UK Health Security Agency

Point prevalence survey (PPS) on healthcare-associated infections, antimicrobial use and antimicrobial stewardship in England

Annexe

Sixth national point prevalence survey on healthcare-associated infections, and third national point prevalence survey on healthcare-associated infections, antimicrobial use and antimicrobial stewardship in England

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Methods

Data validation

There was a data validation process for all 3 data collections. These were in addition to the automated validation checks when PPS participants inputted data into the Data Capture System (DCS).

The patient data collection was the first to be checked, involving 3 validation rounds beginning December 2023 and ending 18 January 2024. Each round we ran checks and sent potential errors to point prevalence survey (PPS) participants to review and correct if necessary. The validation rules evolved during the rounds, ending with 13 validation rules (Annexe Table A, below).

Complete row censoring was used on 'fatal' errors that we deemed called into question the integrity of all variables for that row record, whereas weaker errors only affecting healthcare-associated infection (HCAI) or antimicrobial usage (AMU) variables were only censored from those respective subanalyses, but still contributed to top-line analyses.

The hospital and ward data collections had one validation round in Spring 2024 involving 7 and 5 validation rules, respectively. Some hospitals had missed submission of their hospital data collection. The main aims of validation rules at this stage were to confirm if the hospital had surveyed all its eligible wards according to the study protocol which directly affected inclusion in analyses.

Annexe Table A. Validation rules used for the trust reports, PPS England 2023

Complete censoring: excluded from all analyses
Admission date greater than survey date
Survey year not equal to 2023
Survey date less than survey start (18 September 2023)
Any HCAI entered that was present on admission had an onset greater than hospital admission
Date of birth greater than hospital admission OR age was less than 0
Duplicates dropped (more than one ID with same NHS number and survey date) prior to error checking below; those IDs which could not be linked on ‘NHS number and date of birth’ pair or ‘Hospital number, date of birth and sex’ triplet could not be deduplicated and so were not dropped
Partial censoring: excluded from antimicrobial sub-analyses
Start date of any antimicrobial entered is greater than survey date
Antimicrobials were received on survey date but the number of antimicrobials was missing

Patient received antimicrobials on survey date but no antimicrobial name was given
Partial censoring: excluded from HCAI sub-analyses
Onset date of the first HCAI recorded was greater than survey date
HCAI recorded but no case definition recorded
HCAI/AMU status amended to 'Unknown'
HCAI was not recorded but other HCAI fields were entered
Patient received no antimicrobials on survey date but antimicrobial name was given

Amending data

A date cut-off of 18 January 2024 was set for organisations to submit corrections to the DCS. This was extended only for organisations where the UK Health Security Agency (UKHSA)'s DCS team provided support to input data.

Following the release of the trust report to each organisation on 1 February 2024 no further corrections to data were accepted to avoid self-reported correction and introduce systematic bias.

On the other hand, submissions of complete records were still accepted as some organisations discovered that entire wards or patients not on antimicrobials had erroneously been excluded by them prior submission. These were systematic errors that could not be foreseen during earlier validation rounds.

Data deduplication

The below algorithm was used to remove the most-likely duplicate records in the patient data collection. A similar process was followed later for the ward and hospital data collections.

A: Linkage to HES to increase the number of NHS numbers, date of birth (DOB) and hospital numbers of reliable status

In spring, UKHSA obtained approval by our Caldicott Guardian to process confidential patient information for the PPS under Regulation 3 (reference: CAP-2018-116). This enabled us to link PII in the PPS to the HES data set to improve deduplication and fill in missing ethnicity information.

Each variable of NHS number, date of birth (DOB) or hospital number were each defined as **reliable** for a particular ID record if they were retrievable when the ID was linked on the other linking variables available, otherwise the variable was considered **unreliable**. It was essential to determine their separate reliability status for each record because they uniquely defined an individual through 'NHS number and DOB' pair or 'Hospital number, DOB and sex' triplet in stage B below.

For example, for a dummy record with NHS number '1234123412', DOB '26/10/1985', hospital number 'L9879871' and sex 'female', the NHS number was 'reliable' if a HES linkage using hospital number, sex, 'admission date within PPS survey range' and 'reporting organisation matching PPS hospital code' delivered the NHS number '1234123412' thus matching the PPS entry. This is shown in step 1a below.

As NHS numbers are generally considered to be more dependable than hospital numbers, steps 1 to 4 gave precedence to establishing the reliability of the NHS number, then DOB and then the hospital number.

The first stage involved identifying records which:

1. Shared the same single NHS number but had multiple DOBs:
    a. hospital number, sex, admission date within PPS survey range, reporting organisation matching PPS hospital code were used to trace the 'NHS number and DOB' pairing on the HES data set
    b. if the trace was unsuccessful then that 'NHS number and DOB' pairing was marked as unreliable.
2. Shared the same single hospital number but had multiple DOBs or sex:
    a. if a reliable NHS number was available then a trace for the 'hospital number' on HES was performed using NHS number, reporting organisation and admission date within PPS survey range
    b. if the trace was unsuccessful then that hospital number would be marked as unreliable
3. Unreliable NHS numbers were traced on HES using reliable DOB and reliable hospital numbers along with sex, reporting organisation and admission date within PPS survey range.
4. Unreliable hospital numbers were traced on HES using reliable 'NHS number and DOB' pairings, with sex, reporting organisation and admission date within PPS survey range. Visual checks were performed on similar hospital numbers and deduplication on these hospital numbers was performed.

This algorithm was run in an expanding sequential order (that is: 1→ 2; 1→ 2→ 3; 1→ 2→ 3→ 4) so that newly traced values could help improve the linkage of earlier stages.

B: identification of duplicate records to flag for deduplication

In the next stage, individuals were uniquely identified through either:

- NHS number and DOB and survey date (within HES admission and discharge dates)

Or:

- hospital number, DOB, sex and survey date (within HES admission and discharge dates)

Preference flags were added to keep those with the largest number of non-missing raw DCS fields and with the most recent date update. For duplicate records with differing HCAI and AMU

fields, we preferred those who had a higher sum of affirmative ‘Yes’ answers across HCAI and AMR fields, then next preferred was ‘No’ answers with ‘Unknown’ answers having the least preference.

C: data validation rules indicate duplicate records with the least amount of minor errors

After 3 validation rounds some records still contained a mixture of ‘fatal’ errors (resulting in complete row censoring) or weaker errors that excluded them from later sub-analyses. The amount of these errors and their type was used to decide the deduplication in the next step.

D: deduplication performed

The most-likely original record was kept according to this final algorithm, in descending order:

- absence of all 5 fatal errors as indicated in step C
- fewest non-fatal errors as indicated in step C
- flag preference as defined in step B:
    - HCAI or antimicrobial presence on the survey date marked as 'yes'
    - HCAI presence alone on the survey date marked as 'yes'
- number of non-missing DCS field values
- most recently updated record date
- most recently created DCS id

Only a few hundred records remain that could not be deduplicated because they lacked a combination of reliable identification variables on which to identify an individual and therefore perform deduplication on. These were left in the data set.

Ethnicity linkage

Missing ethnicity information was enhanced by linkage with the HES data set using either:

- reliable NHS number and reliable DOB

Or:

- reliable hospital number, reliable DOB, sex and survey date (within HES admission and discharge dates)

Other data amendments

Missing hospital codes were addressed by merging patient data with the Estates Return Information Collection (ERIC) data set to check for region and hospital codes. Missing trust sizes were corrected using the ERIC data set.

Data about the number of eligible wards from hospitals that did not respond initially was manually uploaded after confirming participation through telephone and email communication.

The distribution of antimicrobial groups and agents followed the 2018 version of the Anatomical Therapeutic Chemical (ATC) classification. Antimicrobials were also categorised according to the Access, Watch, and Reserve (AWaReS) categories (adapted to English) and into antimicrobial classes, following guidance provided by subject matter experts. Data amendments for implausible or inconsistent data entries are presented in Annexe Table B.

Annexe Table B. Data amendments for implausible or inconsistent data entries, PPS England 2023

Variable	Error description	Amendments
Birth weight	A small number of infants had a clearly implausible birth weight (9,999g).	If birth weight was clearly implausible, the infant was excluded from analysis (n=3).
Length of stay	Some lengths of stay were considered implausible, in adult data.	In adult data, the maximum length of stay considered plausible was 180 days. Lengths of stay exceeding this were excluded. No amendment was made to length of stay in paediatric data.
NHS number	Some NHS numbers were invalid, affecting data linkage.	If NHS number was clearly invalid (that is, 0, 9999999999 or failing 10th digit check-sum validation checks), then the NHS number was replaced with missing value.
Trust type	Acute medium trusts were sometimes recorded as acute multi-service trusts.	Acute multi-service trusts were combined with acute medium trusts.
Specialty	In adult data, some patients aged 19 and over had the patient specialty ‘Healthy neonates, maternity’ which was deemed to be implausible. Additionally, there were seven patients over the age of 18 in the paediatrics specialty. In paediatric data, a small number (n=5) of participants were recorded as under the care of Geriatrics, care of the elderly. Additionally, a small number of neonates (n=2) were recorded as under the care of Psychiatry. These were implausible.	In adult data, female patients with the ‘Healthy neonate, maternity’ were reassigned to the ‘Obstetrics or Maternity’ following cross-checking that they were admitted on a maternity ward. We recoded the patient specialty as ‘Missing’ for a male patient with the ‘Healthy neonate, maternity’ specialty. We combined the paediatric specialty and the ‘Other’ specialty in adult data. In paediatric data, if either error occurred, the participant was not included in analysis.
Route	Some antimicrobials recorded as administered via inhalation, which is implausible route for said antimicrobial (1)	Route was amended to missing if route was Inhalation and antimicrobial name was not any of: A07AA10 – Colistin (oral); J01GB01 – Tobramycin; J01XB – Polymyxins NoS; O – Other.

Calculation of indicators

The prevalence of HCAIs was reported as the percentage of patients with at least one HCAI over the total number of patients.

For types of HCAI and microorganisms, the relative frequencies were reported using the total number of HCAIs or microorganisms as the denominator.

Alcohol-based hand rub consumption was reported as the number of litres of alcohol-based hand rub per 1,000 patient-days. Single beds were reported as the percentage of beds in single rooms among the total number of beds in the hospital.

The 2 primary binary outcomes assessed were: (i) having one or more HCAI and (ii) the use of at least one antimicrobial, both of which were treated as dichotomous variables.

Statistical analysis

Univariate analyses

Separate univariate models were initially developed for each predictor variable, yielding crude odds ratios by comparing these predictors to a specified reference level. The analysis primarily employed generalised structural equation modelling with a logistic regression approach to explore the influence of these predictors on the binary outcomes.

Risk models of HCAI and antimicrobial use

Following the univariate analyses, multivariate logistic regression models were constructed to evaluate the combined effects of all predictors on the outcomes. Each predictor was adjusted for all other variables to control for potential confounding factors (except for analysis of paediatric data which, to preserve sample size and reduce bias, excluded co-variates if there was substantial missing data, such as for birth weight, Index of Multiple Deprivation 2019 Quintile, COVID-19 vaccination status, and McCabe score, or if predictors were high correlated (±0.50 or greater) or there were important non-linear relationships with potential for multicollinearity).

The models were also adjusted to account for the hierarchical structure of the data, specifically the clustering of hospitals. Data was collected from hospitals within trusts or independent organisations, with measurements from different hospitals treated as independent, while those from the same hospital were considered potentially correlated. To address this, a logistic regression model with a hospital random effect was added to the linear predictor, using a subject-specific approach. In this approach, a population-average model was used, allowing for dependent error terms. The results are reported with hospital cluster variance adjustments.

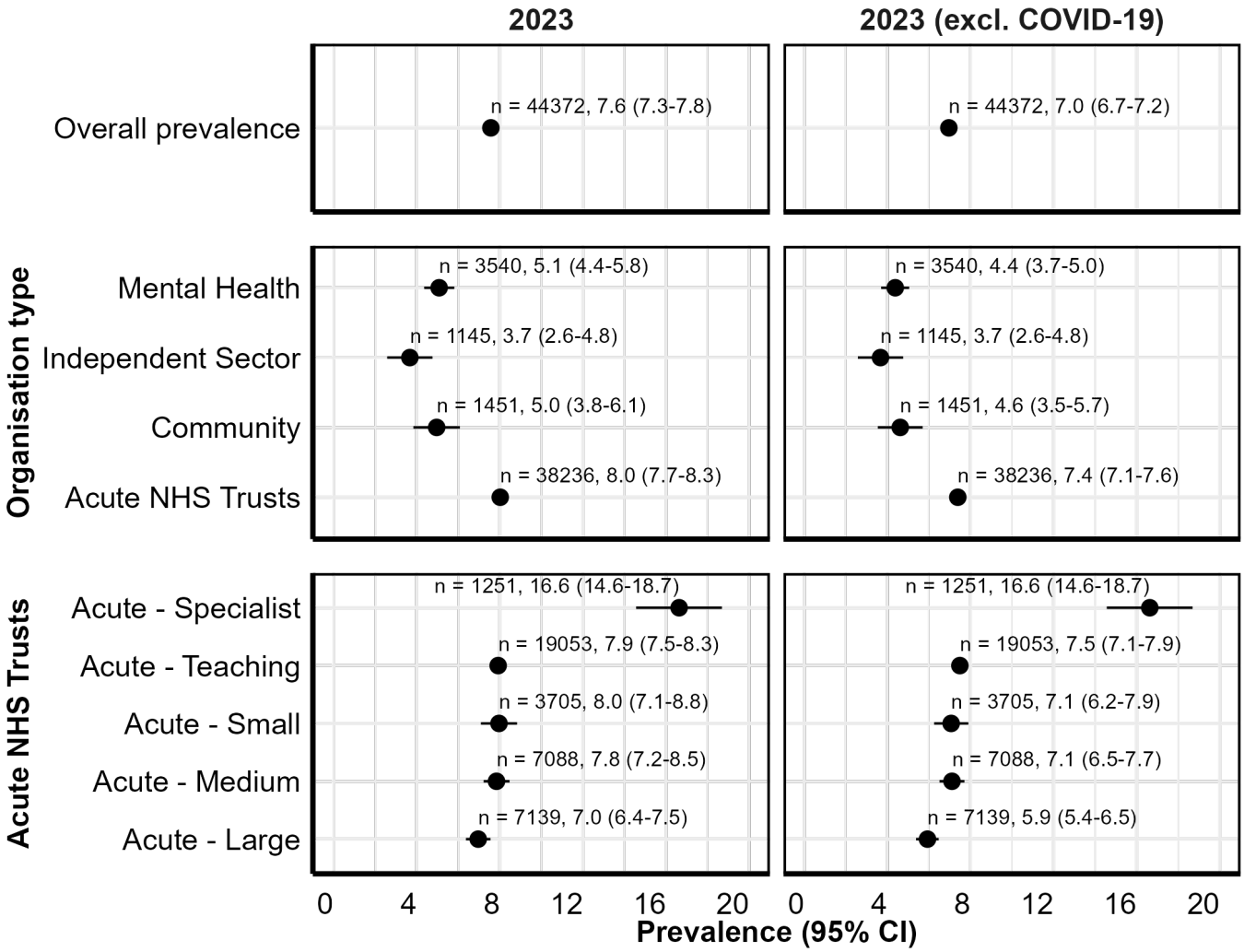
Overview of HCAI and AMU

1.1 Healthcare-associated infections

Annexe Table 2.1.1 Prevalence of healthcare-associated infections by organisation type, PPS England 2023

Organisation type	Number of patients	Number of patients with HCAI	Prevalence of HCAI (95% CI)
Overall	**44,372**	**3,359**	**7.6 (7.3 to 7.8)**
Acute NHS trusts	38,236	3,065	8.0 (7.7 to 8.3)
Community	1,451	72	5.0 (3.8 to 6.1)
Independent sector	1,145	42	3.7 (2.6 to 4.8)
Mental health	3,540	180	5.1 (4.4 to 5.8)
Acute NHS trusts			
Acute: large	7,139	497	7.0 (6.4 to 7.6)
Acute: medium	7,088	556	7.8 (7.2 to 8.5)
Acute: small	3,705	295	8.0 (7.1 to 8.8)
Acute: teaching	19,053	1,509	7.9 (7.5 to 8.3)
Acute: specialist	1,251	208	16.6 (14.6 to 18.7)

Annexe Figure 2.1.1. Prevalence of healthcare-associated infections by organisation type, including and excluding COVID-19, PPS England 2023



1.2 Antimicrobial use

Annexe Table 2.2.2. Prevalence of antimicrobial use by organisation type, PPS England 2023

Organisation type	Number of patients	Number of patients with AMU	Prevalence of AMU (95% CI)
Overall	**44,372**	**15,134**	**34.1 (33.7 to 34.5)**
Acute NHS trusts	38,236	14,254	37.3 (36.8 to 37.8)
Community	1,451	125	8.6 (7.2 to 10.1)
Independent sector	1,145	500	43.7 (40.8 to 46.5)
Mental health	3,540	255	7.2 (6.3 to 8.1)
Acute NHS trusts			
Acute: large	7,139	2,485	34.8 (33.7 to 35.9)

Organisation type	Number of patients	Number of patients with AMU	Prevalence of AMU (95% CI)
Acute: medium	7,088	2,671	37.7 (36.6 to 38.8)
Acute: small	3,705	1,387	37.4 (35.9 to 39.0)
Acute: teaching	19,053	7,126	37.4 (36.7 to 38.1)
Acute: specialist	1,251	585	46.8 (44.0 to 49.5)

Healthcare-associated infections in the adult population

1.3 Acute and teaching trusts

Annexe Table 3.1.1 Prevalence of healthcare-associated infections by patient speciality, Acute General trusts, PPS England 2023

Patient speciality	Number of patients	Number of patients with at least one HCAI	Percent of patients with at least one HCAI	Prevalence
				(95% CI)
Surgical (SUR)	**7,840**	**674**	**24.9**	**8.6 (8 to 9.2)**
Cardio surgery	172	13	0.5	7.6 (3.6 to 11.5)
Cardio surgery and vascular surgery	53	11	0.4	20.8 (9.8 to 31.7)
Digestive tract surgery	424	48	1.8	11.3 (8.3 to 14.3)
Ear, nose and throat (ENT)	191	11	0.4	5.8 (2.5 to 9.1)
General surgery	2,327	191	7	8.2 (7.1 to 9.3)
Maxillo-facial surgery	60	4	0.1	6.7 (0.3 to 13)
Neurosurgery	494	60	2.2	12.2 (9.3 to 15)
Ophthalmology	15	1	0	6.7 (0 to 19.3)
Orthopaedics	1,261	97	3.6	7.7 (6.2 to 9.2)
Orthopaedics and surgical traumatology	1,251	100	3.7	8 (6.5 to 9.5)
Other surgery	176	12	0.4	6.8 (3.1 to 10.5)
Paediatric general surgery	1	0	0	0 (0 to 0)

Patient speciality	Number of patients	Number of patients with at least one HCAI	Percent of patients with at least one HCAI	Prevalence
Plastic and reconstructive surgery	107	12	0.4	11.2 (5.2 to 17.2)
Surgery for cancer	19	3	0.1	15.8 (0 to 32.2)
Thoracic surgery	76	7	0.3	9.2 (2.7 to 15.7)
Transplantation surgery	73	18	0.7	24.7 (14.8 to 34.5)
Traumatology	195	14	0.5	7.2 (3.6 to 10.8)
Urology	527	39	1.4	7.4 (5.2 to 9.6)
Vascular surgery	418	33	1.2	7.9 (5.3 to 10.5)
Medical (MED)	**17,173**	**1275**	**47**	**7.4 (7 to 7.8)**
Bone marrow transplantation (BMT)	19	3	0.1	15.8 (0 to 32.2)
Cardiology	1,677	100	3.7	6 (4.8 to 7.1)
Endocrinology	828	52	1.9	6.3 (4.6 to 7.9)
Gastro-enterology	1,281	96	3.5	7.5 (6 to 8.9)
General medicine	8,964	642	23.7	7.2 (6.6 to 7.7)
Haematology	454	52	1.9	11.4 (8.5 to 14.4)
Haematology or BMT	11	1	0	9.1 (0 to 26.1)
Hepatology	145	14	0.5	9.7 (4.8 to 14.5)
Infectious diseases	175	20	0.7	11.4 (6.7 to 16.1)
Medical traumatology	2	0	0	0 (0 to 0)
Nephrology	553	56	2.1	10.1 (7.6 to 12.6)
Neurology	671	44	1.6	6.6 (4.7 to 8.4)
Oncology	295	29	1.1	9.8 (6.4 to 13.2)
Other medical	1,214	105	3.9	8.7 (7.1 to 10.2)
Pneumology	819	54	2	6.6 (4.9 to 8.3)
Rheumatology	65	7	0.3	10.8 (3.2 to 18.3)
Paediatrics general, not specialised	7	0	0	0 (0 to 0)
Intensive care medicine (ICU)	**741**	**134**	**4.9**	**18.1 (15.3 to 20.9)**
COVID-19 ICU	1	0	0	0 (0 to 0)
Medical ICU	209	31	1.1	14.8 (10 to 19.6)

Patient speciality	Number of patients	Number of patients with at least one HCAI	Percent of patients with at least one HCAI	Prevalence
Mixed (polyvalent) ICU, general intensive or critical care	333	56	2.1	16.8 (12.8 to 20.8)
Other ICU	38	8	0.3	21 (8.1 to 34)
Specialized ICU	39	16	0.6	41 (25.6 to 56.5)
Surgical ICU	121	23	0.8	19 (12 to 26)
Gynaecology or obstetrics (GO)	**1,738**	**57**	**2.1**	**3.3 (2.4 to 4.1)**
Gynaecology	350	21	0.8	6 (3.5 to 8.5)
Obstetrics or maternity	1,387	36	1.3	2.6 (1.8 to 3.4)
Geriatrics (MED)	**5,632**	**498**	**18.4**	**8.8 (8.1 to 9.6)**
Geriatrics, care for the elderly	5,632	498	18.4	8.8 (8.1 to 9.6)
Rehabilitation (RHB)	**698**	**35**	**1.3**	**5 (3.4 to 6.6)**
Rehabilitation	698	35	1.3	5 (3.4 to 6.6)
Psychiatry (PSY)	**27**	**0**	**0**	**0 (0 to 0)**
Psychiatrics	27	0	0	0 (0 to 0)
Other (OTH)	**337**	**31**	**1.1**	**9.2 (6.1 to 12.3)**
Burns care	6	1	0	16.7 (0 to 46.5)
Combination of specialties	76	7	0.3	9.2 (2.7 to 15.7)
COVID-19	25	6	0.2	24 (7.3 to 40.7)
Dermatology	3	0	0	0 (0 to 0)
Long-term care	4	0	0	0 (0 to 0)
Other	215	17	0.6	7.9 (4.3 to 11.5)
Stomatology or dentistry	1	0	0	0 (0 to 0)
Unknown	**77**	**8**	**0.3**	**10.4 (3.6 to 17.2)**

Annexe Table 3.1.2. Microorganisms isolated from HCAIs per diagnosis site, acute general trusts, PPS England 2023

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Number of HCAIs, all	**2,813 (100)**	**833 (100)**	**243 (100)**	**464 (100)**	**225 (100)**	**172 (100)**	**876 (100)**
Number of HCAIs with microorganisms, all	**1,043 (100)**	**117 (100)**	**102 (100)**	**239 (100)**	**21 (100)**	**161 (100)**	**403 (100)**
Number of microoganisms	**1,187 (100)**	**141 (100)**	**144 (100)**	**251 (100)**	**27 (100)**	**183 (100)**	**441 (100)**
Gram-positive cocci	**302 (25.4)**	**30 (21.3)**	**63 (43.8)**	**33 (13.1)**	**8 (29.6)**	**80 (43.7)**	**88 (20)**
Staphylococcus aureus	123 (10.4)	22 (15.6)	20 (13.9)	3 (1.2)	0 (0)	36 (19.7)	42 (9.5)
Staphylococcus epidermidis	17 (1.4)	1 (0.7)	6 (4.2)	2 (0.8)	0 (0)	3 (1.6)	5 (1.1)
Staphylococcus haemolyticus	9 (0.8)	0 (0)	2 (1.4)	0 (0)	0 (0)	3 (1.6)	4 (0.9)
Other coagulase-negative staphylococci (CNS)	3 (0.3)	0 (0)	1 (0.7)	1 (0.4)	0 (0)	1 (0.5)	0 (0)
Coagulase-negative staphylococci, not specified	17 (1.4)	1 (0.7)	3 (2.1)	0 (0)	2 (7.4)	9 (4.9)	2 (0.5)
Staphylococcus sp., not specified	7 (0.6)	0 (0)	2 (1.4)	1 (0.4)	0 (0)	2 (1.1)	2 (0.5)
Streptococcus pneumoniae	4 (0.3)	4 (2.8)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Streptococcus agalactiae (b)	2 (0.2)	1 (0.7)	0 (0)	0 (0)	0 (0)	1 (0.5)	0 (0)
Streptococcus pyogenes (a)	4 (0.3)	0 (0)	2 (1.4)	0 (0)	0 (0)	2 (1.1)	0 (0)
Other haemol. streptococcae (c, g)	8 (0.7)	0 (0)	4 (2.8)	0 (0)	0 (0)	0 (0)	4 (0.9)
Streptococcus sp., other	13 (1.1)	0 (0)	3 (2.1)	1 (0.4)	0 (0)	3 (1.6)	6 (1.4)
Streptococcus sp., not specified	3 (0.3)	0 (0)	0 (0)	0 (0)	0 (0)	2 (1.1)	1 (0.2)
Enterococcus faecalis	19 (1.6)	0 (0)	2 (1.4)	7 (2.8)	0 (0)	4 (2.2)	6 (1.4)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Number of HCAIs, all	**2,813 (100)**	**833 (100)**	**243 (100)**	**464 (100)**	**225 (100)**	**172 (100)**	**876 (100)**
Number of HCAIs with microorganisms, all	**1,043 (100)**	**117 (100)**	**102 (100)**	**239 (100)**	**21 (100)**	**161 (100)**	**403 (100)**
Number of microoganisms	**1,187 (100)**	**141 (100)**	**144 (100)**	**251 (100)**	**27 (100)**	**183 (100)**	**441 (100)**
Enterococcus faecium	53 (4.5)	1 (0.7)	13 (9)	9 (3.6)	4 (14.8)	12 (6.6)	14 (3.2)
Enterococcus sp., other	2 (0.2)	0 (0)	0 (0)	1 (0.4)	0 (0)	1 (0.5)	0 (0)
Enterococcus sp., not specified	17 (1.4)	0 (0)	5 (3.5)	8 (3.2)	1 (3.7)	1 (0.5)	2 (0.5)
Gram-positive cocci, not specified	1 (0.1)	0 (0)	0 (0)	0 (0)	1 (3.7)	0 (0)	0 (0)
Gram-negative cocci	**5 (0.4)**	**2 (1.4)**	**0 (0)**	**0 (0)**	**0 (0)**	**0 (0)**	**3 (0.7)**
Moraxella catharralis	2 (0.2)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Moraxella sp., other	1 (0.1)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Gram-negative cocci, not specified	2 (0.2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.5)
Gram-positive bacilli	**7 (0.6)**	**0 (0)**	**5 (3.5)**	**1 (0.4)**	**0 (0)**	**0 (0)**	**1 (0.2)**
Corynebacterium species	3 (0.3)	0 (0)	3 (2.1)	0 (0)	0 (0)	0 (0)	0 (0)
Bacillus species	2 (0.2)	0 (0)	1 (0.7)	1 (0.4)	0 (0)	0 (0)	0 (0)
Lactobacillus species	2 (0.2)	0 (0)	1 (0.7)	0 (0)	0 (0)	0 (0)	1 (0.2)
Enterobacterales	**401 (33.8)**	**49 (34.8)**	**44 (30.6)**	**187 (74.5)**	**10 (37)**	**72 (39.3)**	**39 (8.8)**
Citrobacter freundii	5 (0.4)	3 (2.1)	1 (0.7)	1 (0.4)	0 (0)	0 (0)	0 (0)
Citrobacter koseri (ex. *diversus*)	9 (0.8)	2 (1.4)	2 (1.4)	3 (1.2)	0 (0)	1 (0.5)	1 (0.2)
Citrobacter sp., other	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
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Number of HCAIs with microorganisms, all	**1,043 (100)**	**117 (100)**	**102 (100)**	**239 (100)**	**21 (100)**	**161 (100)**	**403 (100)**
Number of microoganisms	**1,187 (100)**	**141 (100)**	**144 (100)**	**251 (100)**	**27 (100)**	**183 (100)**	**441 (100)**
Enterobacter cloacae	29 (2.4)	3 (2.1)	7 (4.9)	7 (2.8)	0 (0)	8 (4.4)	4 (0.9)
Enterobacter sp., other	8 (0.7)	1 (0.7)	2 (1.4)	1 (0.4)	1 (3.7)	1 (0.5)	2 (0.5)
Enterobacter sp., not specified	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Escherichia coli	202 (17)	12 (8.5)	23 (16)	117 (46.6)	5 (18.5)	33 (18)	12 (2.7)
Klebsiella pneumoniae	62 (5.2)	11 (7.8)	2 (1.4)	23 (9.2)	3 (11.1)	18 (9.8)	5 (1.1)
Klebsiella oxytoca	10 (0.8)	2 (1.4)	1 (0.7)	3 (1.2)	0 (0)	3 (1.6)	1 (0.2)
*Klebsiell*a sp., other	9 (0.8)	4 (2.8)	0 (0)	2 (0.8)	0 (0)	2 (1.1)	1 (0.2)
Klebsiella sp., not specified	9 (0.8)	1 (0.7)	0 (0)	7 (2.8)	0 (0)	0 (0)	1 (0.2)
Proteus mirabilis	17 (1.4)	0 (0)	2 (1.4)	10 (4)	0 (0)	3 (1.6)	2 (0.5)
Proteus vulgaris	1 (0.1)	0 (0)	0 (0)	1 (0.4)	0 (0)	0 (0)	0 (0)
Proteus sp., not specified	6 (0.5)	1 (0.7)	0 (0)	4 (1.6)	0 (0)	0 (0)	1 (0.2)
Serratia marcescens	13 (1.1)	9 (6.4)	0 (0)	1 (0.4)	0 (0)	1 (0.5)	2 (0.5)
Serratia sp., other	1 (0.1)	0 (0)	0 (0)	1 (0.4)	0 (0)	0 (0)	0 (0)
Serratia sp., not specified	1 (0.1)	0 (0)	0 (0)	0 (0)	1 (3.7)	0 (0)	0 (0)
Morganella species	2 (0.2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.5)
Providencia species	2 (0.2)	0 (0)	0 (0)	1 (0.4)	0 (0)	0 (0)	1 (0.2)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Number of HCAIs, all	**2,813 (100)**	**833 (100)**	**243 (100)**	**464 (100)**	**225 (100)**	**172 (100)**	**876 (100)**
Number of HCAIs with microorganisms, all	**1,043 (100)**	**117 (100)**	**102 (100)**	**239 (100)**	**21 (100)**	**161 (100)**	**403 (100)**
Number of microoganisms	**1,187 (100)**	**141 (100)**	**144 (100)**	**251 (100)**	**27 (100)**	**183 (100)**	**441 (100)**
Other enterobacteriaceae	3 (0.3)	0 (0)	0 (0)	1 (0.4)	0 (0)	1 (0.5)	1 (0.2)
Enterobacteriaceae, not specified	10 (0.8)	0 (0)	4 (2.8)	4 (1.6)	0 (0)	1 (0.5)	1 (0.2)
Gram-negative bacilli	**120 (10.1)**	**40 (28.4)**	**16 (11.1)**	**18 (7.2)**	**4 (14.8)**	**22 (12)**	**20 (4.5)**
Acinetobacter sp., other	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.5)	0 (0)
Acinetobacter sp., not specified	2 (0.2)	0 (0)	0 (0)	1 (0.4)	0 (0)	1 (0.5)	0 (0)
Pseudomonas aeruginosa	79 (6.7)	24 (17)	12 (8.3)	15 (6)	3 (11.1)	13 (7.1)	12 (2.7)
Stenotrophomonas maltophilia	6 (0.5)	2 (1.4)	1 (0.7)	0 (0)	0 (0)	2 (1.1)	1 (0.2)
Burkholderia cepacia	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Pseudomonadaceae family, other	3 (0.3)	3 (2.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pseudomonadaceae family, not specified	3 (0.3)	0 (0)	1 (0.7)	1 (0.4)	0 (0)	0 (0)	1 (0.2)
Haemophilus influenzae	10 (0.8)	9 (6.4)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Achromobacter species	2 (0.2)	0 (0)	0 (0)	0 (0)	0 (0)	2 (1.1)	0 (0)
Alcaligenes species	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Campylobacter species	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Other gram-bacilli, non enterobacteriaciaea	4 (0.3)	1 (0.7)	0 (0)	0 (0)	1 (3.7)	1 (0.5)	1 (0.2)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Number of HCAIs, all	**2,813 (100)**	**833 (100)**	**243 (100)**	**464 (100)**	**225 (100)**	**172 (100)**	**876 (100)**
Number of HCAIs with microorganisms, all	**1,043 (100)**	**117 (100)**	**102 (100)**	**239 (100)**	**21 (100)**	**161 (100)**	**403 (100)**
Number of microoganisms	**1,187 (100)**	**141 (100)**	**144 (100)**	**251 (100)**	**27 (100)**	**183 (100)**	**441 (100)**
G-bac, non enterobacteriaceae, not specified	7 (0.6)	1 (0.7)	2 (1.4)	1 (0.4)	0 (0)	2 (1.1)	1 (0.2)
Anaerobic bacilli	**123 (10.4)**	**1 (0.7)**	**7 (4.9)**	**0 (0)**	**2 (7.4)**	**3 (1.6)**	**110 (24.9)**
Bacteroides fragilis	1 (0.1)	0 (0)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)
Bacteroides sp., other	4 (0.3)	1 (0.7)	0 (0)	0 (0)	0 (0)	3 (1.6)	0 (0)
Clostridioides difficile	106 (8.9)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	106 (24)
Clostridium other	5 (0.4)	0 (0)	0 (0)	0 (0)	2 (7.4)	0 (0)	3 (0.7)
Propionibacterium species	1 (0.1)	0 (0)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)
Anaerobes, not specified	6 (0.5)	0 (0)	5 (3.5)	0 (0)	0 (0)	0 (0)	1 (0.2)
Other bacteria	**4 (0.3)**	**0 (0)**	**0 (0)**	**4 (1.6)**	**0 (0)**	**0 (0)**	**0 (0)**
Other bacteria	3 (0.3)	0 (0)	0 (0)	3 (1.2)	0 (0)	0 (0)	0 (0)
Other bacteria, not specified	1 (0.1)	0 (0)	0 (0)	1 (0.4)	0 (0)	0 (0)	0 (0)
Fungi	**51 (4.3)**	**7 (5)**	**9 (6.2)**	**8 (3.2)**	**3 (11.1)**	**6 (3.3)**	**18 (4.1)**
Candida albicans	25 (2.1)	4 (2.8)	5 (3.5)	4 (1.6)	1 (3.7)	2 (1.1)	9 (2)
Candida glabrata	7 (0.6)	0 (0)	2 (1.4)	1 (0.4)	0 (0)	3 (1.6)	1 (0.2)
Candida krusei	1 (0.1)	0 (0)	0 (0)	0 (0)	1 (3.7)	0 (0)	0 (0)
Candida parapsilosis	6 (0.5)	0 (0)	2 (1.4)	1 (0.4)	1 (3.7)	0 (0)	2 (0.5)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Number of HCAIs, all	**2,813 (100)**	**833 (100)**	**243 (100)**	**464 (100)**	**225 (100)**	**172 (100)**	**876 (100)**
Number of HCAIs with microorganisms, all	**1,043 (100)**	**117 (100)**	**102 (100)**	**239 (100)**	**21 (100)**	**161 (100)**	**403 (100)**
Number of microoganisms	**1,187 (100)**	**141 (100)**	**144 (100)**	**251 (100)**	**27 (100)**	**183 (100)**	**441 (100)**
Candida tropicalis	1 (0.1)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Candida sp., other	1 (0.1)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Candida sp., not specified	6 (0.5)	1 (0.7)	0 (0)	2 (0.8)	0 (0)	1 (0.5)	2 (0.5)
Aspergillus fumigatus	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Other yeasts	2 (0.2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.5)
Fungi other	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Viruses	**173 (14.6)**	**11 (7.8)**	**0 (0)**	**0 (0)**	**0 (0)**	**0 (0)**	**162 (36.7)**
SARS-CoV-2	147 (12.4)	8 (5.7)	0 (0)	0 (0)	0 (0)	0 (0)	139 (31.5)
Norovirus	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Parainfluenzavirus	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Respiratory syncytial virus (RSV)	1 (0.1)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rhinovirus	2 (0.2)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Sars-coronavirus	21 (1.8)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	20 (4.5)
Other parasites, yeasts, fungi, filaments	**1 (0.1)**	**1 (0.7)**	**0 (0)**	**0 (0)**	**0 (0)**	**0 (0)**	**0 (0)**
Other parasites, yeasts, fungi, filaments	1 (0.1)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Number of HCAIs, all	**2,813 (100)**	**833 (100)**	**243 (100)**	**464 (100)**	**225 (100)**	**172 (100)**	**876 (100)**
Number of HCAIs with microorganisms, all	**1,043 (100)**	**117 (100)**	**102 (100)**	**239 (100)**	**21 (100)**	**161 (100)**	**403 (100)**
Number of microoganisms	**1,187 (100)**	**141 (100)**	**144 (100)**	**251 (100)**	**27 (100)**	**183 (100)**	**441 (100)**
Negative codes	**1771 (100)**	**716 (100)**	**141 (100)**	**225 (100)**	**204 (100)**	**12 (100)**	**473 (100)**
Micro-organism not identified	30 (1.7)	9 (1.3)	2 (1.4)	13 (5.8)	0 (0)	1 (8.3)	5 (1.1)
Microbiology test available: no positive microbiology	380 (21.5)	168 (23.5)	27 (19.1)	56 (24.9)	52 (25.5)	2 (16.7)	75 (15.9)
Examination not done	9 (0.5)	7 (1)	1 (0.7)	0 (0)	0 (0)	0 (0)	1 (0.2)
Microbiology test not requested	796 (44.9)	363 (50.7)	47 (33.3)	67 (29.8)	56 (27.5)	2 (16.7)	261 (55.2)
Sterile examination	5 (0.3)	1 (0.1)	2 (1.4)	1 (0.4)	0 (0)	0 (0)	1 (0.2)
Results not available at the time of the survey	551 (31.1)	168 (23.5)	62 (44)	88 (39.1)	96 (47.1)	7 (58.3)	130 (27.5)

Annexe Table 3.1.3. Origin and association of HCAIs, Acute General Trusts, PPS England 2023

Characteristics of HCAIs	Number of HCAIs	Percent of HCAIs
Total	**2,813**	**100**
Origin of HCAI		
HCAIs present on admission	**236**	**8.4**
Origin of HCAI at admission		
Current hospital	144	5.1
Other acute care hospital	52	1.8
Other community or mental health hospital	7	0.2
Long-term care facility	16	0.6
Other	8	0.3
Unknown	9	0.3
HCAI with onset during current hospitalisation	**2,446**	**87**
Days until HCAI onset		
D12	220	7.8
D34	283	10.1
D57	366	13
D814	578	20.5
D1521	334	11.9
More than 3 weeks	651	23.1
Missing	14	0.5
HCAI presence on admission unknown	**131**	**4.7**
HCAI associated with current ward		
Yes	2,063	73.3
No	617	21.9
Unknown	133	4.7
Device-associated infections		
Pneumonia or LRI		8.1
Intubation within 48h before onset	228	16.2
No intubation	457	1.2
Presence of intubation unknown	35	4
Missing	113	

Characteristics of HCAIs	Number of HCAIs	Percent of HCAIs
Urinary tract infections		7.6
Urinary catheter within 7 days before onset	215	7.5
No urinary catheter	211	0.6
Presence of urinary catheter unknown	16	0.8
Missing	22	
Bloodstream infections (laboratory or microbiologically confirmed)		2.7
Vascular catheter within 48 hours before onset	76	1.1
No vascular catheter	32	0.4
Presence of vascular catheter unknown	11	1.9
Missing	53	
BSI origin		
Total BSI	**172**	**100**
Catheter-related		
Central vascular catheter (CVC)	9	5.2
Peripheral vascular catheter (PVC)	6	3.5
Missing	42	24.4
Secondary BSI		
Pulmonary infection	5	2.9
Urinary tract infection	35	20.3
Surgical site infection	3	1.7
Digestive tract infection	10	5.8
Skin or soft tissue infection	9	5.2
Other infection	9	5.2
BSI of unknown origin		
None of the above, BSI of unknown origin (clinically asserted)	22	12.8
Unknown	22	12.8

1.4 Specialist trusts

Annexe Table 3.2.4. Prevalence of healthcare-associated infections by patient speciality, Acute Specialist trusts, PPS England 2023

Patient speciality	Number of patients	Number of patients with at least one HCAI	Percent of patients with at least one HCAI	Prevalence
				(95% CI)
Surgical (SUR)	**251**	**54**	**42.9**	**21.5 (16.4 to 26.6)**
Cardio surgery	94	27	21.4	28.7 (19.6 to 37.9)
Cardio surgery and vascular surgery	12	4	3.2	33.3 (6.7 to 60)
Neurosurgery	1	0	0	0 (0 to 0)
Orthopaedics	64	9	7.1	14.1 (5.6 to 22.6)
Surgery for cancer	39	10	7.9	25.6 (11.9 to 39.4)
Thoracic surgery	35	4	3.2	11.4 (0.9 to 22)
Transplantation surgery	6	0	0	0 (0 to 0)
Medical (MED)	**420**	**65**	**51.6**	**15.5 (12 to 18.9)**
Bone marrow transplantation (BMT)	18	7	5.6	38.9 (16.4 to 61.4)
Cardiology	127	11	8.7	8.7 (3.8 to 13.6)
General medicine	3	2	1.6	66.7 (13.3 to 120)
Haematology	28	7	5.6	25 (9 to 41)
Oncology	205	35	27.8	17.1 (11.9 to 22.2)
Pneumology	39	3	2.4	7.7 (0 to 16.1)
Intensive care medicine (ICU)	**10**	**6**	**4.8**	**60 (29.6 to 90.4)**
Specialized ICU	2	1	0.8	50 (0 to 119.3)
Surgical ICU	8	5	4	62.5 (29 to 96)
Rehabilitation (RHB)	**24**	**1**	**0.8**	**4.2 (0 to 12.2)**
Rehabilitation	24	1	0.8	4.2 (0 to 12.2)
Other (OTH)	**1**	**0**	**0**	**0 (0 to 0)**
Other	1	0	0	0 (0 to 0)
Unknown	**1**	**0**	**0**	**0 (0 to 0)**

Annexe Table 3.2.5. Microorganisms isolated from HCAIs per diagnosis site, acute specialist trusts, PPS England 2023

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Number of HCAIs, all	**134 (100)**	**43 (100)**	**15 (100)**	**9 (100)**	**15 (100)**	**22 (100)**	**30 (100)**
Number of HCAIs with microorganisms, all	**67 (100)**	**16 (100)**	**9 (100)**	**8 (100)**	**1 (100)**	**22 (100)**	**11 (100)**
Number of microoganisms	**89 (100)**	**25 (100)**	**12 (100)**	**11 (100)**	**1 (100)**	**26 (100)**	**14 (100)**
Gram-positive cocci	**34 (38.2)**	**3 (12)**	**9 (75)**	**4 (36.4)**	**0 (0)**	**12 (46.2)**	**6 (42.9)**
Staphylococcus aureus	13 (14.6)	2 (8)	6 (50)	0 (0)	0 (0)	3 (11.5)	2 (14.3)
Staphylococcus epidermidis	5 (5.6)	0 (0)	1 (8.3)	1 (9.1)	0 (0)	1 (3.8)	2 (14.3)
Coagulase-negative Staphylococci, not specified	2 (2.2)	0 (0)	0 (0)	0 (0)	0 (0)	1 (3.8)	1 (7.1)
Staphylococcus sp., not specified	1 (1.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (7.1)
Streptococcus pneumoniae	1 (1.1)	1 (4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Streptococcus sp., other	3 (3.4)	0 (0)	2 (16.7)	0 (0)	0 (0)	1 (3.8)	0 (0)
Enterococcus faecalis	2 (2.2)	0 (0)	0 (0)	1 (9.1)	0 (0)	1 (3.8)	0 (0)
Enterococcus faecium	5 (5.6)	0 (0)	0 (0)	2 (18.2)	0 (0)	3 (11.5)	0 (0)
Enterococcus sp., other	2 (2.2)	0 (0)	0 (0)	0 (0)	0 (0)	2 (7.7)	0 (0)
Enterobacterales	**24 (27)**	**8 (32)**	**1 (8.3)**	**5 (45.5)**	**0 (0)**	**8 (30.8)**	**2 (14.3)**
Citrobacter koseri (ex. *diversus*)	1 (1.1)	1 (4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Enterobacter cloacae	1 (1.1)	0 (0)	0 (0)	1 (9.1)	0 (0)	0 (0)	0 (0)
Enterobacter sp., other	2 (2.2)	1 (4)	0 (0)	0 (0)	0 (0)	1 (3.8)	0 (0)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Escherichia coli	11 (12.4)	4 (16)	1 (8.3)	2 (18.2)	0 (0)	3 (11.5)	1 (7.1)
Klebsiella pneumoniae	6 (6.7)	1 (4)	0 (0)	2 (18.2)	0 (0)	2 (7.7)	1 (7.1)
Klebsiella oxytoca	1 (1.1)	1 (4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Serratia marcescens	2 (2.2)	0 (0)	0 (0)	0 (0)	0 (0)	2 (7.7)	0 (0)
Gram-negative bacilli	**15 (16.9)**	**9 (36)**	**1 (8.3)**	**2 (18.2)**	**0 (0)**	**3 (11.5)**	**0 (0)**
Pseudomonas aeruginosa	6 (6.7)	2 (8)	1 (8.3)	1 (9.1)	0 (0)	2 (7.7)	0 (0)
Stenotrophomonas maltophilia	6 (6.7)	5 (20)	0 (0)	0 (0)	0 (0)	1 (3.8)	0 (0)
Haemophilus influenzae	1 (1.1)	1 (4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Other gram-bacilli, non enterobacteriaciaea	2 (2.2)	1 (4)	0 (0)	1 (9.1)	0 (0)	0 (0)	0 (0)
Anaerobic bacilli	**6 (6.7)**	**1 (4)**	**0 (0)**	**0 (0)**	**0 (0)**	**1 (3.8)**	**4 (28.6)**
Clostridioides difficile	3 (3.4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (21.4)
Clostridium other	2 (2.2)	0 (0)	0 (0)	0 (0)	0 (0)	1 (3.8)	1 (7.1)
Anaerobes, not specified	1 (1.1)	1 (4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Fungi	**6 (6.7)**	**1 (4)**	**1 (8.3)**	**0 (0)**	**0 (0)**	**2 (7.7)**	**2 (14.3)**
Candida albicans	2 (2.2)	0 (0)	1 (8.3)	0 (0)	0 (0)	1 (3.8)	0 (0)
Candida glabrata	1 (1.1)	1 (4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Candida krusei	2 (2.2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (14.3)
Candida parapsilosis	1 (1.1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (3.8)	0 (0)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Viruses	**4 (4.5)**	**3 (12)**	**0 (0)**	**0 (0)**	**1 (100)**	**0 (0)**	**0 (0)**
Adenovirus	1 (1.1)	0 (0)	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)
Cytomegalovirus (CMV)	1 (1.1)	1 (4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rhinovirus	1 (1.1)	1 (4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Other virus	1 (1.1)	1 (4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Negative codes	**67 (100)**	**27 (100)**	**6 (100)**	**1 (100)**	**14 (100)**	**0 (-)**	**19 (100)**
Microbiology test available: no positive microbiology	27 (40.3)	5 (18.5)	0 (0)	1 (100)	4 (28.6)	0 (-)	17 (89.5)
Microbiology test not requested	8 (11.9)	5 (18.5)	2 (33.3)	0 (0)	1 (7.1)	0 (-)	0 (0)
Results not available at the time of the survey	32 (47.8)	17 (63)	4 (66.7)	0 (0)	9 (64.3)	0 (-)	2 (10.5)
Serratia marcescens	13 (1.1)	9 (6.4)	0 (0)	1 (0.4)	0 (0)	1 (0.5)	2 (0.5)
Serratia sp., other	1 (0.1)	0 (0)	0 (0)	1 (0.4)	0 (0)	0 (0)	0 (0)
Serratia sp., not specified	1 (0.1)	0 (0)	0 (0)	0 (0)	1 (3.7)	0 (0)	0 (0)
Morganella species	2 (0.2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.5)
Providencia species	2 (0.2)	0 (0)	0 (0)	1 (0.4)	0 (0)	0 (0)	1 (0.2)
Other enterobacteriaceae	3 (0.3)	0 (0)	0 (0)	1 (0.4)	0 (0)	1 (0.5)	1 (0.2)
Enterobacteriaceae, not specified	10 (0.8)	0 (0)	4 (2.8)	4 (1.6)	0 (0)	1 (0.5)	1 (0.2)
Gram-negative bacilli	**120 (10.1)**	**40 (28.4)**	**16 (11.1)**	**18 (7.2)**	**4 (14.8)**	**22 (12)**	**20 (4.5)**
Acinetobacter sp., other	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.5)	0 (0)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Acinetobacter sp., not specified	2 (0.2)	0 (0)	0 (0)	1 (0.4)	0 (0)	1 (0.5)	0 (0)
Pseudomonas aeruginosa	79 (6.7)	24 (17)	12 (8.3)	15 (6)	3 (11.1)	13 (7.1)	12 (2.7)
Stenotrophomonas maltophilia	6 (0.5)	2 (1.4)	1 (0.7)	0 (0)	0 (0)	2 (1.1)	1 (0.2)
Burkholderia cepacia	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Pseudomonadaceae family, other	3 (0.3)	3 (2.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pseudomonadaceae family, not specified	3 (0.3)	0 (0)	1 (0.7)	1 (0.4)	0 (0)	0 (0)	1 (0.2)
Haemophilus influenzae	10 (0.8)	9 (6.4)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Achromobacter species	2 (0.2)	0 (0)	0 (0)	0 (0)	0 (0)	2 (1.1)	0 (0)
Alcaligenes species	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Campylobacter species	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Other gram-bacilli, non enterobacteriaciaea	4 (0.3)	1 (0.7)	0 (0)	0 (0)	1 (3.7)	1 (0.5)	1 (0.2)
G-bac, non enterobacteriaceae, not specified	7 (0.6)	1 (0.7)	2 (1.4)	1 (0.4)	0 (0)	2 (1.1)	1 (0.2)
Anaerobic bacilli	**123 (10.4)**	**1 (0.7)**	**7 (4.9)**	**0 (0)**	**2 (7.4)**	**3 (1.6)**	**110 (24.9)**
Bacteroides fragilis	1 (0.1)	0 (0)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)
Bacteroides sp., other	4 (0.3)	1 (0.7)	0 (0)	0 (0)	0 (0)	3 (1.6)	0 (0)
Clostridioides difficile	106 (8.9)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	106 (24)
Clostridium other	5 (0.4)	0 (0)	0 (0)	0 (0)	2 (7.4)	0 (0)	3 (0.7)
Propionibacterium species	1 (0.1)	0 (0)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Anaerobes, not specified	6 (0.5)	0 (0)	5 (3.5)	0 (0)	0 (0)	0 (0)	1 (0.2)
Other bacteria	**4 (0.3)**	**0 (0)**	**0 (0)**	**4 (1.6)**	**0 (0)**	**0 (0)**	**0 (0)**
Other bacteria	3 (0.3)	0 (0)	0 (0)	3 (1.2)	0 (0)	0 (0)	0 (0)
Other bacteria, not specified	1 (0.1)	0 (0)	0 (0)	1 (0.4)	0 (0)	0 (0)	0 (0)
Fungi	**51 (4.3)**	**7 (5)**	**9 (6.2)**	**8 (3.2)**	**3 (11.1)**	**6 (3.3)**	**18 (4.1)**
Candida albicans	25 (2.1)	4 (2.8)	5 (3.5)	4 (1.6)	1 (3.7)	2 (1.1)	9 (2)
Candida glabrata	7 (0.6)	0 (0)	2 (1.4)	1 (0.4)	0 (0)	3 (1.6)	1 (0.2)
Candida krusei	1 (0.1)	0 (0)	0 (0)	0 (0)	1 (3.7)	0 (0)	0 (0)
Candida parapsilosis	6 (0.5)	0 (0)	2 (1.4)	1 (0.4)	1 (3.7)	0 (0)	2 (0.5)
Candida tropicalis	1 (0.1)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Candida sp., other	1 (0.1)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Candida sp., not specified	6 (0.5)	1 (0.7)	0 (0)	2 (0.8)	0 (0)	1 (0.5)	2 (0.5)
Aspergillus fumigatus	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Other yeasts	2 (0.2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.5)
Fungi other	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Viruses	**173 (14.6)**	**11 (7.8)**	**0 (0)**	**0 (0)**	**0 (0)**	**0 (0)**	**162 (36.7)**
SARS-CoV-2	147 (12.4)	8 (5.7)	0 (0)	0 (0)	0 (0)	0 (0)	139 (31.5)
Norovirus	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Parainfluenzavirus	1 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Respiratory syncytial virus (RSV)	1 (0.1)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Rhinovirus	2 (0.2)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)
Sars-coronavirus	21 (1.8)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	20 (4.5)
Other parasites, yeasts, fungi, filaments	**1 (0.1)**	**1 (0.7)**	**0 (0)**	**0 (0)**	**0 (0)**	**0 (0)**	**0 (0)**
Other parasites, yeasts, fungi, filaments	1 (0.1)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Negative codes	**1,771 (100)**	**716 (100)**	**141 (100)**	**225 (100)**	**204 (100)**	**12 (100)**	**473 (100)**
Micro-organism not identified	30 (1.7)	9 (1.3)	2 (1.4)	13 (5.8)	0 (0)	1 (8.3)	5 (1.1)
Microbiology test available: no positive microbiology	380 (21.5)	168 (23.5)	27 (19.1)	56 (24.9)	52 (25.5)	2 (16.7)	75 (15.9)
Examination not done	9 (0.5)	7 (1)	1 (0.7)	0 (0)	0 (0)	0 (0)	1 (0.2)
Microbiology test not requested	796 (44.9)	363 (50.7)	47 (33.3)	67 (29.8)	56 (27.5)	2 (16.7)	261 (55.2)
Sterile examination	5 (0.3)	1 (0.1)	2 (1.4)	1 (0.4)	0 (0)	0 (0)	1 (0.2)
Results not available at the time of the survey	551 (31.1)	168 (23.5)	62 (44)	88 (39.1)	96 (47.1)	7 (58.3)	130 (27.5)

Annexe Table 3.2.6. Origin and association of HCAIs, acute specialist trusts, PPS England 2023

Characteristics of HCAIs	Number of HCAIs	Percent of HCAIs
Total	**134**	**100**
Origin of HCAI		
HCAIs present on admission	**18**	**13.4**
Origin of HCAI at admission		
Current hospital	8	6
Other acute care hospital	7	5.2
Other	1	0.7
Unknown	2	1.5
HCAI with onset during current hospitalisation	**112**	**83.6**
Days until HCAI onset		
D12	14	10.4
D34	14	10.4
D57	23	17.2
D814	19	14.2
D1521	16	11.9
More than 3 weeks	25	18.7
Missing	1	0.7
HCAI presence on admission unknown	**4**	**3**
HCAI associated with current ward		
Yes	93	69.4
No	38	28.4
Unknown	3	2.2
Device-associated infections		
Pneumonia/LRI		
Intubation within 48 hours before onset	11	8.2
No intubation	18	13.4
Presence of intubation unknown	1	0.7
Missing	13	9.7
Urinary tract infections		
Urinary catheter within 7 days before onset	6	4.5

Characteristics of HCAIs	Number of HCAIs	Percent of HCAIs
No urinary catheter	2	1.5
Presence of urinary catheter unknown	1	0.7
Bloodstream infections (laboratory or microbiologically confirmed)		
Vascular catheter within 48 hours before onset	10	7.5
No vascular catheter	1	0.7
Presence of vascular catheter unknown	1	0.7
Missing	10	7.5
BSI origin		
Total BSI	**22**	**100**
Catheter-related		
Central vascular catheter (CVC)	3	13.6
Peripheral vascular catheter (PVC)	1	4.5
Missing	10	45.5
Secondary BSI		
Digestive tract infection	2	9.1
Other infection	2	9.1
BSI of unknown origin		
None of the above, BSI of unknown origin (clinically asserted)	4	18.2

1.5 Mental health and community trusts

Annexe Table 3.3.7. Prevalence of healthcare-associated infections by patient speciality, mental health and community trusts, PPS England 2023

Patient speciality	Number of patients	Number of patients with at least one HCAI	Percent of patients with at least one HCAI	Prevalence
				(95% CI)
Mental health				
Medical (MED)	**152**	**27**	**15.3**	**17.8 (11.7 to 23.8)**
Cardiology	9	0	0	0 (0 to 0)
General medicine	118	21	11.9	17.8 (10.9 to 24.7)

Neurology	2	0	0	0 (0 to 0)
Other medical	7	2	1.1	28.6 (0 to 62)
Rheumatology	16	4	2.3	25 (3.8 to 46.2)
Geriatrics (MED)	**110**	**8**	**4.5**	**7.3 (2.4 to 12.1)**
Geriatrics, care for the elderly	110	8	4.5	7.3 (2.4 to 12.1)
Rehabilitation (RHB)	**713**	**77**	**43.8**	**10.8 (8.5 to 13.1)**
Rehabilitation	713	77	43.8	10.8 (8.5 to 13.1)
Psychiatry (PSY)	**2438**	**62**	**35.2**	**2.5 (1.9 to 3.2)**
Psychiatrics	2438	62	35.2	2.5 (1.9 to 3.2)
Other (OTH)	**18**	**0**	**0**	**0 (0 to 0)**
Other	18	0	0	0 (0 to 0)
Unknown	**24**	**2**	**1.1**	**8.3 (0 to 19.4)**
Missing	**2**	**0**	**0**	**0 (0 to 0)**
Community				
Medical (MED)	**5**	**0**	**0**	**0 (0 to 0)**
Other medical	5	0	0	0 (0 to 0)
Geriatrics (MED)	**1**	**0**	**0**	**0 (0 to 0)**
Geriatrics, care for the elderly	1	0	0	0 (0 to 0)
Rehabilitation (RHB)	**1,231**	**67**	**93.1**	**5.4 (4.2 to 6.7)**
Rehabilitation	1,231	67	93.1	5.4 (4.2 to 6.7)
Psychiatry (PSY)	**126**	**2**	**2.8**	**1.6 (0 to 3.8)**
Psychiatrics	126	2	2.8	1.6 (0 to 3.8)
Other (OTH)	**84**	**3**	**4.2**	**3.6 (0 to 7.5)**
Burns care	1	0	0	0 (0 to 0)
Other	83	3	4.2	3.6 (0 to 7.6)

Annexe Table 3.3.8. Microorganisms isolated from HCAIs per diagnosis site, mental health and community trusts, PPS England 2023

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Mental health							
Number of HCAIs, all	**186 (100)**	**35 (100)**	**5 (100)**	**55 (100)**	**1 (100)**	**2 (100)**	**88 (100)**
Number of HCAIs with microorganisms, all	**43 (100)**	**0 (-)**	**2 (100)**	**20 (100)**	**0 (-)**	**2 (100)**	**19 (100)**
Number of microoganisms	**43 (100)**	**0 (-)**	**2 (100)**	**20 (100)**	**0 (-)**	**2 (100)**	**19 (100)**
Gram-positive cocci	**10 (23.3)**	**0 (-)**	**2 (100)**	**2 (10)**	**0 (-)**	**0 (0)**	**6 (31.6)**
Staphylococcus aureus	6 (14)	0 (-)	1 (50)	0 (0)	0 (-)	0 (0)	5 (26.3)
Staphylococcus epidermidis	1 (2.3)	0 (-)	0 (0)	0 (0)	0 (-)	0 (0)	1 (5.3)
Staphylococcus sp., not specified	1 (2.3)	0 (-)	1 (50)	0 (0)	0 (-)	0 (0)	0 (0)
Enterococcus sp., other	1 (2.3)	0 (-)	0 (0)	1 (5)	0 (-)	0 (0)	0 (0)
Enterococcus sp., not specified	1 (2.3)	0 (-)	0 (0)	1 (5)	0 (-)	0 (0)	0 (0)
Gram-negative cocci	**1 (2.3)**	**0 (-)**	**0 (0)**	**1 (5)**	**0 (-)**	**0 (0)**	**0 (0)**
Gram negative cocci, other	1 (2.3)	0 (-)	0 (0)	1 (5)	0 (-)	0 (0)	0 (0)
Enterobacterales	**17 (39.5)**	**0 (-)**	**0 (0)**	**15 (75)**	**0 (-)**	**2 (100)**	**0 (0)**
Citrobacter koseri (ex. *diversus*)	1 (2.3)	0 (-)	0 (0)	0 (0)	0 (-)	1 (50)	0 (0)
Escherichia coli	13 (30.2)	0 (-)	0 (0)	12 (60)	0 (-)	1 (50)	0 (0)
Klebsiella oxytoca	1 (2.3)	0 (-)	0 (0)	1 (5)	0 (-)	0 (0)	0 (0)
Klebsiella sp., other	1 (2.3)	0 (-)	0 (0)	1 (5)	0 (-)	0 (0)	0 (0)
Proteus mirabilis	1 (2.3)	0 (-)	0 (0)	1 (5)	0 (-)	0 (0)	0 (0)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Gram-negative bacilli	**1 (2.3)**	**0 (-)**	**0 (0)**	**1 (5)**	**0 (-)**	**0 (0)**	**0 (0)**
Other gram-bacilli, non enterobacteriaciaea	1 (2.3)	0 (-)	0 (0)	1 (5)	0 (-)	0 (0)	0 (0)
Anaerobic bacilli	**1 (2.3)**	**0 (-)**	**0 (0)**	**0 (0)**	**0 (-)**	**0 (0)**	**1 (5.3)**
Clostridioides difficile	1 (2.3)	0 (-)	0 (0)	0 (0)	0 (-)	0 (0)	1 (5.3)
Fungi	**1 (2.3)**	**0 (-)**	**0 (0)**	**1 (5)**	**0 (-)**	**0 (0)**	**0 (0)**
Other yeasts	1 (2.3)	0 (-)	0 (0)	1 (5)	0 (-)	0 (0)	0 (0)
Viruses	**12 (27.9)**	**0 (-)**	**0 (0)**	**0 (0)**	**0 (-)**	**0 (0)**	**12 (63.2)**
SARS-CoV-2	12 (27.9)	0 (-)	0 (0)	0 (0)	0 (-)	0 (0)	12 (63.2)
Negative codes	**143 (100)**	**35 (100)**	**3 (100)**	**35 (100)**	**1 (100)**	**0 (-)**	**69 (100)**
Microbiology test available: no positive microbiology	4 (2.8)	2 (5.7)	0 (0)	2 (5.7)	0 (0)	0 (-)	0 (0)
Examination not done	7 (4.9)	2 (5.7)	0 (0)	2 (5.7)	0 (0)	0 (-)	3 (4.3)
Microbiology test not requested	83 (58)	22 (62.9)	2 (66.7)	16 (45.7)	1 (100)	0 (-)	42 (60.9)
Results not available at the time of the survey	49 (34.3)	9 (25.7)	1 (33.3)	15 (42.9)	0 (0)	0 (-)	24 (34.8)
Community							
Number of HCAIs, all	**73 (100)**	**12 (100)**	**0 (-)**	**29 (100)**	**0 (-)**	**12 (100)**	**20 (100)**
Number of HCAIs with microorganisms, all	**29 (100)**	**0 (-)**	**0 (-)**	**18 (100)**	**0 (-)**	**5 (100)**	**6 (100)**
Number of microoganisms	**30 (100)**	**0 (-)**	**0 (-)**	**19 (100)**	**0 (-)**	**5 (100)**	**6 (100)**
Gram-positive cocci	**6 (20)**	**0 (-)**	**0 (-)**	**4 (21.1)**	**0 (-)**	**0 (0)**	**2 (33.3)**
Staphylococcus aureus	3 (10)	0 (-)	0 (-)	1 (5.3)	0 (-)	0 (0)	2 (33.3)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Staphylococcus sp., not specified	1 (3.3)	0 (-)	0 (-)	1 (5.3)	0 (-)	0 (0)	0 (0)
Enterococcus sp., not specified	2 (6.7)	0 (-)	0 (-)	2 (10.5)	0 (-)	0 (0)	0 (0)
Enterobacterales	**15 (50)**	**0 (-)**	**0 (-)**	**15 (78.9)**	**0 (-)**	**0 (0)**	**0 (0)**
Enterobacter cloacae	1 (3.3)	0 (-)	0 (-)	1 (5.3)	0 (-)	0 (0)	0 (0)
Enterobacter sp., other	1 (3.3)	0 (-)	0 (-)	1 (5.3)	0 (-)	0 (0)	0 (0)
Escherichia coli	10 (33.3)	0 (-)	0 (-)	10 (52.6)	0 (-)	0 (0)	0 (0)
Klebsiella pneumoniae	2 (6.7)	0 (-)	0 (-)	2 (10.5)	0 (-)	0 (0)	0 (0)
Proteus mirabilis	1 (3.3)	0 (-)	0 (-)	1 (5.3)	0 (-)	0 (0)	0 (0)
Gram-negative bacilli	**5 (16.7)**	**0 (-)**	**0 (-)**	**0 (0)**	**0 (-)**	**5 (100)**	**0 (0)**
Acinetobacter calcoaceticus	5 (16.7)	0 (-)	0 (-)	0 (0)	0 (-)	5 (100)	0 (0)
Anaerobic bacilli	**1 (3.3)**	**0 (-)**	**0 (-)**	**0 (0)**	**0 (-)**	**0 (0)**	**1 (16.7)**
Clostridioides difficile	1 (3.3)	0 (-)	0 (-)	0 (0)	0 (-)	0 (0)	1 (16.7)
Viruses	**3 (10)**	**0 (-)**	**0 (-)**	**0 (0)**	**0 (-)**	**0 (0)**	**3 (50)**
SARS-CoV-2	2 (6.7)	0 (-)	0 (-)	0 (0)	0 (-)	0 (0)	2 (33.3)
Sars-coronavirus	1 (3.3)	0 (-)	0 (-)	0 (0)	0 (-)	0 (0)	1 (16.7)
Negative codes	**44 (100)**	**12 (100)**	**0 (-)**	**11 (100)**	**0 (-)**	**7 (100)**	**14 (100)**
Microbiology test available: no positive microbiology	6 (13.6)	1 (8.3)	0 (-)	2 (18.2)	0 (-)	0 (0)	3 (21.4)
Examination not done	1 (2.3)	0 (0)	0 (-)	1 (9.1)	0 (-)	0 (0)	0 (0)
Microbiology test not requested	31 (70.5)	10 (83.3)	0 (-)	3 (27.3)	0 (-)	7 (100)	11 (78.6)
Results not available at the time of the survey	6 (13.6)	1 (8.3)	0 (-)	5 (45.5)	0 (-)	0 (0)	0 (0)

Annexe Table 3.3.9. Origin and association of HCAIs, mental health and community trusts, PPS England 2023

Characteristics of HCAIs	Number of HCAIs	Percent of HCAIs	Number of HCAIs	Percent of HCAIs
	Mental health		Community	
Total	**186**	**100**	**73**	**100**
Origin of HCAI				
HCAIs present on admission	**31**	**16.7**	**11**	**15.1**
Origin of HCAI at admission				
Other acute care hospital	24	12.9	1	1.4
Other community or mental health hospital	1	0.5	7	9.6
Other	3	1.6	1	1.4
Unknown	3	1.6	1	1.4
			1	1.4
HCAI with onset during current hospitalisation	**153**	**82.3**	**60**	**82.2**
Days until HCAI onset				
D12	9	4.8	2	2.7
D34	9	4.8	4	5.5
D57	23	12.4	7	9.6
D814	33	17.7	7	9.6
D1521	16	8.6	11	15.1
More than 3 weeks	62	33.3	18	24.7
Missing	1	0.5	11	15.1
HCAI presence on admission unknown	**2**	**1.1**	**2**	**2.7**
HCAI associated with current ward				
Yes	129	69.4	43	58.9
No	42	22.6	29	39.7
Unknown	15	8.1	1	1.4
Device-associated infections				
Pneumonia/LRI				
Intubation within 48 hours before onset	7	3.8	7	9.6
No intubation	15	8.1	5	6.8
Presence of intubation unknown	1	0.5	-	-
Missing	12	6.5	-	-

Characteristics of HCAIs	Number of HCAIs	Percent of HCAIs	Number of HCAIs	Percent of HCAIs
Urinary tract infections				
Urinary catheter within 7 days before onset	11	5.9	10	13.7
No urinary catheter	43	23.1	18	24.7
Missing	1	0.5	1	1.4
Bloodstream infections (laboratory or microbiologically confirmed)				
Vascular catheter within 48 hours before onset	2	1.1	12	16.4
BSI origin				
Total BSI	**2**	**100**	**12**	**100**
Catheterrelated				
Central vascular catheter (CVC)			12	100
Secondary BSI				
Urinary tract infection	1	50	-	-
BSI of unknown origin				
Unknown	1	50	-	-

1.6 Independent sector trusts

Annexe Table 3.4.10. Prevalence of healthcare-associated infections by patient speciality, independent sector trusts, PPS England 2023

Patient speciality	Number of patients	Number of patients with at least one HCAI	Percent of patients with at least one HCAI	Prevalence
				(95% CI)
Surgical (SUR)	**837**	**21**	**50**	**2.5 (1.4 to 3.6)**
Cardio surgery	9	0	0	0 (0 to 0)
Cardio surgery and vascular surgery	1	0	0	0 (0 to 0)
Digestive tract surgery	40	1	2.4	2.5 (0 to 7.3)
Ear, nose and throat (ENT)	15	1	2.4	6.7 (0 to 19.3)
General surgery	57	3	7.1	5.3 (0 to 11.1)
Neurosurgery	8	0	0	0 (0 to 0)
Orthopaedics	550	11	26.2	2 (0.8 to 3.2)

Patient speciality	Number of patients	Number of patients with at least one HCAI	Percent of patients with at least one HCAI	Prevalence
Orthopaedics and surgical traumatology	15	0	0	0 (0 to 0)
Other surgery	14	1	2.4	7.1 (0 to 20.6)
Plastic and reconstructive surgery	37	2	4.8	5.4 (0 to 12.7)
Surgery for cancer	1	0	0	0 (0 to 0)
Thoracic surgery	2	0	0	0 (0 to 0)
Urology	81	0	0	0 (0 to 0)
Vascular surgery	7	2	4.8	28.6 (0 to 62)
Medical (MED)	**113**	**11**	**26.2**	**9.7 (4.3 to 15.2)**
Cardiology	6	0	0	0 (0 to 0)
Gastro-enterology	16	0	0	0 (0 to 0)
General medicine	27	2	4.8	7.4 (0 to 17.3)
Haematology	11	3	7.1	27.3 (0.9 to 53.6)
Hepatology	1	1	2.4	100 (100 to 100)
Nephrology	4	0	0	0 (0 to 0)
Neurology	9	0	0	0 (0 to 0)
Oncology	34	5	11.9	14.7 (2.8 to 26.6)
Other medical	4	0	0	0 (0 to 0)
Pneumology	1	0	0	0 (0 to 0)
Intensive care medicine (ICU)	**22**	**2**	**4.8**	**9.1 (0 to 21.1)**
Medical ICU	16	0	0	0 (0 to 0)
Mixed (polyvalent) ICU, general intensive or critical care	6	2	4.8	33.3 (0 to 71)
Gynaecology or obstetrics (GO)	**74**	**1**	**2.4**	**1.4 (0 to 4)**
Gynaecology	74	1	2.4	1.4 (0 to 4)
Rehabilitation (RHB)	**74**	**4**	**9.5**	**5.4 (0.2 to 10.6)**
Rehabilitation	74	4	9.5	5.4 (0.2 to 10.6)
Other (OTH)	**7**	**3**	**7.1**	**42.9 (6.2 to 79.5)**
Combination of specialties	4	0	0	0 (0 to 0)
Dermatology	1	1	2.4	100 (100 to 100)
Other	2	2	4.8	100 (100 to 100)
Unknown	**1**	**0**	**0**	**0 (0 to 0)**

Annexe Table 3.4.11. Microorganisms isolated from HCAIs per diagnosis site, independent sector trusts, PPS England 2023

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Number of HCAIs, all	**45 (100)**	**6 (100)**	**14 (100)**	**4 (100)**	**0 (-)**	**1 (100)**	**20 (100)**
Number of HCAIs with microorganisms, all	**28 (100)**	**4 (100)**	**9 (100)**	**4 (100)**	**0 (-)**	**1 (100)**	**10 (100)**
Number of microoganisms	**41 (100)**	**6 (100)**	**16 (100)**	**4 (100)**	**0 (-)**	**1 (100)**	**14 (100)**
Gram-positive cocci	**13 (31.7)**	**2 (33.3)**	**6 (37.5)**	**0 (0)**	**0 (-)**	**0 (0)**	**5 (35.7)**
Staphylococcus aureus	**3 (7.3)**	**1 (16.7)**	**1 (6.2)**	**0 (0)**	**0 (-)**	**0 (0)**	**1 (7.1)**
Staphylococcus epidermidis	2 (4.9)	1 (16.7)	0 (0)	0 (0)	0 (-)	0 (0)	1 (7.1)
Other coagulase-negative staphylococci (CNS)	1 (2.4)	0 (0)	0 (0)	0 (0)	0 (-)	0 (0)	1 (7.1)
Streptococcus sp., other	1 (2.4)	0 (0)	1 (6.2)	0 (0)	0 (-)	0 (0)	0 (0)
Streptococcus sp., not specified	1 (2.4)	0 (0)	1 (6.2)	0 (0)	0 (-)	0 (0)	0 (0)
Enterococcus faecalis	2 (4.9)	0 (0)	1 (6.2)	0 (0)	0 (-)	0 (0)	1 (7.1)
Enterococcus faecium	**1 (2.4)**	**0 (0)**	**1 (6.2)**	**0 (0)**	**0 (-)**	**0 (0)**	**0 (0)**
Enterococcus sp., other	1 (2.4)	0 (0)	0 (0)	0 (0)	0 (-)	0 (0)	1 (7.1)
Gram positive cocci, not specified	**1 (2.4)**	**0 (0)**	**1 (6.2)**	**0 (0)**	**0 (-)**	**0 (0)**	**0 (0)**
Enterobacterales	14 (34.1)	1 (16.7)	4 (25)	2 (50)	0 (-)	1 (100)	6 (42.9)
Citrobacter koseri (ex. *diversus*)	1 (2.4)	0 (0)	1 (6.2)	0 (0)	0 (-)	0 (0)	0 (0)
Enterobacter cloacae	2 (4.9)	0 (0)	1 (6.2)	0 (0)	0 (-)	0 (0)	1 (7.1)
Enterobacter sp., other	1 (2.4)	0 (0)	0 (0)	0 (0)	0 (-)	1 (100)	0 (0)

Microorganism	Total N (%)	PNLRI N (%)	UTI N (%)	SSI N (%)	Sepsis N (%)	BSI N (%)	Other N (%)
Escherichia coli	6 (14.6)	0 (0)	1 (6.2)	2 (50)	0 (-)	0 (0)	3 (21.4)
Klebsiella pneumoniae	**3 (7.3)**	**1 (16.7)**	**0 (0)**	**0 (0)**	**0 (-)**	**0 (0)**	**2 (14.3)**
Serratia marcescens	1 (2.4)	0 (0)	1 (6.2)	0 (0)	0 (-)	0 (0)	0 (0)
Gram-negative bacilli	**13 (31.7)**	**3 (50)**	**5 (31.2)**	**2 (50)**	**0 (-)**	**0 (0)**	**3 (21.4)**
Pseudomonas aeruginosa	11 (26.8)	3 (50)	3 (18.8)	2 (50)	0 (-)	0 (0)	3 (21.4)
Other gram-bacilli, non enterobacteriaciaea	**2 (4.9)**	**0 (0)**	**2 (12.5)**	**0 (0)**	**0 (-)**	**0 (0)**	**0 (0)**
Fungi	1 (2.4)	0 (0)	1 (6.2)	0 (0)	0 (-)	0 (0)	0 (0)
Candida albicans	**1 (2.4)**	**0 (0)**	**1 (6.2)**	**0 (0)**	**0 (-)**	**0 (0)**	**0 (0)**
Negative codes	17 (100)	2 (100)	5 (100)	0 (-)	0 (-)	0 (-)	10 (100)
Microbiology test available: no positive microbiology	**2 (11.8)**	**0 (0)**	**1 (20)**	**0 (-)**	**0 (-)**	**0 (-)**	**1 (10)**
Microbiology test not requested	5 (29.4)	2 (100)	0 (0)	0 (-)	0 (-)	0 (-)	3 (30)
Results not available at the time of the survey	10 (58.8)	0 (0)	4 (80)	0 (-)	0 (-)	0 (-)	6 (60)

Annexe Table 3.4.12. Origin and association of HCAIs, independent sector trusts, PPS England 2023

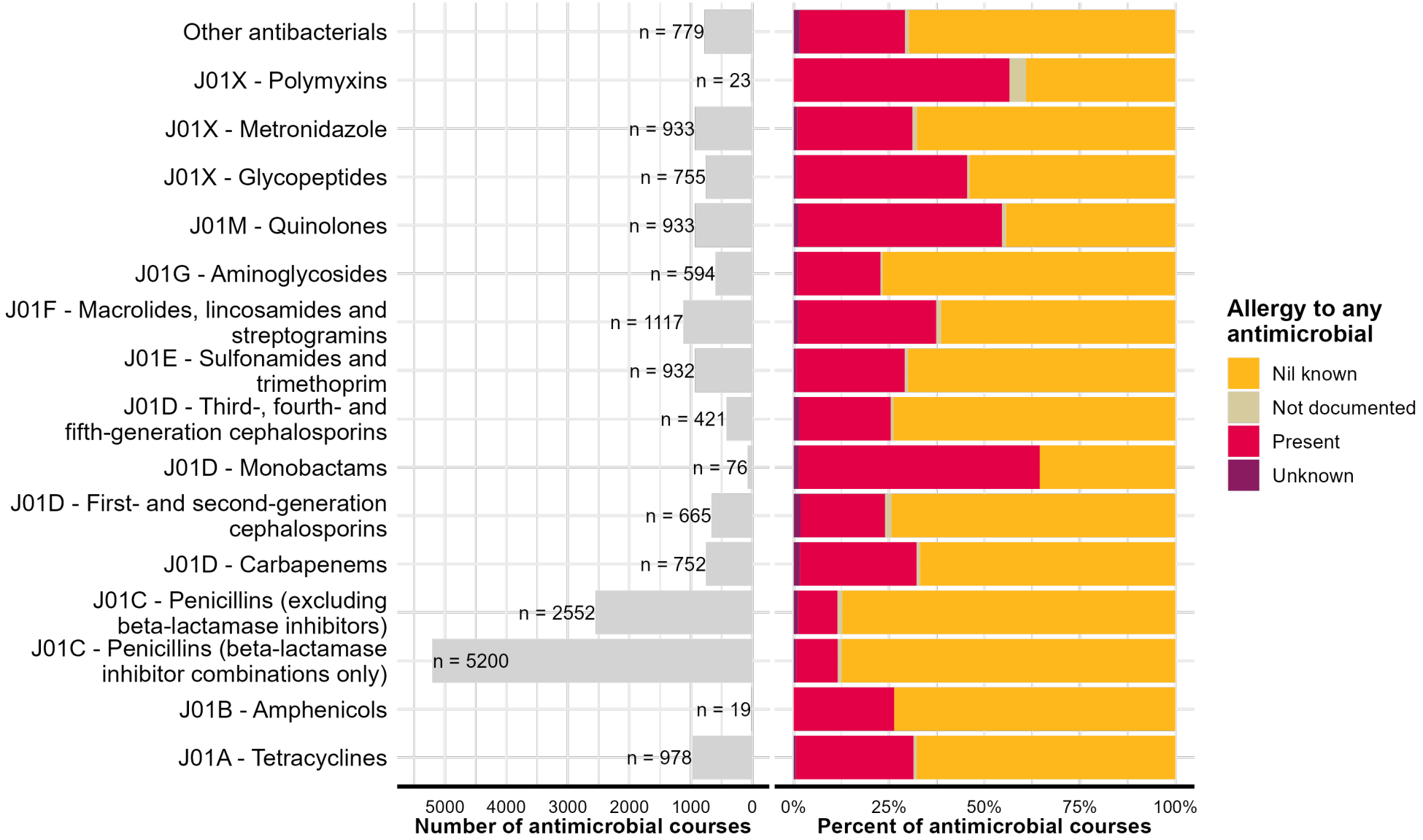
Characteristics of HCAIs	Number of HCAIs	Percent of HCAIs
Total	**45**	**100**
Origin of HCAI		
HCAIs present on admission	**17**	**37.8**
Origin of HCAI at admission	**-**	**-**
Current hospital	4	8.9
Other acute care hospital	2	4.4
Other	1	2.2
Unknown	10	22.2
HCAI with onset during current hospitalisation	**27**	**60**
Days until HCAI onset		
D12	5	11.1
D57	2	4.4
D814	6	13.3
D1521	2	4.4
More than 3 weeks	10	22.2
Missing	2	4.4
HCAI presence on admission unknown	**1**	**2.2**
HCAI associated with current ward		
Yes	26	57.8
No	18	40
Unknown	1	2.2
Device-associated infections		
Pneumonia/LRI	**-**	**-**
Intubation within 48 hours before onset	2	4.4
No intubation	1	2.2
Missing	3	6.7
Urinary tract infections		
Urinary catheter within 7 days before onset	3	6.7
No urinary catheter	1	2.2

Characteristics of HCAIs	Number of HCAIs	Percent of HCAIs
Bloodstream infections (laboratory or microbiologically confirmed)		
Vascular catheter within 48 hours before onset	1	2.2
BSI origin		
Total BSI	**1**	**100**
Catheter-related	**-**	**-**
Secondary BSI	**-**	**-**
Other infection	1	100

Antimicrobial use and stewardship in the adult population

1.7 Additional tables and figures

Annexe Figure 4.1.1. Reported allergy to antimicrobials in adults (19 years and over), PPS England 2023



1.8 Acute and teaching trusts tables and figures

Annexe Table 4.2.13. Characteristics of antimicrobial use in adults (19 years and over) in acute and teaching trusts, PPS England 2023

	Patients on antimicrobials		Antimicrobial courses	
Characteristics	**n**	**%**	**n**	**%**
Total	**12,868**	**100**	**17,141**	**100**
Site of diagnosis				
Respiratory tract	3,738	29	4,700	27.4
Skin, soft tissue, bone or joint	1,891	14.7	2,318	13.5
Gastro-intestinal system	1,602	12.4	2,316	13.5
Systemic infections	1,494	11.6	1,795	10.5
Urinary tract	1,580	12.3	1,666	9.7
Eye, ear, nose or throat	376	2.9	426	2.5
Genito-urinary system or obstetric	172	1.3	253	1.5
Cardiovascular system	144	1.1	216	1.3
Central nervous system	151	1.2	211	1.2
Missing or unknown diagnosis	2,445	19	3,240	18.9
Indication for antimicrobial use				
Treatment intention (TI)				
Community-acquired infection	8,271	64.3	10,645	62.1
Acute hospital-acquired infection	2,830	22	3,491	20.4

	Patients on antimicrobials		Antimicrobial courses	
Characteristics	**n**	**%**	**n**	**%**
Long-term care infection or chronic-care hospital	228	1.8	282	1.6
Surgical prophylaxis (SP)				
Single dose	272	2.1	379	2.2
One day	102	0.8	114	0.7
More than one day	323	2.5	432	2.5
Medical prophylaxis	998	7.8	1,317	7.7
Other indication	195	1.5	240	1.4
Unknown indication (verified during PPS)	109	0.8	116	0.7
Unknown indication	91	0.7	105	0.6
Missing	5	0.0	20	0.1
Route of administration				
Parenteral	7,743	60.2	9,788	57.1
Oral	6,170	47.9	7,277	42.5
Inhalation	49	0.4	51	0.3
Rectal	5	0.0	<5	0.0
Missing	5	0.0	20	0.1
AWaRe categories				
Access	4,651	36.1	5,284	30.8

	Patients on antimicrobials		Antimicrobial courses	
Characteristics	**n**	**%**	**n**	**%**
Watch	7,730	60.1	8,348	48.7
Reserve	945	7.3	996	5.8
Other or not categorised	2,164	16.8	2,513	14.7
Reason in notes				
Yes	12,059	93.7	15,959	93.1
No	998	7.8	1,162	6.8
Missing	5	0.0	20	0.1
Antimicrobial review within 72 hours				
Yes	6,550	50.9	8,409	49.1
No	1,816	14.1	2,176	12.7
Not applicable (start less than 72 hours ago)	4,811	37.4	6,045	35.3
Reported as unknown	365	2.8	491	2.9
Missing	5	0.0	20	0.1
Antimicrobial changed				
No change	10,004	77.7	13,072	76.3
Escalation	953	7.4	1,117	6.5
De-escalation	469	3.6	522	3.0
Switch IV to oral	1,076	8.4	1,191	6.9
Adverse effects	26	0.2	30	0.2

	Patients on antimicrobials		Antimicrobial courses	
Characteristics	**n**	**%**	**n**	**%**
Outpatient parenteral antibiotic therapy	20	0.2	20	0.1
Change for other or unknown reason	291	2.3	338	2.0
Unknown	609	4.7	831	4.8
Missing	5	0	20	0.1
Number of missed doses				
At least one missed dose	806	6.3	890	5.2
No	5,300	41.2	6,835	39.9
Not reported (optional question)	7,052	54.8	9,416	54.9
Reason for missed doses				
Patient declined or refused	101	0.8	105	0.6
Patient could not purchase	7	0.1	8	0.0
Due to stock out	178	1.4	186	1.1
Multiple reasons	52	0.4	53	0.3
Other reason	279	2.2	311	1.8
No missed doses reported	5,300	41.2	6,835	39.9
Reported as unknown	153	1.2	161	0.9
Not reported (optional question)	7,110	55.3	9,482	55.3
Adherence with guidance				
Adherence with national guidelines	2,369	18.4	2,894	16.9

	Patients on antimicrobials		Antimicrobial courses	
Characteristics	**n**	**%**	**n**	**%**
Adherence with locally endorsed guidelines	2,067	16.1	2,705	15.8
Non-adherent with guidelines	1,058	8.2	1,196	7.0
Directed therapy	959	7.5	1,204	7.0
No guidelines available	226	1.8	273	1.6
Not assessable (see accompanying criteria)	129	1.0	148	0.9
Not reported (optional question)	6,552	50.9	8,721	50.9
Appropriateness				
Optimal	3,972	30.9	5,223	30.5
Adequate	1,280	9.9	1,495	8.7
Sub-optimal	592	4.6	647	3.8
Inadequate	309	2.4	341	2.0
Not assessable (see accompanying guidance)	163	1.3	186	1.1
Not reported (optional question)	6,964	54.1	9,249	54.0

Annexe Table 4.2.14. Site of diagnosis for antimicrobial treatment of infections in acute and teaching trusts, PPS England 2023

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N (% total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
Total	**14,418**	**10,645**	**3,491**	**282**
Respiratory tract	**4,699 (32.6%)**	**3,414 (32.1%)**	**1,164 (33.3%)**	**121 (42.9%)**
PNEU - pneumonia	4,196 (29.1%)	2,972 (27.9%)	1,112 (31.9%)	112 (39.7%)
BRON - acute bronchitis or exacerbations of chronic bronchitis	489 (3.4%)	428 (4%)	52 (1.5%)	9 (3.2%)
CF - cystic fibrosis	14 (0.1%)	14 (0.1%)	-	-
Skin, soft tissue, bone or joint	**2,318 (16.1%)**	**1,796 (16.9%)**	**470 (13.5%)**	**52 (18.4%)**
SST-SSI - surgical site infection involving skin or soft tissue but not bone	286 (2%)	81 (0.8%)	203 (5.8%)	ns
SST - skin or soft tissue, relationship to surgery not specified	123 (0.9%)	83 (0.8%)	35 (1%)	<5
SST-O - cellulitis, wound, deep soft tissue not involving bone, not related to surgery	1292 (9%)	1136 (10.7%)	131 (3.8%)	25 (8.9%)
BJ-SSI - septic arthritis, osteomyelitis of surgical site	133 (0.9%)	59 (0.6%)	71 (2%)	<5
BJ - bone or joint, relationship to surgery not specified	43 (0.3%)	36 (0.3%)	<5	<5

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N (% total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
BJ-O - septic arthritis, osteomyelitis, not related to surgery	441 (3.1%)	401 (3.8%)	25 (0.7%)	15 (5.3%)
Gastro-intestinal system	**2,316 (16.1%)**	**1,831 (17.2%)**	**462 (13.2%)**	**23 (8.2%)**
IA - intraabdominal sepsis including hepatobiliary	1,640 (11.4%)	1,383 (13%)	246 (7%)	11 (3.9%)
GI - infections (salmonellosis, antibiotic associated diarrhoea)	676 (4.7%)	448 (4.2%)	216 (6.2%)	12 (4.3%)
Systemic infections	**1,794 (12.4%)**	**1,234 (11.6%)**	**533 (15.3%)**	**27 (9.6%)**
CSEP - clinical sepsis, excluding FN	701 (4.9%)	492 (4.6%)	199 (5.7%)	10 (3.5%)
FN - febrile neutropenia or other form of manifestation of infection in immunocompromised host with no clear anatomical site	206 (1.4%)	144 (1.4%)	60 (1.7%)	<5
SIRS - systemic inflammatory response with no clear anatomic site	268 (1.9%)	188 (1.8%)	78 (2.2%)	<5
BAC - lab-confirmed bacteraemia	450 (3.1%)	279 (2.6%)	165 (4.7%)	6 (2.1%)
UND - completely undefined, site with no systemic inflammation	169 (1.2%)	131 (1.2%)	31 (0.9%)	7 (2.5%)
Urinary tract	**1,666 (11.6%)**	**1,203 (11.3%)**	**440 (12.6%)**	**23 (8.2%)**
CYS - symptomatic lower UTI	1,105 (7.7%)	748 (7%)	343 (9.8%)	14 (5%)
PYE - symptomatic upper UTI	544 (3.8%)	446 (4.2%)	89 (2.5%)	9 (3.2%)

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N (% total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
ASB - asymptomatic bacteriuria	17 (0.1%)	9 (0.1%)	8 (0.2%)	-
Eye, ear, nose or throat	**426 (3%)**	**258 (2.4%)**	**165 (4.7%)**	**<5**
ENT - infections of ear, mouth, nose, throat or larynx	399 (2.8%)	240 (2.3%)	156 (4.5%)	<5
EYE - endophthalmitis	27 (0.2%)	18 (0.2%)	9 (0.3%)	-
Genito-urinary system or obstetric	**253 (1.8%)**	**201 (1.9%)**	**51 (1.5%)**	**<5**
OBGY - obstetric or gynaecological infections, STD in women	202 (1.4%)	158 (1.5%)	44 (1.3%)	-
GUM - prostatitis, epididymoorchitis, STD in men	51 (0.4%)	43 (0.4%)	7 (0.2%)	<5
Cardiovascular system	**216 (1.5%)**	**172 (1.6%)**	**36 (1%)**	**8 (2.8%)**
CVS - cardiovascular infections: endocarditis, vascular graft	216 (1.5%)	172 (1.6%)	36 (1%)	8 (2.8%)
Central nervous system	**211 (1.5%)**	**155 (1.5%)**	**51 (1.5%)**	**<5**
CNS - infections of the central nervous system	211 (1.5%)	155 (1.5%)	51 (1.5%)	<5
Missing or unknown diagnoses	**519 (3.6%)**	**381 (3.6%)**	**119 (3.4%)**	**19 (6.7%)**
Unknown	192 (1.3%)	115 (1.1%)	64 (1.8%)	13 (4.6%)
Missing	327 (2.3%)	266 (2.5%)	55 (1.6%)	6 (2.1%)

Annexe Table 4.2.15. Top 10 antimicrobials used in adults (19 years and over) in acute and teaching trusts, PPS England 2023

Antimicrobial	AWaRe category	Count	Percentage of antimicrobial courses (%)	Percentage of patients on antimicrobials (%)	Percentage of total number of patients (%)	Route of administration n (% of AM courses)		
						Parenteral	Oral	Other
Total number of patients	**-**	**34,263**	**-**	**-**	**-**	**-**	**-**	**-**
Total number of patients on antimicrobials	**-**	**12,868**	**-**	**-**	**-**	**-**	**-**	**-**
Total number of antimicrobial courses	**-**	**17,141**	**-**	**-**	**-**	9,788 (57.1)	7,277 (42.5)	76 (0.4)
J01CR02 - Amoxicillin and enzyme inhibitor	Watch	3,057	17.8	23.8	8.9	1,814 (59.3)	1,244 (40.7)	3 (0.1)
J01CR05 - Piperacillin and enzyme inhibitor	Watch	1,650	9.6	12.8	4.8	1,636 (99.2)	11 (0.7)	3 (0.2)
J01CA04 - Amoxicillin	Access	935	5.5	7.3	2.7	466 (49.8)	467 (49.9)	2 (0.2)
J01XD01 - Metronidazole (parenteral)	Access	890	5.2	6.9	2.6	872 (98.0)	15 (1.7)	3 (0.3)
J01CF05 - Flucloxacillin	Access	851	5	6.6	2.5	565 (66.4)	286 (33.6)	1 (0.1)
J01AA02 - Doxycycline	Access	825	4.8	6.4	2.4	26 (3.2)	798 (96.7)	1 (0.1)
J01DH02 - Meropenem	Reserve	630	3.7	4.9	1.8	627 (99.5)	3 (0.5)	1 (0.2)
J01FA09 - Clarithromycin	Watch	600	3.5	4.7	1.8	126 (21)	475 (79.2)	0 (0.0)
J01MA02 - Ciprofloxacin	Watch	568	3.3	4.4	1.7	170 (29.9)	398 (70.1)	0 (0.0)
J01EE01 - Sulfamethoxazole and trimethoprim	Access	538	3.1	4.2	1.6	133 (24.7)	402 (74.7)	3 (0.6)

1.9 Specialist trusts tables and figures

Annexe Table 4.3.16. Characteristics of antimicrobial use in adults (19 years and over) in specialist trusts, PPS England 2023

	Patients on antimicrobials		Antimicrobial courses	
Characteristics	**n**	**%**	**n**	**%**
Total	**301**	**100**	**569**	**100**
Site of diagnosis				
Respiratory tract	103	34.2	155	27.2
Skin, soft tissue, bone or joint	23	7.6	35	6.2
Gastro-intestinal system	17	5.6	21	3.7
Systemic infections	81	26.9	118	20.7
Urinary tract	15	5	20	3.5
Eye, ear, nose or throat	8	2.7	9	1.6
Genito-urinary system or obstetric	<5	-	<5	-
Cardiovascular system	13	4.3	29	5.1
Central nervous system	<5	-	<5	-
Missing or unknown diagnosis	111	36.9	178	31.3
Indication for antimicrobial use				
Treatment intention (TI)				
Community-acquired infection	108	35.9	161	28.3
Acute hospital-acquired infection	130	43.2	214	37.6
Long-term care infection or chronic-care hospital	10	3.3	15	2.6
Surgical prophylaxis (SP)				
Single dose	12	4	20	3.5
One day	9	3	9	1.6
More than one day	<5	-	6	1.1
Medical prophylaxis	81	26.9	136	23.9
Other indication	<5	-	<5	-
Unknown indication (verified during PPS)	<5	-	<5	-
Unknown indication	5	1.7	6	1.1

	Patients on antimicrobials		Antimicrobial courses	
Characteristics	**n**	**%**	**n**	**%**
Route of administration				
Parenteral	197	65.4	309	54.3
Oral	174	57.8	253	44.5
Inhalation	6	2	6	1.1
Rectal	<5	-	<5	-
AWaRe categories				
Access	103	34.2	118	20.7
Watch	193	64.1	228	40.1
Reserve	77	25.6	90	15.8
Other or not categorised	85	28.2	133	23.4
Reason in notes				
Yes	280	93	507	89.1
No	38	12.6	62	10.9
Antimicrobial review within 72 hours				
Yes	206	68.4	391	68.7
No	57	18.9	86	15.1
Not applicable (start less than 72 hours ago)	62	20.6	79	13.9
Reported as unknown	12	4	13	2.3
Antimicrobial changed				
No change	258	85.7	473	83.1
Escalation	38	12.6	49	8.6
De-escalation	13	4.3	14	2.5
Switch IV to oral	16	5.3	16	2.8
Change for other or unknown reason	<5	-	6	1.1
Unknown	8	2.7	11	1.9
Number of missed doses				
At least one missed dose	9	3	10	1.8
No	128	42.5	239	42
Not reported (optional question)	175	58.1	320	56.2

	Patients on antimicrobials		Antimicrobial courses	
Characteristics	**n**	**%**	**n**	**%**
Reason for missed doses				
Patient declined or refused	<5	-	<5	-
Due to stock out	<5	-	<5	-
Other reason	5	1.7	6	1.1
No missed doses reported	128	42.5	239	42
Reported as unknown	<5	-	<5	-
Not reported (optional question)	175	58.1	320	56.2
Adherence with guidance				
Adherence with national guidelines	57	18.9	92	16.2
Adherence with locally endorsed guidelines	62	20.6	119	20.9
Non-adherent with guidelines	9	3	10	1.8
Directed therapy	16	5.3	32	5.6
No guidelines available	<5	-	<5	-
Not assessable (see accompanying criteria)	<5	-	<5	-
Not reported (optional question)	167	55.5	308	54.1
Appropriateness				
Optimal	94	31.2	173	30.4
Adequate	45	15	65	11.4
Suboptimal	14	4.7	16	2.8
Inadequate	7	2.3	8	1.4
Not assessable (see accompanying guidance)	<5	-	<5	-
Not reported (optional question)	165	54.8	306	53.8

Annexe Table 4.3.17. Site of diagnosis for antimicrobial treatment of infections in specialist trusts, PPS England 2023

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N (% total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
Total	**390**	**161**	**214**	**15**
Respiratory tract	**148 (37.9%)**	**71 (44.1%)**	**71 (33.2%)**	**6 (40%)**
PNEU - pneumonia	120 (30.8%)	49 (30.4%)	65 (30.4%)	6 (40%)
BRON - acute bronchitis or exacerbations of chronic bronchitis	21 (5.4%)	15 (9.3%)	6 (2.8%)	-
CF - cystic fibrosis	7 (1.8%)	7 (4.3%)	-	-
Skin, soft tissue, bone or joint	**35 (9%)**	**10 (6.2%)**	**23 (10.7%)**	**<5**
SST-SSI - surgical site infection involving skin or soft tissue but not bone	9 (2.3%)	-	8 (3.7%)	<5
SST - skin or soft tissue, relationship to surgery not specified	<5	-	-	<5
SST-O - cellulitis, wound, deep soft tissue not involving bone, not related to surgery	6 (1.5%)	6 (3.7%)	-	-
BJ-SSI - septic arthritis, osteomyelitis of surgical site	10 (2.6%)	<5	9 (4.2%)	-
BJ - bone or joint, relationship to surgery not specified	9 (2.3%)	<5	6 (2.8%)	-
BJ-O - septic arthritis, osteomyelitis, not related to surgery	20 (5.1%)	10 (6.2%)	10 (4.7%)	-

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N (% total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
Gastro-intestinal system	**11 (2.8%)**	**5 (3.1%)**	**6 (2.8%)**	**-**
IA - intraabdominal sepsis including hepatobiliary	9 (2.3%)	5 (3.1%)	<5	-
GI - infections (salmonellosis, antibiotic associated diarrhoea)	116 (29.7%)	39 (24.2%)	71 (33.2%)	6 (40%)
Systemic infections	**45 (11.5%)**	**7 (4.3%)**	**36 (16.8%)**	**<5**
CSEP - clinical sepsis, excluding FN	35 (9%)	15 (9.3%)	16 (7.5%)	<5
FN - febrile neutropaenia or other form of manifestation of infection in immuno-compromised host with no clear anatomical site	11 (2.8%)	10 (6.2%)	<5	-
SIRS - systemic inflammatory response with no clear anatomic site	25 (6.4%)	7 (4.3%)	18 (8.4%)	-
BAC - lab-confirmed bacteraemia	20 (5.1%)	11 (6.8%)	9 (4.2%)	-
UND - completely undefined, site with no systemic inflammation	8 (2.1%)	5 (3.1%)	<5	-
Urinary tract	**12 (3.1%)**	**6 (3.7%)**	**6 (2.8%)**	**-**
CYS - symptomatic lower UTI	9 (2.3%)	<5	6 (2.8%)	-
PYE - symptomatic upper UTI	9 (2.3%)	<5	6 (2.8%)	-
ASB - asymptomatic bacteriuria	<5	<5	<5	-
Eye, ear, nose or throat	<5	<5	<5	-

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N (% total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
ENT - infections of ear, mouth, nose, throat or larynx	29 (7.4%)	13 (8.1%)	16 (7.5%)	-
EYE - endophthalmitis	29 (7.4%)	13 (8.1%)	16 (7.5%)	-
Genito-urinary system or obstetric	**<5**	**-**	**<5**	**-**
OBGY - obstetric or gynaecological infections, STD in women	<5	-	<5	-
GUM - prostatitis, epididymoorchitis, STD in men	9 (2.3%)	<5	5 (2.3%)	<5
Cardiovascular system	**9 (2.3%)**	**<5**	**5 (2.3%)**	**<5**
CVS - cardiovascular infections: endocarditis, vascular graft	390 (100%)	161 (100%)	214 (100%)	15 (100%)
Central nervous system	**148 (37.9%)**	**71 (44.1%)**	**71 (33.2%)**	**6 (40%)**
CNS - infections of the central nervous system	120 (30.8%)	49 (30.4%)	65 (30.4%)	6 (40%)
Missing or unknown diagnoses	**21 (5.4%)**	**15 (9.3%)**	**6 (2.8%)**	**-**
Unknown	7 (1.8%)	7 (4.3%)	-	-
Missing	35 (9%)	10 (6.2%)	23 (10.7%)	<5

Annexe Table 4.3.18. Top 10 antimicrobials used in adults (19 years and over) specialist trusts, PPS England 2023

Antimicrobial	AWaRe category	Count	Percentage of antimicrobial courses (%)	Percentage of patients on antimicrobials (%)	Percentage of total number of patients (%)	Route of administration n (% of AM courses)		
						Parenteral	Oral	Other
Total number of patients	**-**	**707**	**-**	**-**	**-**	**-**	**-**	**-**
Total number of patients on antimicrobials	**-**	**301**	**-**	**-**	**-**	**-**	**-**	**-**
Total number of antimicrobial courses	**-**	**569**	**-**	**-**	**-**	70 (98.6)	0 (0.0)	1 (1.4)
J01CR05 - Piperacillin and enzyme inhibitor	Watch	71	12.5	23.6	10	55 (100.0)	0 (0.0)	0 (0.0)
J01DH02 - Meropenem	Reserve	55	9.7	18.3	7.8	5 (14.7)	29 (85.3)	0 (0.0)
J01EE01 - Sulfamethoxazole and trimethoprim	Access	34	6.0	11.3	4.8	27 (96.4)	1 (3.6)	0 (0.0)
J01XA01 - Vancomycin (parenteral)	Watch	28	4.9	9.3	4.0	0 (0.0)	26 (100.0)	0 (0.0)
J05AB01 - Aciclovir	Other	26	4.6	8.6	3.7	21 (84.0)	4 (16.0)	0 (0.0)
J01CF05 - Flucloxacillin	Access	25	4.4	8.3	3.5	4 (16.0)	21 (84.0)	0 (0.0)
J01CR02 - Amoxicillin and enzyme inhibitor	Watch	25	4.4	8.3	3.5	0 (0.0)	22 (100.0)	0 (0.0)
J01E - Sulfonamides and Trimethoprim NoS	Other	22	3.9	7.3	3.1	17 (100.0)	0 (0.0)	0 (0.0)
J01GB03 - Gentamicin	Access	17	3.0	5.6	2.4	1 (5.9)	16 (94.1)	0 (0.0)
J01MA02 - Ciprofloxacin	Watch	17	3.0	5.6	2.4	70 (98.6)	0 (0.0)	1 (1.4)

1.10 Mental health and community trusts tables and figures

Annexe Table 4.4.19. Characteristics of antimicrobial use in adults (19 years and over) in mental health and community trusts, PPS England 2023

	Mental health				Community			
	Patients on antimicrobials		Antimicrobial courses		Patients on antimicrobials		Antimicrobial courses	
Characteristics	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Total	**251**	**100**	**278**	**100**	**125**	**100**	**132**	**100**
Site of diagnosis								
Respiratory tract	36	14.3	40	14.4	20	16	22	16.7
Skin, soft tissue, bone or joint	51	20.3	54	19.4	22	17.6	22	16.7
Gastro-intestinal system	6	2.4	6	2.2	<5	-	<5	-
Systemic infections	5	2	<5	-	<5	-	<5	-
Urinary tract	62	24.7	64	23	36	28.8	36	27.3
Eye, ear, nose or throat	15	6	16	5.8				
Genito-urinary system or obstetric	9	3.6	10	3.6				
Cardiovascular system	<5	-	<5	-				
Central nervous system	75	29.9	81	29.1	<5	-	<5	-
Missing or unknown diagnosis	36	14.3	40	14.4	44	35.2	46	34.8
Indication for antimicrobial use								
Treatment intention (TI)								
Community-acquired infection	92	36.7	98	35.3	29	23.2	29	22
Acute hospital-acquired infection	84	33.5	92	33.1	45	36	46	34.8
Long-term care infection or chronic-care hospital	10	4	10	3.6	23	18.4	26	19.7
Surgical prophylaxis (SP)								
More than one day	6	2.4	6	2.2	<5	-	<5	-
Medical prophylaxis	**39**	**15.5**	**43**	**15.5**	**12**	**9.6**	**13**	**9.8**
Other indication	**17**	**6.8**	**17**	**6.1**	**9**	**7.2**	**10**	**7.6**

	Mental health				Community			
	Patients on antimicrobials		Antimicrobial courses		Patients on antimicrobials		Antimicrobial courses	
Unknown indication (verified during PPS)	**6**	**2.4**	**6**	**2.2**	**<5**	**-**	**<5**	**-**
Unknown indication	**5**	**2**	**6**	**2.2**	**<5**	**-**	**<5**	**-**
Route of administration								
Parenteral	15	6	16	5.8	<5	-	<5	-
Oral	237	94.4	261	93.9	122	97.6	129	97.7
Inhalation	<5	-	<5	-				
AWaRe categories								
Access	141	56.2	145	52.2	80	64	80	60.6
Watch	57	22.7	57	20.5	26	20.8	27	20.5
Reserve	5	2	<5	-	<5	-	<5	-
Other or not categorised	64	25.5	71	25.5	23	18.4	24	18.2
Reason in notes								
Yes	237	94.4	262	94.2	112	89.6	118	89.4
No	16	6.4	16	5.8	14	11.2	14	10.6
Antimicrobial review within 72 hours								
Yes	88	35.1	94	33.8	36	28.8	36	27.3
No	64	25.5	69	24.8	51	40.8	55	41.7
Not applicable (start less than 72 hours ago)	44	17.5	47	16.9	22	17.6	24	18.2
Reported as unknown	60	23.9	68	24.5	17	13.6	17	12.9
Antimicrobial changed								
No change	222	88.4	245	88.1	112	89.6	118	89.4
Escalation	<5	-	<5	-	<5	-	<5	-
De-escalation	<5	-	<5	-				
Switch IV to oral	<5	-	<5	-	<5	-	<5	-
Adverse effects	<5	-	<5	-				
Change for other or unknown reason	<5	-	<5	-	5	4	<5	-
Unknown	24	9.6	25	9	6	4.8	7	5.3
Number of missed doses								
At least one missed dose	40	15.9	40	14.4	5	4	<5	-

	Mental health				Community			
	Patients on antimicrobials		Antimicrobial courses		Patients on antimicrobials		Antimicrobial courses	
No	124	49.4	141	50.7	79	63.2	83	62.9
Not reported (optional question)	89	35.5	97	34.9	42	33.6	44	33.3
Reason for missed doses								
Patient declined or refused	12	4.8	12	4.3	<5	-	<5	-
Due to stock out	10	4	10	3.6	0	-	0	-
Multiple reasons	5	2	<5	-	<5	-	<5	-
Other reason	9	3.6	9	3.2	0	-	0	-
No missed doses reported	124	49.4	141	50.7	79	63.2	83	62.9
Reported as unknown	<5	-	<5	-	<5	-	<5	-
Not reported (optional question)	89	35.5	97	34.9	42	33.6	44	33.3
Adherence with guidance								
Adherence with national guidelines	119	47.4	125	45	44	35.2	47	35.6
Adherence with locally endorsed guidelines	23	9.2	23	8.3	20	16	20	15.2
Non-adherent with guidelines	14	5.6	14	5	9	7.2	9	6.8
Directed therapy	8	3.2	9	3.2	8	6.4	8	6.1
No guidelines available	<5	-	8	2.9	0	-	0	-
Not assessable (see accompanying criteria)	19	7.6	20	7.2	<5	-	<5	-
Not reported (optional question)	69	27.5	79	28.4	41	32.8	43	32.6
Appropriateness								
Optimal	127	50.6	135	48.6	54	43.2	57	43.2
Adequate	26	10.4	26	9.4	18	14.4	18	13.6
Suboptimal	6	2.4	6	2.2	5	4	6	4.5
Inadequate	<5	-	<5	-	<5	-	<5	-
Not assessable (see accompanying guidance)	16	6.4	20	7.2	<5	-	<5	-
Not reported (optional question)	79	31.5	90	32.4	45	36	48	36.4

Annexe Table 4.4.20. Site of diagnosis for antimicrobial treatment of infections in mental health and community trusts, PPS England 2023

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N % total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
Mental health trusts				
Total	**200**	**98**	**92**	**10**
Respiratory tract	**40 (20%)**	**19 (19.4%)**	**21 (22.8%)**	**-**
PNEU - pneumonia	30 (15%)	12 (12.2%)	18 (19.6%)	-
BRON - acute bronchitis or exacerbations of chronic bronchitis	10 (5%)	7 (7.1%)	<5	-
Skin, soft tissue, bone or joint	**54 (27%)**	**25 (25.5%)**	**25 (27.2%)**	**<5**
SST-SSI - surgical site infection involving skin or soft tissue but not bone	<5	-	<5	-
SST - skin or soft tissue, relationship to surgery not specified	11 (5.5%)	5 (5.1%)	5 (5.4%)	<5
SST-O - cellulitis, wound, deep soft tissue not involving bone, not related to surgery	31 (15.5%)	18 (18.4%)	10 (10.9%)	<5

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N % total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
BJ-SSI - septic arthritis, osteomyelitis of surgical site	6 (3%)	<5	5 (5.4%)	-
BJ - bone or joint, relationship to surgery not specified	<5	<5	-	-
BJ-O - septic arthritis, osteomyelitis, not related to surgery	<5	-	<5	-
Gastro-intestinal system	**6 (3%)**	**<5**	**<5**	**-**
GI - infections (salmonellosis, antibiotic associated diarrhoea)	6 (3%)	<5	<5	-
Systemic infections	**5 (2.5%)**	**<5**	**<5**	**<5**
CSEP - clinical sepsis, excluding FN	<5	<5	-	-
SIRS - systemic inflammatory response with no clear anatomic site	<5	-	<5	-
BAC - lab-confirmed bacteraemia	<5	-	<5	<5

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N % total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
Urinary tract	**64 (32%)**	**31 (31.6%)**	**30 (32.6%)**	**<5**
CYS - symptomatic lower UTI	59 (29.5%)	30 (30.6%)	26 (28.3%)	<5
PYE - symptomatic upper UTI	5 (2.5%)	<5	<5	-
Eye, ear, nose or throat	**16 (8%)**	**11 (11.2%)**	**5 (5.4%)**	**-**
ENT - infections of ear, mouth, nose, throat or larynx	16 (8%)	11 (11.2%)	5 (5.4%)	-
Genito-urinary system or obstetric	**10 (5%)**	**9 (9.2%)**	**<5**	**-**
OBGY - obstetric or gynaecological infections, STD in women	6 (3%)	5 (5.1%)	<5	-
GUM - prostatitis, epididymoorchitis, STD in men	<5	<5	-	-
Cardiovascular system	**<5**	**-**	**<5**	**<5**
CVS - cardiovascular infections: endocarditis, vascular graft	<5	-	<5	<5

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N % total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
Missing or unknown diagnoses	**<5**	**-**	**<5**	**<5**
Unknown	<5	-	<5	-
Missing	<5	-	-	<5
Community trusts				
Total	**101**	**29**	**46**	**26**
Respiratory tract	**22 (21.8%)**	**5 (17.2%)**	**11 (23.9%)**	**6 (23.1%)**
PNEU - pneumonia	20 (19.8%)	5 (17.2%)	9 (19.6%)	6 (23.1%)
BRON - acute bronchitis or exacerbations of chronic bronchitis	<5	-	<5	-
Skin, soft tissue, bone or joint	**22 (21.8%)**	**10 (34.5%)**	**6 (13%)**	**6 (23.1%)**
SST - skin or soft tissue, relationship to surgery not specified	<5	<5	<5	<5
SST-O - cellulitis, wound, deep soft tissue not involving bone, not related to surgery	11 (10.9%)	5 (17.2%)	<5	5 (19.2%)

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N % total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
BJ - bone or joint, relationship to surgery not specified	<5	-	<5	-
BJ-O - septic arthritis, osteomyelitis, not related to surgery	6 (5.9%)	<5	<5	-
Gastro-intestinal system	**<5**	**<5**	**-**	**-**
GI - infections (salmonellosis, antibiotic associated diarrhoea)	<5	<5	-	-
Systemic infections	**<5**	**-**	**<5**	**<5**
SIRS - systemic inflammatory response with no clear anatomic site	<5	-	<5	-
UND - completely undefined, site with no systemic inflammation	<5	-	-	<5
Urinary tract	**36 (35.6%)**	**7 (24.1%)**	**25 (54.3%)**	**<5**
CYS - symptomatic lower UTI	32 (31.7%)	6 (20.7%)	23 (50%)	<5
PYE - symptomatic upper UTI	<5	<5	<5	<5

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N % total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
Central nervous system	**<5**	**-**	**-**	**<5**
CNS - infections of the central nervous system	<5	-	-	<5
Missing or unknown diagnoses	**15 (14.9%)**	**6 (20.7%)**	**<5**	**6 (23.1%)**
Unknown	6 (5.9%)	<5	<5	-
Missing	9 (8.9%)	<5	<5	6 (23.1%)

Annexe Table 4.4.21. Top 10 antimicrobials used in adults (19 years and over) mental health and community trusts, PPS England 2023

Antimicrobial	AWaRe category	Count	Percentage of antimicrobial courses (%)	Percentage of patients on antimicrobials (%)	Percentage of total number of patients (%)	Route of administration n (% of AM courses)		
						Parenteral	Oral	Other
Mental health trusts								
Total number of patients	**-**	**3,457**	**-**	**-**	**-**	**-**	**-**	**-**
Total number of patients on antimicrobials	**-**	**251**	**-**	**-**	**-**	**-**	**-**	**-**
Total number of antimicrobial courses	**-**	**278**	**-**	**-**	**-**	16 (5.8)	261 (93.9)	1 (0.4)
J01XE01 - Nitrofurantoin	Access	40	14.4	15.9	1.2	0 (0.0)	40 (100.0)	0 (0.0)
J01CF05 - Flucloxacillin	Access	27	9.7	10.8	0.8	1 (3.7)	26 (96.3)	0 (0.0)
J01AA02 - Doxycycline	Access	25	9.0	10.0	0.7	0 (0.0)	25 (100.0)	0 (0.0)
J01CA04 - Amoxicillin	Access	25	9.0	10.0	0.7	1 (4.0)	24 (96.0)	0 (0.0)
J01CR02 - Amoxicillin and enzyme inhibitor	Watch	22	7.9	8.8	0.6	0 (0.0)	22 (100.0)	0 (0.0)
J01EA01 - Trimethoprim	Access	11	4.0	4.4	0.3	0 (0.0)	11 (100.0)	0 (0.0)
J01EE01 - Sulfamethoxazole and trimethoprim	Access	10	3.6	4.0	0.3	0 (0.0)	10 (100.0)	0 (0.0)
P01AB01 - Metronidazole (oral = rectal)	Other	10	3.6	4.0	0.3	1 (10.0)	9 (90.0)	0 (0.0)
J01FA09 - Clarithromycin	Watch	9	3.2	3.6	0.3	0 (0.0)	9 (100.0)	0 (0.0)

Antimicrobial	AWaRe category	Count	Percentage of antimicrobial courses (%)	Percentage of patients on antimicrobials (%)	Percentage of total number of patients (%)	Route of administration n (% of AM courses)		
						Parenteral	Oral	Other
J01XX05 - Methenamine	Other	8	2.9	3.2	0.2	0 (0.0)	8 (100.0)	0 (0.0)
Community trusts								
Total number of patients	**-**	**1,447**	**-**	**-**	**-**	**-**	**-**	**-**
Total number of patients on antimicrobials	**-**	**125**	**-**	**-**	**-**	**-**	**-**	**-**
Total number of antimicrobial courses	**-**	**132**	**-**	**-**	**-**	3 (2.3)	129 (97.7)	0 (0.0)
J01XE01 - Nitrofurantoin	Access	21	15.9	16.8	1.5	0 (0.0)	21 (100.0)	0 (0.0)
J01CA04 - Amoxicillin	Access	17	12.9	13.6	1.2	0 (0.0)	17 (100.0)	0 (0.0)
J01CF05 - Flucloxacillin	Access	13	9.8	10.4	0.9	0 (0.0)	13 (100.0)	0 (0.0)
J01AA02 - Doxycycline	Access	12	9.1	9.6	0.8	0 (0.0)	12 (100.0)	0 (0.0)
J01CR02 - Amoxicillin and enzyme inhibitor	Watch	12	9.1	9.6	0.8	0 (0.0)	12 (100.0)	0 (0.0)
J01EA01 - Trimethoprim	Access	10	7.6	8	0.7	0 (0.0)	10 (100.0)	0 (0.0)
J01MA02 - Ciprofloxacin	Watch	7	5.3	5.6	0.5	0 (0.0)	7 (100.0)	0 (0.0)
J01CE02 - Phenoxymethylpenicillin	Access	4	3.0	3.2	0.3	0 (0.0)	4 (100.0)	0 (0.0)
J01E - Sulfonamides and Trimethoprim NoS	Other	4	3.0	3.2	0.3	0 (0.0)	4 (100.0)	0 (0.0)

Antimicrobial	AWaRe category	Count	Percentage of antimicrobial courses (%)	Percentage of patients on antimicrobials (%)	Percentage of total number of patients (%)	Route of administration n (% of AM courses)		
						Parenteral	Oral	Other
J01CR50 - Combinations of penicillins	Other	3	2.3	2.4	0.2	0 (0.0)	3 (100.0)	0 (0.0)

1.11 Independent sector trusts tables and figures

Annexe Table 4.5.22. Characteristics of antimicrobial use in adults (19 years and over) in independent sector trusts, PPS England 2023

	Patients on antimicrobials		Antimicrobial courses	
Characteristics	**n**	**%**	**n**	**%**
Total	**493**	**100**	**659**	**100**
Site of diagnosis				
Respiratory tract	15	3	22	3.3
Skin, soft tissue, bone or joint	24	4.9	34	5.2
Gastro-intestinal system	12	2.4	18	2.7
Systemic infections	16	3.2	19	2.9
Urinary tract	9	1.8	10	1.5
Eye, ear, nose or throat	<5	-	<5	-
Genito-urinary system or obstetric	<5	-	<5	-
Cardiovascular system	<5	-	<5	-
Central nervous system	417	84.6	552	83.8
Missing or unknown diagnosis	15	3	22	3.3
Indication for antimicrobial use				
Treatment intention (TI)				
Community-acquired infection	48	9.7	59	9
Acute hospital-acquired infection	31	6.3	46	7
Long-term care infection or chronic-care hospital	6	1.2	9	1.4
Surgical prophylaxis (SP)				
Single dose	150	30.4	201	30.5
One day	190	38.5	198	30
More than one day	96	19.5	118	17.9
Medical prophylaxis	**11**	**2.2**	**15**	**2.3**
Other indication	**<5**	**-**	**<5**	**-**
Unknown indication (verified during PPS)	**<5**	**-**	**<5**	**-**
Unknown indication	**5**	**1**	**<5**	**-**

	Patients on antimicrobials		Antimicrobial courses	
Characteristics	**n**	**%**	**n**	**%**
Route of administration				
Parenteral	444	90.1	590	89.5
Oral	63	12.8	69	10.5
AWaRe categories				
Access	152	30.8	193	29.3
Watch	354	71.8	370	56.1
Reserve	25	5.1	26	3.9
Other or not categorised	66	13.4	70	10.6
Reason in notes				
Yes	437	88.6	586	88.9
No	58	11.8	73	11.1
Antimicrobial review within 72 hours				
Yes	126	25.6	169	25.6
No	20	4.1	22	3.3
Not applicable (start less than 72 hours ago)	339	68.8	442	67.1
Reported as unknown	20	4.1	26	3.9
Antimicrobial changed				
No change	453	91.9	603	91.5
Escalation	8	1.6	10	1.5
De-escalation	6	1.2	7	1.1
Switch IV to oral	22	4.5	23	3.5
Change for other or unknown reason	<5	-	<5	-
Unknown	12	2.4	15	2.3
Number of missed doses				
No	211	42.8	293	44.5
Not reported (optional question)	289	58.6	366	55.5
Reason for missed doses				
No missed doses reported	211	42.8	293	44.5
Not reported (optional question)	289	58.6	366	55.5

	Patients on antimicrobials		Antimicrobial courses	
Characteristics	**n**	**%**	**n**	**%**
Adherence with guidance				
Adherence with national guidelines	82	16.6	104	15.8
Adherence with locally endorsed guidelines	76	15.4	107	16.2
Non-adherent with guidelines	21	4.3	25	3.8
Directed therapy	19	3.9	27	4.1
No guidelines available	<5	-	<5	-
Not assessable (see accompanying criteria)	<5	-	<5	-
Not reported (optional question)	303	61.5	393	59.6
Appropriateness				
Optimal	151	30.6	202	30.7
Adequate	41	8.3	53	8
Sub-optimal	7	1.4	9	1.4
Inadequate	9	1.8	11	1.7
Not assessable (see accompanying guidance)	13	2.6	18	2.7
Not reported (optional question)	283	57.4	366	55.5

Annexe Table 4.5.23. Site of diagnosis for antimicrobial treatment of infections in independent sector trusts, PPS England 2023

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N (% total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
Total	**114 (100%)**	**59 (100%)**	**46 (100%)**	**9 (100%)**
Respiratory tract	**22 (19.3%)**	**14 (23.7%)**	**7 (15.2%)**	**<5**
PNEU - pneumonia	19 (16.7%)	11 (18.6%)	7 (15.2%)	<5
BRON - acute bronchitis or exacerbations of chronic bronchitis	<5	<5	-	-
Skin, soft tissue, bone or joint	**34 (29.8%)**	**9 (15.3%)**	**19 (41.3%)**	**6 (66.7%)**
SST-SSI - surgical site infection involving skin or soft tissue but not bone	18 (15.8%)	<5	13 (28.3%)	<5
SST - skin or soft tissue, relationship to surgery not specified	<5	-	<5	<5
SST-O - cellulitis, wound, deep soft tissue not involving bone, not related to surgery	7 (6.1%)	<5	<5	<5
BJ-SSI - septic arthritis, osteomyelitis of surgical site	<5	<5	<5	-
BJ-O - septic arthritis, osteomyelitis, not related to surgery	<5	-	-	<5
Gastro-intestinal system	**18 (15.8%)**	**12 (20.3%)**	**<5**	**<5**
IA - intraabdominal sepsis including hepatobiliary	11 (9.6%)	5 (8.5%)	<5	<5

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N (% total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
GI - infections (salmonellosis, antibiotic associated diarrhoea)	7 (6.1%)	7 (11.9%)	-	-
Systemic infections	**19 (16.7%)**	**10 (16.9%)**	**9 (19.6%)**	**-**
CSEP - clinical sepsis, excluding FN	<5	-	<5	-
FN - febrile neutropaenia or other form of manifestation of infection in immuno-compromised host with no clear anatomical site	6 (5.3%)	-	6 (13%)	-
BAC - lab-confirmed bacteraemia	11 (9.6%)	10 (16.9%)	<5	-
Urinary tract	**10 (8.8%)**	**6 (10.2%)**	**<5**	**-**
CYS - symptomatic lower UTI	8 (7%)	5 (8.5%)	<5	-
PYE - symptomatic upper UTI	<5	<5	<5	-
Eye, ear, nose and throat	**<5**	**<5**	**-**	**-**
ENT - infections of ear, mouth, nose, throat or larynx	<5	<5	-	-
Genito-urinary system and obstetric	**<5**	**<5**	**-**	**-**
OBGY - obstetric or gynaecological infections, STD in women	<5	<5	-	-
GUM - prostatitis, epididymoorchitis, STD in men	<5	<5	-	-

Site of diagnosis	Total diagnoses, N (% total)	Community-acquired infection, N (% total)	Acute hospital-acquired infection, N (% total)	Long-term care infection or chronic-care hospital, N (% total)
Cardiovascular system	**<5**	**-**	**<5**	**-**
CVS - cardiovascular infections: endocarditis, vascular graft	<5	-	<5	-
Missing or unknown diagnoses	**7 (6.1%)**	**5 (8.5%)**	**<5**	**-**
Unknown	7 (6.1%)	5 (8.5%)	<5	-

Annexe Table 4.5.24. Top 10 antimicrobials used in adults (19 years and over) independent sector trusts, PPS England 2023

Antimicrobial	AWaRe category	Count	Percentage of antimicrobial courses (%)	Percentage of patients on antimicrobials (%)	Percentage of total number of patients (%)	Route of administration n (% of AM courses)		
						Parenteral	Oral	Other
Total number of patients	**-**	**1,128**	**-**	**-**	**-**	**-**	**-**	**-**
Total number of patients on antimicrobials	**-**	**493**	**-**	**-**	**-**	**-**	**-**	**-**
Total number of antimicrobial courses	**-**	**659**	**-**	**-**	**-**	590 (89.5)	69 (10.5)	0 (0.0)
J01DC02 - Cefuroxime	Watch	168	25.5	34.1	14.9	169 (100.6)	0 (0.0)	0 (0.0)
J01CR02 - Amoxicillin and enzyme inhibitor	Watch	114	17.3	23.1	10.1	91 (79.8)	23 (20.2)	0 (0.0)
J01GB03 - Gentamicin	Access	81	12.3	16.4	7.2	81 (100.0)	0 (0.0)	0 (0.0)
J01CF05 - Flucloxacillin	Access	61	9.3	12.4	5.4	58 (95.1)	4 (6.6)	0 (0.0)
J01XA02 - Teicoplanin	Watch	56	8.5	11.4	5.0	56 (100.0)	0 (0.0)	0 (0.0)
J01XD01 - Metronidazole (parenteral)	Access	33	5.0	6.7	2.9	33 (100.0)	0 (0.0)	0 (0.0)
J01DH02 - Meropenem	Reserve	18	2.7	3.7	1.6	18 (100.0)	0 (0.0)	0 (0.0)
J01CR05 - Piperacillin and enzyme inhibitor	Watch	13	2.0	2.6	1.2	13 (100.0)	0 (0.0)	0 (0.0)
J01FA01 - Erythromycin	Watch	8	1.2	1.6	0.7	7 (87.5)	1 (12.5)	0 (0.0)
J01MA02 - Ciprofloxacin	Watch	8	1.2	1.6	0.7	2 (25.0)	6 (75.0)	0 (0.0)

Reference

1. National Institute for Health and Care Excellence. 'British National Formulary (BNF)'

About the UK Health Security Agency

UKHSA is responsible for protecting every member of every community from the impact of infectious diseases, chemical, biological, radiological and nuclear incidents and other health threats. We provide intellectual, scientific and operational leadership at national and local level, as well as on the global stage, to make the nation health secure.

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