxytoca*, which increased within hospital-onset cases around the start of the pandemic and broadly maintained a similar rate throughout the period (2.0-2.1 per 100,000 bed days).

There is evidence of seasonality in the incidence trends of all-reported *Klebsiella* spp. bacteraemia cases, with the highest rates normally observed in July to September of each year, although it is important to evaluate 2020/2021 and 2021/2022 with caution.

Figure 2a: Quarterly rates of all reported *Klebsiella* spp. bacteraemia by species: April to June 2017 April to June 2021

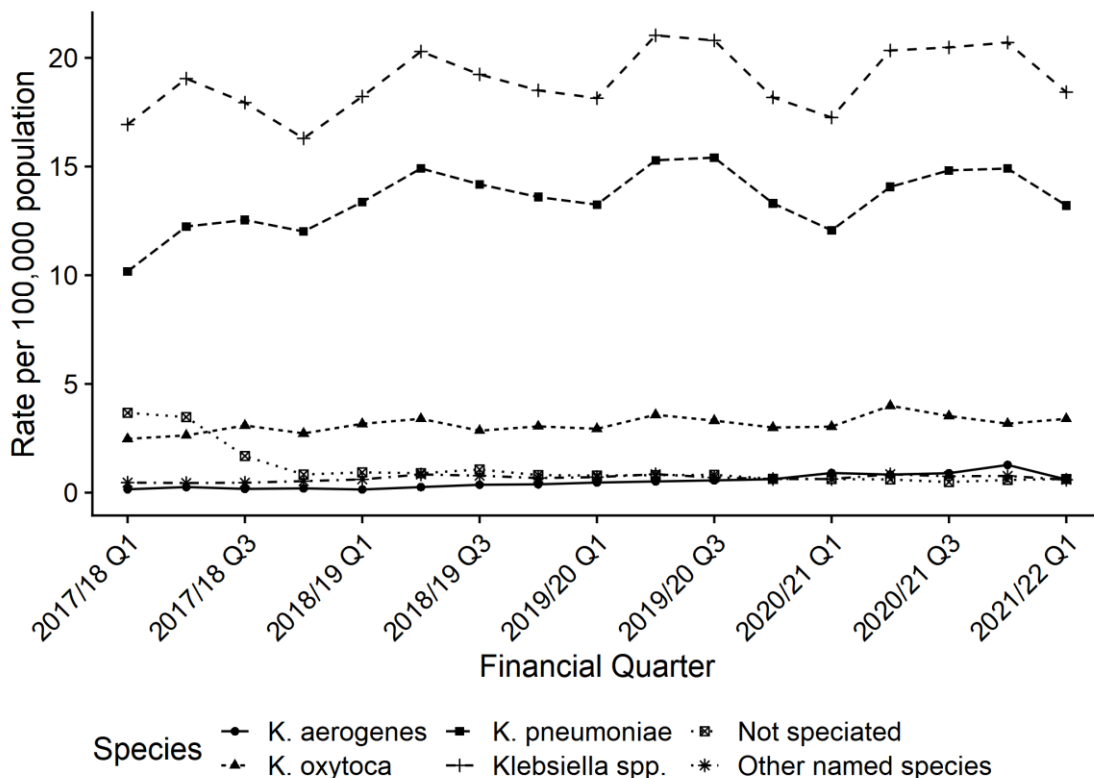
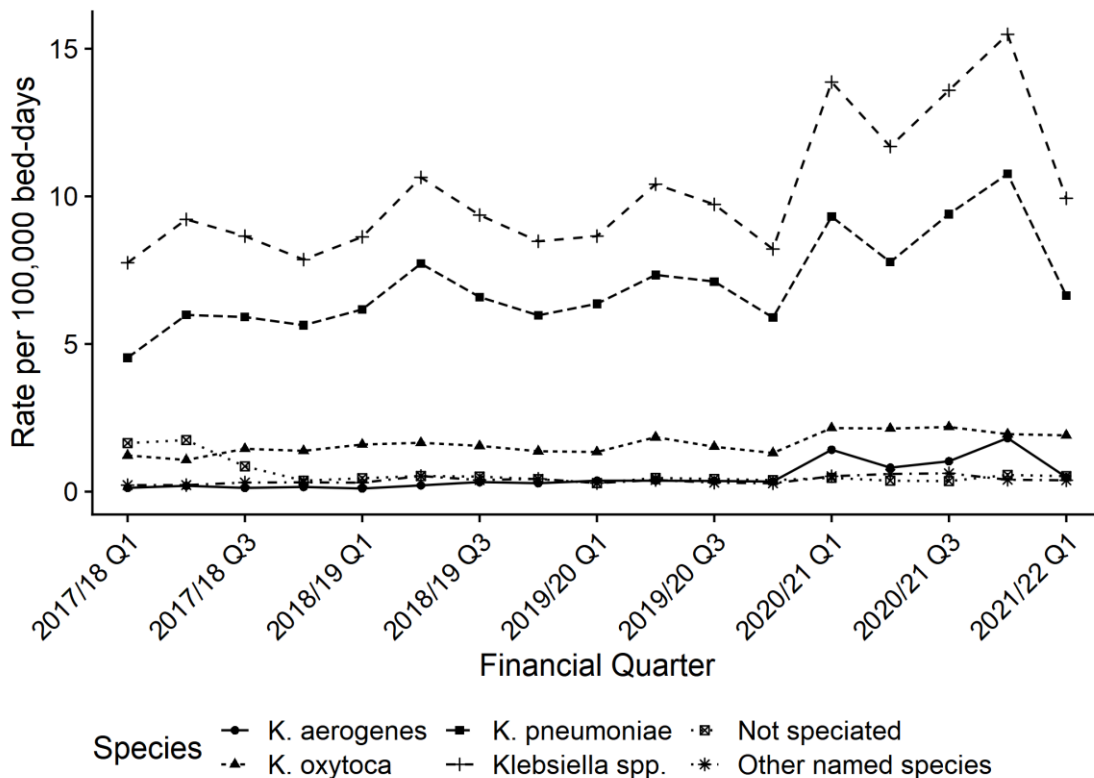


Figure 2b: Quarterly rates of hospital-onset *Klebsiella* spp. bacteraemia: April to June 2017 to April to June 2021



Pseudomonas aeruginosa bacteraemia

Between April to June 2017 and April to June 2021, there was little change in the count of all reported *P. aeruginosa* bacteraemia cases from 1,012 to 1,003 and a 2.3% decrease in the incidence rate from 7.3 to 7.1 cases per 100,000 population (figure 3a). The count and the incidence rate of community-onset cases increased 5.5% from 638 to 673 cases and by 4.0% from 4.6 to 4.8 cases per 100,000 population respectively. Over the same period, the count and the incidence rate of hospital-onset cases decreased by 11.8% from 374 to 330 cases and by 2.5% from 4.3 to 4.2 cases per 100,000 bed-days respectively (figure 3b).

Similar to *Klebsiella* spp. cases, an increase in counts and rates of hospital-onset *P. aeruginosa* was also observed during the second wave of the pandemic. The hospital-onset *P. aeruginosa* counts and rates increased between July to September 2020 and January to March 2021. Both the hospital-onset counts and rates were higher than ever reported prior to the pandemic, and peaked at 7.0 cases per 100,000 bed-days in January to March 2021. The reasons for this increase are still being investigated, but what is clear is that these trends coincided with a rise in the percentage of hospital-onset bacteraemia cases who were also positive for COVID-19. Data for the most recent quarter suggests that the count and rate of hospital-onset infection may be returning to pre-COVID-19 pandemic levels.

When comparing to the same period in the previous year (April to June 2020) care should be taken as it is still a comparison with a quarter under the influence of the COVID-19 pandemic. A comparison to the same period in 2019 (April to June 2019), which is a more typical year prior to the pandemic, shows a 6.1% decrease in both the count in all reported cases from 1,068 to 1,003 and a 6.3% decrease in the rate from 7.6 to 7.1 cases per 100,000 population. Hospital-onset *P. aeruginosa* case counts decreased 17.1% from 398 to 330, which corresponds to a decrease in the incidence rate of 8.4% from 4.6 to 4.2 per 100,000 bed-days. Community-onset *P. aeruginosa* cases stayed approximately the same at 670 to 673 respectively, while the community-onset incidence rate remained the same at 4.8 per 100,000 population (figure 3a, 3b and table S3).

There is evidence of seasonality in the incidence of all-reported *P. aeruginosa* bacteraemia cases, with the highest rates normally observed in July to September of each year.

Figure 3a: Quarterly rates of all reported *P. aeruginosa* bacteraemia: April to June 2017 to April to June 2021

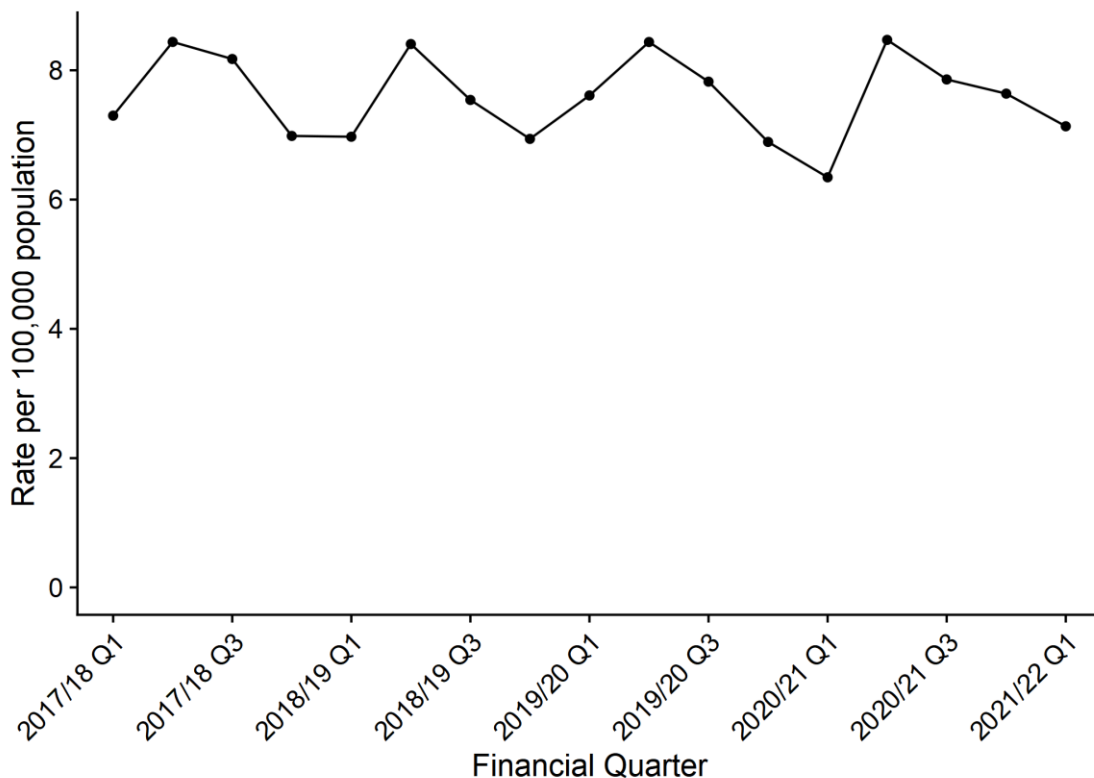
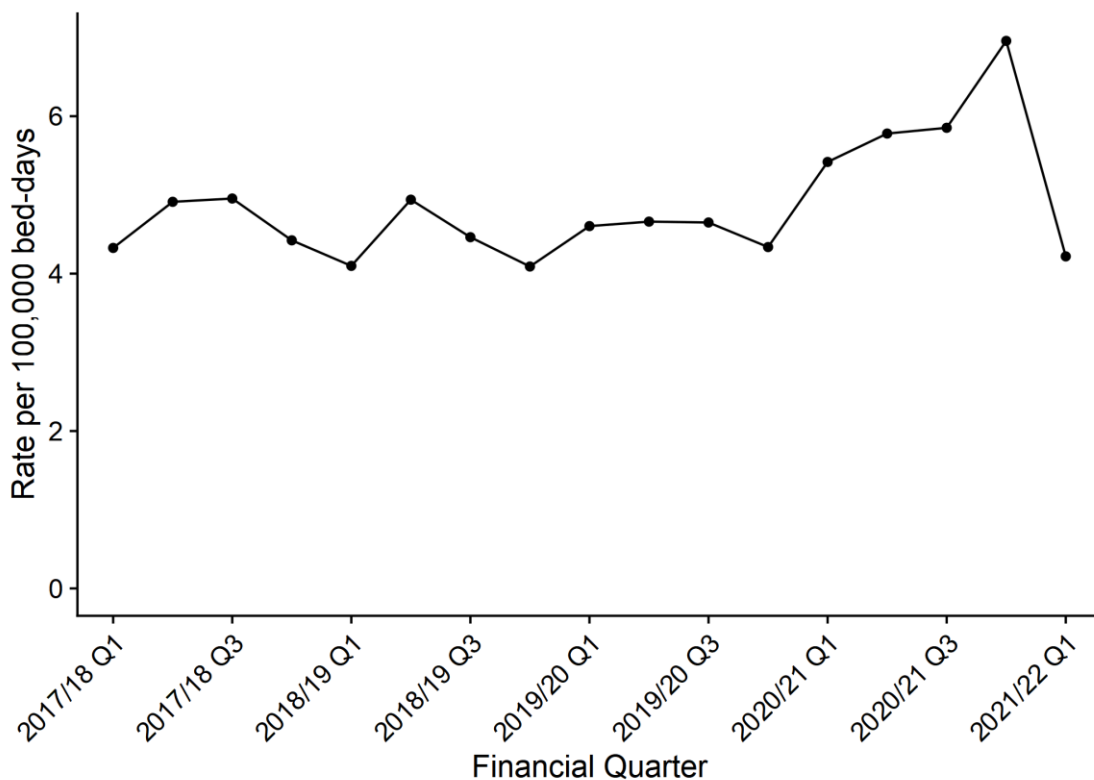


Figure 3b: Quarterly rates of hospital-onset *P. aeruginosa* bacteraemia: April to June 2017 to April to June 2021



Epidemiological analyses of *Staphylococcus aureus* bacteraemia data

MRSA bacteraemia

There has been a considerable decrease in the incidence rate of all reported MRSA bacteraemia since the enhanced mandatory surveillance of MRSA bacteraemia began in April 2007 (figures 4a, table S4a). The incidence rate of all reported cases fell by 85% from 10.2 cases per 100,000 population in April to June 2007 to 1.5 cases per 100,000 in January to March 2014. The rate has fluctuated between 0.6 and 1.8 since then and is currently at 1.0 cases per 100,000 population in April to June 2021.

A similar trend was observed with the incidence rate of hospital-onset cases (figures 4b, table S4a). There was a steep decrease of 79.0% from 4.9 cases per 100,000 bed-days in April to June 2008 to 1.0 January to March 2014. Subsequently, between January to March 2014 and April to June 2021, the rate has decreased to 0.6 cases per 100,000 bed-days. Within this period there have been fluctuations of hospital-onset cases overtime and similar to *Klebsiella* spp. and *P. aeruginosa*, the counts and rate of hospital-onset peaked at 1.5 cases per 100,000 bed-days in January and March 2021. This was the highest rate seen for hospital-onset MRSA bacteraemia since April to June 2011. The reasons for this increase are still being investigated, but what is clear is that these trends coincided with a rise in the percentage of hospital-onset bacteraemia cases who were also positive for COVID-19.

A comparison to the same period in 2019 (April to June 2019), which is a more typical year prior to the pandemic, shows a 19.3% decrease in counts from 181 to 146 in April to June 2021, and a decline in the incidence rate of 19.5% from 1.3 to 1.0 cases per 100,000 population. Community-onset MRSA bacteraemia cases decreased by 24.0% from 129 to 98, while the rate decreased 24.2% from 0.9 to 0.7 cases per 100,000 population (table 4a). The count of hospital-onset MRSA bacteraemia cases decreased 7.7%, although caution is required as this was only a decline of four cases from 52 to 48. The corresponding incidence hospital-onset rate remained stable at 0.6 per 100,000 bed-days (figure 4a and 4b).

Figure 4a: Quarterly rates of all reported MRSA bacteraemia: April to June 2007 to April to June 2021

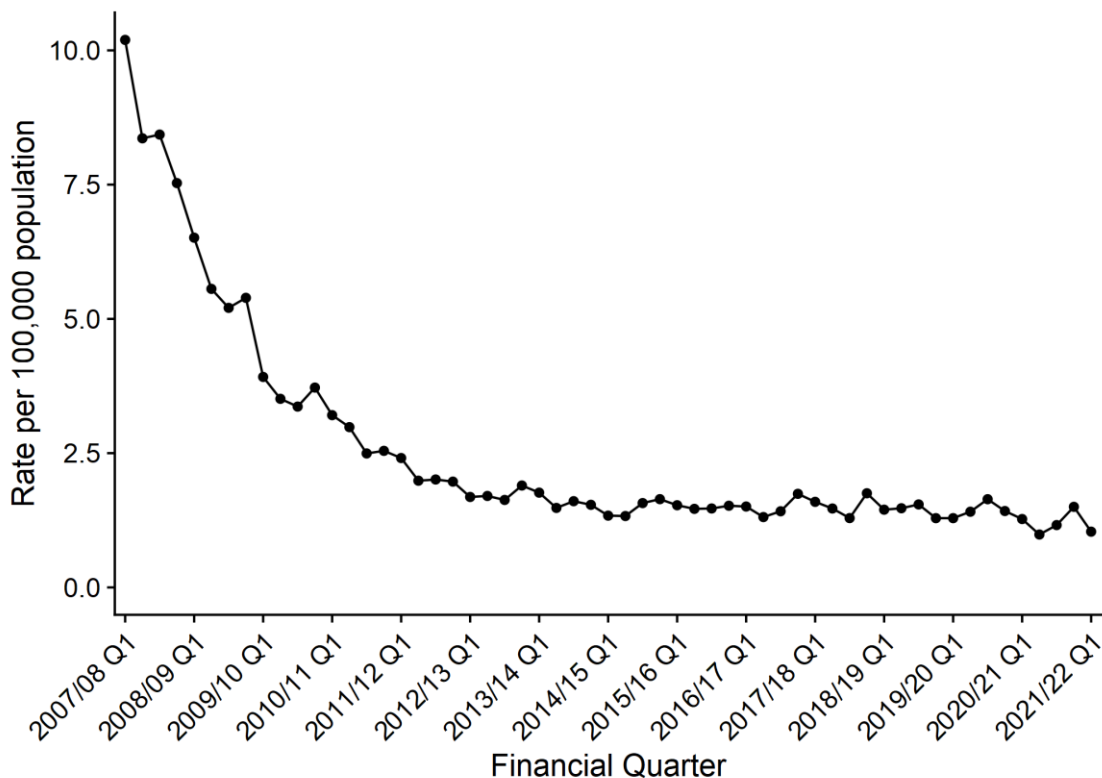
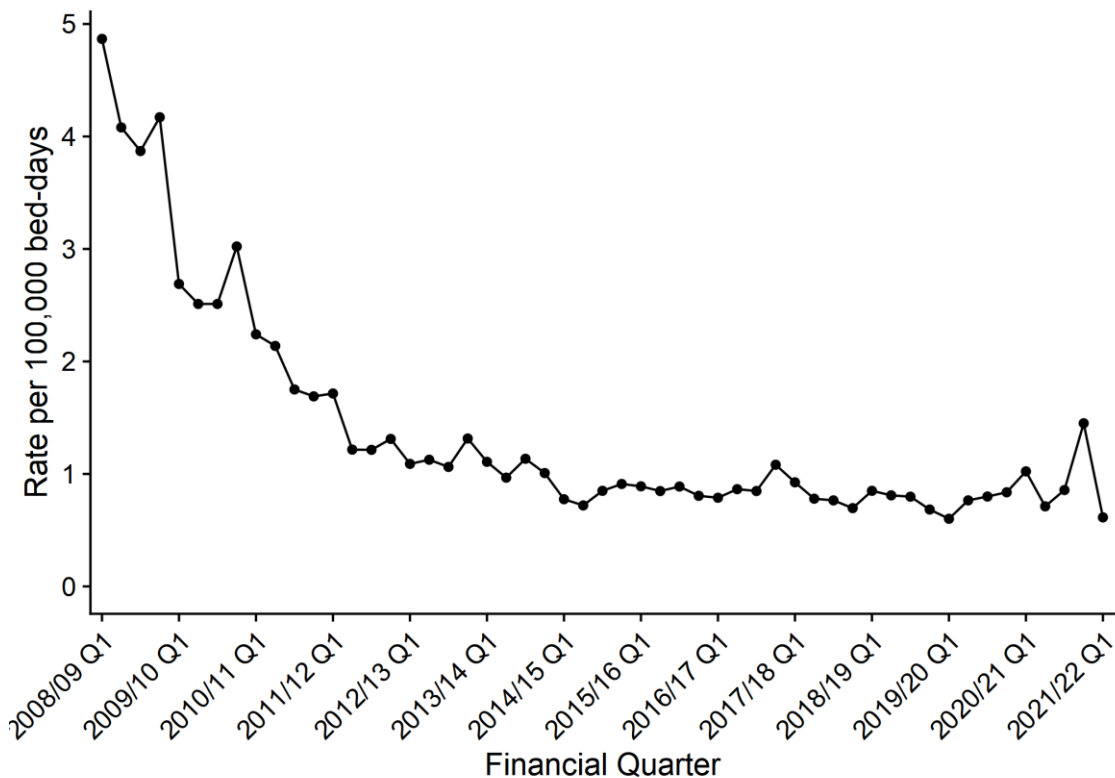


Figure 4b: Quarterly rates of hospital-onset MRSA bacteraemia: April to June 2008 to April to June 2021



MSSA bacteraemia

Since the mandatory reporting of MSSA bacteraemia began in January 2011 there has been a general trend of increasing counts and incidence rates of cases. The count of all reported cases of MSSA bacteraemia increased by 36.2% from 2,199 to 2,996 between January to March 2011 and April to June 2021. This was accompanied by a 26.9% increase in incidence rate from 16.8 to 21.3 per 100,000 population (figure 5a, table S5).

These increases are primarily driven by the increase in community-onset cases. Between January 2011 and April to June 2021, the count and the incidence rate of community-onset cases increased by 46.6% and 36.5% respectively from 1,464 to 2,146 cases and from 11.2 to 15.3 cases per 100,000 population. Over the same period, the count of hospital-onset cases increased by 15.6% from 735 to 850 cases, while the hospital-onset incidence rate increased 30.4% from 8.3 to 10.9 cases per 100,000 bed-days (figure 5a and 5b, table S5a). Since the beginning of the COVID-19 pandemic there has generally been lower numbers of all reported MSSA cases and since July to September 2020, a contrasting increase in hospital-onset cases. The overall reduction is, in part, a result of reduced hospital activity and this caused a large increase in the hospital-onset rate over a relatively short time, as hospital activity data is used as a denominator for rate calculations. This culminated in a peak during January to March 2021 of 13.4 cases per 100,000 bed-days, which was the highest MSSA hospital-onset rate that has been observed since the inception of MSSA surveillance. This pattern is similar to that observed in both *Klebsiella* spp. and *P. aeruginosa*. Furthermore, MSSA has had a sharp decline in the rate of hospital-onset cases in April to June 2021 compared to January to March 2021, although the rate remains higher than it was in the pre-pandemic period.

A comparison to the same period in 2019 (April to June 2019), which is a more typical year prior to the pandemic, shows a 2.0% decrease in the counts of all reported cases from 3,058 to 2,996 and a decrease in the rate from 21.8 to 21.3 cases per 100,000 population. Hospital-onset MSSA bacteraemia cases remained stable at 850 although due to the reduction in hospital activity, this corresponds to an increase in the incidence rate increase of 10.7% from 9.8 to 10.8 per 100,000 bed-days. Community-onset MSSA bacteraemia cases decreased 2.9% from 2,209 to 2,146, while the rates decreased 3.0% from 15.7 to 15.3 per 100,000 population.

Figure 5a: Quarterly rates of all reported MSSA bacteraemia: January to April 2011 to April to June 2021

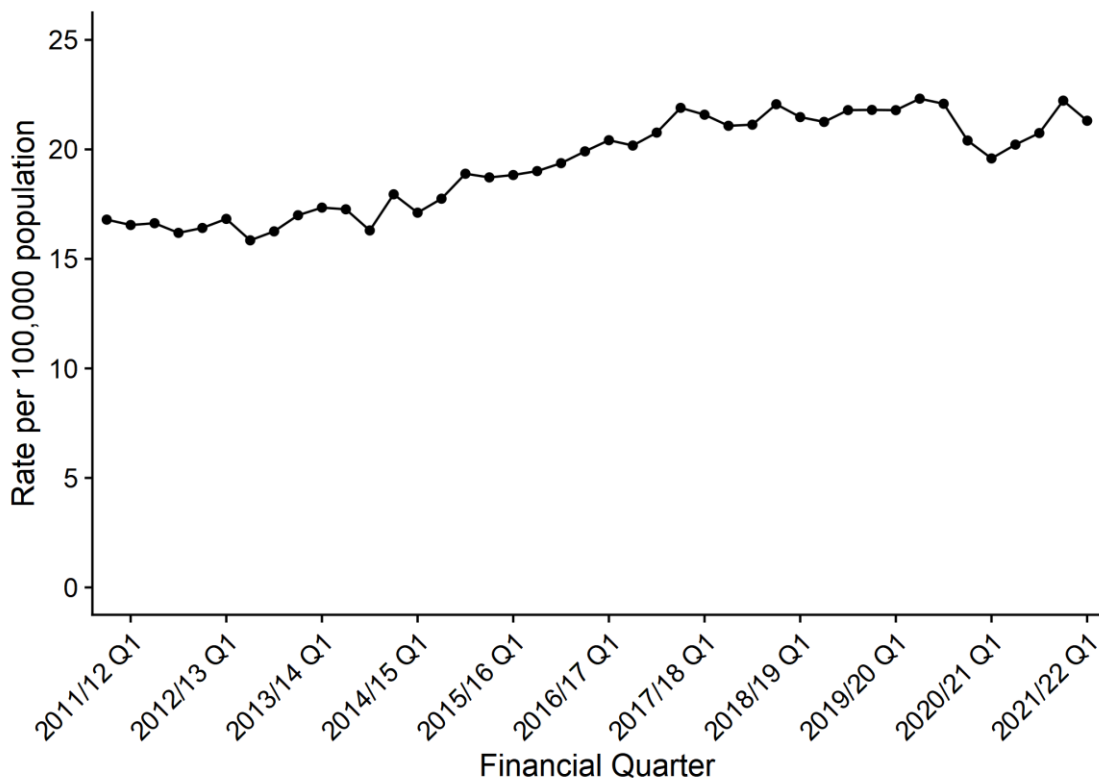
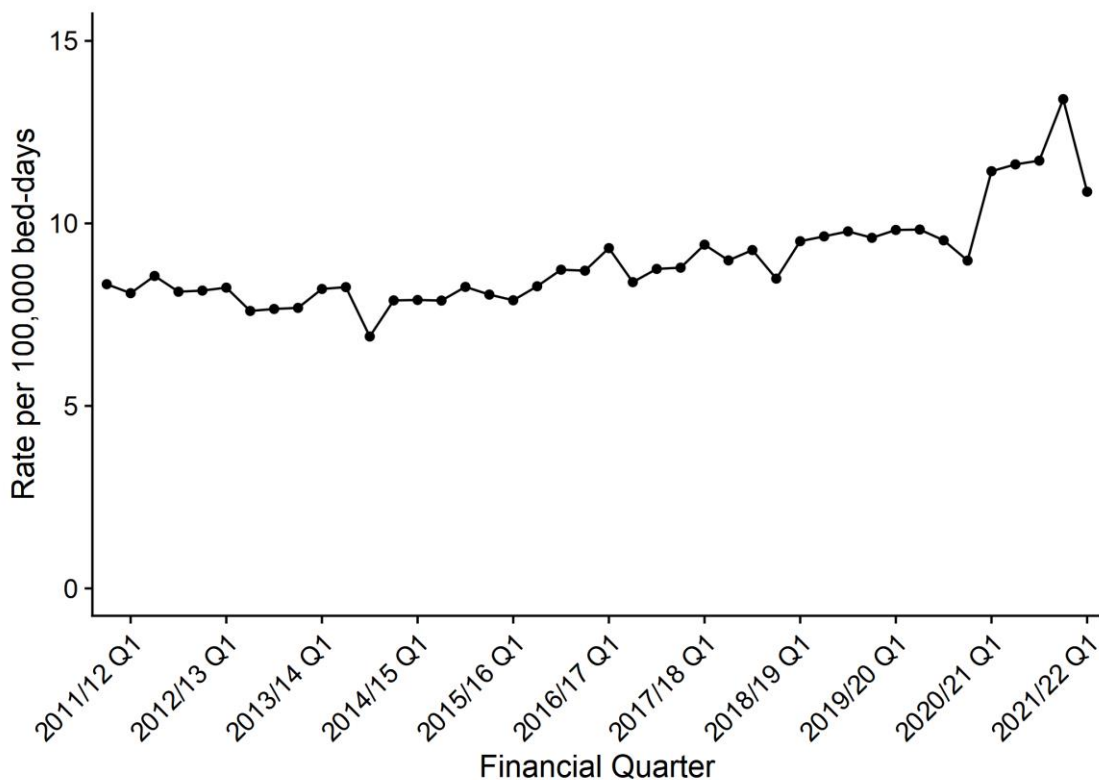


Figure 5b: Quarterly rates of hospital-onset MSSA bacteraemia: January to April 2011 to April to June 2021



Epidemiological analyses of *Clostridioides difficile* infection data

Since the initiation of *C. difficile* (CDI) surveillance in April 2007, there has been an overall decrease in the count and incidence rate of both all-reported and hospital-onset cases of CDI (figure 6a, 6b and table S6).

A large part of the decrease in the incidence rate occurred between April to June 2007 and January to March 2012 with a 78% decrease in all-reported cases of CDI from 16,864 to 3,711 cases and an associated 79% reduction in incidence rate from 131.6 cases per 100,000 population to 27.9. Subsequently, between January to March 2012 and April to June 2021, the count of all-reported cases decreased by 5.7% from 3,711 to 3,499 cases and the incidence rate reduced by 10.8% from 27.9 to 24.9 cases per 100,000 population.

There were similar, but greater, reductions among hospital-onset CDI cases with an 85.0% reduction in count of cases between April to June 2007 and January to March 2012 from 10,436 to 1,613 cases and 84.0% reduction in the incidence rate from 112.5 to 18.2 per 100,000 bed-days. This was followed by a further 23.2% decrease in the count of cases from 1,613 to 1,239 cases and a decrease of 12.4% in the incidence rate from 18.1 cases per 100,000 bed-days to 15.8 between January to March 2012 and April to June 2021.

Comparing the most recent quarter (April to June 2021) to the same period in the pre-pandemic period (April to June 2019) shows a 13.1% increase in the count of all reported cases from 3,093 to 3,499, while the incidence rate also increased 12.9% from 22.0 cases per 100,000 population to 24.9. Hospital-onset CDI cases increased 15.1% from 1,076 to 1,239 which corresponds to an incidence rate increase of 27.3% from 12.4 cases per 100,000 bed-days to 15.8. Community-onset CDI cases increased 12.0% from 2,017 to 2,260 while the rate increased from 14.7 to 16.1 per 100,000 population (figure 6a and 6b).

Figure 6a: Quarterly rates of all reported *C. difficile*: April to June 2007 to April to June 2021

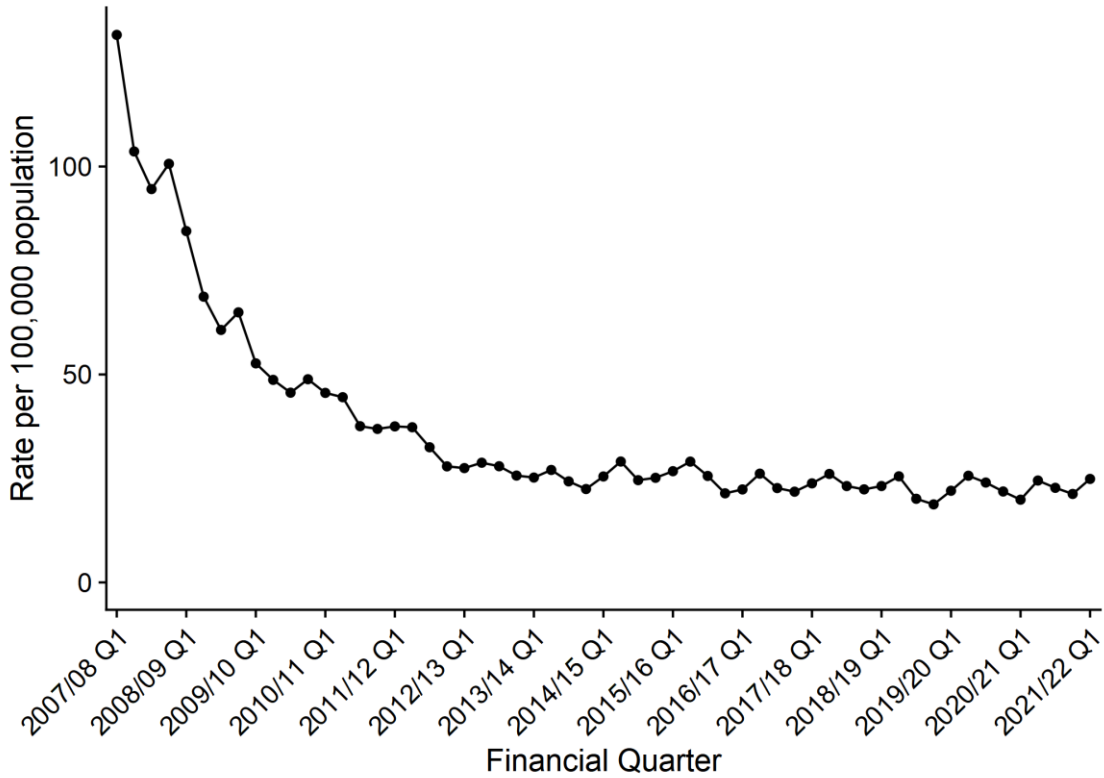
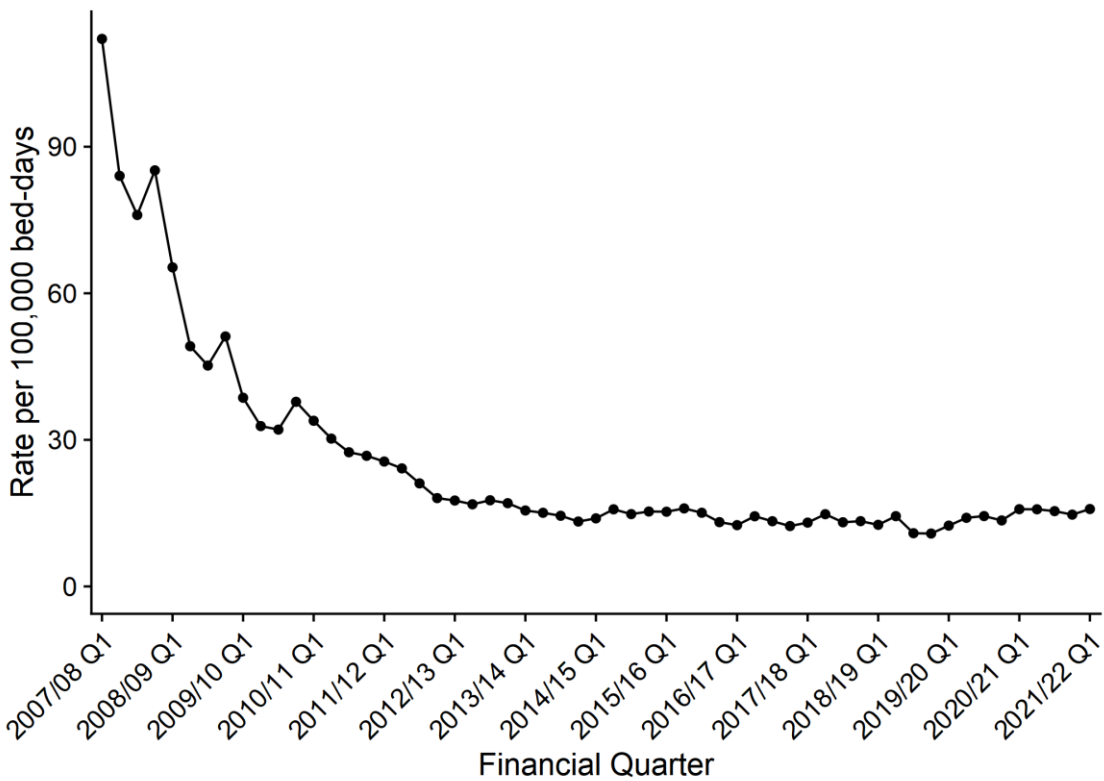


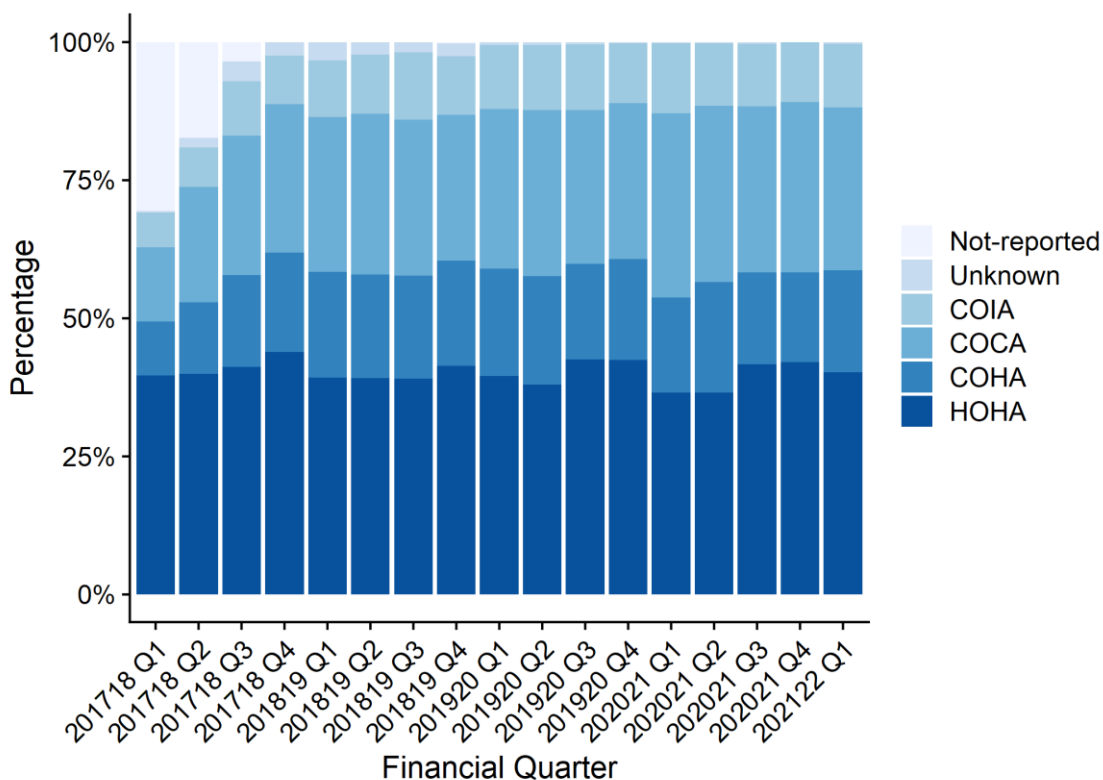
Figure 6b: Quarterly rates of hospital-onset *C. difficile*: April to June 2007 to April to June 2021



From April 2017, the HCAI DCS has included questions relating to prior trust exposure to the same acute trust reporting the CDI case. These additional, mandatory, items help align English CDI surveillance with definitions used by the European Centre for Disease Prevention and Control (ECDC) and Centres for Disease Control and Prevention (CDC) in the USA. Cases are now categorised as: Healthcare-Onset, Healthcare Associated (HOHA), Community-Onset, Healthcare Associated (COHA), Community-Onset, Indeterminate Association (COIA) or Community-Onset, Community Associated (COCA). Cases where prior admission details were recorded as ‘Don’t know’, are assigned as ‘Unknown’ and those with missing information as ‘Not-reported’.

Between April to June 2018 and April to June 2021 the largest proportion of cases were HOHA. While there have been some fluctuations, the proportion has remained broadly stable at around 40% of all cases. Over the same period, COCA cases increased from 26.9% to 34.6% of all CDI. COHA cases have increased from 19.1% to 21.5% of all CDI. COIA cases have increased from 10.2% to 13.4% of all CDI. Much of the increase observed is likely due to improved data quality as shown by the sharp decline of cases with missing data (figure 7 table S7).

Figure 7: CDI rates by prior trust exposure April 2017 to April to June 2021



Appendix

Bed-day data

For 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 rate rates (assigned and apportioned). As of Q1 2011 to 2012, [bed-day data](#) has been available on a quarterly basis and has been used as such for Q2 2011/2012 to Q1 2021/2022.

Amendments to the published figures on KH03 included the following.

However, UKHSA has reviewed its policy for processing KH03 data. Data irregularities identified have been flagged with colleagues at NHS England (data owners of the KH03 data set). Until we receive confirmation that any identified change in the occupied overnight bed-days for an acute trust is anomalous, UKHSA now uses the data as published in the KH03 data set. This affects all reports published since 1 December 2015 and incidence rate rates published prior that time will differ slightly as a result. For the KH03 data used to calculate rates included in this report to be consistent over the full-time period, previously amended KH03 data for trust United Lincolnshire Hospitals (RWD) for FY 2014/2015 has been altered to reflect that published in the KH03 data set. Please note that this could lead to slight differences in hospital-onset/assigned rates when compared with publications prior to 1 December 2015.

Missing data for acute trusts in the KH03 returns will continue to be processed as before, where the KH03 return for the same quarter from the previous year will be used as a proxy. The following acute trusts were thus affected:

- Moorfields Eye Hospital NHS Foundation Trust (RP6) 2007/2008 and 2008/2009 KH03 figures: replaced with 2006/2007 KH03 figure
- Rotherham NHS Foundation Trust (RFR): 2009/2010 and April - June 2010 to April - June 2011 KH03 figures: replaced with 2008/2009 KH03 figure
- Sheffield Teaching Hospitals NHS Foundation Trust (RHQ) April - June 2010 to April - June 2011 KH03 figures: replaced with 2009/2010 KH03 data
- The Princess Alexandra Hospital NHS Trust (RQW) April - June 2014 and October - December 2014 KH03 figures: replaced with April - June 2013 to October - December 2013 KH03 figures, respectively
- Ipswich Hospital NHS Trust (RGQ) January - March 2016 KH03 figure: replaced with January - March 2015 figures
- West Suffolk NHS Foundation Trust (RGR) April - June 2016 to October - December 2016 and April - June 2017 KH03 figures: replaced with April - June 2015 to October - December 2015 KH03 figures

- Gloucestershire Hospitals NHS Foundation Trust (RTE) October - December 2016 to January - March 2017 KH03 figures: replaced with October - December 2015 to January- March 2016 KH03 figures

The KH03 data used for this report was published on 19 August 2021. This includes revisions of previously published KH03 data and so these data may differ from those used in earlier reports.

Population data

National incidence rates are calculated using 2007 to 2019 mid-year resident population estimates which are based on the 2011 census for England (2020 estimates are based on 2019 mid-year estimates).

Definitions

Bacteraemia hospital-onset (trust-apportioned) cases

Include patients who are (i) in-patients, day-patients, emergency assessment patients or not known; AND (ii) have had their specimen taken at an acute trust or not known; AND (iii) specimen was taken on or after day 3 of the admission (admission date is considered day 'one'). Cases that do not meet these criteria are categorised as community-onset (not-trust apportioned).

CDI hospital-onset (trust-apportioned) cases

Include patients who are (i) in-patients, day-patients, emergency assessment patients or not known; AND (ii) have had their specimen taken at an acute trust or not known; AND (iii) specimen was taken on or after day 4 of the admission (admission date is considered day 'one'). Cases that do not meet these criteria are categorised as community-onset (not-trust apportioned).

Historically, reports published before September 2017 have used the term 'trust- apportioned' to describe cases meeting the above conditions for apportionment and 'not trust-apportioned' for those that do not. Moving forward, these terminologies have been updated to 'hospital-onset' and 'community-onset' respectively. Please note that this is simply a change in terminology and does not constitute a change in the methodology for apportionment.

Prior trust exposure

From April 2017, reporting trusts were asked to provide information on whether patients with CDI had been admitted to the reporting trust within the 3 months prior to the onset of the current case. This allows a greater granulation of the healthcare association of cases.

Cases are split into one of 6 groups:

1. Hospital-onset healthcare-associated: Date of onset is > 2 days after admission (where day of admission is day 1).
2. Community-onset healthcare-associated: Date of onset is ≤ 2 days after admission and the patient was admitted to the trust in the 4 weeks prior to the current episode.
3. Community-onset indeterminate association: Date of onset is ≤ 2 days after admission and the patient was admitted in the previous 12 weeks, but not the previous 4 weeks prior to the current episode.
4. Community-onset community-associated: Date of onset is ≤ 2 days after admission and the patient had not been admitted to the trust in the previous 12 weeks prior to the current episode.
5. Unknown 3 months: The reporting trust answered, "Don't know" to the question regarding admission in the 3 months prior to the current episode.
6. All unknown: The reporting trust did not provide any answer for questions on prior admission.

Total reported cases

This is the total count of infections for each organism as of the date of extraction. Please note that for *C. difficile*, this count excludes those from patients less than 2 years old.

Episode duration

The length of an infection episode is defined as 14 days for MRSA, MSSA, *E. coli*, *Klebsiella* spp. and *P. aeruginosa* bacteraemia and 28 days for CDI, with the date of specimen being considered day 'one'.

Incidence rate calculations

MRSA, MSSA and *E. coli*, *Klebsiella* spp., *P. aeruginosa* bacteraemia, and CDI population incidence rate (episodes per 100,000):

This incidence rate is calculated using the mid-year England population and is

$$= \frac{n \text{ episodes}}{\left(\frac{\text{mid-year population for England}}{\text{days in quarter}} \right)} \times 100,000$$

MRSA, MSSA and *E. coli*, *Klebsiella* spp., *P. aeruginosa* and CDI hospital-onset incidence:

This incidence rate is calculated using KH03 average bed-day activity (see [bed-day](#) data above) and is calculated as follows:

$$= \frac{\text{n episodes}}{\text{average KH03 beds per day} \times \text{days in quarter}} \times 100,000$$

Graphs and percentage change calculation

Please note that percentage changes in rate have been calculated using raw rate figures while those presented in the tables and commentary have been rounded to one decimal place. Similarly, graphs included in this report were plotted using raw rates figures. The raw rate figures are included in the accompanying [Quarterly Epidemiological Commentary's accompanying data](#).

Quarters

In publications prior to March 2016, all references to quarterly data are based on calendar year definitions and NOT financial year definitions, that is:

- Q1 2014: April to June 2014
- Q2 2014: April to June 2014
- Q3 2014: July to September 2014
- Q4 2014: October to December 2014

However, for all subsequent publications, including this one, all references to quarterly data are based on financial year definitions and not calendar year definitions, that is:

- Q1 2014/2015: April to June 2014
- Q2 2014/2015: July to September 2014
- Q3 2014/2015: October to December 2014
- Q4 2014/2015: April to June 2015

About the UK Health Security Agency

The UK Health Security Agency is an executive agency, sponsored by the [Department of Health and Social Care](#).

www.ukhsa.gov.uk

© Crown copyright 2021

For queries relating to this document, please contact: Mandatory.Surveillance@phe.gov.uk

Published: October 2021

Publishing reference: GOV-10037



You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v3.0. To view this licence, visit [OGL](#). Where we have identified any third-party copyright information you will need to obtain permission from the copyright holders concerned.



UKHSA supports the UN
Sustainable Development Goals

