



UK Health  
Security  
Agency

# Quarterly laboratory surveillance of acquired carbapenemase-producing Gram-negative bacteria in England: October 2020 to December 2022

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 December 2022 in England. The data was extracted on 7 February 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 9 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 is utilising 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 <sup>D</sup>	<10 <sup>D</sup>
OXA-48-like	¥	<10 <sup>D</sup>	0
NDM	¥	¥	¥
VIM	¥	¥	<10 <sup>D</sup>
IMP	¥	¥	¥
IMI/NMC-A	¥ <sup>B</sup>	0	0
GES	¥	¥	<10 <sup>D</sup>
FRI	<10	0	0
SME	<10 <sup>CD</sup> ¥	0	0
DIM	0	<10 <sup>D</sup>	0
GIM	<10 <sup>D</sup>	0	0
SIM	0	<10 <sup>D</sup>	0
SPM	0	<10 <sup>D</sup>	0
OXA-23-like	<10 <sup>D</sup>	0	¥
OXA-40-like	0	0	¥
OXA-51-like <sup>A</sup>	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 Q4 2022, AMRHAI identified the first known instance of GIM carbapenemase in a clinical isolate referred to the national reference laboratory. The isolate was identified as a *Pseudomonas putida* group originating from the urine of an inpatient. Prior to referral of this isolate, GIM carbapenemase had only been identified in *Citrobacter freundii* isolated from environmental screening swabs [1]. GIM carbapenemase was first reported in *Pseudomonas aeruginosa* clinical isolates from Germany in 2002 [2] but has since been reported in *Acinetobacter* spp. and various genera of Enterobacterales. Enterobacterales, *Pseudomonas* spp. and *Acinetobacter* spp. that exhibit an MIC profile consist with metallo-carbapenemase activity (resistance to penicillins, extended-spectrum cephalosporins (with no inhibition by clavulanic acid or avibactam) and carbapenems (with good carbapenem/EDTA synergy if tested) irrespective of susceptibility or resistance to aztreonam) but negative for IMP, NDM and VIM carbapenemases by PCR or immunochromatographic assay should be referred to AMRHAI for further investigation.

## Specimen type

Between October 2020 and December 2022, there were 6,241 acquired carbapenemase-producing Gram-negative bacterial episodes. The majority were identified in screening samples, accounting for 69.2% 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 December 2022**

Specimen type	All reports number	All reports percentage [note 4]	From AMRHAI number	From AMRHAI percentage [note 4]
Sterile site samples	317	5.1	123	10.1
Screening samples	4,320	69.2	584	48.1
Other samples [note 3]	1,604	25.7	508	41.8
All samples	6,241	100.0	1,215	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 December 2022 is shown in Figure 1. For all specimen types grouped together, the quarterly rate was 1.23 episodes per 100,000 population.

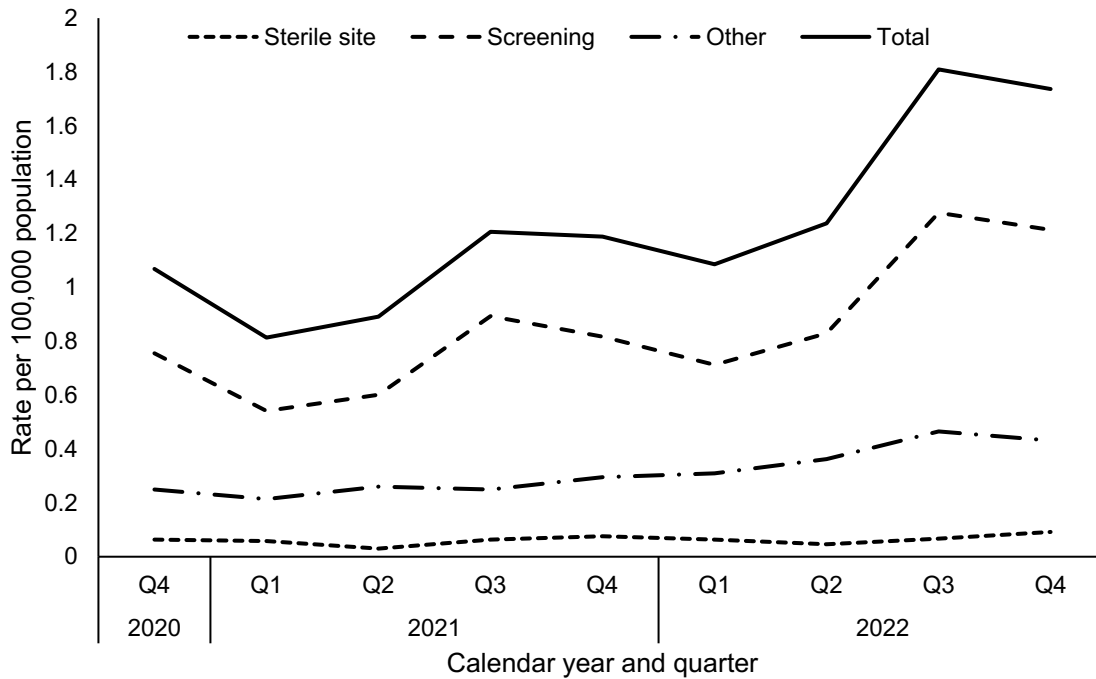
In Q3 2022, there was a sharp rise in the quarterly rate of carbapenemase-producing Gram-negative bacterial episodes (1.81 per 100,000 population) and the rate also remained elevated this quarter (1.73 per 100,000 population), with all previous quarters reporting below 1.24 episodes per 100,000 population. This increase was predominantly due to increases among screening and other samples, with the number of sterile site isolates remaining stable (Figure 1). Most of this increase appears to correlate with increased detection relating to screening following localised hospital outbreaks.

The remaining data summaries in this report consider all samples grouped together. Comparing the quarterly rates of episodes between 2021 and 2022, each quarter in 2022 had a higher rate when compared to the same quarter in 2021. Furthermore, higher rates were seen in the second half of the calendar year (0.81, 0.89, 1.21 and 1.19 per 100,000 population from Q1 to Q4 2021, and 1.09, 1.24, 1.81 and 1.74 per 100,000 population from Q1 to Q4 2022).

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 9 quarters of notification data, it is too early to conclude that there may be any seasonality, particularly in light of the coronavirus (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.



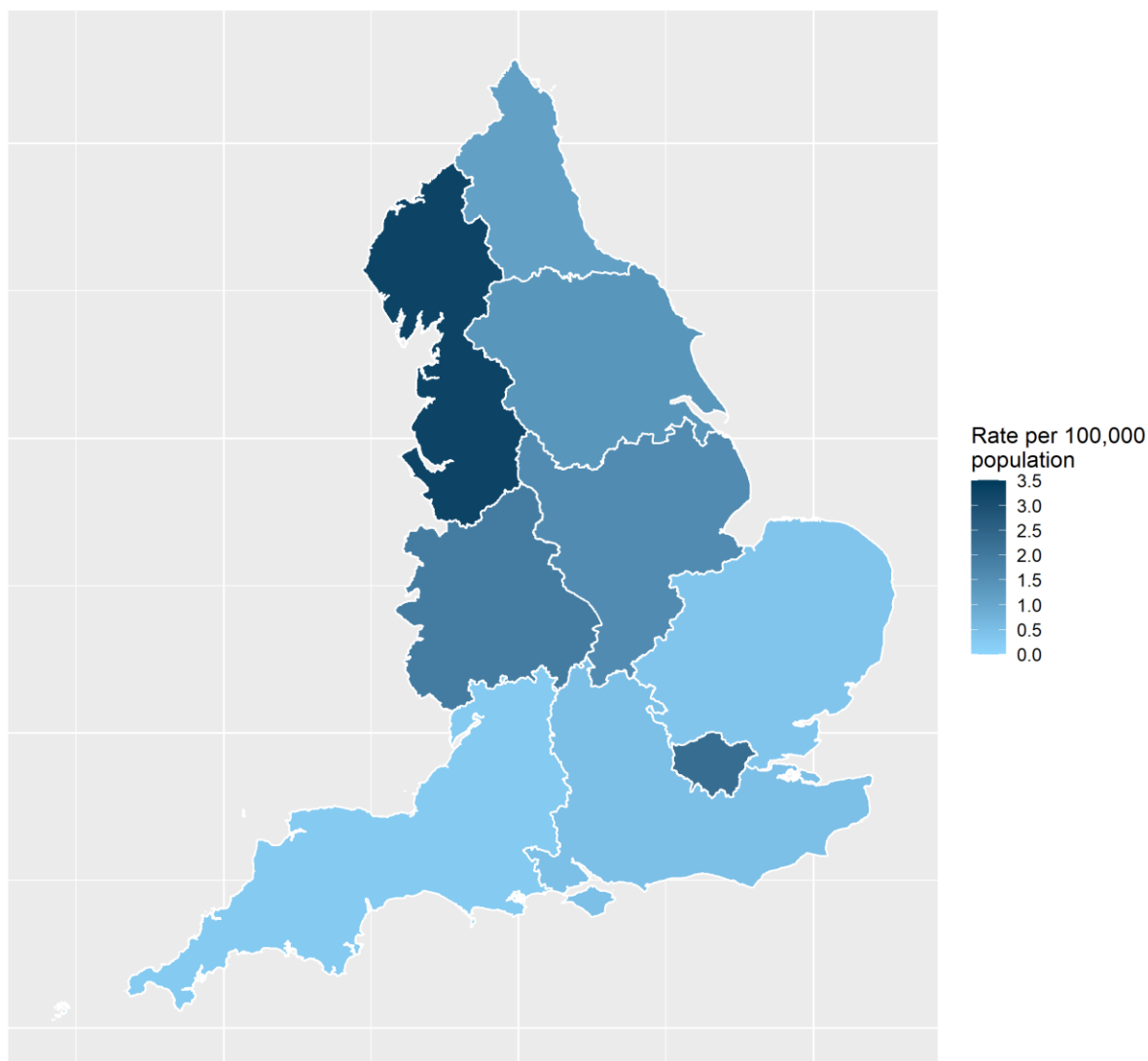
**Figure 1. Rate of acquired carbapenemase-producing Gram-negative bacteria episodes by specimen type and quarter (England): October 2020 to December 2022**



## 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 for the last year reported in the North West (3.26 episodes per 100,000 population), followed by the London region (2.29 episodes per 100,000 population). The lowest incidence across the last year was reported in the South West and East of England regions (0.27 and 0.37 episodes per 100,000 population, respectively).

**Figure 2. Geographical distribution of acquired carbapenemase-producing Gram negative bacterial incidence rates per 100,000 population (England): January to December 2022 [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.

In Q3 2022, the rate of bacterial episodes in all ONS regions rose compared to the last quarter. Particularly large increases were noted in the East Midlands (1.33 to 2.62 episodes per 100,000 population), North West (2.65 to 3.95 episodes per 100,000 population) and Yorkshire and Humber (1.19 to 1.93 episodes per 100,000 population).

In the West Midlands, the bacterial episode rate rose further this quarter (up to 2.84 episodes per 100,000 population), higher than the rate seen in Q3 and Q4 2021. In the North West and Yorkshire and the Humber, the rates remained elevated this quarter (3.76 and 1.68 episodes per 100,000 population, respectively).

**Table 3. Rate per 100,000 population of acquired carbapenemase-producing Gram-negative bacterial episodes by ONS region (England): January to December 2022**

ONS region	Q4 2020 no.	Q4 2020 rate	Q1 2021 no.	Q1 2021 rate	Q2 2021 no.	Q2 2021 rate	Q3 2021 no.	Q3 2021 rate	Q4 2021 no.	Q4 2021 rate	Q1 2022 no.	Q1 2022 rate	Q2 2022 no.	Q2 2022 rate	Q3 2022 no.	Q3 2022 rate	Q4 2022 no.	Q4 2022 rate
East Midlands	50	1.02	32	0.66	41	0.84	56	1.15	50	1.02	56	1.15	65	1.33	128	2.62	65	1.33
East of England	23	0.36	18	0.28	12	0.19	5	0.08	27	0.43	11	0.17	17	0.27	33	0.52	32	0.50
London	187	2.13	129	1.47	145	1.65	189	2.15	151	1.72	166	1.89	182	2.07	231	2.63	227	2.58
North East	9	0.34	20	0.76	26	0.98	28	1.06	42	1.59	28	1.06	19	0.72	41	1.55	34	1.28
North West	165	2.22	118	1.59	143	1.93	182	2.45	147	1.98	200	2.69	197	2.65	293	3.95	279	3.76
South East	32	0.34	18	0.19	19	0.20	28	0.30	48	0.52	31	0.33	39	0.42	50	0.54	61	0.66
South West	16	0.28	8	0.14	16	0.28	10	0.18	9	0.16	11	0.19	11	0.19	19	0.33	21	0.37
West Midlands	99	1.66	88	1.48	66	1.11	145	2.44	159	2.67	72	1.21	105	1.76	119	2.00	169	2.84
Yorkshire and The Humber	23	0.42	29	0.53	36	0.66	39	0.71	39	0.71	39	0.71	65	1.19	106	1.93	92	1.68

## Geographical differences in carbapenemase family

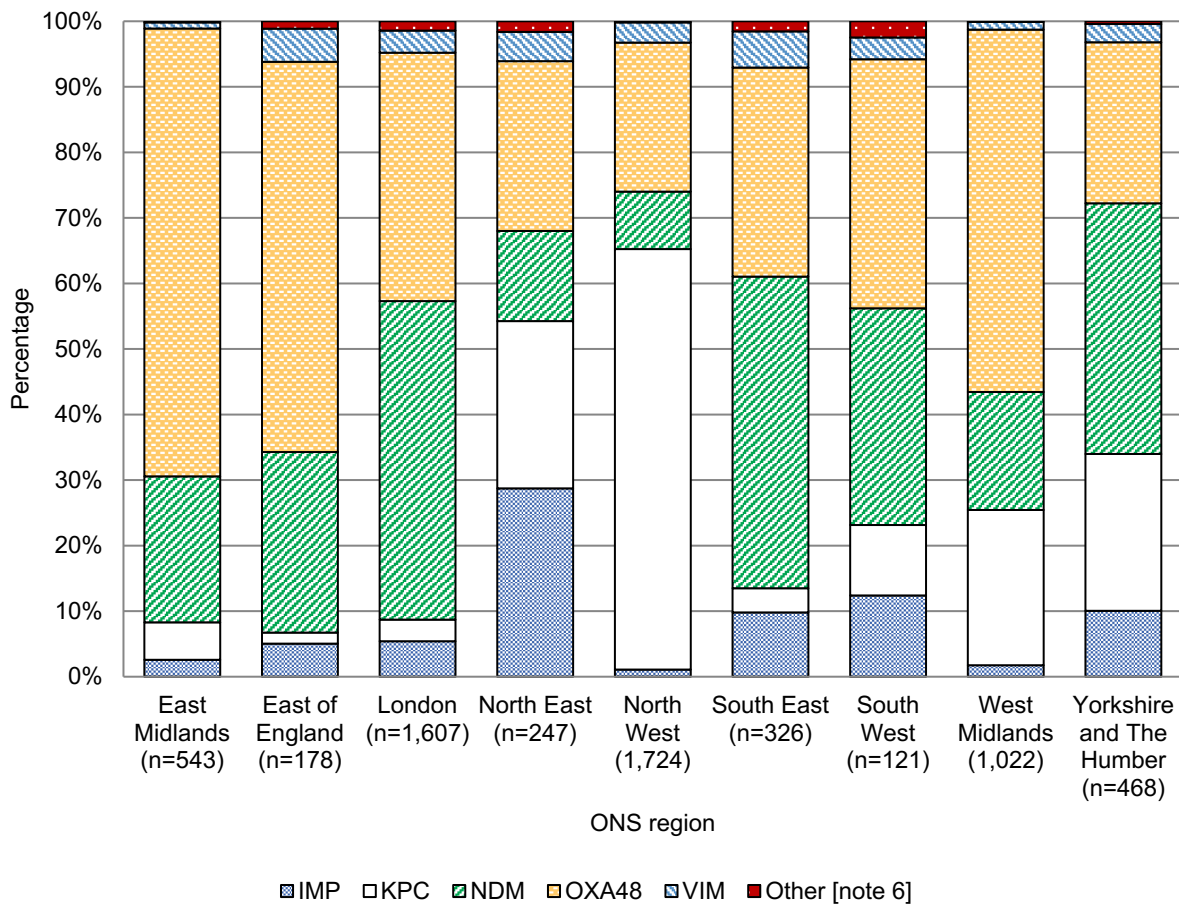
Between October 2020 and December 2022, the most common carbapenemase families reported across all regions were OXA-48-like (38.0%), NDM (27.2%), and KPC (26.2%). However, similarly to the incidence of episodes, the distribution of carbapenemase families identified also varied regionally (Figure 3).

In the North West, which had the highest incidence rate, the most common carbapenemase families identified were KPC (64.2%) and OXA-48-like (22.7%). KPC was not as common in any of the other regions, only accounting for below 25.5% of episodes in each region. For example, in London, which also had a high overall incidence rate, KPC accounted for 3.3% of episodes with NDM and OXA-48-like carbapenemases dominating (48.6% and 37.9%, respectively).

Another regional difference was observed in the North East, where IMP was the most commonly identified carbapenemase family (28.7%), only accounting for a small percentage of episodes in other regions (below 12.4%). 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 (38.0% in the South West and 59.6% in the East of England, respectively).

The distribution of carbapenemase families within each ONS region also varied by quarter). For example, the rise in episodes in the North West in Q3 and Q4 2022 was predominantly due to KPC carbapenemases from screening isolates and the Q3 and Q4 rise in the South East was predominantly NDM carbapenemases, also from screening isolates.

**Figure 3. Geographical distribution of acquired carbapenemase-producing Gram-negative bacterial episodes by carbapenemase family (England): October 2020 to December 2022**



**Notes to Figure 3**

Note 6. Other carbapenemase families include GES, GIM, IMI 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 32.7% of all specimens. This was followed by *Escherichia coli* and *Enterobacter* spp., which accounted for 30.3% and 18.4% of all specimens, respectively (Table 4).

Across these 3 species, the carbapenemase family most frequently identified was OXA-48-like (41.6%, 42.0% and 31.6% in *K. pneumoniae*, *E. coli* and *Enterobacter* spp. respectively). In *K. pneumoniae* and *Enterobacter* spp. isolates, this was followed by KPC and NDM carbapenemase families (30.1% and 24.8% in *K. pneumoniae* and 31.5% and 23.2% in *Enterobacter* spp.), and in *E. coli* this was followed by NDM (34.9%) and KPC (20.2%) carbapenemase families.

Aside from the 'big 5' carbapenemase families (KPC, OXA-48-like, NDM, VIM and IMP), the AMRHAI Reference Unit also screens for rarer carbapenemase families, and it is recommended that all isolates suspected to produce a carbapenemase but are negative for the 'big 5' carbapenemase families are referred to the AMRHAI Reference Unit for further screening. Between October 2020 and December 2022, GES, GIM, IMI and SME carbapenemases were identified in small numbers (21, 1, 20 and 2, respectively), none being identified from invasive specimens.

**Table 4. Acquired carbapenemase-producing Gram-negative bacterial episodes by species and carbapenemase family (England): October 2020 to December 2022**

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.	Total %
<i>Acinetobacter</i> spp. [note 7]	13	22.8	2	3.5	35	61.4	5	8.8	1	1.8	1	1.8	57	100.0
<i>Citrobacter</i> spp.	18	5.3	82	24.3	73	21.6	151	44.7	13	3.8	1	0.3	338	100.0
<i>Enterobacter</i> spp.	123	10.7	361	31.5	266	23.2	362	31.6	17	1.5	18	1.6	1,147	100.0
<i>Escherichia coli</i>	34	1.8	383	20.2	661	34.9	794	42.0	19	1.0	1	0.1	1,892	100.0
Other <i>Escherichia</i> spp.	0	0.0	6	40.0	4	26.7	5	33.3	0	0.0	0	0.0	15	100.0
<i>Klebsiella oxytoca</i>	13	6.2	112	53.1	14	6.6	67	31.8	5	2.4	0	0.0	211	100.0
<i>Klebsiella pneumoniae</i>	46	2.3	615	30.1	507	24.8	850	41.6	25	1.2	0	0.0	2,043	100.0
Other <i>Klebsiella</i> spp.	9	6.4	25	17.7	42	29.8	60	42.6	5	3.5	0	0.0	141	100.0
<i>Morganella</i> spp.	0	0.0	0	0.0	6	27.3	16	72.7	0	0.0	0	0.0	22	100.0
<i>Pseudomonas aeruginosa</i> [note 7]	45	21.8	8	3.9	56	27.2	9	4.4	70	34.0	18	8.7	206	100.0
Other <i>Pseudomonas</i> spp. [note 7]	7	15.9	5	11.4	8	18.2	4	9.1	19	43.2	1	2.3	44	100.0
<i>Serratia</i> spp.	0	0.0	1	4.8	5	23.8	13	61.9	0	0.0	2	9.5	21	100.0
Other Enterobacterales [note 8]	3	3.0	34	34.3	21	21.2	34	34.3	5	5.1	2	2.0	99	100.0
Other Gram-negative bacteria [note 9]	1	20.0	1	20.0	1	20.0	2	40.0	0	0.0	0	0.0	5	100.0
<b>Total</b>	<b>312</b>		<b>1,635</b>		<b>1,699</b>		<b>2,372</b>		<b>179</b>		<b>44</b>		<b>6,241</b>	

**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.



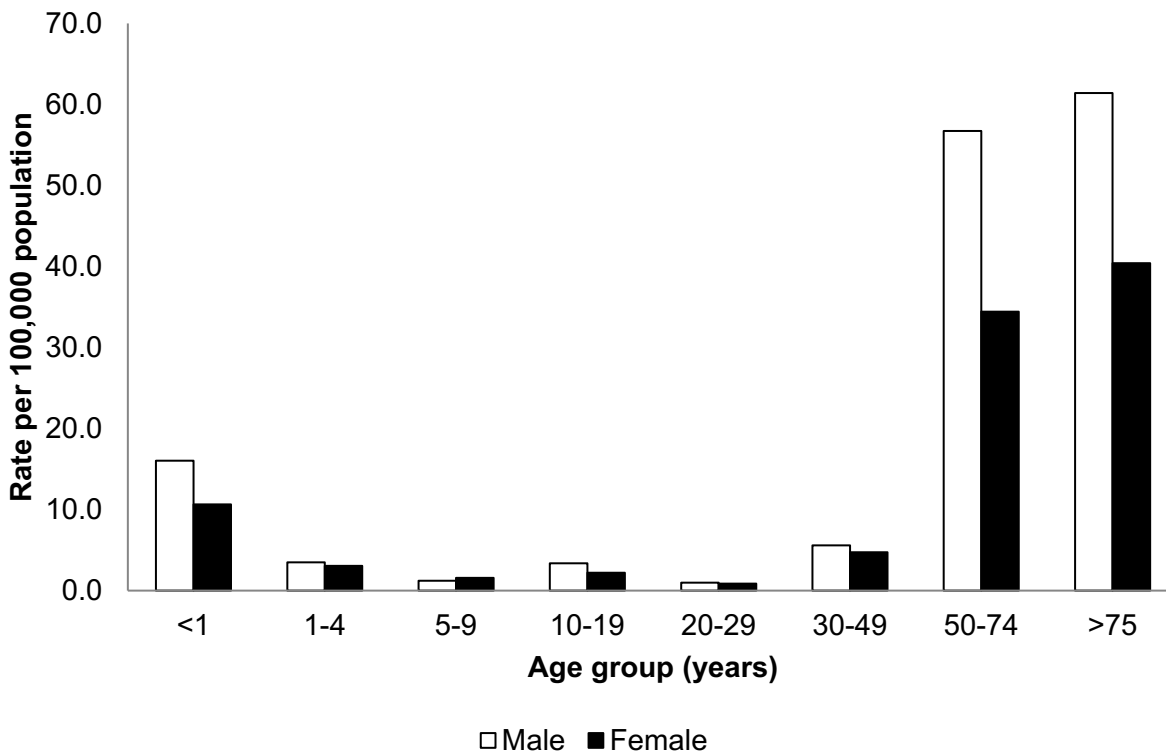
Note 8. Includes coliform, *Cronobacter* spp., *Hafnia* spp., *Kluyvera* spp., *Leclercia adecarboxylata*, *Lelliottia amnigena*, *Mixta calida*, *Pantoea* spp., *Phytobacter ursingii*, *Pluralibacter gergoviae*, *Proteus* spp., *Providencia* spp., *Raoultella* spp., and *Shigella* spp.

Note 9. Includes *Achromobacter* spp., *Aeromonas hydrophila*, *Bacteroides fragilis*, and *Stenotrophomonas maltophilia*. 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 12.4 and 9.4 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 December 2022**



### Notes to Figure 4

Note 10. Rates have been calculated using cumulative reports across all 9 quarters of reporting, and as such cannot be compared to previous quarters.

Note 11. Information about patient sex is only recorded in 97% 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 (49.9 per 100,000 population) followed by those aged 50 to 74 years old (46.0 per 100,000 population). The overall rate of confirmed carbapenemases was 14.4 per 100,000 population in infants less than one year old.

## Quarterly mandatory laboratory return reporting (January to December 2022)

**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): January to December 2022**

Trust type [note 12]	Q1 2022 reported screens (%)	Q1 2022 total # screens	Q2 2022 reported screens (%)	Q2 2022 total # screens	Q3 2022 reported screens (%)	Q3 2022 total # screens	Q4 2022 reported screens (%)	Q4 2022 total # screens
Small	15 (55.6)	2,138	16 (59.3)	2,884	15 (55.6)	3,747	17 (63.0)	4,476
Medium	20 (76.9)	7,645	20 (76.9)	8,568	20 (76.9)	8,591	19 (73.1)	6,836
Large	23 (85.2)	11,160	22 (81.5)	10,570	23 (85.2)	14,631	21 (77.8)	13,345
Multiservice	3 (75.0)	533	3 (75.0)	957	3 (75.0)	901	3 (75.0)	621
Specialist	10 (62.5)	4,178	10 (62.5)	3,674	10 (62.5)	4,267	10 (62.5)	4,220
Teaching	29 (80.6)	70,714	30 (83.3)	77,566	30 (80.6)	81,318	26 (72.2)	64,154
<b>Total</b>	<b>100 (73.5)</b>	<b>96,368</b>	<b>101 (74.3)</b>	<b>104,219</b>	<b>101 (74.3)</b>	<b>113,455</b>	<b>96 (70.6)</b>	<b>93,652</b>

### 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. Across 2022, there were 407,694 screens reported by 108 NHS Trusts leading to an overall Trust reporting rate of 73.2% (Table 5). This means that across the 4 quarters, there were 146 instances where an NHS Trust did not submit a return. Of the acute Trusts that reported screening data, 2.4% reported that they conducted zero screens (by quarter from Q1 to Q4 2022 this was 3, 3, 3, and 4 reports).

Between Q1 and Q3, the number of Trusts that reported screens was stable, but the total number of screens increased (100 Trusts reporting 96,368 screens in Q1 compared to 101 Trusts reporting 113,455 screens in Q3). There was a slight dip in both the number of Trusts reporting screens (96) and the total number of screens (93,652) in Q4 2022. Screening was more predominant in the acute teaching Trusts, accounting for 72.1% of screening swabs taken during this time period. By reporting acute Trust, the total screens reported for the quarter ranged from 0 to 21,853. The full list of reporting, including those that did not submit a return, is available in the data appendix by individual NHS acute Trust.

## References

1. UK Health Security Agency. [English surveillance programme for antimicrobial utilisation and resistance \(ESPAUR\) report 2018 to 2019](#) 2019
2. Castanheira M and others. 'Molecular characterization of a beta-lactamase gene, blaGIM-1, encoding a new subclass of metallo-beta-lactamase' *Antimicrobial Agents and Chemotherapy* 2004: volume 48, issue 12, pages 4,654 to 4,661

## Appendices

**Appendix Table 1. QMLR returns for the total number of rectal swabs and faecal screening specimens taken for CPE screening by acute trust (England): January to December 2022**

Trust name	Trust type	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Airedale NHS Foundation Trust	Small	21	42	88	125
Alder Hey Children's NHS Foundation Trust	Specialist	1,231	1,129	1,143	1,193
Ashford and St Peter's Hospitals NHS Foundation Trust	Medium	245	239	265	461
Barking, Havering and Redbridge University Hospitals NHS Trust	Large	1,121	1,122	1,185	
Barnsley Hospital NHS Foundation Trust	Small	109	35	38	30
Barts Health NHS Trust	Teaching	1,775	2,263	3,109	3,252
Bedfordshire Hospitals NHS Foundation Trust	Medium	148	122	125	161
Birmingham Women's and Children's NHS Foundation Trust	Specialist				
Blackpool Teaching Hospitals NHS Foundation Trust	Teaching	801	858	759	853
Bolton NHS Foundation Trust	Medium	344	396		
Bradford Teaching Hospitals NHS Foundation Trust	Teaching				
Buckinghamshire Healthcare NHS Trust	Multi-service	444	555	396	407
Calderdale and Huddersfield NHS Foundation Trust	Large	40	81	217	225
Cambridge University Hospitals NHS Foundation Trust	Teaching	1,602	1,692	1,627	1,815
Chelsea and Westminster Hospital NHS Foundation Trust	Teaching				
Chesterfield Royal Hospital NHS Foundation Trust	Small				
Countess of Chester Hospital NHS Foundation Trust	Small				

Trust name	Trust type	Q1 2022	Q2 2022	Q3 2022	Q4 2022
County Durham and Darlington NHS Foundation Trust	Multi-service	82	363	475	162
Croydon Health Services NHS Trust	Medium	502	527	400	272
Dartford and Gravesham NHS Trust	Small	246	296	309	217
Doncaster and Bassetlaw Teaching Hospitals NHS Foundation Trust	Teaching	122	202	177	193
Dorset County Hospital NHS Foundation Trust	Small	0	8	13	3
East and North Hertfordshire NHS Trust	Large	1,166	1,104	1,494	1,530
East Cheshire NHS Trust	Small				
East Kent Hospitals University NHS Foundation Trust	Teaching	378	348	426	312
East Lancashire Hospitals NHS Trust	Large		556	411	549
East Suffolk and North Essex NHS Foundation Trust	Medium				
East Sussex Healthcare NHS Trust	Large	289			299
Epsom And St Helier University Hospitals NHS Trust	Large	252	252		
Essex Partnership University NHS Foundation Trust	Multi-service				
Frimley Health NHS Foundation Trust	Medium	741	795	745	757
Gateshead Health NHS Foundation Trust	Small	1	4	22	15
George Eliot Hospital NHS Trust	Small				254
Gloucestershire Hospitals NHS Foundation Trust	Large	83	118	103	100
Great Ormond Street Hospital for Children NHS Foundation Trust	Specialist	1,445	1,121	1,604	1,577
Great Western Hospitals NHS Foundation Trust	Medium	147	159	114	151
Guy's And St Thomas' NHS Foundation Trust	Teaching	420	395	433	492
Hampshire Hospitals NHS Foundation Trust	Large	235	283	288	333

Trust name	Trust type	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Harrogate and District NHS Foundation Trust	Small				84
Homerton University Hospital NHS Foundation Trust	Medium	808	1,094	875	
Hull University Teaching Hospitals NHS Trust	Teaching	138	184	309	209
Imperial College Healthcare NHS Trust	Teaching	20,996	21,853	20,088	19,472
Isle of Wight NHS Trust	Multi-service	7	39	30	52
James Paget University Hospitals NHS Foundation Trust	Small	50	44	29	33
Kettering General Hospital NHS Foundation Trust	Small	213	262	316	259
King's College Hospital NHS Foundation Trust	Teaching	10,116	10,418	10,622	9,679
Kingston Hospital NHS Foundation Trust	Small	76	54	113	88
Lancashire Teaching Hospitals NHS Foundation Trust	Teaching	102	264	501	591
Leeds Teaching Hospitals NHS Trust	Teaching	2,155	2,633	4,690	58
Lewisham and Greenwich NHS Trust	Large	1,820	905	1,572	1,572
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	Large	649	544	730	
Maidstone and Tunbridge Wells NHS Trust	Large	315	308	314	297
Manchester University NHS Foundation Trust	Teaching				
Medway NHS Foundation Trust	Medium				
Mid and South Essex NHS Foundation Trust	Medium				
Mid Cheshire Hospitals NHS Foundation Trust	Small				



Trust name	Trust type	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Mid Yorkshire Hospitals NHS Trust	Large	149	167	134	137
Milton Keynes University Hospital NHS Foundation Trust	Small				
Moorfields Eye Hospital NHS Foundation Trust	Specialist	0	0	0	0
Norfolk and Norwich University Hospitals NHS Foundation Trust	Teaching	660	613	542	604
North Bristol NHS Trust	Large			112	
North Cumbria Integrated Care NHS Foundation Trust	Small	194	566	1,077	1,057
North Middlesex University Hospital NHS Trust	Small				
North Tees and Hartlepool NHS Foundation Trust	Medium		329	306	285
North West Anglia NHS Foundation Trust	Large	147	143	168	172
Northampton General Hospital NHS Trust	Medium				
Northern Care Alliance NHS Foundation Trust	Teaching	219	669	801	859
Northern Lincolnshire and Goole NHS Foundation Trust	Large	13	11	25	31
Northumbria Healthcare NHS Foundation Trust	Large	17	81	195	218
Nottingham University Hospitals NHS Trust	Teaching	1,897	2,248	2,030	1,527
Oxford University Hospitals NHS Foundation Trust	Teaching	684	1,181	1,690	
Portsmouth Hospitals University National Health Service Trust	Large	326	197	221	268
Queen Victoria Hospital NHS Foundation Trust	Specialist	1	6	0	0
Royal Berkshire NHS Foundation Trust	Large	407	812	1,895	1,994
Royal Cornwall Hospitals NHS Trust	Large	130	124	122	174
Royal Devon University Healthcare NHS Foundation Trust	Large	264	300	366	258
Royal Free London NHS Foundation Trust	Teaching	7,383	7,878	8,451	

Trust name	Trust type	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Royal National Orthopaedic Hospital NHS Trust	Specialist	239	107	136	255
Royal Papworth Hospital NHS Foundation Trust	Specialist	51	59	48	75
Royal Surrey County Hospital NHS Foundation Trust	Medium	1,186	1,144	1,177	1,162
Royal United Hospitals Bath NHS Foundation Trust	Medium	160	145	110	160
Salisbury NHS Foundation Trust	Small				
Sandwell and West Birmingham Hospitals NHS Trust	Large	0	0	0	0
Sheffield Children's NHS Foundation Trust	Specialist	1	11	79	54
Sheffield Teaching Hospitals NHS Foundation Trust	Teaching	560	812	1212	1135
Sherwood Forest Hospitals NHS Foundation Trust	Medium				
South Tees Hospitals NHS Foundation Trust	Teaching	412	210	265	260
South Tyneside and Sunderland NHS Foundation Trust	Large				
South Warwickshire NHS Foundation Trust	Small	269	206	309	405
Southport and Ormskirk Hospital NHS Trust	Small	198	236		
St George's University Hospitals NHS Foundation Trust	Teaching	1,332	1,639	1,521	
St Helens and Knowsley Teaching Hospitals NHS Trust	Medium	1,334	1,419	1,580	1,491
Stockport NHS Foundation Trust	Medium	258	312	465	420
Surrey and Sussex Healthcare NHS Trust	Medium	139	132	167	177
Tameside and Glossop Integrated Care NHS Foundation Trust	Small		166	153	182
The Christie NHS Foundation Trust	Specialist				
The Clatterbridge Cancer Centre NHS Foundation Trust	Specialist				
The Dudley Group NHS Foundation Trust	Medium	32	44	86	24

Trust name	Trust type	Q1 2022	Q2 2022	Q3 2022	Q4 2022
The Hillingdon Hospitals NHS Foundation Trust	Small				
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	Teaching	595	647	666	539
The Princess Alexandra Hospital NHS Trust	Small	236	282	265	250
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	Small	126	193	220	211
The Robert Jones and Agnes Hunt Orthopaedic Hospital NHS Foundation Trust	Specialist	51	33	44	27
The Rotherham NHS Foundation Trust	Medium	14	11	1	1
The Royal Marsden NHS Foundation Trust	Specialist	1,101	908	913	691
The Royal Orthopaedic Hospital NHS Foundation Trust	Specialist	58	300	300	348
The Royal Wolverhampton NHS Trust	Large	893	1,019	1,847	2,401
The Shrewsbury and Telford Hospital NHS Trust	Large	91	147	107	116
The Walton Centre NHS Foundation Trust	Specialist				
Torbay and South Devon NHS Foundation Trust	Medium	4	1	13	8
United Lincolnshire Hospitals NHS Trust	Large	421		950	597
University College London Hospitals NHS Foundation Trust	Teaching	988	918	967	902
University Hospital Southampton NHS Foundation Trust	Teaching	328	505	553	574
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	811	902	1,058	1,200
University Hospitals of Derby and Burton NHS Foundation Trust	Teaching	85		256	
University Hospitals of Leicester NHS Trust	Teaching	6,348	6,842	7,352	8,011
University Hospitals of Morecambe Bay NHS Foundation Trust	Medium	81	56	195	127

Trust name	Trust type	Q1 2022	Q2 2022	Q3 2022	Q4 2022
University Hospitals of North Midlands NHS Trust	Teaching	8,965	8,962	8,893	8,988
University Hospitals Plymouth NHS Trust	Teaching	535	405	473	808
University Hospitals Sussex NHS Foundation Trust	Large				
Walsall Healthcare NHS Trust	Medium	558	710	836	873
Warrington and Halton Teaching Hospitals NHS Foundation Trust	Teaching	276	285	334	290
West Hertfordshire Hospitals NHS Trust	Medium	713	724	825	0
West Suffolk NHS Foundation Trust	Small				
Whittington Health NHS Trust	Medium	54		64	79
Wirral University Teaching Hospital NHS Foundation Trust	Teaching		1,669	1,457	1,486
Worcestershire Acute Hospitals NHS Trust	Large	2,332	2,296	2,175	2,074
Wrightington, Wigan and Leigh NHS Foundation Trust	Medium	177	209	242	227
Wye Valley NHS Trust	Small	246	304	312	326
Yeovil District Hospital NHS Foundation Trust	Small	153	186	483	937
York and Scarborough Teaching Hospitals NHS Foundation Trust	Teaching	31	71	56	45

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Prepared by: Kirsty Bennet, Katie Hopkins, Katherine Henderson and Alicia Demirjian  
For queries relating to this document, please contact: [hcai.amrdepartment@ukhsa.gov.uk](mailto:hcai.amrdepartment@ukhsa.gov.uk)

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