

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

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# **Background**

Since 1 October 2020 all diagnostic laboratories in England have had a duty to notify the following via the UK Health Security Agency (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 any resistance mechanism for any of the causative agents listed in <u>Schedule 2 of the Health Protection</u> (<u>Notifications</u>) <u>Regulations 2010</u>

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

These analyses are based on data relating to notifications of confirmed acquired carbapenemase-producing Gram-negative bacteria between October 2020 and June 2022 in England. The data was extracted on 2 August 2022 from both UKHSA's voluntary surveillance database, SGSS, and the <a href="Antimicrobial Resistance and Healthcare-Associated Infections">Antimicrobial Resistance and Healthcare-Associated Infections</a> (AMRHAI) Reference Unit database.

There has been a large decrease in the reported number of tested isolates for all organisms across all regions in Q1 and Q2 2022 to SGSS AMR Module. The reason for this is currently under investigation. Resistance and testing data for this quarter should therefore be interpreted with caution and may be revised in the coming months.

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 the nine regions using data from the Office for National Statistics (ONS).

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 carbapenemase family results from the AMRHAI Reference Unit retained preferentially where patient specimen overlap occurred. This method differs slightly from the weekly causative agent notification

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<u>data</u>, 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 <u>Antimicrobial Resistance and Healthcare Associated Infections (AMRHAI) Reference Unit</u> 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 should be able to detect 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 <u>AMRHAI Reference Unit</u> for confirmation.

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

Carbapenemase	Associat	ted with common 'host	d' organism
family	Enterobacterales	Pseudomonas spp.	Acinetobacter 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	¥B	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	¥

#### Note 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

The AMRHAI Reference Unit screens all Enterobacterales sent for investigation of carbapenem resistance with a multiplex PCR that includes the *bla*OXA-23-like, *bla*OXA-40-like and *bla*OXA-58-like acquired carbapenemase genes consistently associated with resistance in *Acinetobacter* spp. since 2020.

In 2021, AMRHAI detected the first known instance of an Enterobacterales isolate (*Proteus mirabilis*) harbouring a gene encoding for OXA-23 carbapenemase amongst referrals; a second isolate with no known links to the first was identified in early 2022. Similar isolates of *P. mirabilis* have been reported in the literature as associated with human and animal sources in France and Belgium since 1996 (1). As previously reported, both isolates were susceptible to most antibiotics but with meropenem above the EUCAST meropenem screening cut-off for CPE and observed resistance to imipenem (although reduced susceptibility to imipenem is expected in *Proteus* spp.) therefore their clinical significance is uncertain.

# First 21 months of notification data (October 2020 to June 2022)

Between October 2020 and June 2022, there were 3,806 acquired carbapenemase-producing Gram-negative bacteria episodes. The majority were identified in screening samples, accounting for 68.2% of carbapenemase notifications, with only 5.6% reported in sterile site specimens (Table 2).

Table 2. Number and percentage of acquired carbapenemase-producing Gramnegative reports by specimen type (England): October 2020 to June 2022

Specimen type	All re	ports	From AMRHAI [note 1]					
opcomen type	No.	% [note 3]	No.	% [note 3]				
Sterile site samples	212	5.6	92	10.7				
Screening samples	2,596	68.2	392	45.6				
Other samples [note 2]	998	26.2	375	43.7				
All samples	3,806	100.0	859	100.0				

#### Notes to Table 2

Note 1. The AMRHAI Reference Unit actively encourages submission of sterile site isolates for carbapenemase confirmation; the distribution of specimen type will reflect this.

Note 2. Samples that do not fall into either 'sterile site' or 'screening' samples, for example, urine and lower respiratory tract specimens.

Note 3. The percentages presented in this table are column percentages, with the breakdown of specimen types shown for all reports and AMRHAI reports separately.

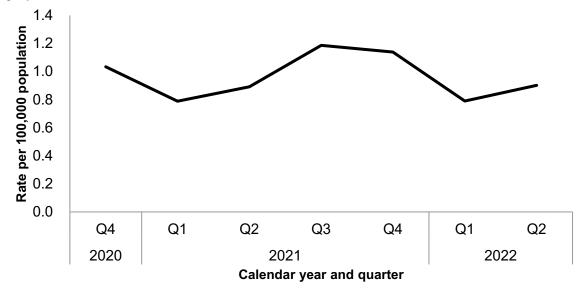
The remaining data summaries in this report consider all samples grouped together.

# **Quarterly trends**

The quarterly rate of acquired carbapenemase-producing Gram-negative bacteria episodes between October 2020 and June 2022 is shown in Figure 1. The overall rate of episodes across the entire time period was 0.96 per 100,000 population.

Comparing the quarterly rates of episodes across 2021, higher rates were seen in the second half of the calendar year (1.19 and 1.14 per 100,000 population in Q3 2021 and Q4 2021, respectively, compared with 0.79 and 0.89 per 100,000 population in Q1 and Q2 2021 respectively). Similarly, a higher rate was observed in Q4 2020 (1.03 per 100,000 population) and lower rates were observed in Q1 2022 and Q2 2022 (0.79 and 0.90 per 100,000 population, respectively). However, as there are only 21 months 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.

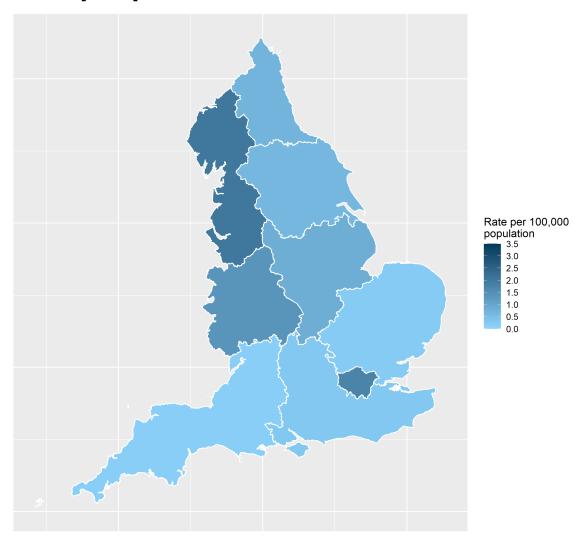
Figure 1. Rate of acquired carbapenemase-producing Gram-negative bacteria episodes by quarter, October 2020 to June 2022



# **Geographic distribution**

The rate of acquired carbapenemase-producing Gram-negative bacteria reports varied by ONS Region (Figure 2), with the highest overall rate for all seven quarters combined reported in the North West (2.06 per 100,000 population), followed by the London region (1.77 per 100,000 population). The lowest incidence across the time period was reported in the East of England and South West regions (0.30 and 0.19 reports per 100,000 population, respectively).

Figure 2. Geographical distribution of acquired carbapenemase-producing Gramnegative bacteria incidence rates per 100,000 population (England): October 2020 to June 2022 [note 1]



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#### Note to Figure 2

Note 1. The region geography is based on the laboratory location and linked to the ONS data for regions.

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In Q2 2022, the rate of reporting rose or remained stable in all ONS Regions apart from the North East (where the rate of reporting fell from 0.56 in Q1 2022 to 0.37 per 100,000 population; 15 to 10 episodes, respectively). In Yorkshire and Humber, the rate of reports rose from 0.62 in Q1 2022 to 0.98 in Q2 2022 (34 to 54 episodes, respectively), the highest rate recorded for this region since acquired carbapenemase-producing Gram-negative bacteria became notifiable.

Comparing Q2 between 2021 and 2022, the rate of acquired carbapenemase-producing Gram-negative episodes was similar for all ONS Regions combined, however, notable increases were observed in the North West (1.98 to 2.14 per 100,000 population), Yorkshire and Humber (0.63 to 0.98 per 100,000 population) and London (1.61 to 1.76 per 100,000 population). Comparatively, decreases in the rate of carbapenemase Gram-negative bacteria were seen in the North East (0.97 to 0.37 per 100,000 population), West Midlands (1.07 to 0.70 per 100,000 population), and South West (0.29 to 0.15 per 100,000 population) as shown in Table 3.

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Table 3. Rate per 100,000 population of acquired carbapenemase-producing Gram-negative episodes by ONS Region (England): October 2020 to June 2022 [note 1]

UK	ONS Region	Q4 2	2020	Q1 2	2021	Q2 2	2021	Q3 2	2021	Q4 2	2021	Q1 2	2022	Q2 2	2022	Trend Line
Region	ONS Region	No.	Rate	Trend Line												
	North East	9	0.34	20	0.75	26	0.97	26	0.97	31	1.16	15	0.56	10	0.37	
North of	North West	165	2.24	117	1.59	146	1.98	182	2.47	144	1.95	150	2.04	158	2.14	<u></u>
England	Yorkshire and Humber	23	0.42	27	0.49	35	0.63	39	0.71	40	0.72	34	0.62	54	0.98	
Midlands	East Midlands	47	0.97	32	0.66	41	0.84	56	1.15	50	1.03	26	0.53	38	0.78	
and East	East of England	23	0.34	18	0.27	12	0.18	5	0.07	27	0.40	10	0.15	16	0.24	<b>─</b> ✓✓
of England	West Midlands	87	1.46	80	1.34	64	1.07	137	2.30	143	2.40	25	0.42	42	0.70	
London	London	183	2.03	127	1.41	145	1.61	188	2.09	153	1.70	158	1.76	158	1.76	
South of	South East	32	0.36	18	0.20	19	0.21	28	0.31	47	0.53	21	0.23	26	0.29	
England	South West	16	0.29	7	0.13	16	0.29	10	0.18	9	0.16	8	0.15	8	0.15	
England overall	England overall	585	1.03	446	0.79	504	0.89	671	1.19	644	1.14	447	0.79	510	0.90	

Note to Table 3

Note 1. Trend line vertical axes are set to zero for each ONS Region

# Geographical differences in carbapenemase family

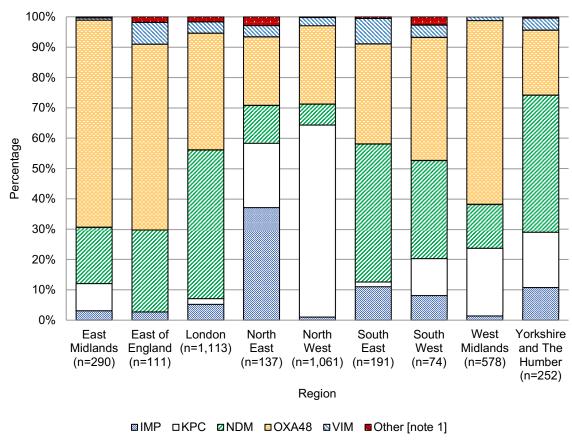
For the entire period between October 2020 and June 2022, the most common carbapenemase families reported across all ONS Regions were OXA-48-like (39.3%; n=1,496/3,807), NDM (27.0%; n=1,029), and KPC (24.6%; n=935). However, similarly to the incidence of episodes, the distribution of carbapenemase families identified also varied geographically (Figure 3, Figure 4a and 4b).

In the North West, which had the highest incidence rate for the first 21 months of mandatory reporting, the most common carbapenemase families identified were KPC (63.3%; n=672/1,061) and OXA-48-like (25.8%; n=274/1,061). KPC was not as common in any of the other ONS Region, only accounting for between 0% and 22.3% of notifications. For example, in London, which also had a high overall incidence rate, KPC accounted for 1.9% (n=21/1,113) with NDM and OXA-48-like carbapenemases dominating the reports (49.1% (n=546) and 38.5% (n=428)), respectively.

Another geographical difference was observed in the North East, where IMP was the most commonly identified carbapenemase family (37.2%; n=51/137), only accounting for a small percentage of episodes in other ONS Regions (up to 11.0%). However, given the small number of carbapenemases reported in some ONS Regions, the diversity of carbapenemases reported is likely to be strongly impacted by individual outbreaks. In the two ONS Regions that had the lowest incidence rates, the most common carbapenemase family was OXA-48-like (40.5% (n=30/74) in the South West and 61.3% (n=68/111) in the East of England, respectively).

The distribution of carbapenemase families within each ONS Region also varied by quarter (Figure 4b). In the West Midlands, OXA-48-like carbapenemases were the dominant carbapenemase family reported between Q4 2020 and Q4 2021 (between 59.4% and 66.3%); but the percentage of OXA-48-like carbapenemases fell (to 32.0%; n=8/25) in Q1 2022, with NDM carbapenemases now dominating (40.0%; n=10/25). In Q2 2022, the number of OXA-48-like carbapenemases rose, and they were the most frequently identified carbapenemase family (50.0%; n=21/42). The percentage of NDM carbapenemases in the West Midlands was elevated in Q1 and Q2 2022 compared to previous quarters (previously below 20.7%, now accounting for 40.0% and 31.0% in Q1 and Q2 2022, respectively).

Figure 3. Geographical distribution of episodes by carbapenemase family (England): October 2020 to June 2022



Note to Figure 3

Note 1. Other carbapenemase families include GES and IMI

Figure 4a. Acquired carbapenemase-producing Gram-negative bacteria episodes by carbapenemase family and ONS Region (England): October 2020 to June 2022

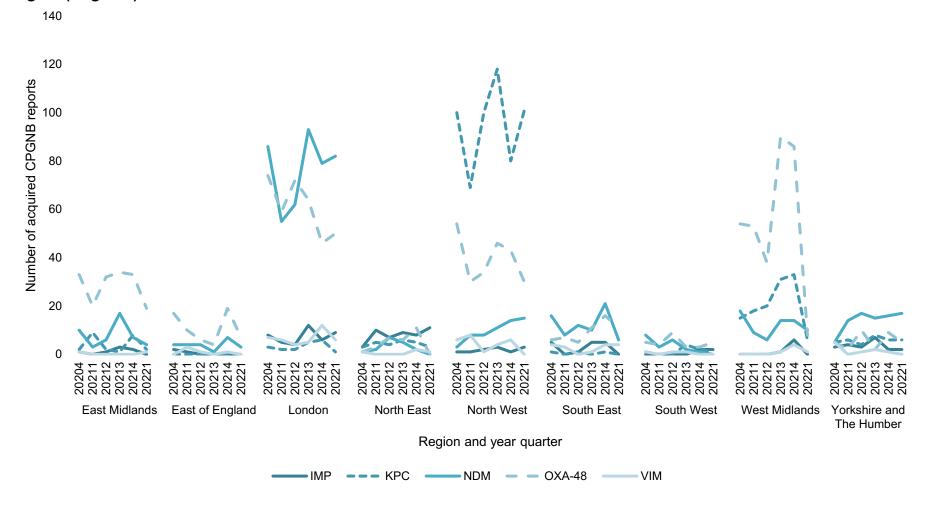
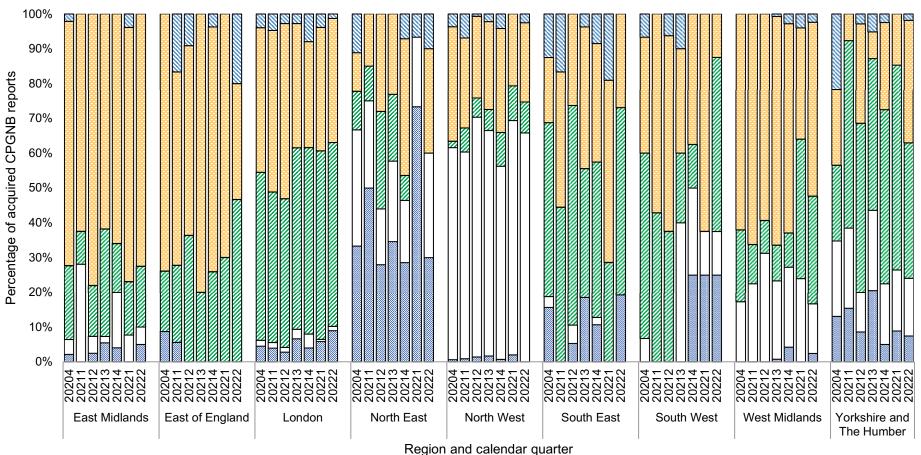


Figure 4b. Distribution of carbapenemase families (England) by ONS Region and calendar quarter: October 2020 to June 2022



■IMP □KPC ■NDM ■OXA-48-like ■VIM

# Distribution of species and carbapenemase family

Across the entire 21 months of reporting, the most frequently isolated Gram-negative bacterial species with a confirmed acquired carbapenemase was *Klebsiella pneumoniae*, accounting for 1,286 (33.8%) of all episodes. This was followed by *Escherichia coli* and *Enterobacter* spp., which accounted for 27.4% (n=1,043) and 19.5% (n=743) of all specimens, respectively (Table 4).

Across these three species, the carbapenemase family most frequently identified was OXA-48-like (43.5%, 43.3% and 33.4% 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 (27.4% and 26.0% in *K. pneumoniae* and 30.7% and 22.9% in *Enterobacter* spp.), and in *E. coli* this was followed by NDM (33.2%) 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 negative for one of the 'big 5' carbapenemases are referred to the AMRHAI Reference Unit for identification and/or confirmation. Between October 2020 and June 2022, both GES and IMI carbapenemases were identified in small numbers (31 in total), none being identified from invasive specimens. Only one IMI carbapenemase was identified this quarter (Q2 2022, previously no IMI carbapenemases had been identified since Q3 2021), and all (13 in total) were identified in *Enterobacter* spp. isolates. The majority of GES carbapenemases (83.3%; n=15/18) were identified among *Pseudomonas aeruginosa* isolates.

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Table 4. Episodes of acquired carbapenemase-producing Gram-negative bacteria by species and carbapenemase family (England): October 2020 to June 2022

Carbapenemase family	IMP		KF	C	N	DM	OXA-	48-like	٧	'IM	Other		Total	
Species	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No	%
Acinetobacter spp. [note 1]	5	16.7	0	0.0	22	73.3	2	6.7	0	0.0	1	3.3	30	100.0
Citrobacter spp.	8	3.6	54	24.4	50	22.6	98	44.3	10	4.5	1	0.5	221	100.0
Enterobacter spp.	74	10.0	228	30.7	170	22.9	248	33.4	10	1.3	13	1.7	743	100.0
Escherichia coli	24	2.3	211	20.2	346	33.2	452	43.3	9	0.9	1	0.1	1,043	100.0
Other Escherichia spp.	0	0.0	0	0.0	0	0.0	2	100.0	0	0.0	0	0.0	2	100.0
Klebsiella oxytoca	8	6.8	47	39.8	10	8.5	49	41.5	4	3.4	0	0.0	118	100.0
Klebsiella pneumoniae	25	1.9	353	27.4	335	26.0	560	43.5	13	1.0	0	0.0	1,286	100.0
Other Klebsiella spp.	9	9.4	18	18.8	31	32.3	33	34.4	5	5.2	0	0.0	96	100.0
Morganella spp.	0	0.0	0	0.0	5	29.4	12	70.6	0	0.0	0	0.0	17	100.0
Pseudomonas aeruginosa [note 1]	34	22.2	4	2.6	39	25.5	6	3.9	55	35.9	15	9.8	153	100.0
Other Pseudomonas spp. [note 1]	6	17.1	4	11.4	7	20.0	3	8.6	15	42.9	0	0.0	35	100.0
Serratia spp.	0	0.0	0	0.0	4	33.3	8	66.7	0	0.0	0	0.0	12	100.0
Other Enterobacterales [note 2]	1	2.0	16	32.7	10	20.4	21	42.9	1	2.0	0	0.0	49	100.0
Other Gram-negative bacteria [note 3]	0	0.0	0	0.0	0	0.0	2	100.0	0	0.0	0	0.0	2	0.0
Total	I 194		935		1,029		1,496		122		31		3,807	

#### Notes to Table 4

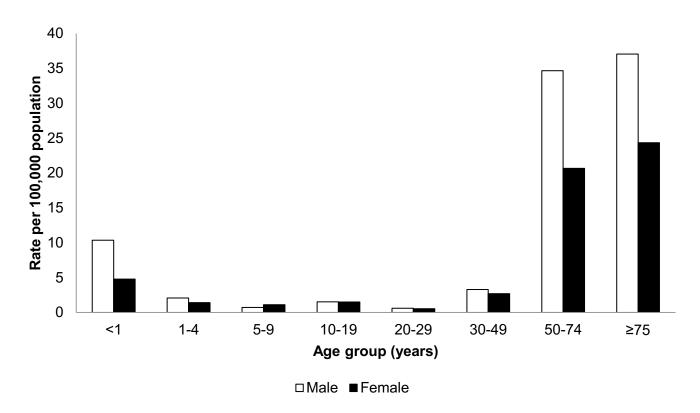
Note 1. KPC and OXA-48-like in *Pseudomonas* spp. and OXA-48-like in *Acinetobacter* spp. are extremely rare, and results should be interpreted with caution. The numbers reported here have not been confirmed by the AMRHAI Reference Unit Note 2. Includes coliform, *Hafnia* spp., *Kluyvera* spp., *Leclercia adecarboxylata*, *Mixta calida*, *Pantoea* spp., *Phytobacter ursingii*, *Pluralibacter gergoviae*, *Proteus mirabilis*, *Providencia* spp., and *Raoultella* spp.

Note 3. Includes *Aeromonas hydrophila*, and *Bacteroides fragilis*. The numbers reported here have not been confirmed by the AMRHAI Reference Unit

# Age and sex distribution

The rate of acquired carbapenemase-producing Gram-negative bacteria 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 7.6 and 5.7 reports per 100,000 population, respectively: Figure 5). 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. and has been consistent across all quarters of mandatory acquired carbapenemase-producing Gram-negative bacteria reporting.

Figure 5. Rates [note 1] of acquired carbapenemase-producing Gram-negative bacteria episodes per 100,000 population by age and sex [note 2] (England): October 2020 to June 2022



#### Notes to Figure 5

Note 1. Rates have been calculated using cumulative episodes across all seven quarters of reporting, and as such cannot be compared to previous quarters. Note 2. Information about patient sex is only recorded in 97% of cases.

Figure 5 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 (30.2 per 100,000 population) followed by the those aged between 50 to 74 years old (28.1 per 100,000 population). The overall rate of confirmed acquired carbapenemase-producing Gram-negative bacteria was 8.3 per 100,000 population in infants less than one year old.

# Quarterly mandatory laboratory return reporting (QMLR) (October 2021 to June 2022)

Table 5. Quarterly mandatory laboratory return reporting (QMLR) returns for the total number of rectal swabs and faecal screening specimens taken for CPE screening by acute Trust type [note 1] (England): October to June 2022

	Q4 2	020	Q1 20	021	Q2 2	021	Q3 2	021	Q4 2	021	Q1 2	022	Q2 2	022
Trust type [note 1]	Reported screens (%)	Total # screens	Reported screens (%)	Total # screens										
Small	21 (77.8)	3,759	19 (70.4)	3,605	18 (66.7)	6,134	15 (55.6)	3,217	14 (37.0)	1,803	10 (29.6)	1,492	8 (29.6)	1,679
Medium	22 (84.6)	6,943	22 (84.6)	7,725	22 (84.6)	9,853	22 (84.6)	10,001	20 (73.1)	8,203	19 (46.1)	7,506	12 (46.2)	6,780
Large	26 (92.9)	10,550	24 (85.7)	10,378	23 (82.1)	10,842	22 (78.6)	11,827	21 (67.9)	12,096	19 (28.6)	10,195	8 (28.6)	5,490
Multi- service	3 (75.0)	480	3 (75.0)	406	3 (75.0)	581	3 (75.0)	536	3 (75.0)	576	3 (75.0)	533	3 (75.0)	957
Specialist	13 (81.3)	5,412	14 (87,5)	5,547	13 (81.3)	4,717	13 (81.3)	5,472	14 (62.5)	5,998	10 (37.5)	4,178	6 (37.5)	2,567
Teaching	31 (86.1)	74,281	31 (86.1)	65,181	27 (75.0)	50,692	26 (72.2)	37,777	26 (63.9)	38,219	23 (41.7)	29,488	15 (41.7)	25,910
Total	116 (84.7)	101,425	113 (82.5)	92,842	106 (77.4)	82,819	101 (73.7)	68,830	98 (61.3)	66,895	84 (38.0)	53,392	52 (38.0)	43,383

#### Note to Table 5

Note 1. 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 quarterly mandatory laboratory returns (QMLR) section of the Healthcare Associated Infections Data Capture System in October 2019, and reporting became mandatory in October 2020. Across all seven quarters, there were 509,586 screens reported by 116 NHS Trusts leading to an overall percentage of Trusts reporting their CPE screens of 69.9% (Table 5). This means that across all seven quarters, there were 289 instances where an NHS Trust did not submit a return and 16 acute NHS Trusts that have not submitted a return for any of the quarters. Of the acute Trusts that reported screening data, 3.1% reported that they conducted 0 screens (by quarter from Q4 2020 to Q2 2022 there were seven, four, three, four, three, two, and two reports of 0 screens). Between each consecutive quarter, both the number of Trusts that reported screens and the total number of screens fell (116 Trusts reporting 101,425 screens in Q4 2020 compared to 52 Trusts reporting 43,383 screens in Q2 2022). UKHSA will be contacting Trusts who are not consistently reporting to remind them that this is a mandatory return and to retrospectively report missing data in due course.

Screening was more common in the acute teaching Trusts, accounting for 63.1% of screening swabs taken during this time period. By reporting acute Trust, the total screens reported by quarter ranged from 0 to 18,859. The full list of reporting, including those that did not submit a return, is available in the data appendix by individual NHS acute Trust.

### Reference

1. Bonnin R and others. (2020) '<u>A single Proteus mirabilis lineage from human and animal sources: a hidden reservoir of OXA-23 or OXA-58 carbapenemases in Enterobacterales</u>'. Scientific Reports volume 10, issue 1, page 9,160

# **Appendix**

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 2020 to June 2022

			202	0				2022			
Trust name	Trust type	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Airedale NHS Foundation Trust	Small	41	9	17	4	11	22	24	32		
Alder Hey Children's NHS Foundation Trust	Specialist				1216	890	261	1151	1344	1231	1129
Ashford And St Peter's Hospitals NHS Foundation Trust	Medium			255	271	267	253	283	337	245	239
Barking, Havering and Redbridge University Hospitals NHS Trust	Large		576	1024	1108	1353					
Barnsley Hospital NHS Foundation Trust	Small	101			38						
Barts Health NHS Trust	Teaching	1533	1112	1727	1555	1321	2128	2737	1733	1775	
Bedfordshire Hospitals NHS Foundation Trust	Medium	83	29	191		154	155	158	134	148	122
Birmingham Women's and Children's NHS Foundation Trust	Specialist										
Blackpool Teaching Hospitals NHS Foundation Trust	Teaching	760	591	958	689	719	980	796	792	801	858
Bolton NHS Foundation Trust	Medium	502	286	469	362	389	409	403	425	344	
Bradford Teaching Hospitals NHS Foundation Trust	Teaching	541	545	697	629		288				
Buckinghamshire Healthcare NHS Trust	Multi-Service			526	405	389	546	501	503	444	555
Calderdale And Huddersfield NHS Foundation Trust	Large	151	46	44	37		62	101	39	40	81
Cambridge University Hospitals NHS Foundation Trust	Teaching	1587	959	1273	1332	992	1257	1340	1407	1602	
Chelsea And Westminster Hospital NHS Foundation Trust	Teaching										
Chesterfield Royal Hospital NHS Foundation Trust	Small										
Countess Of Chester Hospital NHS Foundation Trust	Small										
County Durham and Darlington NHS Foundation Trust	Multi-Service		10		68	12	30	28	63	82	363
Croydon Health Services NHS Trust	Medium			0	358	288	449	503	500	502	
Dartford And Gravesham NHS Trust	Small		0						0		
Doncaster And Bassetlaw Teaching Hospitals NHS Foundation Trust	Teaching			75		55		85	78	122	202
Dorset County Hospital NHS Foundation Trust	Small	31	17	32	14	26	57				
East And North Hertfordshire NHS Trust	Large			1304	1206	982	1314	1308	1274	1166	
East Cheshire NHS Trust	Small	83	7	35	10	33	19	29			
East Kent Hospitals University NHS Foundation Trust	Teaching	421	225	339	338	249	395	383	400	378	
East Lancashire Hospitals NHS Trust	Large	933	464	619	453	489	538	751	697		556
East Suffolk and North Essex NHS Foundation Trust	Medium										
East Sussex Healthcare NHS Trust	Large	520	306	339	373	264	396	411	370	289	
Epsom And St Helier University Hospitals NHS Trust	Large			0	368	313	292	312	270		
Essex Partnership University NHS Foundation Trust	Multi-Service										
Frimley Health NHS Foundation Trust	Medium				679	659	691	568	705	741	795

Gateshead Health NHS Foundation Trust	Small	8	2	5	3	17	18	15	22		
George Eliot Hospital NHS Trust	Small	52	18	77	74	47					
Gloucestershire Hospitals NHS Foundation Trust	Large			119	98	57	56	73	77	83	
Great Ormond Street Hospital for Children NHS Foundation Trust	Specialist	1345	1158	1207	1200	1223	1324	1353	1420	1445	1121
Great Western Hospitals NHS Foundation Trust	Medium	45	52	88	125	186	139	135	118	147	
Guy's And St Thomas' NHS Foundation Trust	Teaching	4205	3245	3635	3537	693					
Hampshire Hospitals NHS Foundation Trust	Large	29	28	124	218	266	250	273	290	235	283
Harrogate And District NHS Foundation Trust	Small	182	100	87	141						
Homerton University Hospital NHS Foundation Trust	Medium				938	1080	1164	1170	882	808	1094
Hull University Teaching Hospitals NHS Trust	Teaching										
Imperial College Healthcare NHS Trust	Teaching	24039	12546	19790	18859	15952					
Isle Of Wight NHS Trust	Multi-Service		5	0	7	5	5	7	10	7	39
James Paget University Hospitals NHS Foundation Trust	Small	31	13	30	15	7	10	10	10	50	44
Kettering General Hospital NHS Foundation Trust	Small	169	148	232	223	165	223	285	275	213	
King's College Hospital NHS Foundation Trust	Teaching			0	11008	9471	10547				
Kingston Hospital NHS Foundation Trust	Small		0	0	122	95	96	88	86	76	54
Lancashire Teaching Hospitals NHS Foundation Trust	Teaching				134	119	0	185	140	102	264
Leeds Teaching Hospitals NHS Trust	Teaching			0	1488	1319	1188	2214	2360		
Lewisham And Greenwich NHS Trust	Large	1020	639	926	686	1684	929	1045	2102	1820	
Liverpool Heart and Chest Hospital NHS Foundation Trust	Specialist			357	327	381	367	413	364		
Liverpool University Hospitals NHS Foundation Trust	Teaching			2904	2744	2970	2940	2707	3166		
Liverpool Women's NHS Foundation Trust	Specialist			76	55	68	63	94	70		
London North West University Healthcare NHS Trust	Large			788	766	888	765	776		649	
Maidstone And Tunbridge Wells NHS Trust	Large	683	363	451	392	341	478	310	332		
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	185	42	114	22	120	98	86			
Mid Yorkshire Hospitals NHS Trust	Large	81	22	28	15	99	200	191	192	149	
Milton Keynes University Hospital NHS Foundation Trust	Small	24									
Moorfields Eye Hospital NHS Foundation Trust	Specialist	0		0	0	0	0	0	0	0	0
Norfolk And Norwich University Hospitals NHS Foundation Trust	Teaching	136	74	88	85	86	48	120	239	660	
North Bristol NHS Trust	Large		99	145	62	164	37				
North Cumbria Integrated Care NHS Foundation Trust	Small	393	90	89	63	67	2637	1722	271	194	566
North Middlesex University Hospital NHS Trust	Small	2108	1567	2119	2362	2396	2099				
North Tees and Hartlepool NHS Foundation Trust	Medium	395	268	292	290	245	199	356			
North West Anglia NHS Foundation Trust	Large	229	115	200	158	86	142	172	174	147	143

Northampton General Hospital NHS Trust	Medium		46		181	762	1062	858			
Northern Care Alliance NHS Foundation Trust	Teaching	434	258	339	286	275	275	296	242	219	
Northern Lincolnshire and Goole NHS Foundation Trust	Large	84	48	41	13		7	15	20	13	
Northumbria Healthcare NHS Foundation Trust	Large	55	7	23	14	49					
Nottingham University Hospitals NHS Trust	Teaching				204	956	1537	1810	1666	1897	2248
Oxford University Hospitals NHS Foundation Trust	Teaching	561	373	566	585	489	618	713	776	684	1181
Pennine Acute Hospitals NHS Trust	Large	784	489	581	495	510	691	679	731	740	
Portsmouth Hospitals University National Health Service Trust	Large			310	280	295	356	332	244	326	
Queen Victoria Hospital NHS Foundation Trust	Specialist			0	0	2		0	1	1	6
Royal Berkshire NHS Foundation Trust	Large	477	316	324	696	394	551	524	525	407	812
Royal Cornwall Hospitals NHS Trust	Large	105	54	50	53	59	58	148	427	130	
Royal Devon University Healthcare NHS Foundation Trust	Large	217	208	281	156	204	217	303	294	264	300
Royal Free London NHS Foundation Trust	Teaching	8219	4611	7669	8354	6194	7400				
Royal National Orthopaedic Hospital NHS Trust	Specialist	255	309	204	234	473	316		238	239	
Royal Papworth Hospital NHS Foundation Trust	Specialist	89	114	75	85	125	66	64	47	51	
Royal Surrey County Hospital NHS Foundation Trust	Medium	385	223	454	692	725	1135	1159	1183	1186	1144
Royal United Hospitals Bath NHS Foundation Trust	Medium		21	20	0	244	334	229	173	160	
Salisbury NHS Foundation Trust	Small	113	72	81	81	68	86				
Sandwell And West Birmingham Hospitals NHS Trust	Large		0	0	0	0					
Sheffield Children's NHS Foundation Trust	Specialist	0		0	0	0	2	0	3	1	11
Sheffield Teaching Hospitals NHS Foundation Trust	Teaching	332	173	315	353	259	463	496	644	560	812
Sherwood Forest Hospitals NHS Foundation Trust	Medium	0			0						
South Tees Hospitals NHS Foundation Trust	Teaching	134	27	26	46	16	88	143	304	412	210
South Tyneside and Sunderland NHS Foundation Trust	Large										
South Warwickshire NHS Foundation Trust	Small				0	0	0	0	0	0	0
Southport And Ormskirk Hospital NHS Trust	Small			203	172	180	224	270	241	198	236
St George's University Hospitals NHS Foundation Trust	Teaching			0	84	906	979	961	1268	1332	
St Helens And Knowsley Teaching Hospitals NHS Trust	Medium	1807	1131	1613	1541	1222	1546	1688	1557	1334	1419
Stockport NHS Foundation Trust	Medium				161	126	241	269	203	258	312
Surrey And Sussex Healthcare NHS Trust	Medium	169	81		146	117	167	156	146		
Tameside And Glossop Integrated Care NHS Foundation Trust	Small	277	228	228	170	164	196	209	192		
The Christie NHS Foundation Trust	Specialist	330	297	246	322	297	358	467	619		
The Clatterbridge Cancer Centre NHS Foundation Trust	Specialist										
The Dudley Group NHS Foundation Trust	Medium	15	3	6	14	9	16	46	30	32	
The Hillingdon Hospitals NHS Foundation Trust	Small										
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	Teaching	817	459	680	591	842	740	749	673	595	
The Princess Alexandra Hospital NHS Trust	Small	35	8	15	21	12	28	93	217	236	282

The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	Small	21	7	2	3	2	4	5	94	126	193
The Robert Jones and Agnes Hunt Orthopaedic Hospital NHS Foundation Trust	Specialist	71	103	135	104	87	98	82	90	51	
The Rotherham NHS Foundation Trust	Medium	1	69		68	94	520	548	452	14	11
The Royal Marsden NHS Foundation Trust	Specialist	1265	1045	1126	1200	1175	1200	1148	1159	1101	
The Royal Orthopaedic Hospital NHS Foundation Trust	Specialist	19	22			25	56	31	38	58	300
The Royal Wolverhampton NHS Trust	Large	2201	938	1315	1161	949	1220	1031	1047	893	1019
The Shrewsbury and Telford Hospital NHS Trust	Large	102	50	143	134	124	125	143	135	91	
The Walton Centre NHS Foundation Trust	Specialist	662	495	487	669	801	606	669	605		
Torbay And South Devon NHS Foundation Trust	Medium	7	4	1	9	12	2	9	5	4	1
United Lincolnshire Hospitals NHS Trust	Large	282	93				303	394	512	421	
University College London Hospitals NHS Foundation Trust	Teaching	312	312	369	419	537	601	793	912	970	899
University Hospital Southampton NHS Foundation Trust	Teaching			236	282	1390	224	254	386	328	505
University Hospitals Birmingham NHS Foundation Trust	Teaching										
University Hospitals Bristol and Weston NHS Foundation Trust	Teaching	19	4	10	1302	1322					
University Hospitals Coventry and Warwickshire NHS Trust	Teaching	562	202	388	433	448	547	809	978	811	902
University Hospitals of Derby and Burton NHS Foundation Trust	Teaching	174	101	64	100	48	94	93	97	85	
University Hospitals of Leicester NHS Trust	Teaching	4215	2957	5413	6818	5870	7325	6919	6834	6348	6842
University Hospitals of Morecambe Bay NHS Foundation Trust	Medium	71	65	131	89	72	112	130	106	81	
University Hospitals of North Midlands NHS Trust	Teaching				8487	8213	9446	9593	9975	8965	8962
University Hospitals Plymouth NHS Trust	Teaching			175	132	167	146	416	628	535	
University Hospitals Sussex NHS Foundation Trust	Large	141	63	116	162	88					
Walsall Healthcare NHS Trust	Medium				44	184	182	231	302	558	710
Warrington And Halton Teaching Hospitals NHS Foundation Trust	Teaching	650	320	436	390	376	392	288	296	276	285
West Hertfordshire Hospitals NHS Trust	Medium		214	477	668	549	780	857	662	713	724
West Suffolk NHS Foundation Trust	Small										
Whittington Health NHS Trust	Medium	79	42	86	211	58	69	41	54	54	
Wirral University Teaching Hospital NHS Foundation Trust	Teaching	5986	2815	2748	2925	2900		2844	2147		1669
Worcestershire Acute Hospitals NHS Trust	Large	2202	694	1534	1446	720	1855	2535	2344	2332	2296
Wrightington, Wigan and Leigh NHS Foundation Trust	Medium				96	283	228	204	229	177	209
Wye Valley NHS Trust	Small	323	164	206	178	167	273	329	304	246	304
Yeovil District Hospital NHS Foundation Trust	Small	0	0	29	43	28	44	52	59	153	
York And Scarborough Teaching Hospitals NHS Foundation Trust	Teaching	81	40	30	92	27	46	33	78	31	71
Total		78,221	46,416	74,115	101,796	931,53	832,03	692,14	683,23	546,98	433,83

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