

Antimicrobial Stewardship Annual Report Board of Directors (in public)

Item

Subject: Antimicrobial Stewardship Annual Report
Date of Meeting: 24th September 2024
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Presented by: Noor Anjum
Purpose of Report: To Note

BAF Reference	Impact on BAF
3.1-3.6	Potential Patient Harm

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.

This year, the switch of intravenous (IV) antimicrobial prescriptions to oral formulations where appropriate, has been the focus of a CQUIN target. 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.

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 5-year 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 (see below)

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 2023-24.

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. CQUIN and performance data

Over the last financial year, quarterly submissions were made for CQUIN03, which focused on the prompt switch of IV antimicrobial treatment to the oral route of administration (IVOS) as soon as patients met national IVOS switch criteria. The aim of this CQUIN was both to ensure that no more than 40% of patients remained on IV antibiotics when they should have been eligible for an oral switch, and to continue to improve this percentage over the quarters. IVOS is a critical step within the national 'Start Smart Then Focus' framework, and benefits include reduced nursing time, length of patient stays, risk of line-related infections, environmental benefits and more.

Participating in this CQUIN prompted us to run educational sessions to prescribers and pharmacists, where the benefits of this switch were emphasised.

Over the financial year 2023-24, the number of patients judged to have remained on IV antimicrobials despite being eligible for an oral switch fell from 10% in Quarter 1, to 7% in Quarter 2, to 1% in Quarter 3 and 4 (see Table 1). This proves drastic improvements in the rationale and appropriate use of IV antimicrobial therapy at LHCH.

Quarter (Q)	% of patient cases receiving IV antimicrobials and meeting IVOS criteria
Q1 2023-24	10
Q2 2023-24	7
Q3 2023-24	1
Q4 2023-24	1

Figure 1: IVOS CQUIN data results

With these efforts, we significantly reduced our spend on IV antimicrobials by roughly £121,500 (a total decrease of 30%) in 2023-24 compared to that of 2022-23. During this time period, we also established a decrease of 14.2% in oral defined daily doses (DDDs) at LHCH compared with that of the previous year. This data is summarised in Table 2 below and demonstrates progress in reducing unnecessary antimicrobial treatments amongst our patient population.

IV antibiotic DDDs dispensed (FY 2022/23)	Change in IV DDDs (22/23 to 23/24)	% change in IV DDDs (22/23 to 23/24)	Spend on IV antibiotics (FY 2022/23)	Change in IV Spend (22/23 to 23/24)	% change in IV Spend (22/23 to 23/24)	Oral antibiotic DDDs dispensed (FY 2022/23)	Change in oral DDDs (22/23 to 23/24)	% change in oral DDDs (22/23 to 23/24)
44,325	-7,069	-15.9%	£405,139	-£121,500	-30.0%	44,632	-6,354	-14.2%

Figure 2: IV and oral antimicrobial expenditure

Furthermore, LHCH has been identified to have a significant reduction in broad spectrum antimicrobial use against a 2017 baseline. Figure 3 below shows the general decline in total antimicrobial prescribing, particularly following Quarter 1 2021/22 after consistent provision of a multi-disciplinary AMS Group team (namely the post of an infection nurse specialist) and microbiology ward rounds three times a week across the Trust. Challenges regarding the appropriateness of antimicrobial prescribing are raised by the team during these ward rounds, particularly where area trends are identified.



Figure 3: Total antimicrobial prescribing from 2017-2024

4. Audits

The Antimicrobial Prescribing Point Prevalence audit is conducted on a quarterly 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:

Quarter (Q)	Number of prescriptions	Allergy Recorded (%) 100%	Compliance with formulary (%) >95%	Indication in notes (%) >95%	Correct indication on antibiotic prescription (%) >95%
Q4 2022-23	45	98	89	87	76
Q1 2023-24	45	100	89	80	76
Q2 2023-24	45	100	96	87	91
Q3 2023-24	45	100	90	89	87
Q4 2023-24	45	100	93	86	96

Figure 4: Antimicrobial 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 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.

5. National Point Prevalence Survey

This survey concluded the proportion of healthcare-associated infections (HCAIs) and the use of antimicrobial treatments at LHCH. The survey parameters included HCAI prevalence/distribution by infection site and patient speciality as well as antimicrobial indications, routes of administration and course lengths.

The HCAI National Point Prevalence Survey for 2023 was completed for LHCH in November 2023. The data collection for this survey involved both pharmacist and infection prevention team input.

We are awaiting a final report summarising the results for our Trust, however draft feedback has been issued and suggests that surgical site infections are our highest area of concern for HCAIs which are being addressed by the Surgical Site Infection Group.

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.

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:

- The treatment of endocarditis following the European Society of Cardiology 2023 revised guidance
- The restricted use of fluoroquinolones and counselling protocol following MHRA alerts around their side effect profile
- Updates to Start Smart then Focus guidelines following the national IVOS decision aid
- Therapeutic drug monitoring for aminoglycosides, namely gentamicin and tobramycin dose titration
- Therapeutic drug monitoring for vancomycin
- Renal dosing guidance for all drugs on the antimicrobial formulary
- Antimicrobial formulary additions including dalbavancin, temocillin, cefazolin and daptomycin
- The treatment of aspiration pneumonia and infected leg ulcers

The policy is currently under review for movement to a more user-friendly and modern digital interface, the MicroGuide application. This technology will allow clinicians to have both mobile application- and web-based access to the formulary content. This application has been approved by the Capital Management Team, which will be a great contribution to our progress in quality and innovation at LHCH.

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	
'Microbiology Ward Round' document	April 2024	This was updated following feedback from ward teams, to include a timeline of antimicrobial therapy, antimicrobial plans on discharge, and description of the members of the microbiology ward round team.
'Antimicrobial Therapy' summary within Pharmacy Care Plan		This was updated to include designated area for documentation of patient's allergy status, previous TDM and antimicrobial therapy, current antimicrobial therapy and antimicrobial plans on discharge. Integrating these changes has facilitated a more comprehensive pharmacist review
'Therapeutic Drug Monitoring' document		This was produced to aid all staff in reviewing antimicrobial levels of antimicrobial therapy such as gentamicin, teicoplanin and vancomycin. The document includes target levels, the results of recent assays, and a dosing regimen plan. This has hugely improved how levels are taken and monitored for high-risk antimicrobial therapy, reducing the risk of toxicity and supporting their cessation where appropriate
Gentamicin Order Set	March 2024	This was produced to direct prescribers in safely prescribing gentamicin and monitoring its use
Penicillin Allergy De-labelling test dose Order Set and document	August 2024	This was produced in line with the Penicillin Allergy De-labelling guideline, to direct the prescribing and monitoring of the 'direct provocation test'

Recently, the Trust has been 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 led on 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 has become 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, which focuses on antimicrobial stewardship principles such as .

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 pharmacists have produced counselling videos and checklists , designed to help pharmacists and pharmacy technicians prepare to conduct a formal consultation with all patients initiated on this group of antimicrobial therapy.

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 2024	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 Antimicrobial Awareness Week and World Sepsis Day	November 2022	Face to face sessions including ward visits and stalls across LHCH. Ward visits include interactive quizzes on topics such as identifying sepsis in patients and Teams sessions (usually based on appropriate internal themes in line with national themes)

8. Gentamicin Working Group

The Gentamicin Working Group was developed as a clinical task and finish group, leading on the management of gentamicin prescriptions across the Trust following several InPhase incidents highlighting discrepancies around the dosing and monitoring of this high-risk aminoglycoside agent. The following projects were led by the Group this year:

- Inclusion of monitoring guidance for gentamicin in the antimicrobial policy
- Review of gentamicin dosing regimens
- 'Gentamicin Crib Sheet' for nursing teams handling gentamicin prescriptions out of hours
- Development of gentamicin patient information leaflets to educate LHCH patients on side effect monitoring

This group meet every two quarters and the minutes, action logs and agendas are available for the financial year of 2023-24.

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 2023-24.

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 following updates were most recently made to the protocol this year:

- Guidance around renal dosing in sepsis
- Guidance around gentamicin dosing in overweight patients or pregnant patients
- Guidance around antifungal cover in sepsis

The group also takes a lead in trust level initiatives to educate and inform patients and staff about sepsis, its features and the importance on early identification and treatment; an example being the trust's annual World Sepsis Day this September 2024.

Conclusion and future plans

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

Future initiatives contributing to our AMS practice include the use of phage therapy to treat our patients, which is currently being explored by our respiratory consultant team.