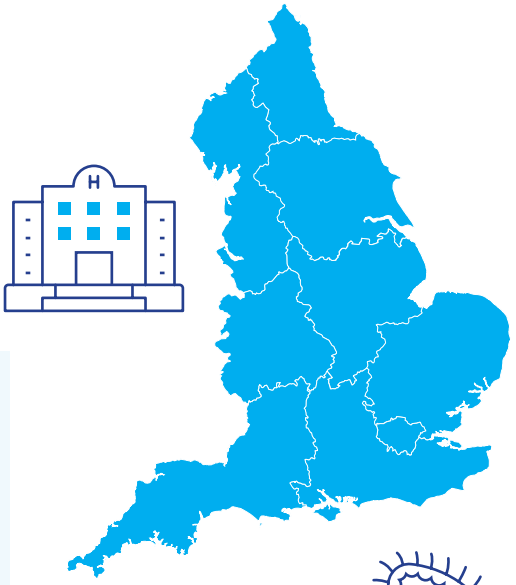
# The Escalating Threat of CPE Superbugs in England:

# Hospitals Under Fire



## Summary


The rate of CPE infection have increased in recent years from 0.91 per 100,000 people in Q1 2021, to 3.5 per 100,000 people in Q2 2024.[1] This is the largest quarterly increase since mandatory reporting began.

CPE pose one of the greatest antimicrobial resistance challenges to the NHS.[2]

CPE have a severe impact on patients, hospitals and NHS finances, including:

**30% all cause fatality rate** with invasive infections[3]

**24% readmissions rate** within 30 days of discharge[4]

**Delayed and cancelled** elective operations[4]

**Outbreaks** which can cost up to £1m, including lost opportunity costs, additional PPE, contamination and treatment[4]

UK Health Security Agency (UKSHA) guidance is essential to combatting the risk of CPE, however, adherence and implementation within the NHS is inconsistent, particularly regarding testing and screening regimes.


## What are CPE?

Carbapenemase-producing Enterobacterales (CPE) are bacteria that produce carbapenemase enzymes. These enzymes allow for the bacteria to be resistant to a valuable family of carbapenem antibiotics normally reserved to treat life-threatening multidrug-resistant infections.

Carbapenem antibiotics are the true **"antibiotics of last resort"**. Resistance to these antibiotics risks a world where we have no treatment options remaining.

Carbapenem resistance is one type of antimicrobial resistance (AMR), however its rapid ability to spread and cause outbreaks, limited treatment options and association with healthcare settings means it can be particularly deadly and costly.

## What impact can CPE have?[4]

### 1 CPE burden

- 30% fatality rate, all-cause, with invasive infections[3]
- 24% re-admission rate within 30 days of discharge

### 2 Operational flow

- Delayed and cancelled operations
- Greatly increased length of stay for CPE carriers vs non-carriers
- Need for further therapeutics

### 3 Financial consequences

- £49,537 vs £19,299: median cost of treating carbapenem resistant vs susceptible organism
- £1,319: cost of a last line antibiotic (10 vials) for CPE-NDM infections

### 4 Outbreak costs

- €1.1m for a single outbreak in West London
- Cost driven by additional PPE, decontamination, treatment, staff and opportunity costs

## There are five common varieties of carbapenemase gene families present in the UK[1]

The UK sees more geographical variation in the type of CPE which dominates compared to most other European countries.[3]

For example, in London, 47.9% of cases are from the NDM (New Delhi metallo-β-lactamase) family, whereas the largest proportion of cases (42.9%) in the North West are from the KPC (*Klebsiella pneumoniae* carbapenemase) family.[1]

Understanding this variation is critically important for enhancing patient outcomes and to stop even more superbugs leading to a complete inability to treat, as depending on the specific carbapenemase family identified through testing, the clinically recommended therapeutic interventions will differ.[5]


*This briefing has been developed by Cepheid and supported by the Fleming Initiative.*

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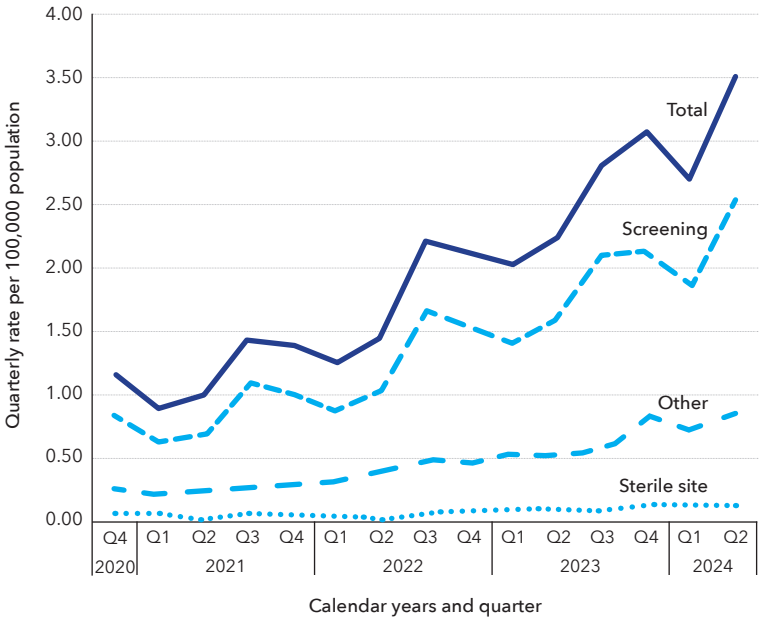
## The growth of CPE infection in the UK

The rate of CPE infection has increased in recent years by nearly three-fold since data was first collected in Q4 2020.[1]

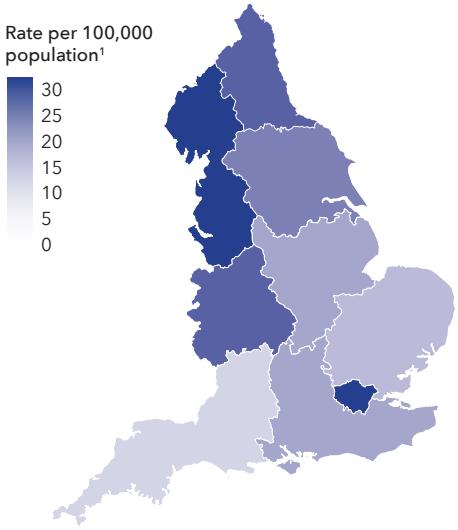
Quarterly rate of acquired CPO episodes by specimen type and quarter (England): October 2020 to June 2024




## Rates of CPE infection vary across the country and are higher in the most deprived communities[1]

The rate of CPE infection is higher in London and the North West compared to other areas of the country.

CPE infection rates are correlated with deprivation, with the most deprived communities seeing rates over double the least deprived.



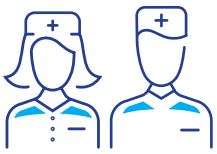

## Combatting CPE infection

UKHSA has published a framework of actions to contain CPE (last updated in 2022).[6] The guidance emphasises that **each health provider should implement active admission screening guided by regional prevalence of CPE**, and recommends NHS Trusts should use PCR or immunochromatographic assays for the four most common carbapenemase families.[6]

However, financial constraints, competing priorities and practical barriers, including workforce shortages and acceptability, mean that the framework is only partially implemented across the country. [4] There is a clinical consensus that more needs to be done to establish protocols for CPE screening and and pre-emptive isolation of high-risk patients to reduce transmission across hospitals in England using rapid PCR testing.[4]

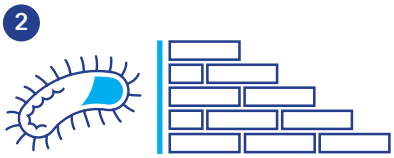
## Recommendations

1



**Healthcare providers should follow UKHSA's framework to contain CPE by establishing consistent protocols.** This includes the rapid screening of high-risk patients to inform isolation measures, optimise antimicrobial stewardship, and identify acquisition and transmission pathways to mitigate risks.

2



**Healthcare systems must prioritise and resource infection prevention, and establish targets to contain CPE.** Following UKHSA guidance is essential, this includes active patient screening to prevent resistant bacteria transmission and reduce the high costs of CPE infections and outbreaks.

3

**Healthcare systems should standardise infection reduction practices and metrics across providers.** By adopting a system approach to AMR control, the NHS can address gaps that hinder effective transmission reduction, improve patient outcomes, and reduce health inequalities contributing to "postcode lotteries".


1 UKHSA, *Carbapenemase-producing Gram-negative organisms in England since October 2020: quarterly update,* Q2 2024, September 2024 2 Patel B, et al. ***Carbapenemase-producing Enterobacterales: a challenge for healthcare now and for the next decade.*** IPIP. 2020 Sep;2(3):100089 3 UKHSA, *English surveillance programme for antimicrobial utilisation and resistance (ESPAUR) Report 2022 to 2023.* November 2023 4 Jenkins DR, et al. ***A practical approach to screening for carbapenemase-producing Enterobacterales-views of a group of multidisciplinary experts from English hospitals.*** BMC Infect Dis. 2024 Apr 26;24(1):444. 5 UKHSA, *Commercial assays for the detection of acquired carbapenemases,* November 2022 6 UKHSA, *Framework of actions to contain carbapenemase-producing Enterobacterales,* September 2022.



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