Public Health England

Protecting and improving the nation's health

Annual commentary on MRSA, MSSA and Gram-negative bacteraemia and *Clostridioides difficile* infections from Independent Sector healthcare organisations in England

April 2019 to March 2020

Experimental statistics

About Public Health England

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Public Health England
Wellington House
133-155 Waterloo Road
London SE1 8UG
Tel: 020 7654 8000

www.gov.uk/phe
Twitter: @PHE_uk
Facebook: www.facebook.com/PublicHealthEngland

Prepared by: Olisaeloka Nsonwu, Sobia Wasti, Graeme Rooney, Dimple Chudasama, Simon Thelwall and Russell Hope
For queries relating to this document, please contact: IndependentSector@phe.gov.uk

Published November 2020
PHE publications
gateway number: GW-1680

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Executive summary

Between 1 April 2019 and 31 March 2020, four cases of MRSA bacteraemia, 34 cases of MSSA bacteraemia, 149 cases of *E. coli* bacteraemia, 79 cases of *Klebsiella* spp. bacteraemia, 43 cases of *P. aeruginosa* bacteraemia and 81 cases of *Clostridioides difficile* infections (CDI) were reported by Independent Sector (IS) healthcare providers.

Ten of 25 IS healthcare organisations had bed occupancy data. Among IS providers with occupancy data, the highest incidence rate was in *E. coli* bacteraemia (6.9 per 100,000 bed days plus discharges, n = 146), while the lowest rate was in MRSA bacteraemia (0.2, n= 4). Incidence rates for the other infections were; *Klebsiella* spp. bacteraemia (3.6, n= 76), CDI (3.3, n= 70), *P. aeruginosa* bacteraemia (2.0, n= 42) and MSSA bacteraemia (1.5, n= 32).

These figures include all cases reported by the IS and does not take into account whether or not the infection was thought to be associated with the Independent Sector organisation. Below is a summary of key differences between the NHS and IS which should be considered (Table 1)

Table 1: Summary of key differences between the NHS and IS

Independent Sector Organisations	NHS acute trusts
Data are not classified based on onset of the bacteraemia of infection.	Data are categorised into “Hospital-onset” and “Community-onset” cases. “Hospital-onset” cases are those thought to have been associated with a given NHS Trust during a given hospital admission.
Primarily elective patient-mix	Broad patient-mix including emergency-based treatments
Constantly changing facility list	Mainly static list of providers
Large number of specialist facilities	Mainly general acute facilities
Organisations may comprise geographically diverse hospitals	Mainly local clusters of hospitals
Rates calculated using bed-days plus discharges due to the high proportion of day cases compared to the NHS	Rates calculated using bed-days (occupied beds at midnight[1])

1 Inpatient bed-days figures are available here: https://www.england.nhs.uk/statistics/statistical-work-areas/bed-availability-and-occupancy/bed-data-overnight

Introduction

This report is the latest in a series of publications of HCAI surveillance data on MRSA, MSSA and Gram-negative (*E. coli*, *Klebsiella* spp. and *P. aeruginosa*) bacteraemia and *Clostridioides difficile* (CDI) reported by IS healthcare organisations to PHE. IS healthcare organisations providing regulated activities[2] undertake surveillance on HCAIs and report identified cases to PHE as specified in the Code of Practice[3].

Patient level data is provided to PHE via the secure Data Capture System (DCS) and the data for this publication was extracted on 01 October 2020.

Presentation of data:

- counts and rates (per 100,000; calculated using bed days and discharges) of MRSA, MSSA, *E. coli*, *Klebsiella* spp. and *P. aeruginosa* bacteraemia and CDI are presented by IS organisation[4] for the 12-month period 1 April 2019 and 31 March 2020
- the modified IS denominator (bed days plus discharges) is provided for the most recent financial year available (April 2019 to March 2020) as an indication of the size of each facility
- the hospital type (large hospital, small hospital[5], NHS treatment centre, diagnostic centre seeing mainly day case patients and women's health) is listed for the hospital(s) within a group; this indicates the type of service(s) provided[6]. This is correct as at 22 September 2020 as supplied to PHE

Additional information can be found in the accompanying OpenDocument Spreadsheet. Some IS organisations included in the data tables may have not been reporting for the entire period. Such hospitals are included in Appendix 2. Cases amongst renal patients have been excluded pending a separate publication.

2 See: http://www.legislation.gov.uk/uksi/2010/781/contents/made

3 The Health and Social Care Act 2008 (2010). Code of Practice on the prevention and control of infections and related guidance. Department of Health. Gateway Reference: 14808

4 An IS organisation can comprise a group of hospitals owned by one company or a single hospital. It is possible to identify a group versus a hospital using the "number of hospitals in organisation" field

5 Large hospital: >49 beds, small hospital: <50 beds

6 Where a group comprises more than one hospital type, all types are listed

Interpreting the data

What the data shows:

- counts and rates of all reported cases of MRSA bacteraemia by Independent Sector Healthcare Organisation; April 2019 to March 2020 (Table T1)
- counts and rates of all reported cases of MSSA bacteraemia by Independent Sector Healthcare Organisation; April 2019 to March 2020 (Table T2)
- counts and rates of all reported cases of *E. coli* bacteraemia by Independent Sector Healthcare Organisation; April 2019 to March 2020 (Table T3)
- counts and rates of all reported cases of *Klebsiella* spp. bacteraemia by Independent Sector Healthcare Organisation; April 2019 to March 2020 (Table T4)
- counts and rates of all reported cases of *P. aeruginosa* bacteraemia by Independent Sector Healthcare Organisation; April 2019 to March 2020 (Table T5)
- counts and rates of all reported cases of CDI by Independent Sector Healthcare Organisation; April 2019 to March 2020 (Table T6)

What the data does not provide:

- the data does not provide a basis for comparisons between different IS organisations due to their variable size and range (case mix) of patients seen
- the data does not provide a basis for reliable comparison of these infections between the NHS and IS organisations.

A full discussion of these issues is presented elsewhere[7]

Specific data caveats

Below is a list of specific caveats to be considered in relation to the published data.

Data quality

Not all IS organisations have signed off their data or submitted data for the reporting period. Data for such organisations may not yet be finalised and therefore may not be

7 The reasons behind this are discussed in Commentary on Reporting of *C. difficile* infections and MRSA bacteraemia from the Independent Sector, published 2009

accurate. IS organisations that have not signed off their data for the time period are highlighted in the accompanying OpenDocument Spreadsheet.

Duplicate entries

Data entered onto the DCS by the NHS and IS are collected in two parallel systems. This means that data on a single case may be entered by either an NHS trust or an IS organisation or both. Data has only been de-duplicated against the NHS dataset for cases reported via the DCS. If a case is reported by an IS provider and an NHS acute trust, the IS case is excluded as a duplicate entry in the following scenario:

- if the NHS case was reported with a patient location of “NHS acute trust”, and the IS case was reported with a patient location that is not “IS provider”
- if the NHS case was reported with a patient location of “NHS acute trust”, and the IS case was reported with a patient location of “IS provider” but has a specimen date within 14 days (28 days for CDI) prior to the NHS case

Cases are only de-duplicated if they are reported by both IS providers and NHS acute trusts, and are within the same episode length; 14 days for bacteraemia and 28 days for CDI. Multiple cases reported by one IS provider or by multiple IS providers only are not de-duplicated. Additionally, NHS number, which is one of the variables used to de-duplicate records, is not always known for patients treated in the IS, so potential duplicate records entered onto the DCS may not be identified.

Organisational changes

Some IS organisations included in the data tables may have not been open for the entire reporting period, whilst others may have closed over this time. This may reduce the count of these infections in such IS organisations, compared to those that were open for the whole period. However, this will also be reflected in their bed occupancy data, so any rate calculated still has validity over the shorter period. Such organisations are listed in Appendix 2.

Results

25 organisations are included in this report, 11 of which are groups of more than one hospital and the remaining 14 are single hospitals. Occupancy data8 was available for ten organisations. Individual rates for these organisations are included in the accompanying OpenDocument Spreadsheet

MRSA bacteraemia (Table T1)

A total of four cases were reported from April 2019 to March 2020 by the following organisations; The London Clinic [two cases]; BUPA Cromwell Hospital and HCA International [one case each].

Among IS providers that submitted their modified inpatient bed-days data, the incidence rate of MRSA bacteraemia for April 2019 to March 2020 was 0.2 cases (n=4) per 100,000 bed days plus discharges.

MSSA bacteraemia (Table T2)

34 cases were reported from April 2019 to March 2020 by the following organisations; HCA International [15 cases]; The London Clinic [eight cases]; BMI Healthcare (GHG) and BUPA Cromwell Hospital [three cases each]; Ramsay Health Care UK and Spire Healthcare [two cases each]; Aspen Healthcare [one case].

Among IS providers that provided their modified inpatient bed-days, the incidence rate of MSSA bacteraemia for April 2019 to March 2020 was 1.5 cases (n=32) per 100,000 bed days plus discharges.

E. coli bacteraemia (Table T3)

149 cases were reported from April 2019 to March 2020 by the following organisations; HCA International [77 cases]; The London Clinic [25 cases]; Nuffield Health [14 cases]; BUPA Cromwell Hospital [13 cases]; BMI Healthcare (GHG) [nine cases]; Aspen Healthcare [four cases]; Spire Healthcare [three cases]; Ramsay Health Care UK and Royal Hospital for Neuro-disability [two cases each].

Among IS providers that provided their modified inpatient bed-days, the incidence rate of *E. coli* bacteraemia for April 2019 to March 2020 was 6.9 cases (n=146) per 100,000 bed days plus discharges.

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8 Inpatient bed-days plus discharges. See Appendix 2 for further details

Klebsiella spp. bacteraemia (Table T4)

79 cases were reported from April 2019 to March 2020 by the following organisations; HCA International [44 cases]; The London Clinic [14 cases]; BMI Healthcare (GHG) and BUPA Cromwell Hospital [seven cases each]; Spire Healthcare [three cases]; Nuffield Health [two cases]; Aspen Healthcare and Royal Hospital for Neuro-disability [one case each].

Among IS providers that provided their modified inpatient bed-days, the incidence rate of *Klebsiella* spp. bacteraemia for April 2019 to March 2020 was 3.6 cases (n=76) per 100,000 bed days plus discharges.

Pseudomonas aeruginosa bacteraemia (Table T5)

43 cases were reported from April 2019 to March 2020 by the following organisations; HCA International [28 cases]; The London Clinic [nine cases]; BUPA Cromwell Hospital [three cases]; BMI Healthcare (GHG) [two cases]; Spire Healthcare [one case].

Among IS providers that provided their modified inpatient bed-days, the incidence rate of *P. aeruginosa* bacteraemia for April 2019 to March 2020 was 2.0 cases (n=42) per 100,000 bed days plus discharges.

CDI (Table T6)

81 cases were reported from April 2019 to March 2020 by the following organisations; HCA International [39 cases]; BMI Healthcare (GHG) [nine cases]; Royal Hospital for Neuro-disability, Spire Healthcare and The London Clinic [seven cases each]; Nuffield Health [five cases]; BUPA Cromwell Hospital and The Kent Institute of Medicine & Surgery (KIMS) [two cases each]; King Edward VII Sister Agnes, Ramsay Health Care UK and The Hospital of St John & St Elizabeth [one case each].

Among IS providers that provided their modified inpatient bed-days, the incidence rate of *P. aeruginosa* bacteraemia for April 2019 to March 2020 was 3.3 cases (n=70) per 100,000 bed days plus discharges.

Appendix

Appendix 1: How to calculate bed-day plus discharge denominator

The denominator we intend to use, which is more appropriate for shorter stay hospitals is:

Bed-days in year + discharges in year

Instead of counting the number of midnights the patient was resident for, this counts the number of different days on which they were in the hospital. A day case will count 1, a one night stay in the year will count 2.

The methodology for calculating the two components are listed below. These are then summed to create the denominator.

Bed-days in the financial year April 2019 to March 2020

This is the sum of the number of occupants in a bed each midnight during the year:

Number in a bed at midnight at the end of the day 1 April 2019 + … +
Number in a bed at midnight at the end of the day 31 March 2019.

If it is being derived from admission dates and discharge dates, you work out the contribution that each patient makes to the year's bed-days by a formula.

The only patients who can contribute a bed-day to that financial year are those who are admitted **strictly before 1 April 2020** and discharged strictly **on or after 1 April 2019**. That is, the latest date they could have been admitted was 31 March 2020 and the earliest date they could have been discharged was 1 April 2019.

For these we work out:

Discharge date or 1 April 2020 (whichever is earlier)
MINUS
Admission date or 1 April 2019 (whichever is later)

then add up over all the patients.

This counts the number of bed-days the patient contributes to the year.

If the patient is still in hospital and does not yet have a discharge date then the first expression should be taken as 1 April 2020.

Discharges in the financial year April 2019 to March 2020

This is the number of patients with a discharge date between 1 April 2019 and 31 March 2020 ie:

Number of patients discharged on 1 April 2019 + … +
Number discharged on 31 March 2020

It should include any day cases that took place during the year.

Examples of bed-day and discharge calculations

Scenario 1

If a patient was admitted on 17 March 2019 and discharged on 1 April 2019 they will contribute

Bed-days in April 2019 to March 2020: 0

Discharges in April 2019 to March 2020: One

Scenario 2

If a patient was admitted on 17 March 2019 and discharged on 2 April 2019 they will contribute

Bed-days in April 2019 to March 2020: One

Discharges in April 2019 to March 2020: One

Scenario 3

If a patient was admitted on 1 April 2019 and discharged on 1 April 2019 they will contribute

Bed-days in April 2019 to March 2020: 0

Discharges in April 2019 to March 2020: One

Scenario 4

If a patient was admitted on 1 April 2019 and discharged on 3 April 2019 they will contribute

Bed-days in April 2019 to March 2020: Two

Discharges in April 2019 to March 2020: One

Scenario 5

If a patient was admitted on 17 March 2019 and discharged on 1 April 2020 they will contribute

Bed-days in April 2019 to March 2020: 366

Discharges in April 2019 to March 2020: 0

Scenario 6

If a patient was admitted on 1 April 2019 and discharged on 23 April 2020 they will contribute

Bed-days in April 2019 to March 2020: 366

Discharges in April 2019 to March 2020: 0

Scenario 7

If a patient was admitted on 31 March 2020 and discharged on 23 April 2020 they will contribute

Bed-days in April 2019 to March 2020: One

Discharges in April 2019 to March 2020: 0

Scenario 8

If a patient was admitted on 23 April 2020 and discharged on 23 April 2020 they will contribute

Bed-days in April 2019 to March 2020: 0

Discharges in April 2019 to March 2020: 0

Scenario 9

If a patient was admitted on 1 March 2020 and discharged on 19 June 2020 they will contribute:

Bed-days =

Minimum of (discharge date, 1 April 2020) - maximum of (admission date, 1 April 2019)

= 1 April 2020 - maximum (1 March 2020, 1 April 2019)

= 1 April 2020 - 1 March 2020

= 31 days

Discharges = 0

Figures provided should be aggregated for each organisation (where an organisation owns more than hospital or facility) or for the individual hospital if an organisation comprises one hospital or facility.