

Board of Directors (in public)

Item 2.4

Subject: Antimicrobial Stewardship Annual Report
Date of Meeting: 23rd September 2025
Prepared by: Noor Anjum – Antimicrobial Lead Pharmacist
 Jonathan Folb – Consultant Microbiologist
Presented by: Manoj Kuduvalli – Medical Director
Purpose of Report: To Note

BAF Reference	Impact on BAF
3.1-3.6	Potential Patient Harm

Level of Assurance (please tick) To be used to provide the Board / Committee with a guide on the extent of assurance and evidence of assurance provided within the report		<input checked="" type="checkbox"/>
Level of Assurance	Description	
High	There is a strong system of internal control which has been effectively designed to meet the system objectives, and that controls are consistently applied in all areas reviewed.	<input type="checkbox"/>
Substantial	There is a good system of internal control designed to meet the system objectives, and that controls are generally being applied consistently.	<input checked="" type="checkbox"/>
Moderate	There is an adequate system of internal control, however, in some areas weakness in design and/or inconsistent application of controls puts the achievement and some aspects of the system objectives at risk.	<input type="checkbox"/>
Limited	There is a compromised system of internal control as weaknesses in the design and / or inconsistent application of controls puts the achievement of the system objectives at risk.	<input type="checkbox"/>
No	There is an inadequate system of internal control as weaknesses in control, and/or consistent non-compliance with controls could/has resulted in failure to achieve the system objectives.	<input type="checkbox"/>

Executive Summary

This report details the management of antimicrobial stewardship (AMS) at Liverpool Heart and Chest Hospital (LHCH), with discussion of the various initiatives and protocols in place to encourage rational use of antimicrobial therapy for our patients.

Last year, the switch of intravenous (IV) antimicrobial prescriptions to oral formulations where appropriate was the focus of the last CQUIN target for antimicrobial therapy. In this, we achieved top results on a national level, in reducing the number of inappropriate IV prescriptions to a total of 1% in the last quarter submission.

This year's focus has been the movement towards an application based antimicrobial policy and formulary. In today's digital era, it was vital for us to provide a dynamic and interactive platform for clinicians and patients to easily access resources. This modern approach not only allowed for safer and quicker prescription decisions but also improves antimicrobial stewardship by ensuring consistent, evidence-based prescribing across the hospital.

A multidisciplinary action plan is in place to ensure antimicrobial stewardship remains at the forefront of our prescribing surveillance, practice and guidance at LHCH throughout the year.

Background

Antimicrobial resistance is a global threat that calls for the controlled use of antimicrobials.

AMS refers to “an organisational or health-care system-wide approach to promoting and monitoring the judicious use of antimicrobials to preserve their future effectiveness” (Ridge, et al, 2011) and is incorporated into the UK government's 5year national action plan. This action plan supports the UK 20-year vision for antimicrobial resistance which corresponds with the aims and objectives of our local AMS programme.

As outlined in the Trust AMS strategy, our AMS programme is in line with recommendations made in the National Institute for Health and Care Excellence (NICE) Antimicrobial stewardship: Systems and processes for effective antimicrobial medicine use guidelines (NG15) published in August 2015 and the UK Health Security Agency toolkits such as the national 'Start Smart Then Focus' in-patient aid updated in September 2023.

All those who prescribe antimicrobial therapy across the Trust are responsible for good stewardship practice.

Report

1. Antimicrobial Stewardship team

The Trust's AMS programme is overseen by a multidisciplinary AMS Group, which includes an operational lead (antimicrobial lead pharmacist) and executive lead (medical director) as well as representation from Microbiology, the infection prevention team, and surgical and medical divisions. The current operational lead is Noor Anjum and the current executive lead is Mr Manoj Kudavalli. There are two consultant microbiologists (Dr Jonathan Folb and Dr Ang Li) covering LHCH, both rotating to provide clinical cover on microbiology ward rounds.

There are ongoing quarterly team meetings, with secretarial support and the following members:

Medical Director

Antimicrobial Lead Pharmacist

Consultant Microbiologists (currently two in post)

Critical Care Infection nurse specialists (currently two in post)

Infection Prevention (IP) Lead Nurse

Consultant anaesthetist

Consultant surgeon

Consultant cardiologist

The AMS Group works to monitor antimicrobial use across the Trust through audit, surveillance and review. Sustainable and safe antimicrobial prescribing is promoted and supported by the Group, with input from all members of the multi-disciplinary team to ensure areas for improvement are proactively addressed. Priorities include the antimicrobial point prevalence audit, antimicrobial InPhase incidents reported across the Trust, antimicrobial shortages and antimicrobial policy and protocol reviews.

The AMS Group meeting minutes, action logs and agendas are available for the financial year of 2024-25.

2. LHCH microbiology ward rounds

Ward rounds are conducted both virtually and on site each week at LHCH, and encompass Critical Care as well as other wards and units across LHCH. These are conducted by a microbiology ward round team consisting of the primary clinical team together with a consultant microbiologist, two infection nurse specialists and the antimicrobial lead pharmacist. These ward rounds allow the team the opportunity to provide therapeutic advice with prescriber feedback and promote antimicrobial stewardship principles.

There are two to three formal weekly microbiology ward rounds within the Critical Care Unit as well as one formal weekly microbiology ward round for all wards and units across LHCH.

In between these timeframes, patients are referred to any member of the microbiology ward round team for review, and clinical advice is provided whenever needed by the Microbiology team.

3. Performance data

LHCH has maintained a significant reduction in broad spectrum antimicrobial use against a 2017 baseline. Figure 3 below shows the general decline in carbapenem prescriptions from 2018 to 2025.

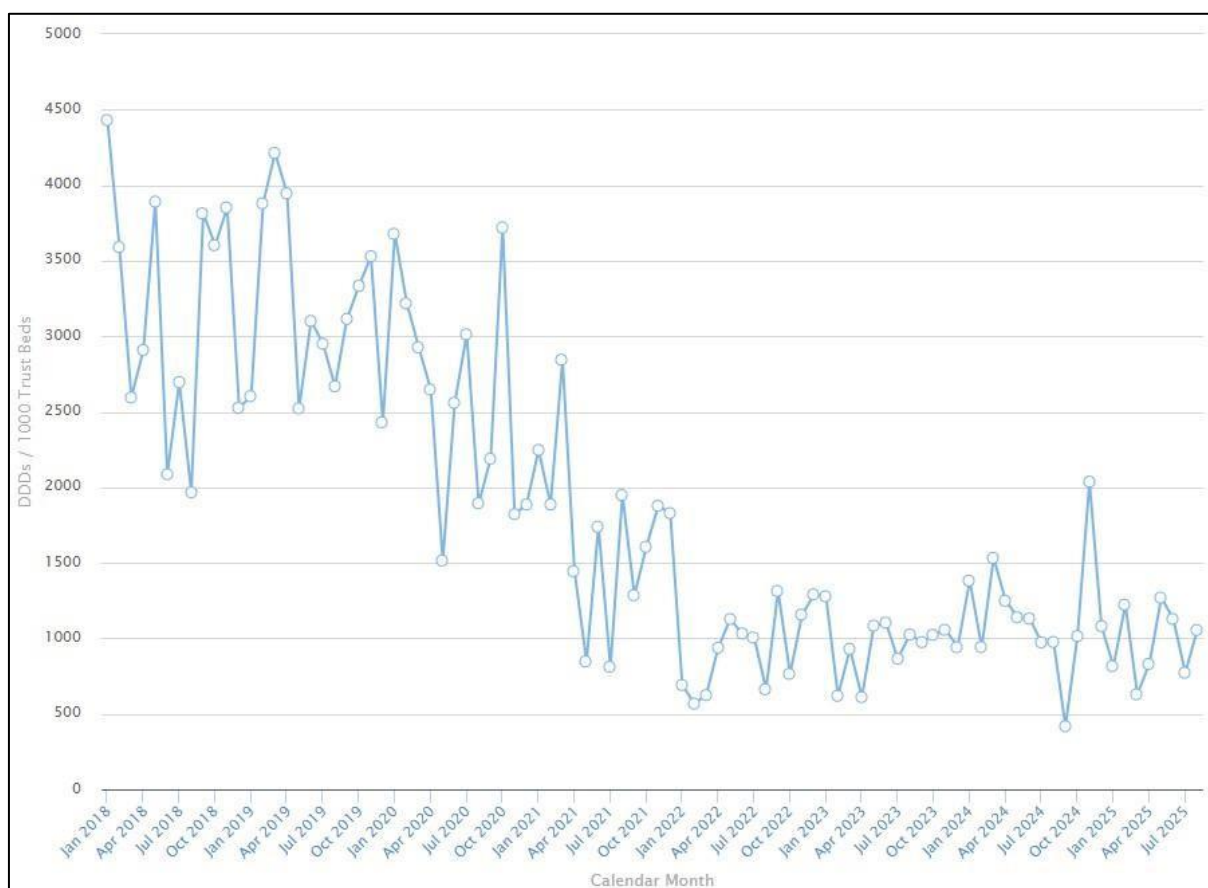


Figure 3: Carbapenem use at LHCH per 1000 Trust Beds from 2018-2025

4. Audits

In order to gain greater insight into our prescribing habits for chest infections including hospital acquired pneumonia (HAP) and ventilator associated pneumonia (VAP), we amended the antimicrobial audit schedule for the Antimicrobial Prescribing

Point Prevalence audit this year. This is now conducted on a twoquarterly basis by the antimicrobial lead pharmacist.

This audit looks at 45 LHCH antimicrobial prescriptions and the adherence to antimicrobial policies and microbiology input on choices of antimicrobial therapy and antimicrobial review decisions, as well as the documentation of allergies and accurate clinical indications.

Figure 4 below summarises the improvements in these parameters over the last five quarters, with particularly impressive results over Quarter 2 2024-25.

Quarter (Q)	Allergy Recorded (%) 100%	Compliance with formulary (%) >95%	Indication in notes (%) >95%	Correct indication on antibiotic prescription (%) >95%
Q4 2023-24	100	93	86	96
Q1 2024-25	100	93	84	98
Q2 2024-25	100	98	96	96
Q4 2024-25	98	91	100	93

Figure 4: Antimicrobial Prescribing Point Prevalence audit results

The newly introduced HAP/VAP prescribing audit aims to assess the clinical decision making behind prescriptions, as well as documentation, compliance, review decisions and duration of therapy against the antimicrobial policy. Additionally, the use of the current order set on EPR was looked at, such as the HAP order set, teicoplanin order set or sepsis bundle order set.

This audit will be repeated every two quarters.

Figure 5 summarises the results of Quarter 3 2024-25, where a total of 20 prescriptions for 20 patients with HAP and a total of 5 prescriptions for 6 patients with VAP were recorded and reviewed. In terms of RAG ratings, this audit demonstrates impressive compliance, other than the infrequent use of EPR order sets in prescribing for these patient groups.

Clinical decision making	Compliance with formulary/ microbiology advice	Documentation of indication (in the notes)	Order set utilised in prescribing	Documentation of a review within 72 hours	Appropriate duration given as part of review decision
90	100	88	11	95	80

Figure 5: HAP/VAP Prescribing Point Prevalence audit results

Recommendations in line with the results are also fed back to various parties including the AMS Group, Drug and Therapeutics Committee, IP Team, and the education and training lead pharmacist. Errors and instances of poor prescribing habits are addressed by the AMS Group and reported back to individual prescribers for discussion. The patient reviews and relevant learning points are then shared with the relevant divisions to improve practice.

The table below summarises other audits relevant to the AMS programme:

Audit	Schedule	
Surgical prophylaxis audit	Every two quarters	Individualised feedback is arranged with anaesthetists following audit results
MRSA pathway	Annually	All aspects of the MRSA pathway are audited for MRSA positive patients
Treatment of Sepsis pathway	Every quarter	All aspects of the Sepsis Bundle pathway are audited, including the sepsis screening tool
Decolonisation audit	Every two quarters	Audits are performed to monitor compliance with the programme for the pre-operative decolonisation of patient undergoing cardiac surgery.

Given the success of our penicillin allergy de-labelling within the Trust, there is an audit planned in collaboration with primary care pharmacists to determine whether patients who are de-labelled in hospital then have that reflected in the primary care records.

5. Research

The microbiology team at LHCH initiated our participation in the UKAR (UK Antimicrobial Registry) Study by the University of Aberdeen and BSAC. With the threat of antimicrobial resistance, it is becoming more difficult to successfully treat some bacterial infections worldwide however this study will guide us on the use, safety and effectiveness of these antimicrobial agents for future prescribing. This study does not affect the antimicrobial treatment that our patients receive, but involves collection of important information around the use of the study drugs at LHCH both during and after treatment.

These drugs include novel and newly licensed antimicrobials, such as dalbavancin, cefiderocol and ceftazidime-avibactam.

Patient recruitment began in February 2025 and so far one participant at LHCH has reached the 6-month follow-up data collection stage.

6. Policies and protocols

The LHCH Antimicrobial Policy includes recommendations for empirical and directed antimicrobial treatments, as well as guidance around therapy durations, therapeutic drug monitoring, IV administration and de-escalation to oral antimicrobial agents. This document also includes a list of formulary antimicrobial agents, updated with those that are newly approved through D&T.

This policy officially moved to a more user-friendly and modern digital interface, Eolas Medical (previously known as MicroGuide). This technology gives clinicians both mobile application- and website-based access to the formulary content. This application has been a great contribution to our progress in quality and innovation at LHCH. Roll-out involved an extensive communication plan including ward visits from the microbiology team and overall, this has had highly positive staff feedback. This application has included quick access to other resources including national guidelines, Medusa, plus QR code scanning for patient information leaflets to share with patients and therefore hugely improved patient engagement.

The content is regularly updated in line with national and international clinical, safety and supply changes to antimicrobial therapy throughout the year. The following updates were most recently made to the policy this year, which are usually followed by Trust-wide comms:

- UTI guidelines including catheter insertion prophylaxis
- Dental prophylaxis
- Pacemaker insertion prophylaxis
- Linezolid patient counselling (with an information leaflet and video)

With updates to the antimicrobial policy, updates to the electronic prescribing system (EPR) have followed to support ward teams in safe prescribing of antimicrobials. The table below summarises some of these EPR updates:

EPR update	Schedule	
Penicillin Allergy Delabelling test dose Order Set and document	June 2025	This was produced in line with the Penicillin Allergy De-labelling guideline, to direct the prescribing and monitoring of the 'direct provocation test' and recently amended to reflect the types of de-labelling approaches. This includes de-labelling patients who report intolerances to penicillin as opposed to allergies. This also includes de-labelling patients who have already had a test dose in the community setting.
Teicoplanin order set	September 2025	The teicoplanin order set has been updated with more weight-based dose bandings, to support prescribing in obese patients. This has also been incorporated into the sepsis bundle order set, where teicoplanin is recommended first-line for penicillin allergy patients. Additionally, the order set has been updated to ensure first dose is given within the hour of prescribing, followed by an appropriately timed loading and maintenance course. This followed feedback from prescribers that there was confusion and difficulty ensuring that initial doses were given promptly whilst future doses were accounted for.

The Trust was one of the first to produce policies on novel areas including penicillin allergy de-labelling, open chest antimicrobial prophylaxis and ECMO antimicrobial prophylaxis. The LHCH microbiology ward round team have continued to lead on the distribution of these clinical policies, whilst the IP Committee regularly review other policies including the Respiratory Viruses Policy, C Difficile Policy, and MRSA Policy which all impact on AMS.

Penicillin allergy de-labelling remains a national AMS focus since current evidence suggests that roughly 95% of penicillin allergy labels are incorrect when tested (BSACI, 2024). The primary goal of this policy is to aid the decision-making behind the challenge process to penicillin allergy de-labelling for inpatients at LHCH and ensure that true penicillin allergies are established where possible amongst our patient cohort. The use of broad-spectrum antimicrobial therapy is seen to be higher in penicillin-allergic patients, therefore establishing whether the allergy label is correct and removing this label from a patient's health records if not, helps to guide later antimicrobial choices. Our efforts to address these allergy statuses will benefit the

management of our patients, treatment costs and optimisation, and wider objectives to improve AMS at LHCH.

7. Teaching and education

All induction programmes for advanced nurse practitioners (ANPs), doctors, nurses and pharmacist incorporate IP and AMS principles, including prescribing information on Start Smart Then Focus, antimicrobial order sets, sepsis bundles and documentation. With ongoing changes made to antimicrobial prescribing on EPR, the education and training lead pharmacist is directly informed of updates for the induction programme.

Moreover, in-person teaching is conducted to nursing teams throughout the year via 'Ward Bite' presentations. This past year, the focus has been therapeutic drug monitoring (TDM) following various InPhase incidents highlighting a gap in knowledge around TDM drug management. Alongside the antimicrobial lead pharmacist and infection nurse specialist, a junior pharmacist and the nurse clinical education team have taken part in this Ward Bite teaching.

Furthermore, AMS teaching has been included on programmes for prescribing teams (ANPs, doctors and pharmacists), namely the IMT trainees on rotation. This teaching has also focused on TDM prescribing, and is conducted by an infection specialist nurse and antimicrobial lead pharmacist.

Microbiologist-led teaching has been arranged on an ad-hoc basis for ANPs and junior medical staff. Teaching topics have included a review of medically important bacteria and the antibiotics used to treat them, a review of the microbiology of Infective Endocarditis, including the investigation of culture-negative endocarditis, and general principles of antibiotic prescribing for acutely unwell patients.

Antibiotic education aids (patient information leaflets) have been generated for high-risk antimicrobial agents including those with extensive side effect profiles. This includes the fluoroquinolone class, in line with guidance from the MHRA. The antimicrobial lead pharmacist produced a counselling video, EPR checklist and leaflet to support pharmacists and pharmacy technicians conducting these formal consultations with all patients initiated on this group of antimicrobial therapy. Education aids for other frequently used antimicrobials with high-risk side effect profiles such as gentamicin, linezolid and rifampicin are next to be prioritised.

The table below summarises the AMS teaching programme at LHCH:

Session	Schedule	Input from AMS Group
Tier 1/Medical SHO induction programme	Every two quarters	Face to face session
Anaesthesia/ICM/IMT induction programme	Every two quarters	Face to face session
Ward Bites to nursing teams	January 2025	Face to face session
EPR prescribing induction programme for medical staff	Ongoing weekly basis	Face to face session
Rolling education programme for nursing staff	Every two months	Face to face session
Nurse preceptorship programme	Every two quarters	Face to face session
Pharmacist Journal Club and Pharmacy Dispensary Meetings	Every three quarters	Face to face session
World Sepsis Day	September each year	Face to face sessions including ward visits and stalls across LHCH. Ward visits include interactive quizzes on topics (such as identifying sepsis in patients) + Teams sessions (for internal teaching or national webinars as per NHS England)
World Antimicrobial Awareness Week	November each year	Face to face sessions including ward visits and stalls across LHCH. Ward visits include interactive quizzes on topics (such as identifying sepsis in patients) + Teams sessions (for internal teaching or national webinars as per NHS England)

8. AMS Presentations

There have been several local and national initiatives where our LHCH microbiology team has been successfully selected to present on AMS.

Some members of the LHCH microbiology team (the infection specialist nurse and antimicrobial lead pharmacist) were invited to present nationally this year at the “Reducing prescribing of Watch and Reserve (WaRe) antibiotics in hospitals – lessons learned from real-world practice: a mixed methods evaluation” webinar, which involved discussion of our own strategies to reduce watch and reserve antibiotic use at LHCH.

Additionally, “Managing sepsis and antimicrobial prescribing” was included as a topic for discussion at LHCH’s first Learning Disabilities and Difficulties Study Day at Alder-Hey Hospital and this was presented by the antimicrobial lead pharmacist. The evaluation summary received for this presentation had positive feedback, from both patients and clinicians attending the day.

9. Sepsis Group

The Sepsis Group Committee is led by consultant anaesthetist Ben Murray with representation from key stakeholders from within the Trust. The Committee includes members from microbiology, medicine, surgery, critical care, outreach, the directors of nursing and the medical director. This group meet every quarter and the minutes, action logs and agendas are available for the financial year of 2024-25. Each meeting includes review of monthly sepsis data within LHCH.

With regards to AMS, the Sepsis Group Committee regularly reviews our sepsis prescribing and compliance with the LHCH Sepsis Protocol as guided by the NICE guidance. The latest update has been the teicoplanin weight-based dosing recommendations.

Other new actions include the launch of a newly improved Sepsis E-learning Module for the Trust as well as the display of sepsis posters across the Trust, for which a patient awareness audit is completed annually.

The group also takes a lead in Trust level initiatives to educate and inform patients and staff about sepsis, its features and the importance of early identification and treatment; an example being the Trust’s annual World Sepsis Day this September 2025.

Conclusion and future plans

There has been great success in the AMS programme at LHCH, as demonstrated in our audit data performance, our introduction of Eolas Medical and the UKAR study and our development of cutting-edge policies.

Future initiatives contributing to both our own and international AMS include the use of phage therapy to treat our patients, which is currently being explored by our respiratory consultant team. As a penicillin allergy de-labelling centre, we will also be involved in future local and national penicillin allergy de-labelling audits.

The Board is requested to note the contents of this report.