



UK Health  
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Agency

# Quarterly laboratory surveillance of acquired carbapenemase-producing Gram-negative bacteria in England: October 2020 to December 2021

Health Protection Report  
Volume 16 Number 4  
22 March 2022

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## Background

From 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 any 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.

These analyses are based on data relating to notifications of confirmed acquired carbapenemase-producing Gram-negative bacteria between October 2020 and December 2021 in England. The data was extracted on 20 October 2021 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 London.

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. The following table uses these 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*.

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 a carbapenemase (that is any bacterial genera other than a member of the Enterobacterales, *Pseudomonas* spp. or *Acinetobacter* spp.), isolates should be sent to [AMRHAI Reference Unit](#) for confirmation.

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

Carbapenemase family	Associated with common 'host' organism		
	Enterobacterales	<i>Pseudomonas</i> spp.	<i>Acinetobacter</i> spp.
<b>KPC</b>	¥	<10	<10
<b>OXA-48-like</b>	¥	<10	0
<b>NDM</b>	¥	¥	¥
<b>VIM</b>	¥	¥	<10
IMP	¥	¥	¥
IMI/NMC-A	B ¥	0	0
GES	¥	¥	0
FRI	<10	0	0
SME	<10 <sup>c</sup> ¥	0	0
DIM	0	<10	0

Carbapenemase family	Associated with common 'host' organism		
	Enterobacterales	<i>Pseudomonas</i> spp.	<i>Acinetobacter</i> spp.
GIM	<10	0	0
KHM	0	<10	0
SIM	0	<10	0
SPM	0	<10	0
OXA-23-like	0	0	¥
OXA-40-like	0	0	¥
OXA-51-like <sup>A</sup>	0	0	¥
OXA-58-like	0	0	¥

## First 15 months of notification data (October 2020 to December 2021)

Between October 2020 and December 2021, there were 2,831 acquired carbapenemase-producing Gram-negative bacteria episodes. The majority were identified in screening samples, accounting for 69.9% of carbapenemase notifications, with only 5.7% reported in sterile site specimens (Table 2).

**Table 2. Number and percentage of acquired carbapenemase-producing Gram-negative reports by specimen type (England): October 2020 to December 2021**

Specimen type	All reports		From AMRHAI ‡	
	No.	%	No.	%
Sterile site samples	161	5.7	78	12.3
Screening samples	1979	69.9	305	48.1
Other samples *	691	24.4	251	39.6
All samples	2,831	100.0	634	100.0

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

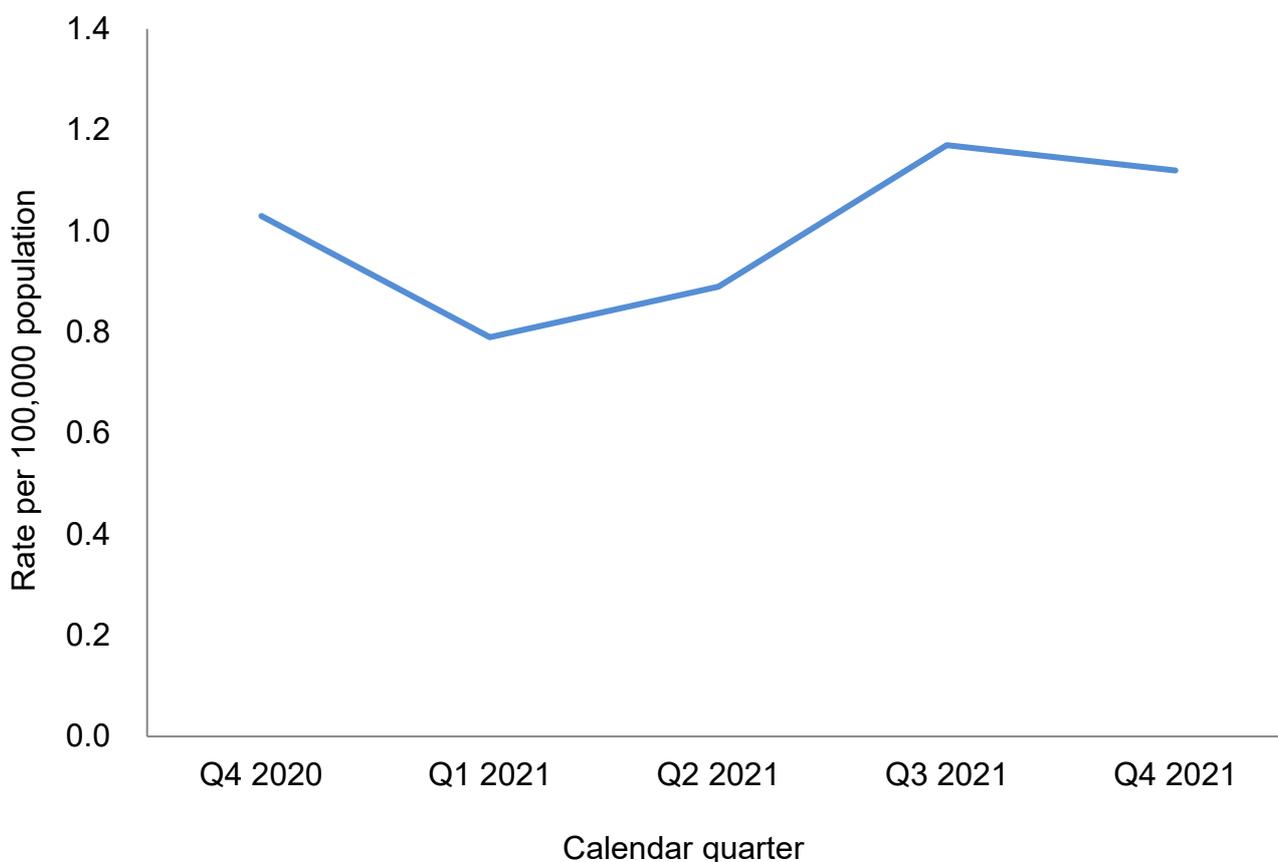
‡ The AMRHAI Reference Unit actively encourages submission of sterile site isolates for carbapenemase confirmation; the distribution of specimen type will reflect this.

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

## Quarterly trends

The quarterly rate of acquired carbapenemase-producing Gram-negative bacteria reports over the first year of notifiable reporting is shown in Figure 1. The overall rate of reporting between October 2020 and December 2021 was 1.00 per 100,000 population. The rate of reports was higher in the second half of the calendar year – in Q3 2021 and Q4 2021 the rate of reports were 1.17 and 1.12 per 100,000 population, whereas in Q1 and Q2 of 2021 this was 0.79 and 0.89 per 100,000 population, respectively. Similarly, in Q4 2020, the rate of reports was also slightly higher (1.03 per 100,000 population). However; as there are only 15 months 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 could be affected by COVID-19 ‘waves’ seen through 2020 and 2021 or associated with local carbapenemase-producing Gram-negative bacteria outbreaks that have occurred during these periods.

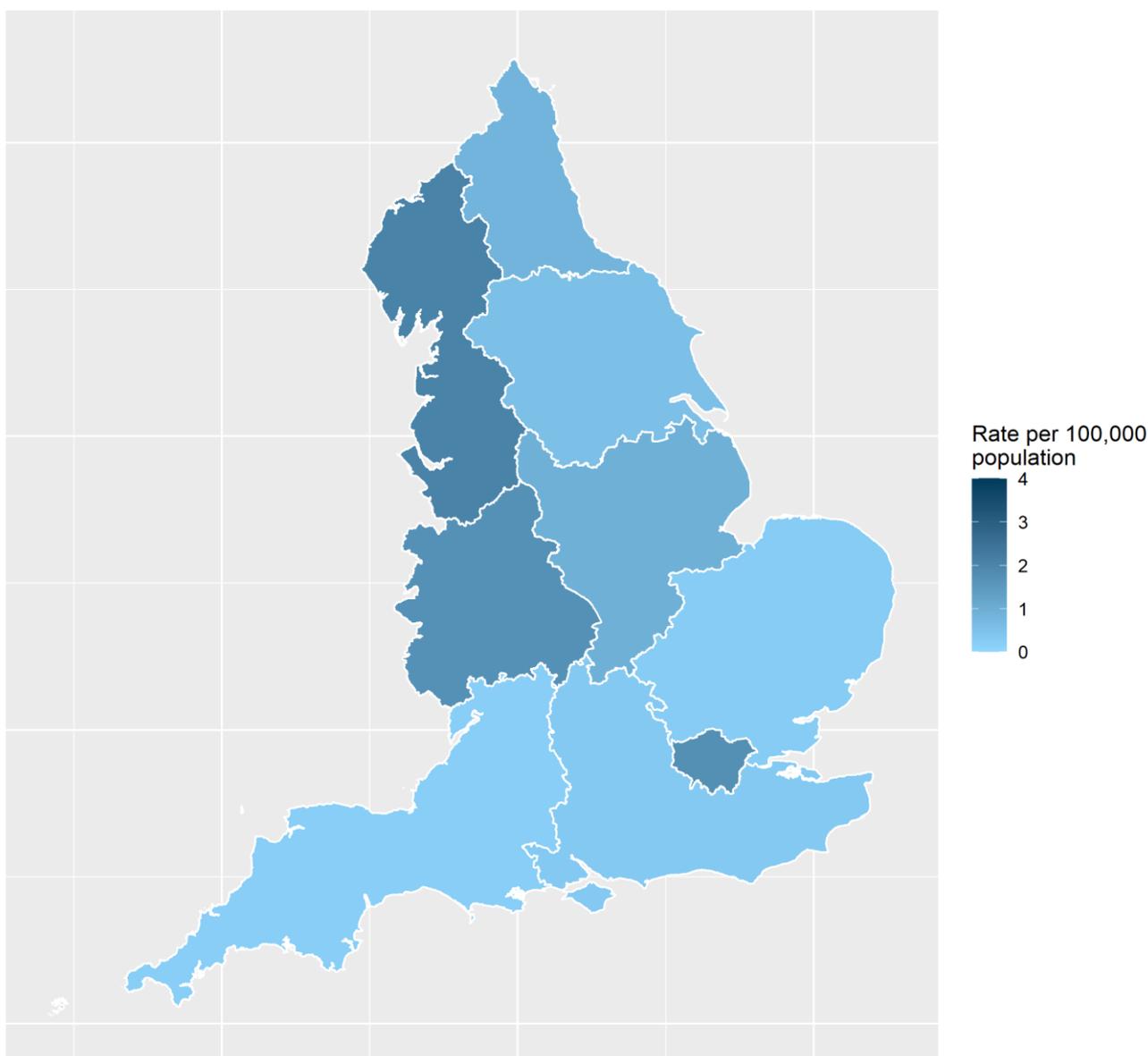
**Figure 1. Rate of acquired carbapenemase-producing Gram-negative reports by quarter, October 2020 to December 2021**



## Geographic distribution

The rate of acquired carbapenemase-producing Gram-negative reports varied by region (Figure 2), with the highest overall rate for all 5 quarters combined being in the North West (2.05 per 100,000 population), followed by the London region (1.75 per 100,000 population). The lowest incidence across the time period was reported in the East of England and South West regions (0.26 and 0.21 reports per 100,000 population, respectively).

**Figure 2. Geographical distribution of acquired carbapenemase-producing Gram-negative bacteria incidence rates per 100,000 population (England): October 2020 to December 2021**



Comparing the regional case numbers and rates across all 5 quarters (Table 3), all regions noted a decrease between Q4 2020 and Q1 2021, with the exception of the North East region and Yorkshire and Humber region, where the rate per 100,000 population increased from 0.34 to 0.75 (9 to 20 reports) and from 0.42 to 0.49 (23 to 27 reports), respectively. Between Q1 and Q2 2021, all regions noted an increase, with the exception of the East of England and West Midlands regions, where the rate per 100,000 population decreased from 0.28 to 0.18 (19 to 12 reports) and from 1.34 to 1.07 (80 to 64 reports), respectively. Between Q2 and Q3 of 2021, case numbers and rates increased or remained fairly stable in the majority of regions; however, the number of acquired carbapenemase-producing Gram-negative bacteria reports from the West Midlands more than doubled (from 64 to 130) between Q2 and Q3 2021. In the most recent quarter (Q4 2021), the number of reports from the West Midlands remained elevated (138 reports; 2.31 per 100,000 population). This increase likely reflects an increase in screening due to an ongoing investigation and may not actually represent an increase in prevalence.

Between Q3 and Q4 2021, the number of reports slightly increased or remained fairly stable in most regions. However, large drops in the rate of reporting compared to the previous quarter were observed in the North West and London regions. Comparing Q4 between 2020 and 2021, the North East region has had an increase in rate from 0.34 to 1.12 reports per 100,000 population (9 to 30 reports in each quarter respectively).

While the London region recorded the highest number of acquired carbapenemase-producing Gram-negative bacteria in Q4 2020 and Q1 2021 (183 and 126, respectively), the North West had the highest rate in these quarters (2.23 and 1.60 reports per 100,000 population, respectively). In both Q2 and Q3 2021, the North West recorded both the highest number of acquired carbapenemase-producing Gram-negative bacteria (145 and 181), and the highest rate (1.97 and 2.46 reports per 100,000 population). In Q4 2021, the highest number of reports (149) was from the London whereas the highest rate came from the West Midlands (1.66 per 100,000 population)

**Table 3. Rate per 100,000 population of acquired carbapenemase-producing Gram-negative reports by region (England): October 2020 to December 2021**

Region	Local Area Region	Q4 2020		Q1 2021		Q2 2021		Q3 2021		Q4 2021		Trend line
		No.	Rate	Rate								
North of England	North East	9	0.34	20	0.75	26	0.97	23	0.86	30	1.12	
	North West	164	2.23	118	1.6	145	1.97	181	2.46	145	1.97	
	Yorkshire and Humber	23	0.42	27	0.49	35	0.63	33	0.6	34	0.62	
Midlands and East of England	East Midlands	47	0.97	32	0.66	41	0.84	54	1.11	51	1.05	
	East of England	23	0.34	19	0.28	12	0.18	5	0.07	27	0.4	
	West Midlands	88	1.48	80	1.34	64	1.07	130	2.18	138	2.31	
London	London	183	2.03	126	1.4	145	1.61	184	2.04	149	1.66	
South of England	South East	32	0.36	18	0.2	19	0.21	28	0.31	47	0.53	
	South West	16	0.29	7	0.13	16	0.29	10	0.18	10	0.18	
<b>England overall</b>		<b>585</b>	<b>1.03</b>	<b>447</b>	<b>0.79</b>	<b>503</b>	<b>0.89</b>	<b>648</b>	<b>1.15</b>	<b>631</b>	<b>1.12</b>	

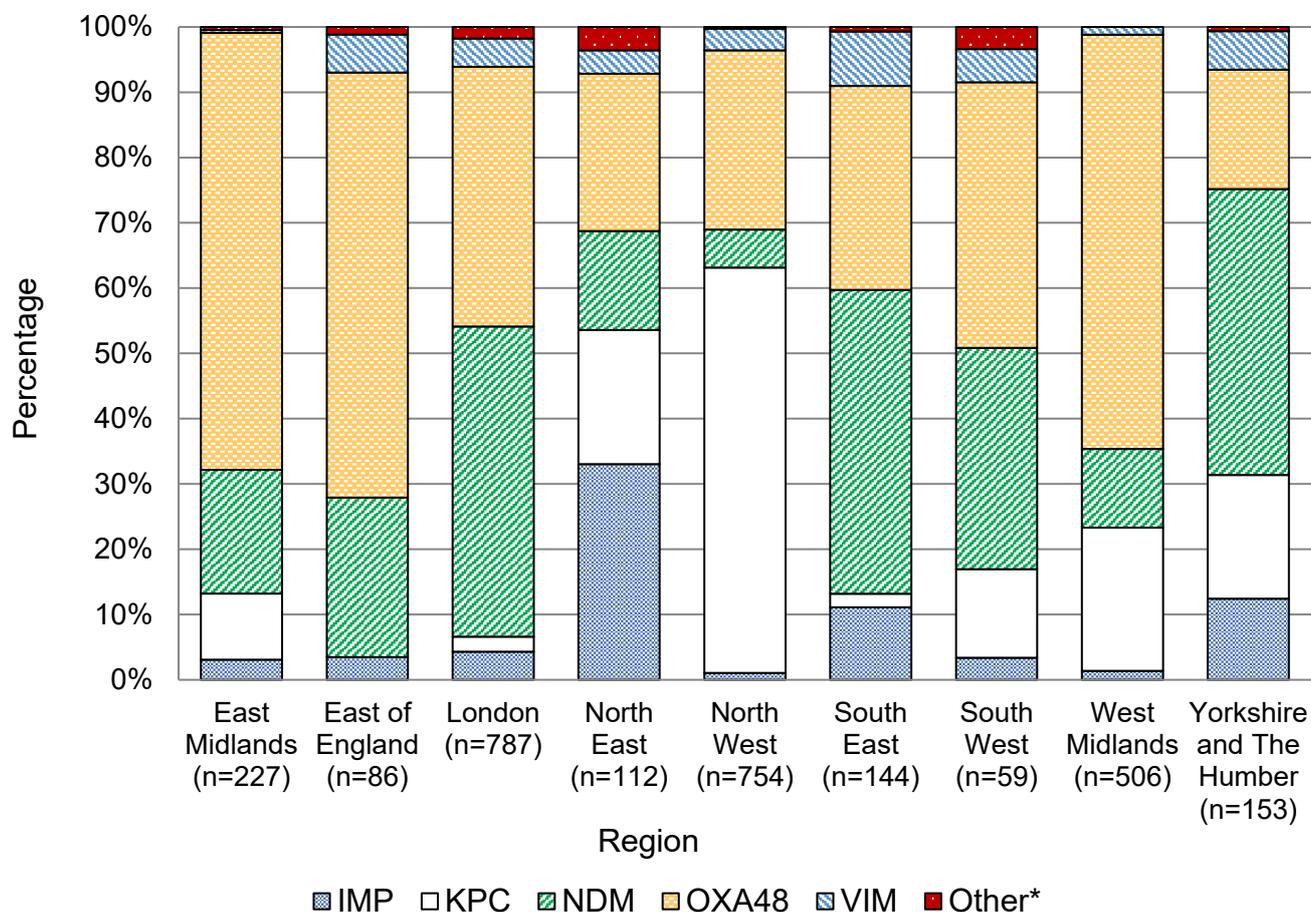
Trend line vertical axes are set to zero for each region.

## Regional differences in carbapenemase family

Between October 2020 and December 2021, the most common carbapenemase families reported across all regions were OXA-48-like (41%), NDM (25%), and KPC (25%). However, similarly to the incidence of reports, the distribution of carbapenemase families identified also varied regionally (Figure 3).

In the North West, which had the highest incidence rate for the first 15 months of mandatory reporting, the most common carbapenemase families identified were KPC (62%) and OXA-48-like (27%). KPC was not as common in any of the other regions, only accounting for between 0 and 22% of notifications in each region. For example, in London, which also had a high overall incidence rate, KPC accounted for 2% with NDM and OXA-48-like carbapenemases dominating the reports (48% and 40%, respectively). Another regional difference was observed in the North East, where IMP was the most commonly identified carbapenemase family (33%), only accounting for a small percentage of reports in other regions (up to 12%). 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 (41% in the South West and 65% in the East of England, respectively).

**Figure 3. Regional distribution of reports by carbapenemase family (England): October 2020 to December 2021**



\* Other carbapenemase families include GES and IMI

## Distribution of species and carbapenemase family

Across the 15 month period, the most frequently isolated Gram-negative bacterial species with a confirmed acquired carbapenemase was *Klebsiella pneumoniae*, accounting for 33.0% of all specimens. This was followed by *Escherichia coli* and *Enterobacter* spp., which accounted for 25.5% and 20.8% of all specimens, respectively (Table 4).

Across these 3 species, the carbapenemase family most frequently identified was OXA-48-like (46.0%, 37.8% and 45.1% in *K. pneumoniae*, *Enterobacter* spp. and *E. coli*, respectively). In *K. pneumoniae* and *Enterobacter* spp. isolates, this was followed by KPC and NDM carbapenemase families (27.7% and 23.4% in *K. pneumoniae* and 30.3% and 20.2% in *Enterobacter* spp.), and in *E. coli* this was followed by NDM (32.5%) and KPC (18.9%) 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 is negative for the big 5 carbapenemases are referred to the AMRHAI Reference Unit for identification and/or confirmation. In England between October 2020 and September 2021, both GES and IMI carbapenemases were identified in small numbers (26 total), none being identified from invasive specimens. All IMI carbapenemases (12 in total) were identified in *Enterobacter* spp. isolates.

**Table 4. Reports of acquired carbapenemase-producing Gram-negative bacteria by species and carbapenemase family (England): October 2020 to December 2021**

Carbapenemase family	IMP		KPC		NDM		OXA-48-like		VIM		Other		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<i>Acinetobacter</i> spp.	3	11.5	0	0.0	20	76.9	2*	7.7	0	0.0	1	3.8	26	100.0
<i>Citrobacter</i> spp.	8	4.5	45	25.6	37	21.0	77	43.8	8	4.5	1	0.6	176	100.0
<i>Enterobacter</i> spp.	52	8.8	178	30.3	119	20.2	222	37.8	5	0.9	12	2.0	588	100.0
<i>Escherichia coli</i>	15	2.1	137	18.9	235	32.5	326	45.1	9	1.2	1	0.1	723	100.0
Other <i>Escherichia</i> spp.	0	0.0	0	0.0	0	0.0	2	100.0	0	0.0	0	0.0	2	100.0
<i>Klebsiella oxytoca</i>	7	8.2	29	34.1	5	5.9	40	47.1	4	4.7	0	0.0	85	100.0
<i>Klebsiella pneumoniae</i>	18	1.9	259	27.7	219	23.4	430	46.0	9	1.0	0	0.0	935	100.0
Other <i>Klebsiella</i> spp.	7	8.2	15	17.6	30	35.3	29	34.1	4	4.7	0	0.0	85	100.0
<i>Morganella</i> spp.	0	0.0	0	0.0	5	33.3	10	66.7	0	0.0	0	0.0	15	100.0
<i>Pseudomonas aeruginosa</i>	21	18.1	4*	3.4	29	25.0	5*	4.3	46	39.7	11	9.5	116	100.0
Other <i>Pseudomonas</i> spp.	3	10.3	4*	13.8	6	20.7	2*	6.9	14	48.3	0	0.0	29	100.0
<i>Serratia</i> spp.	0	0.0	0	0.0	4	36.4	7	63.6	0	0.0	0	0.0	11	100.0
Other Gram-negative bacteria‡	1	2.5	12	30.0	6	15.0	21	52.5	0	0.0	0	0.0	40	100.0
<b>Total</b>	<b>135</b>		<b>683</b>		<b>715</b>		<b>1,173</b>		<b>99</b>		<b>26</b>		<b>2,831</b>	

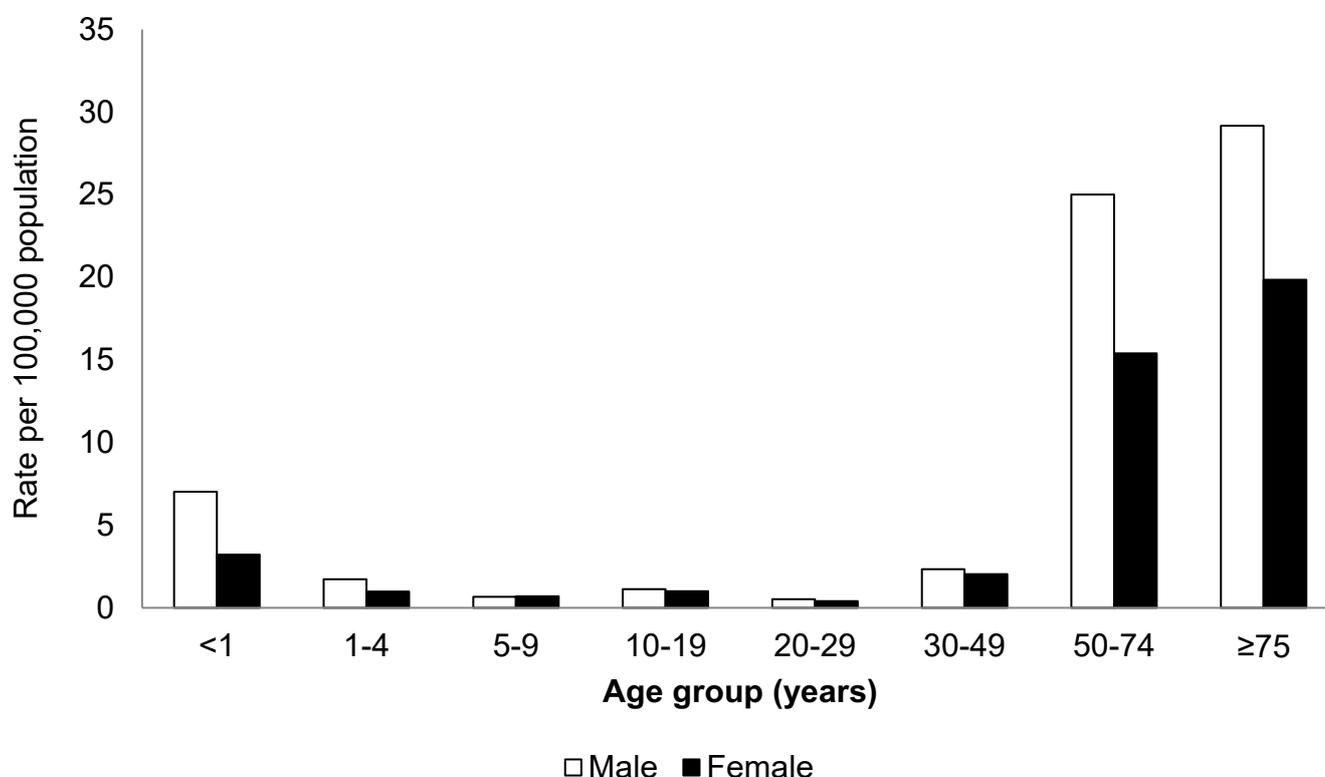
‡ includes *Aeromonas hydrophila*, *Bacteroides fragilis*, coliform, other *Escherichia* spp., *Hafnia* spp., *Kluyvera* spp., *Leclercia adecarboxylata*, *Pantoea* spp., *Phytobacter ursingii*, *Pluralibacter gergoviae*, *Proteus mirabilis*, *Providencia rettgeri*, and *Raoultella* spp.

\* 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 reference laboratory

## Age and sex distribution

The rate of acquired carbapenemase-producing Gram-negative bacteria reports 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 5.6 and 4.3 reports 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. Rates\* of acquired carbapenemase-producing Gram-negative bacteria reports per 100,000 population by age and sex† (England): October 2020 to December 2021**



\* Rates have been calculated using cumulative reports across all 5 quarters of reporting, and as such cannot be compared to previous quarters

† 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 (24.2 per 100,000 population) followed by the those aged between 50 to 74 years old (20.6 per 100,000 population). The overall rate of confirmed carbapenemases was 5.6 per 100,000 population in infants less than one year old.

## Quarterly Mandatory Laboratory Return (QMLR) reporting (October 2021 to December 2021)

**Table 5. QMLR returns for the total number of rectal swabs and faecal screening specimens taken for CPE screening by acute Trust type\* (England): October to December 2021**

Trust type*	Oct-Dec (Q4) 2020		Jan-Mar (Q1) 2021		Apr-Jun (Q2) 2021		Jul-Sep (Q3) 2021		Oct-Dec (Q4) 2021	
	Reported screens (%)	Total # screens								
Small	22 (78.6)	3,826	20 (71.4)	3,682	18 (64.3)	6,195	12 (42.9)	2,752	10 (35.7)	1,289
Medium	22 (84.6)	6,943	21 (80.8)	7,653	21 (80.8)	9,741	19 (73.1)	9,459	17 (45.4)	7,530
Large	26 (92.9)	10,483	24 (85.7)	10,301	22 (78.6)	10,285	21 (75.0)	11,449	18 (64.3)	8,899
Multiservice	3 (75.0)	480	3 (75.0)	406	3 (75.0)	581	3 (75.0)	536	3 (75.0)	576
Specialist	13 (81.3)	5,412	14 (87.5)	5,547	13 (81.3)	4,717	13 (81.3)	5,472	12 (75.0)	4,234
Teaching	31 (86.1)	74,281	31 (86.1)	65,181	27 (75.0)	50,692	25 (69.4)	36,984	22 (61.1)	28,035
<b>Total</b>	<b>117 (84.8)</b>	<b>101,425</b>	<b>113 (81.9)</b>	<b>92,770</b>	<b>104 (75.4)</b>	<b>82,211</b>	<b>93 (67.4)</b>	<b>66,652</b>	<b>82 (59.4)</b>	<b>50,563</b>

\* 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 all 5 quarters, there were 393,621 screens reported by 117 NHS Trusts leading to an overall Trust reporting rate of 73.8% (Table 5). This means that across all quarters, there were 181 instances where an NHS Trust did not submit a return. Of the acute Trusts that reported screening data, 3% reported that they conducted zero screens (by quarter from Q4 2020 to Q4 2021 this was 7, 4, 3, 4, and 3 reports of 0 screens). Between each consecutive quarter, both the number of Trusts that reported screens and the total number of screens fell (117 Trusts reporting 101,425 screens in Q4 2020 compared to 82 Trusts reporting 50,563 screens in Q4 2021).

Screening was more predominant in the acute Teaching trusts, accounting for 64.8% of screening swabs taken during this time period. By reporting acute Trust, the total screens reported for the 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.

## 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): October to December 2021**

Trust name	Trust type	2020				2021			
		Jan to March	April to June	July to Sep	Oct to Dec	Jan to Mar	Apr to Jun	Jul to Sep	Oct to Dec
Airedale NHS Foundation Trust	Small	41	9	17	4	11	22		
Alder Hey Children's NHS Foundation Trust	Specialist				1,216	890	261	1,151	1,344
Ashford And St Peter's Hospitals NHS Foundation Trust	Medium			255	271	267	253	283	337
Barking, Havering And Redbridge University Hospitals NHS Trust	Large		576	1,024	1,108	1,353			
Barnsley Hospital NHS Foundation Trust	Small	101			38				
Barts Health NHS Trust	Teaching	1,533	1,112	1,727	1,555	1,321	2,128	2,737	1,733
Bedfordshire Hospitals NHS Foundation Trust	Medium	83	29	191		154	155	158	134
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
Bolton NHS Foundation Trust	Medium	502	286	469	362	389	409		
Bradford Teaching Hospitals NHS Foundation Trust	Teaching	541	545	697	629		288		

Trust name	Trust type	2020				2021			
		Jan to March	April to June	July to Sep	Oct to Dec	Jan to Mar	Apr to Jun	Jul to Sep	Oct to Dec
Buckinghamshire Healthcare NHS Trust	Multi-service			526	405	389	546	501	503
Calderdale And Huddersfield NHS Foundation Trust	Large	151	46	44	37		62	101	39
Cambridge University Hospitals NHS Foundation Trust	Teaching	1,587	959	1,273	1,332	992	1,257	1,340	1,407
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
Croydon Health Services NHS Trust	Medium			0	358	288	449	503	500
Dartford And Gravesham NHS Trust	Small		0						0
Doncaster And Bassetlaw Teaching Hospitals NHS Foundation Trust	Teaching			75		55		85	
Dorset County Hospital NHS Foundation Trust	Small	31	17	32	14	26	57		
East and North Hertfordshire NHS Trust	Large			1,304	1,206	982	1,314	1,308	1,274
East Cheshire NHS Trust	Small	83	7	35	10	33	19	29	

Trust name	Trust type	2020				2021			
		Jan to March	April to June	July to Sep	Oct to Dec	Jan to Mar	Apr to Jun	Jul to Sep	Oct to Dec
East Kent Hospitals University NHS Foundation Trust	Teaching	421	225	339	338	249	395	383	400
East Lancashire Hospitals NHS Trust	Large	933	464	619	453	489	538	751	
East Suffolk And North Essex NHS Foundation Trust	Medium								
East Sussex Healthcare NHS Trust	Large	520	306	339	373	264	396	411	370
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
Gateshead Health NHS Foundation Trust	Small	8	2	5	3	17			
George Eliot Hospital NHS Trust	Small	52	18	77	74	47			
Gloucestershire Hospitals NHS Foundation Trust	Large			119	98	57	56	73	77
Great Ormond Street Hospital for Children NHS Foundation Trust	Specialist	1,345	1,158	1,207	1,200	1,223	1,324	1,353	1,420
Great Western Hospitals NHS Foundation Trust	Medium	45	52	88	125	186	139	135	118
Guy's and St Thomas' NHS Foundation Trust	Teaching	4,205	3,245	3,635	3,537	693			

Trust name	Trust type	2020				2021			
		Jan to March	April to June	July to Sep	Oct to Dec	Jan to Mar	Apr to Jun	Jul to Sep	Oct to Dec
Hampshire Hospitals NHS Foundation Trust	Large	29	28	124	218	266	250	273	290
Harrogate And District NHS Foundation Trust	Small	182	100	87	141				
Homerton University Hospital NHS Foundation Trust	Medium				938	1080	1164	1170	882
Hull University Teaching Hospitals NHS Trust	Teaching								
Imperial College Healthcare NHS Trust	Teaching	24,039	12,546	19,790	18,859	15,952			
Isle of Wight NHS Trust	Multi-service		5	0	7	5	5	7	10
James Paget University Hospitals NHS Foundation Trust	Small	31	13	30	15	7	10	10	10
Kettering General Hospital NHS Foundation Trust	Small	169	148	232	223	165	223		
King's College Hospital NHS Foundation Trust	Teaching			0	11,008	9,471	10,547		
Kingston Hospital NHS Foundation Trust	Small		0	0	122	95	96	88	86
Lancashire Teaching Hospitals NHS Foundation Trust	Teaching				134	119	0	185	140
Leeds Teaching Hospitals NHS Trust	Teaching			0	1,488	1,319	1,188	2,214	
Lewisham And Greenwich NHS Trust	Large	1,020	639	926	686	1,684	929	1,045	

Trust name	Trust type	2020				2021			
		Jan to March	April to June	July to Sep	Oct to Dec	Jan to Mar	Apr to Jun	Jul to Sep	Oct to Dec
Liverpool Heart and Chest Hospital NHS Foundation Trust	Specialist			357	327	381	367	413	364
Liverpool University Hospitals NHS Foundation Trust	Teaching			2,904	2,744	2,970	2,940	2,707	3,166
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	
Maidstone And Tunbridge Wells NHS Trust	Large	683	363	451	392	341			
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
Milton Keynes University Hospital NHS Foundation Trust	Small	24							
Moorfields Eye Hospital NHS Foundation Trust	Specialist	0		0	0	0	0	0	0
Norfolk And Norwich University Hospitals NHS Foundation Trust	Teaching	136	74	88	85	86	48	120	239

Trust name	Trust type	2020				2021			
		Jan to March	April to June	July to Sep	Oct to Dec	Jan to Mar	Apr to Jun	Jul to Sep	Oct to Dec
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
North Middlesex University Hospital NHS Trust	Small	2,108	1,567	2,119	2,362	2,396	2,099		
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
Northampton General Hospital NHS Trust	Medium		46		181	762	1,062	858	
Northern Devon Healthcare NHS Trust	Small	84	78	60	67	77	79	68	66
Northern Lincolnshire And Goole NHS Foundation Trust	Large	84	48	41	13		7	15	20
Northumbria Healthcare NHS Foundation Trust	Large	55	7	23	14	49			
Nottingham University Hospitals NHS Trust	Teaching				204	956	1,537	1,810	1,666
Oxford University Hospitals NHS Foundation Trust	Teaching	561	373	566	585	489	618	713	776
Pennine Acute Hospitals NHS Trust	Large	784	489	581	495	510	691	679	731
Portsmouth Hospitals University National Health Service Trust	Large			310	280	295	356	332	244

Trust name	Trust type	2020				2021			
		Jan to March	April to June	July to Sep	Oct to Dec	Jan to Mar	Apr to Jun	Jul to Sep	Oct to Dec
Queen Victoria Hospital NHS Foundation Trust	Specialist			0	0	2		0	1
Royal Berkshire NHS Foundation Trust	Large	477	316	324	696	394	551	524	525
Royal Cornwall Hospitals NHS Trust	Large	105	54	50	53	59	58	148	427
Royal Devon And Exeter NHS Foundation Trust	Large	133	130	221	89	127	138	235	228
Royal Free London NHS Foundation Trust	Teaching	8,219	4,611	7,669	8,354	6,194	7,400		
Royal National Orthopaedic Hospital NHS Trust	Specialist	255	309	204	234	473	316		238
Royal Papworth Hospital NHS Foundation Trust	Specialist	89	114	75	85	125	66	64	47
Royal Surrey County Hospital NHS Foundation Trust	Medium	385	223	454	692	725	1,135	1,159	1,183
Royal United Hospitals Bath NHS Foundation Trust	Medium		21	20	0	244	334	229	173
Salford Royal NHS Foundation Trust	Teaching	434	258	339	286	275	275	296	242
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

Trust name	Trust type	2020				2021			
		Jan to March	April to June	July to Sep	Oct to Dec	Jan to Mar	Apr to Jun	Jul to Sep	Oct to Dec
Sheffield Teaching Hospitals NHS Foundation Trust	Teaching	332	173	315	353	259	463	496	644
Sherwood Forest Hospitals NHS Foundation Trust	Medium	0			0				
South Tees Hospitals NHS Foundation Trust	Teaching	134	27	26	46	16	88	143	304
South Tyneside And Sunderland NHS Foundation Trust	Large								
South Warwickshire NHS Foundation Trust	Small				0	0	0	0	0
Southport And Ormskirk Hospital NHS Trust	Small			203	172	180	224	270	241
St George's University Hospitals NHS Foundation Trust	Teaching			0	84	906	979	961	1268
St Helens And Knowsley Teaching Hospitals NHS Trust	Medium	1,807	1,131	1,613	1,541	1,222	1,546	1,688	1,557
Stockport NHS Foundation Trust	Medium				161	126	241	269	203
Surrey and Sussex Healthcare NHS Trust	Medium	169	81		146	117	167	156	
Tameside And Glossop Integrated Care NHS Foundation Trust	Small	277	228	228	170	164	196		
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

Trust name	Trust type	2020				2021			
		Jan to March	April to June	July to Sep	Oct to Dec	Jan to Mar	Apr to Jun	Jul to Sep	Oct to Dec
The Hillingdon Hospitals NHS Foundation Trust	Small								
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	Teaching	817	459	680	591	842	740	749	673
The Princess Alexandra Hospital NHS Trust	Small	35	8	15	21	12	28	93	217
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	Small	21	7	2	3	2	4	5	94
The Robert Jones And Agnes Hunt Orthopaedic Hospital NHS Foundation Trust	Specialist	71	103	135	104	87	98	82	90
The Rotherham NHS Foundation Trust	Medium	1	69		68	94	520	548	452
The Royal Marsden NHS Foundation Trust	Specialist	1,265	1,045	1,126	1,200	1,175	1,200	1,148	
The Royal Orthopaedic Hospital NHS Foundation Trust	Specialist	19	22			25	56	31	38
The Royal Wolverhampton NHS Trust	Large	2,201	938	1,315	1,161	949	1,220	1,031	1,047
The Shrewsbury And Telford Hospital NHS Trust	Large	102	50	143	134	124	125	143	135
The Walton Centre NHS Foundation Trust	Specialist	662	495	487	669	801	606	669	
Torbay And South Devon NHS Foundation Trust	Medium	7	4	1	9	12	2		9
United Lincolnshire Hospitals NHS Trust	Large	282	93				303	394	512

Trust name	Trust type	2020				2021			
		Jan to March	April to June	July to Sep	Oct to Dec	Jan to Mar	Apr to Jun	Jul to Sep	Oct to Dec
University College London Hospitals NHS Foundation Trust	Teaching	312	312	369	419	537	601		
University Hospital Southampton NHS Foundation Trust	Teaching			236	282	1390	224	254	386
University Hospitals Birmingham NHS Foundation Trust	Teaching								
University Hospitals Bristol And Weston NHS Foundation Trust	Teaching	19	4	10	1,302	1,322			
University Hospitals Coventry And Warwickshire NHS Trust	Teaching	562	202	388	433	448	547	809	978
University Hospitals of Derby and Burton NHS Foundation Trust	Teaching	174	101	64	100	48	94	93	97
University Hospitals of Leicester NHS Trust	Teaching	4,215	2,957	5,413	6,818	5,870	7,325	6,919	
University Hospitals of Morecambe Bay NHS Foundation Trust	Medium		65	131	89				
University Hospitals of North Midlands NHS Trust	Teaching				8,487	8,213	9,446	9,593	9,975
University Hospitals Plymouth NHS Trust	Teaching			175	132	167	146	416	628
University Hospitals Sussex NHS Foundation Trust	Large	141	63	116	162	88			
Walsall Healthcare NHS Trust	Medium				44	184	182	231	302

Trust name	Trust type	2020				2021			
		Jan to March	April to June	July to Sep	Oct to Dec	Jan to Mar	Apr to Jun	Jul to Sep	Oct to Dec
Warrington And Halton Teaching Hospitals NHS Foundation Trust	Teaching	650	320	436	390	376	392	288	296
West Hertfordshire Hospitals NHS Trust	Medium		214	477	668	549	780	857	662
West Suffolk NHS Foundation Trust	Small								
Whittington Health NHS Trust	Medium	79	42	86	211	58	69	41	54
Wirral University Teaching Hospital NHS Foundation Trust	Teaching	5,986	2,815	2,748	2,925	2,900		2,844	2,147
Worcestershire Acute Hospitals NHS Trust	Large	2,202	694	1,534	1,446	720	1,855	2,535	2,344
Wrightington, Wigan And Leigh NHS Foundation Trust	Medium				96	283	228	204	229
Wye Valley NHS Trust	Small	323	164	206	178	167	273	329	304
Yeovil District Hospital NHS Foundation Trust	Small	0	0	29	43	28	44	52	
York And Scarborough Teaching Hospitals NHS Foundation Trust	Teaching	81	40	30	92	27	46	33	78

## Acknowledgements

These reports would not be possible without the weekly contributions from microbiology colleagues in laboratories across England, without whom there would be no surveillance data. The support from colleagues within the UK Health Security Agency, and the AMRHAI Reference Unit in particular, is valued in the preparation of the report. Feedback and specific queries about this report are welcome via [hcai.amrdepartment@phe.gov.uk](mailto:hcai.amrdepartment@phe.gov.uk).

To influence the future surveillance outputs on acquired carbapenemase-producing Gram-negative bacteria we are seeking the input of interested stakeholders, if you would like to input into this development please indicate your intent by emailing [amr@phe.gov.uk](mailto:amr@phe.gov.uk) before 17 April 2022.

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Prepared by: Kirsty Bennet, Katie Hopkins, Rebecca Guy, Russell Hope and Sarah Gerver For queries relating to this document, please contact: [hcai.amrdepartment@phe.gov.uk](mailto:hcai.amrdepartment@phe.gov.uk)

Published: 22 March 2022

Version 2

Publishing reference: GOV-11740



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