



UK Health
Security
Agency

Quarterly laboratory surveillance of acquired carbapenemase-producing Gram-negative bacteria in England: October 2020 to March 2023

Health Protection Report

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Background

Since 1 October 2020, all diagnostic laboratories in England have a duty to notify the following via UKHSA's Second Generation Surveillance System (SGSS):

- acquired carbapenemase-producing Gram-negative bacteria identified in human samples
- the results of any antimicrobial susceptibility test and carbapenem resistance mechanism in any of the causative agents listed in [Schedule 2 of the Health Protection \(Notifications\) Regulations 2010](#)

This requirement was launched in conjunction with the national [Framework of actions to contain carbapenemase-producing Enterobacterales \(CPE\)](#) which sets out a range of measures that, if implemented well, will help health and social care providers minimise the impact of CPE.

The analyses below are based on data relating to notifications of confirmed acquired carbapenemase-producing Gram-negative bacteria between 1 October 2020 and 31 March 2023 in England. The data was extracted on 17 May 2023 from both UKHSA's voluntary surveillance database, SGSS, and the [Antimicrobial Resistance and Healthcare-Associated Infections \(AMRHAI\) Reference Unit](#) database.

Rates of acquired carbapenemase-producing Gram-negative bacteria were calculated using [mid-year resident population estimates](#) for the respective year and geography. Geographical analyses were based on the patient's residential postcode. Where this information was unknown, the postcode of the patient's General Practitioner was used. Failing that, the postcode of the reporting laboratory was used. Cases in England were further assigned to one of nine local areas, formed from the [administrative local authority boundaries](#).

As patients may have more than one positive specimen taken, specimens taken from the same patient that yielded growth of the same pathogen and carbapenemase within a 52-week period from the initial positive sterile site specimen, screening site specimen or other specimen type (grouped together), were regarded as comprising the same episode and were de-duplicated. Carbapenemase-producing Gram-negative bacteria referred isolates and local laboratory isolates were combined for this de-duplication process, with resistance mechanism results from the AMRHAI Reference Unit retained preferentially where patient specimen overlap occurred. This method differs slightly from the [weekly causative agent notification data](#), where data is not de-duplicated incorporating specimen type. In addition, the data presented in the weekly notification reports utilises SGSS reports only.

The following report summarises trends and geographical distribution of carbapenemase mechanisms identified from Gram-negative bacteria in human samples. Species, mechanism, sample type, and age and sex of patients are also described. For the purposes of this report, quarters are calendar quarters, as such January to March is referred to as 'Q1', April to June is referred to as 'Q2', July to September is referred to as 'Q3' and October to December is referred to as 'Q4', alongside relevant years.

Microbiology services

For reference services, including species identification and confirmation of susceptibility testing results, laboratories should contact UKHSA's Antimicrobial Resistance and Healthcare Associated Infections (AMRHAi) Reference Unit in Colindale, London.

Table 1 summarises the carbapenemase gene families that are targeted using the routine PCR applied to referred Enterobacterales, *Pseudomonas* spp. and *Acinetobacter* spp. that are suspected of harbouring an acquired carbapenemase gene. UKHSA strongly recommends that all diagnostic laboratories are able to detect at least the 4 carbapenemase families in bold (the 'big 4') using either PCR or immunochromatographic methods.

Where an 'exceptional' carbapenemase and species combination result (cells without a ¥ symbol in Table 1) has been identified, or where an unusual organism has been identified with an acquired carbapenemase (that is, any bacterial genera other than a member of the Enterobacterales, *Pseudomonas* spp. or *Acinetobacter* spp.), isolates should be sent to the AMRHAi Reference Unit for confirmation.

Table 1. Distribution of carbapenemase genes covered by AMRHAI Reference Unit molecular assay (based on AMRHAI data) [note 1]

Carbapenemase family	Associated with common 'host' organism <i>Enterobacterales</i>	Associated common 'host' organism <i>Pseudomonas</i> spp.	Associated with common 'host' organism <i>Acinetobacter</i> spp.
KPC	¥	<10 ^D	<10 ^D
OXA-48-like	¥	<10 ^D	0
NDM	¥	¥	¥
VIM	¥	¥	<10 ^D
IMP	¥	¥	¥
IMI/NMC-A	¥ ^B	0	0
GES	¥	¥	<10 ^D
FRI	<10	0	0
SME	<10 ^{CD} ¥	0	0
DIM	0	<10 ^D	0
GIM	<10 ^D	0	0
SIM	0	<10 ^D	0
SPM	0	<10 ^D	0
OXA-23-like	<10 ^D	0	¥
OXA-40-like	0	0	¥
OXA-51-like ^A	0	0	¥
OXA-58-like	0	0	¥

Notes to Table 1

Note 1. Table 1 uses the following symbols:

¥ = combinations of mechanism and species would not be considered as exceptional results.

A = intrinsic to *A. baumannii* and only expressed when associated with an insertion element.

B = almost exclusively reported in *Enterobacter* spp. with less than a handful of reports in other genera.

C = reported only in *Serratia marcescens*.

D = fewer than 10 in total ever referred to AMRHAI Reference Unit.

Recent developments

In Q1 2023, AMRHAI detected the second known instance of GIM carbapenemase in a clinical isolate referred to the national reference laboratory. The isolate was identified as *Pseudomonas aeruginosa* originating from the blood of an inpatient. This isolate was referred by the same diagnostic laboratory as the previous GIM-producing isolates (See: [Quarterly laboratory surveillance of acquired carbapenemase-producing Gram-negative bacteria in England: October 2020 to December 2022](#)) but no links between the 2 inpatients have been identified.

Samples from unusual combinations of organism and mechanism should be referred to the AMRHAI reference unit for confirmation.

Follow up of such unusual drug/bug combinations has shown that some were due to mixed cultures or reporting errors.

Specimen type

Between October 2020 and March 2023, there were 7,254 acquired carbapenemase-producing Gram-negative bacteria episodes. The majority were identified in screening samples, accounting for 68.9% of carbapenemase notifications, with only 5.1% reported in sterile site specimens (Table 2).

Table 2. Number and percentage of acquired carbapenemase-producing Gram-negative bacterial episodes by specimen type (England): October 2020 to March 2023

Specimen type	All reports number	All reports percentage [note 4]	From AMRHAI number	From AMRHAI percentage [note 4]
Sterile site samples	371	5.1	138	10.2
Screening samples	5,000	68.9	646	47.6
Other samples [note 3]	1,883	26.0	573	42.2
All samples	7,254	100.0	1,357	100.0

Notes to Table 2

Note 2. The AMRHAI Reference Unit actively encourages submission of sterile site isolates for carbapenemase confirmation; the distribution of specimen type will reflect this.

Note 3. Samples that do not fall into either 'sterile site' or 'screening' samples, for example, urine and lower respiratory tract specimens.

Note 4. The percentages presented in this table are column percentages, with the breakdown of specimen types shown for all reports and AMRHAI reports separately.

Quarterly trends

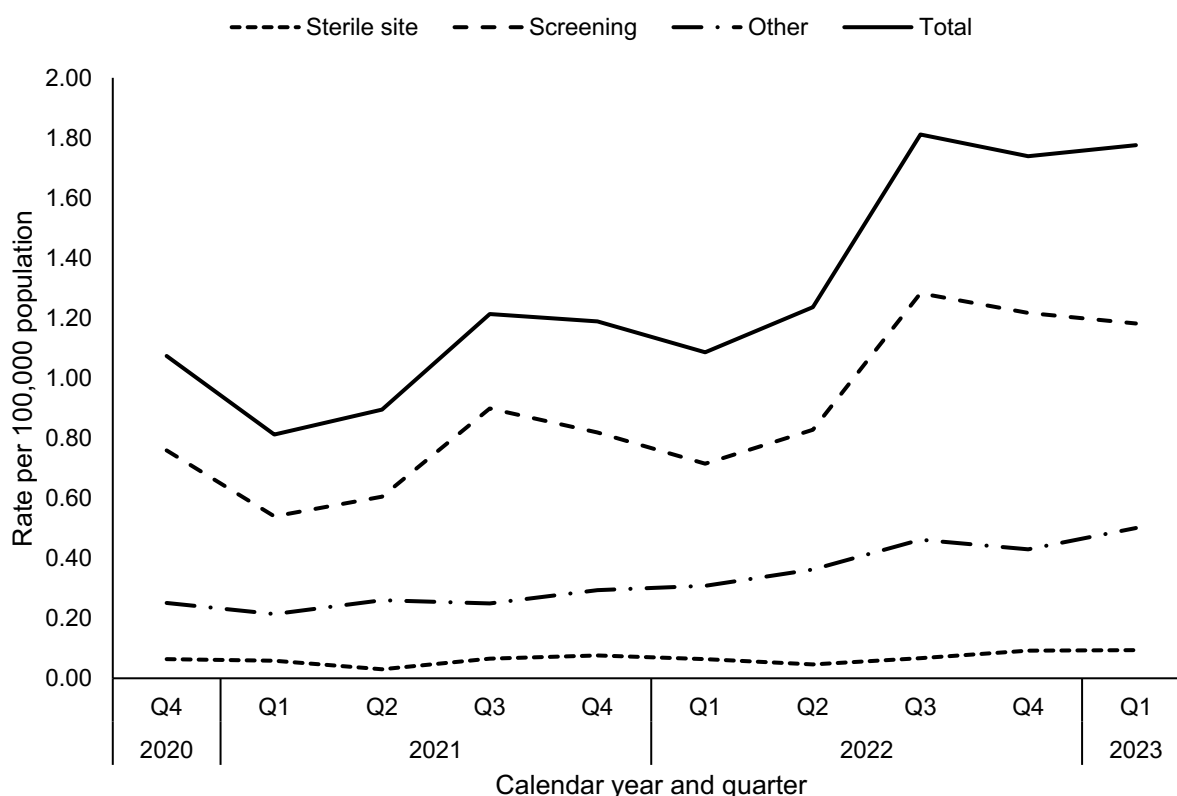
The quarterly rate of acquired carbapenemase-producing Gram-negative bacterial episodes between October 2020 and March 2023 is shown in Figure 1. For all specimen types grouped together, the quarterly rate was 1.43 episodes per 100,000 population.

This quarter has maintained the same rate of carbapenemase-producing Gram-negative bacterial episodes (1.78 per 100,000 population) since the rise observed in Q3 2022 (to 1.81 per 100,000 population); all previous quarters reported below 1.24 per 100,000 population. This rise was predominantly due to increases among screening and other samples, with the number of sterile site isolates remaining relatively stable (Figure 1). Most of this increase appears to correlate with increased detection relating to screening following localised hospital outbreaks.

Quarterly changes in rate of episodes may reflect an uptake in screening following changes to screening policy rather than an actual increase in incidence. Furthermore, as there are only 10 quarters of notification data, it is too early to conclude that there may be any seasonality, particularly in light of the COVID-19 pandemic, where quarterly changes may be affected by COVID-19 'waves' seen during this period or associated with local carbapenemase-producing Gram-negative bacteria outbreaks.

The remaining data summaries in this report consider all samples grouped together.

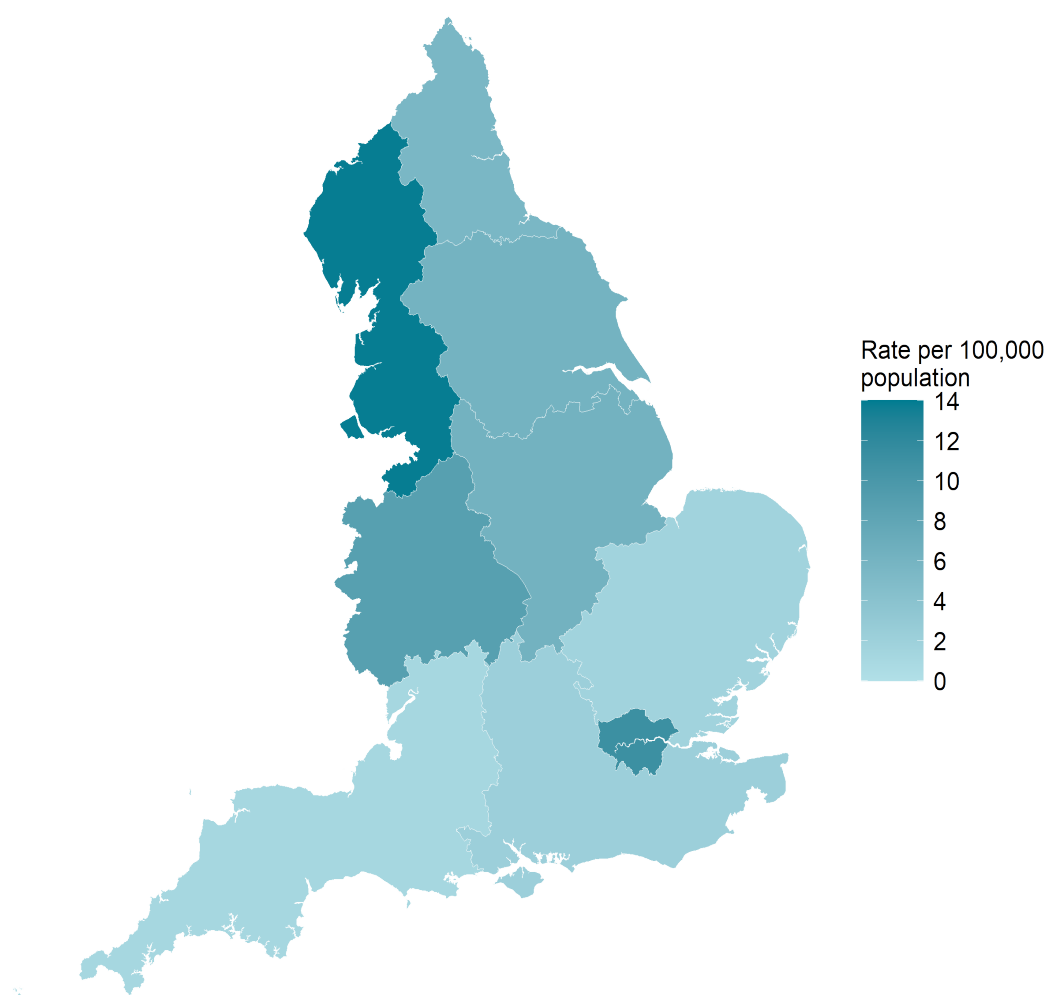
Figure 1. Rate of acquired carbapenemase-producing Gram-negative bacteria episodes by specimen type and quarter (England): October 2020 to March 2023



Geographic distribution

The rate of acquired carbapenemase-producing Gram-negative bacterial episodes varied by Office for National Statistics (ONS) region (Figure 2), with the highest overall rate between April 2022 and March 2023 reported in the North West (13.86 episodes per 100,000 population), followed by the London region (11.12 episodes per 100,000 population). The lowest incidence across the last year was reported in the East of England and South West regions (1.69 and 1.17 episodes per 100,000 population, respectively).

Figure 2. Geographical distribution of acquired carbapenemase-producing Gram negative bacterial incidence rates per 100,000 population (England): April 2022 to March 2023 [note 5]



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Notes to Figure 2

Note 5. The region geography is based on the laboratory location and linked to the ONS data for regions.

The rate of acquired carbapenemase-producing Gram-negative bacterial episodes for each ONS region by calendar quarter is shown in Table 3.

The rate of bacterial episodes in all ONS regions decreased from Q4 2022 to Q1 2023 in all regions except London and the North East. A large increase was noted in London, where the rate increased from 2.58 to 3.84 per 100,000 population – the highest since the start of mandatory reporting. The increase in London was only seen in screening samples. In the North East, the bacterial episode rate rose from 1.32 in Q4 2022 to 1.93 episodes per 100,000 population in Q1 2023. Whilst the rate of bacterial episodes in all ONS regions decreased in all other regions from Q4 2022 to Q1 2023, the rates remained elevated in Q1 2023 compared to the same quarter in previous years for most regions.

Table 3. Rate per 100,000 population of acquired carbapenemase-producing Gram-negative bacterial episodes by ONS region (England): October 2020 to March 2023

ONS region	Q4 2020 rate	Q1 2021 rate	Q2 2021 rate	Q3 2021 rate	Q4 2021 rate	Q1 2022 rate	Q2 2022 rate	Q3 2022 rate	Q4 2022 rate	Q1 2023 rate
East Midlands	1.00	0.66	0.84	1.15	1.00	1.17	1.33	2.62	1.35	0.96
East of England	0.36	0.28	0.19	0.08	0.43	0.17	0.27	0.52	0.50	0.39
London	2.13	1.47	1.65	2.15	1.72	1.88	2.07	2.63	2.58	3.84
North East	0.42	0.76	0.98	1.13	1.59	1.06	0.72	1.59	1.32	1.93
North West	2.22	1.58	1.91	2.44	1.98	2.69	2.64	3.95	3.76	3.52
South East	0.34	0.19	0.20	0.30	0.52	0.33	0.42	0.54	0.66	0.62
South West	0.28	0.14	0.28	0.18	0.16	0.19	0.19	0.33	0.37	0.28
West Midlands	1.70	1.48	1.16	2.49	2.69	1.21	1.76	2.00	2.82	2.25
Yorkshire and The Humber	0.42	0.53	0.66	0.71	0.71	0.71	1.19	1.93	1.68	1.35

Geographical differences in carbapenemase family

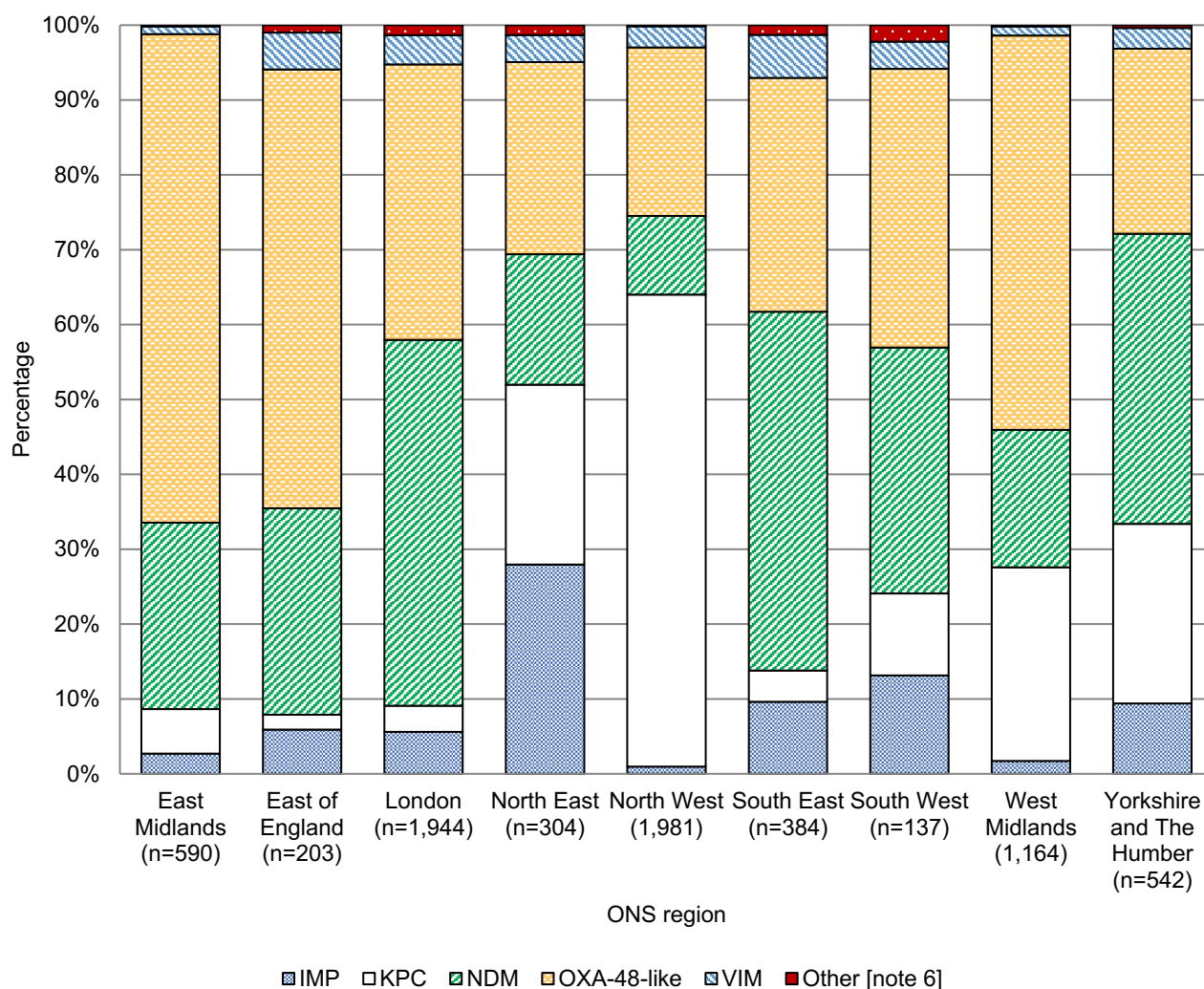
Between October 2020 and March 2023, the most common carbapenemase families reported across all regions were OXA-48-like (36.7%), NDM (28.5%), and KPC (26.1%). However, similarly to the incidence of episodes, the distribution of carbapenemase families identified also varied regionally (Figure 3).

In the North West, which had the highest incidence rate, the most common carbapenemase families identified were KPC (63.0%) and OXA-48-like (22.5%). KPC was not as common in any of the other regions, accounting for fewer than 25.9% of episodes in each region. For example, in London, which also had a high overall incidence rate, KPC accounted for 3.5% of episodes with NDM and OXA-48-like carbapenemases dominating (48.9% and 36.8%, respectively).

Another regional difference was observed in the North East, where IMP was the most commonly identified carbapenemase family (28.0%), only accounting for a small percentage of episodes in other regions (fewer than 13.1%). However, given the small number of carbapenemases reported in some regions, the diversity of carbapenemases reported is likely to be strongly impacted by individual outbreaks. In the 2 regions that had the lowest incidence rates, the most common carbapenemase family was OXA-48-like (58.6% in the East of England and 37.2% in the South West, respectively).

The distribution of carbapenemase families within each ONS region also varied by quarter. For example, the most common carbapenemase family identified in the North East was predominantly NDM in Q1 2023 but in Q4 2022 it was predominantly KPC; however, for both quarters the majority were identified in screening samples.

Figure 3. Geographical distribution of acquired carbapenemase-producing Gram-negative bacterial episodes by carbapenemase family (England): October 2020 to March 2023



Notes to Figure 3

Note 6. Other carbapenemase families include GES, GIM, IMI, OXA-23 and SME.

Distribution of species and carbapenemase family

The most frequently isolated Gram-negative bacterial species with a confirmed acquired carbapenemase was *Klebsiella pneumoniae*, accounting for 32.9% of all specimens. This was followed by *Escherichia coli* and *Enterobacter* spp., which accounted for 31.0% and 17.9% of all specimens, respectively (Table 4).

The carbapenemase family most frequently identified in *K. pneumoniae* and *E. coli* isolates was OXA-48-like (39.8% and 41.0%, respectively) and in *Enterobacter* spp. isolates was KPC (30.6%). In *K. pneumoniae* and *E. coli* isolates, this was followed by KPC and NDM carbapenemase families (30.4% and 26.0% in *K. pneumoniae*, and 20.1% and 36.1% in *E. coli*, respectively), and in *Enterobacter* spp. this was followed by OXA-48-like (29.7%) and NDM (25.0%) carbapenemase families.

Aside from the 'big 5' carbapenemase families (KPC, OXA-48-like, NDM, VIM and IMP), the AMRHA1 Reference Unit also screens for rarer carbapenemase families, and it is recommended that all isolates suspected to produce a carbapenemase but negative for the 'big 5' carbapenemase families are referred to the AMRHA1 Reference Unit for further screening. Between October 2020 and March 2023, GES, GIM, IMI, OXA-23 and SME carbapenemases were identified in small numbers (24, 2, 21, 4 and 2, respectively), with only one isolate (GIM positive) being identified from an invasive specimen.

Table 4. Acquired carbapenemase-producing Gram-negative bacterial episodes by species and carbapenemase family (England): October 2020 to March 2023

Species	IMP no.	IMP %	KPC no.	KPC %	NDM no.	NDM %	OXA- 48- like no.	OXA- 48- like %	VIM no.	VIM %	Other no.	Other %	Total no.	Per cent of total per species
<i>Acinetobacter</i> spp. [note 7]	15	21.1	2	2.8	47	66.2	5	7.0	1	1.4	1	1.4	71	1.0
<i>Citrobacter</i> spp.	21	5.4	97	25.1	86	22.3	165	42.7	16	4.1	1	0.3	386	5.3
<i>Enterobacter</i> spp.	151	11.6	397	30.6	324	25.0	385	29.7	21	1.6	19	1.5	1,297	17.9
<i>Escherichia coli</i>	41	1.8	451	20.1	812	36.1	922	41.0	22	1.0	1	0.0	2,249	31.0
Other <i>Escherichia</i> spp.	0	0.0	6	33.3	6	33.3	6	33.3	0	0.0	0	0.0	18	0.2
<i>Klebsiella oxytoca</i>	13	5.6	126	53.8	18	7.7	71	30.3	6	2.6	0	0.0	234	3.2
<i>Klebsiella pneumoniae</i>	55	2.3	724	30.4	620	26.0	950	39.8	36	1.5	0	0.0	2,385	32.9
Other <i>Klebsiella</i> spp.	9	5.8	28	18.1	46	29.7	67	43.2	5	3.2	0	0.0	155	2.1
<i>Morganella</i> spp.	0	0.0	0	0.0	7	30.4	16	69.6	0	0.0	0	0.0	23	0.3
<i>Pseudomonas aeruginosa</i> [note 7]	50	21.0	10	4.2	65	27.3	12	5.0	80	33.6	21	8.8	238	3.3
Other <i>Pseudomonas</i> spp. [note 7]	7	14.9	5	10.6	9	19.1	4	8.5	21	44.7	1	2.1	47	0.6
<i>Serratia</i> spp.	0	0.0	1	4.0	5	20.0	16	64.0	1	4.0	2	8.0	25	0.3

Species	IMP no.	IMP %	KPC no.	KPC %	NDM no.	NDM %	OXA- 48- like no.	OXA- 48- like %	VIM no.	VIM %	Other no.	Other %	Total no.	Per cent of total per species
Other Enterobacterales [note 8]	3	2.5	43	36.1	25	21.0	40	33.6	6	5.0	2	1.7	119	1.6
Other Gram- negative bacteria [note 9]	2	28.6	1	14.3	2	28.6	2	28.6	0	0.0	0	0.0	7	0.1
Total	367	5.1	1,891	26.1	2,072	28.6	2,661	36.7	215	3.0	48	0.7	7,254	100.0

Notes to Table 4

Note 7. KPC and OXA-48-like in *Pseudomonas* spp. and OXA-48-like in *Acinetobacter* spp. are extremely rare, and results should be interpreted with caution. The numbers reported here have not been confirmed by the AMRHAI Reference Unit and laboratories identifying these unusual combinations should be referring such isolates to AMRHAI.

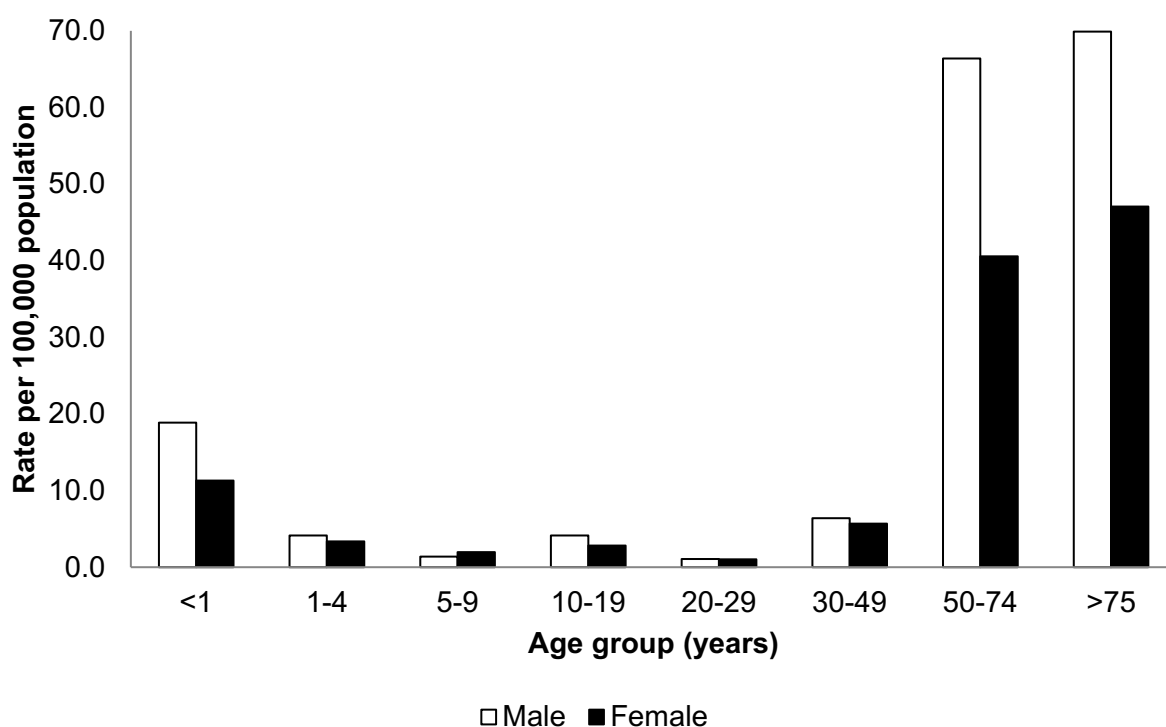
Note 8. Includes coliform, *Cronobacter* spp., *Hafnia* spp., *Kluyvera* spp., *Leclercia adecarboxylata*, *Lelliottia amnigena*, *Mixta calida*, *Pantoea* spp., *Phytobacter ursingii*, *Pluralibacter gergoviae*, *Proteus* spp., *Providencia* spp., *Raoultella* spp., and *Shigella* spp.

Note 9. The numbers reported here have not been confirmed by the AMRHAI Reference Unit and laboratories identifying these unusual combinations should be referring such isolates to AMRHAI.

Age and sex distribution

The rate of acquired carbapenemase-producing Gram-negative bacterial episodes was highest among the oldest and youngest members of the population. A similar age pattern was noted for both sexes, although overall the rate was higher in males compared to females (overall rates of 14.4 and 11.0 episodes per 100,000 population, respectively: Figure 4). This aligns with the age group and sex distribution noted in [previously published reports](#) on Gram-negative bacteraemia such as *E. coli*, *Klebsiella* spp., *P. aeruginosa* and *Enterobacter* spp.

Figure 4. Rate [note 10] of acquired carbapenemase-producing Gram-negative bacterial episodes per 100,000 population by age and sex [note 11] (England): October 2020 to March 2023



Notes to Figure 4

Note 10. Rates have been calculated using cumulative reports across all 10 quarters of reporting, and as such cannot be compared to previous quarters.

Note 11. Information about patient sex is only recorded in 98.4% of cases.

Figure 4 shows the acquired carbapenemase-producing Gram-negative bacterial incidence rates by age group, with the highest rate reported in those aged 75 years and over (57.4 per 100,000 population) followed by those aged 50 to 74 years old (53.9 per 100,000 population). The overall rate of confirmed carbapenemases was 16.2 per 100,000 population in infants less than one year old.

Quarterly mandatory laboratory return reporting (April 2022 to March 2023)

Table 5. Quarterly mandatory laboratory returns (QMLR) for the total number of rectal swabs and faecal screening specimens taken for CPE screening by acute trust type [note 12] (England): April 2022 to March 2023

Trust type [note 12]	Q2 2022 reported screens (%)	Q2 2022 total # screens	Q3 2022 reported screens (%)	Q3 2022 total # screens	Q4 2022 reported screens (%)	Q4 2022 total # screens	Q1 2023 reported screens (%)	Q1 2023 total # screens
Small (n=22)	13 (59.1)	2,993	12 (54.5)	3,799	14 (63.6)	4,483	10 (45.5)	5,231
Medium (n=21)	18 (85.7)	4,904	17 (81.0)	4,858	17 (81.0)	4,155	15 (71.4)	5,028
Large (n=24)	18 (75.0)	9,289	20 (83.3)	13,329	21 (87.5)	14,040	15 (62.5)	10,538
Multi-service (n=7)	6 (85.7)	2,046	7 (100.0)	2,116	7 (100.0)	1,887	6 (85.7)	1,676
Specialist (n=16)	10 (62.5)	3,674	10 (62.5)	4,267	10 (62.5)	4,220	9 (56.3)	3,845
Teaching (n=47)	38 (80.9)	82,538	38 (80.9)	86,742	36 (76.6)	71,951	25 (53.2)	28,581
Total	103 (75.2)	105,444	104 (75.9)	115,111	105 (76.6)	100,736	80 (58.4)	54,899

Notes to Table 5

Note 12. Trust type obtained through [NHS Digital Estate Return Information Collection](#) (ERIC).

Reporting of quarterly totals of rectal swabs and faecal specimens taken for CPE screening was added to the mandatory quarterly laboratory returns (QMLR) section of the HCAI DCS in October 2019, and reporting became mandatory in October 2020. Between April 2022 and March 2023, there were 376,190 screens reported by 111 NHS trusts leading to an overall trust reporting rate of 81.0% (Table 5). This means that across the 4 quarters, there were 162 instances where an NHS trust did not submit a return. Of the acute trusts that reported screening data, 4.5% reported that they conducted zero screens.

Between Q2 and Q4 2022, the number of trusts that reported screens was stable, but the total number of screens sharply decreased in Q1 2023 (105 trusts reporting 100,736 screens in Q4 2022 compared to 80 trusts reporting 54,899 screens in Q1 2023). Screening was more predominant in the acute teaching trusts, accounting for 71.7% of screening swabs taken during this time period. By reporting acute trust, the total screens reported for the quarter ranged from 0 to 8,018. The full list of reporting, including those that did not submit a return, is available in the data appendix by individual NHS acute trust.

Appendix

Table 1. QMLR returns for the total number of rectal swabs and faecal screening specimens taken for CPE screening by acute trust (England): April 2022 to March 2023

Trust name	Trust type	Q2 2022	Q3 2022	Q4 2022	Q1 2023
Airedale NHS Foundation Trust	Small	42	88	125	2161
Alder Hey Children's NHS Foundation Trust	Specialist	1,129	1,143	1,193	1,210
Ashford and St Peter's Hospitals NHS Foundation Trust	Medium	239	265	461	257
Barking, Havering and Redbridge University Hospitals NHS Trust	Teaching	1,122	1,185		
Barnsley Hospital NHS Foundation Trust	Small	35	38	30	43
Barts Health NHS Trust	Teaching	2,263	3,109	3,252	3,143
Bedfordshire Hospitals NHS Foundation Trust	Medium	122	125	161	109
Birmingham Women's and Children's NHS Foundation Trust	Specialist				
Blackpool Teaching Hospitals NHS Foundation Trust	Teaching	858	759	853	753
Bolton NHS Foundation Trust	Medium	396			
Bradford Teaching Hospitals NHS Foundation Trust	Teaching				
Buckinghamshire Healthcare NHS Trust	Multi-service	555	396	407	315
Calderdale and Huddersfield NHS Foundation Trust	Large	81	217	225	272
Cambridge University Hospitals NHS Foundation Trust	Teaching	1,692	1,627	1,815	1,719
Chelsea and Westminster Hospital NHS Foundation Trust	Teaching				
Chesterfield Royal Hospital NHS Foundation Trust	Small				

Trust name	Trust type	Q2 2022	Q3 2022	Q4 2022	Q1 2023
Countess of Chester Hospital NHS Foundation Trust	Small				
County Durham and Darlington NHS Foundation Trust	Multi-service	363	475	162	161
Croydon Health Services NHS Trust	Medium	527	400	272	493
Dartford and Gravesham NHS Trust	Small	296	309	217	
Doncaster and Bassetlaw Teaching Hospitals NHS Foundation Trust	Teaching	202	177	193	222
Dorset County Hospital NHS Foundation Trust	Small	8	13	3	
East and North Hertfordshire NHS Trust	Large	1,104	1,494	1,530	1,144
East Cheshire NHS Trust	Small				
East Kent Hospitals University NHS Foundation Trust	Teaching	348	426	312	328
East Lancashire Hospitals NHS Trust	Large	556	411	549	351
East Suffolk and North Essex NHS Foundation Trust	Large				
East Sussex Healthcare NHS Trust	Large			299	
Epsom and St Helier University Hospitals NHS Trust	Teaching	252	288	246	
Frimley Health NHS Foundation Trust	Large	795	745	757	679
Gateshead Health NHS Foundation Trust	Medium	4	22	15	
George Eliot Hospital NHS Trust	Small			254	
Gloucestershire Hospitals NHS Foundation Trust	Large	118	103	100	
Great Ormond Street Hospital For Children NHS Foundation Trust	Specialist	1,121	1,604	1,577	1,747

Trust name	Trust type	Q2 2022	Q3 2022	Q4 2022	Q1 2023
Great Western Hospitals NHS Foundation Trust	Medium	159	114	151	147
Guy's and St Thomas' NHS Foundation Trust	Teaching	395	433	492	
Hampshire Hospitals NHS Foundation Trust	Large	283	288	333	380
Harrogate and District NHS Foundation Trust	Small			84	109
Homerton Healthcare NHS Foundation Trust	Teaching	1,094	875	844	854
Hull University Teaching Hospitals NHS Trust	Teaching	184	309	209	211
Imperial College Healthcare NHS Trust	Teaching	21,853	20,088	19,472	
Isle of Wight NHS Trust	Multi-service	39	30	52	35
James Paget University Hospitals NHS Foundation Trust	Teaching	44	29	33	
Kettering General Hospital NHS Foundation Trust	Small	262	316	259	238
King's College Hospital NHS Foundation Trust	Teaching	10,418	10,622	9,679	
Kingston Hospital NHS Foundation Trust	Medium	54	113	88	100
Lancashire Teaching Hospitals NHS Foundation Trust	Teaching	264	501	591	596
Leeds Teaching Hospitals NHS Trust	Teaching	2,633	4,690	58	
Lewisham and Greenwich NHS Trust	Large	905	1572	1572	
Liverpool Heart and Chest Hospital NHS Foundation Trust	Specialist				
Liverpool University Hospitals NHS Foundation Trust	Teaching				
Liverpool Women's NHS Foundation Trust	Specialist				
London North West University Healthcare NHS Trust	Teaching	544	730	1040	
Maidstone and Tunbridge Wells NHS Trust	Large	308	314	297	293

Trust name	Trust type	Q2 2022	Q3 2022	Q4 2022	Q1 2023
Manchester University NHS Foundation Trust	Teaching				
Medway NHS Foundation Trust	Medium				
Mid and South Essex NHS Foundation Trust	Large				
Mid Cheshire Hospitals NHS Foundation Trust	Small				
Mid Yorkshire Hospitals NHS Trust	Large	167	134	137	95
Milton Keynes University Hospital NHS Foundation Trust	Teaching				
Moorfields Eye Hospital NHS Foundation Trust	Specialist	0	0	0	0
Norfolk and Norwich University Hospitals NHS Foundation Trust	Teaching	613	542	604	524
North Bristol NHS Trust	Large		112	85	
North Cumbria Integrated Care NHS Foundation Trust	Small	566	1,077	1,057	1,030
North Middlesex University Hospital NHS Trust	Teaching				
North Tees and Hartlepool NHS Foundation Trust	Medium	329	306	285	
North West Anglia NHS Foundation Trust	Large	143	168	172	151
Northampton General Hospital NHS Trust	Medium				
Northern Care Alliance NHS Foundation Trust	Teaching	669	801	859	804
Northern Lincolnshire and Goole NHS Foundation Trust	Medium	11	25	31	52
Northumbria Healthcare NHS Foundation Trust	Large	81	195	218	
Nottingham University Hospitals NHS Trust	Teaching	2,248	2,030	1,527	1,732
Oxford University Hospitals NHS Foundation Trust	Teaching	1,181	1,690	1,824	1,781
Portsmouth Hospitals University National Health Service Trust	Large	197	221	268	246
Queen Victoria Hospital NHS Foundation Trust	Specialist	6	0	0	0

Trust name	Trust type	Q2 2022	Q3 2022	Q4 2022	Q1 2023
Royal Berkshire NHS Foundation Trust	Large	812	1,895	1,994	1,497
Royal Cornwall Hospitals NHS Trust	Large	124	122	174	202
Royal Devon University Healthcare NHS Foundation Trust	Large	300	366	258	192
Royal Free London NHS Foundation Trust	Teaching	7,878	8,451		
Royal National Orthopaedic Hospital NHS Trust	Specialist	107	136	255	189
Royal Papworth Hospital NHS Foundation Trust	Specialist	59	48	75	99
Royal Surrey County Hospital NHS Foundation Trust	Medium	1,144	1,177	1,162	1,209
Royal United Hospitals Bath NHS Foundation Trust	Medium	145	110	160	303
Salisbury NHS Foundation Trust	Small				
Sandwell and West Birmingham Hospitals NHS Trust	Large	0	0	0	
Sheffield Children's NHS Foundation Trust	Specialist	11	79	54	111
Sheffield Teaching Hospitals NHS Foundation Trust	Teaching	812	1,212	1,135	1,127
Sherwood Forest Hospitals NHS Foundation Trust	Medium				
Somerset NHS Foundation Trust	Multi-service	784	826	853	854
South Tees Hospitals NHS Foundation Trust	Teaching	210	265	260	288
South Tyneside and Sunderland NHS Foundation Trust	Large				
South Warwickshire University NHS Foundation Trust	Medium	206	309	405	533
Southport and Ormskirk Hospital NHS Trust	Small	236			
St George's University Hospitals NHS Foundation Trust	Teaching	1,639	1,521	1,476	988
St Helens and Knowsley Teaching Hospitals NHS Trust	Teaching	1,419	1,580	1,491	1,274

Trust name	Trust type	Q2 2022	Q3 2022	Q4 2022	Q1 2023
Stockport NHS Foundation Trust	Medium	312	465	420	388
Surrey and Sussex Healthcare NHS Trust	Medium	132	167	177	252
Tameside and Glossop Integrated Care NHS Foundation Trust	Small	166	153	182	192
The Christie NHS Foundation Trust	Specialist				
The Clatterbridge Cancer Centre NHS Foundation Trust	Specialist				
The Dudley Group NHS Foundation Trust	Medium	44	86	24	40
The Hillingdon Hospitals NHS Foundation Trust	Small				
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	Teaching	647	666	539	670
The Princess Alexandra Hospital NHS Trust	Small	282	265	250	232
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	Small	193	220	211	219
The Robert Jones and Agnes Hunt Orthopaedic Hospital NHS Foundation Trust	Specialist	33	44	27	104
The Rotherham NHS Foundation Trust	Small	11	1	1	16
The Royal Marsden NHS Foundation Trust	Specialist	908	913	691	
The Royal Orthopaedic Hospital NHS Foundation Trust	Specialist	300	300	348	385
The Royal Wolverhampton NHS Trust	Large	1,019	1,847	2,401	2,219
The Shrewsbury and Telford Hospital NHS Trust	Medium	147	107	116	114
The Walton Centre NHS Foundation Trust	Specialist				
Torbay and South Devon NHS Foundation Trust	Multi-service	1	13	8	1

Trust name	Trust type	Q2 2022	Q3 2022	Q4 2022	Q1 2023
United Lincolnshire Hospitals NHS Trust	Large		950	597	743
University College London Hospitals NHS Foundation Trust	Teaching	918	967	902	957
University Hospital Southampton NHS Foundation Trust	Teaching	505	553	574	647
University Hospitals Birmingham NHS Foundation Trust	Teaching				
University Hospitals Bristol and Weston NHS Foundation Trust	Teaching	0			
University Hospitals Coventry and Warwickshire NHS Trust	Teaching	902	1,058	1,200	
University Hospitals Dorset NHS Foundation Trust	Teaching			229	170
University Hospitals of Derby and Burton NHS Foundation Trust	Teaching		256		
University Hospitals of Leicester NHS Trust	Teaching	6,842	7,352	8,011	8,018
University Hospitals of Morecambe Bay NHS Foundation Trust	Teaching	56	195	127	
University Hospitals of North Midlands NHS Trust	Teaching	8,962	8,893	8,988	
University Hospitals Plymouth NHS Trust	Teaching	405	473	808	919
University Hospitals Sussex NHS Foundation Trust	Teaching	441	542	487	526
Walsall Healthcare NHS Trust	Small	710	836	873	991
Warrington and Halton Teaching Hospitals NHS Foundation Trust	Teaching	285	334	290	272
West Hertfordshire Teaching Hospitals NHS Trust	Medium	724	825	0	836
West Suffolk NHS Foundation Trust	Small				
Whittington Health NHS Trust	Multi-service		64	79	
Wirral University Teaching Hospital NHS Foundation Trust	Teaching	1,669	1,457	1,486	

Trust name	Trust type	Q2 2022	Q3 2022	Q4 2022	Q1 2023
Worcestershire Acute Hospitals NHS Trust	Large	2,296	2,175	2,074	2,074
Wrightington, Wigan and Leigh NHS Foundation Trust	Medium	209	242	227	195
Wye Valley NHS Trust	Multi-service	304	312	326	310
Yeovil District Hospital NHS Foundation Trust	Small	186	483	937	
York and Scarborough Teaching Hospitals NHS Foundation Trust	Teaching	71	56	45	58

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