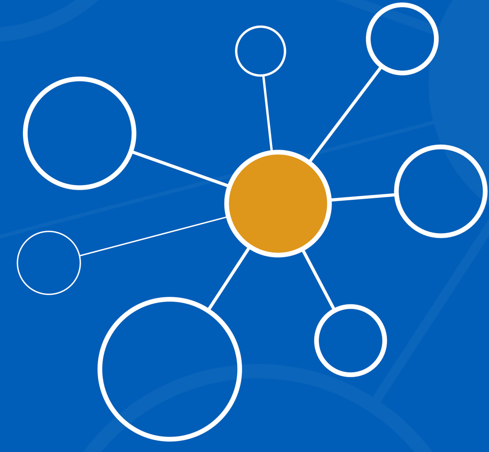

Gloucestershire Safety and Quality Improvement Academy 2026

Improving Urine Sampling Compliance Before IV Antibiotic Administration in Urinary Tract Infections

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NHS
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Background

Antimicrobial resistance (AMR) is a global health emergency accelerated by inappropriate antimicrobial use. In UK hospitals, UTIs are frequently treated with broad-spectrum IV antibiotics such as gentamicin and temocillin-which carry a significant AMR risk if used without microbiological justification.

Gloucestershire Hospitals NHS Foundation Trust policy and NICE guidance require that urine samples are taken before administering IV antibiotics for urinary infections, to enable targeted, culture-guided therapy. A urine culture identifies the causative organism and its sensitivities, allowing de-escalation to a narrower-spectrum antibiotic.

This project was initiated following concern from microbiology consultants that sampling practices were not being consistently followed, risking inadequate treatment, recurrent infections, progression to sepsis, and rising resistance patterns.

Methodology

A retrospective audit was conducted from 23 October to 17 November 2023 (weekdays only) at both sites of Gloucestershire Hospitals NHS Foundation Trust. Inpatients prescribed IV gentamicin and/or temocillin for UTI, urosepsis, or pyelonephritis were identified via the electronic prescribing system (EPR). Patients on additional antibiotics or treated for other indications were excluded.

For each of the 40 included patients, the EPR and results system were reviewed to determine whether a urine sample was obtained: before the first dose, within 24 hours, in the preceding week, or not at all. Staff feedback was gathered from nurses and doctors. A re-audit of 40 patients was conducted following Cycle 1 interventions using the same methodology.

Aim

To increase compliance with urine sampling prior to IV antibiotic administration for urinary infections from 37.5% to ≥85% by mid-2025, in line with Gloucestershire Hospitals NHS Foundation Trust antimicrobial policy and NICE guidance.

The QI Team

Nabeela Umar — Project Lead, Endocrine Specialist Pharmacist
Microbiology Department — advisory and PDSA Cycle 2 collaboration
Community GPs, nursing staff — stakeholders in UTI bundle development

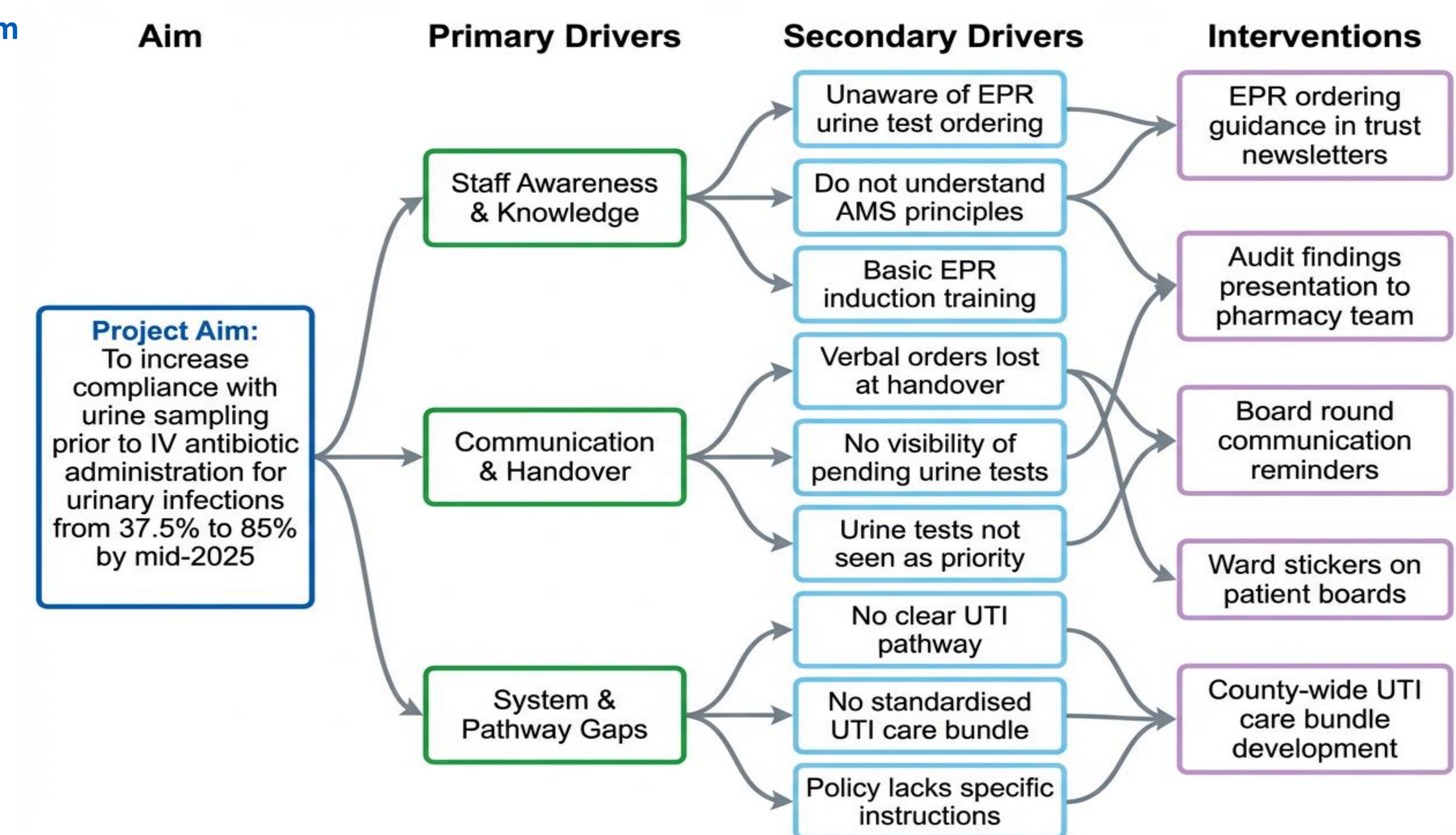
Measures

Outcome: % patients with urine sample taken before first IV antibiotic dose

Process: % clinicians ordering via EPR;
% board rounds with urine test handover

Balancing: Time to first antibiotic dose

Driver Diagram



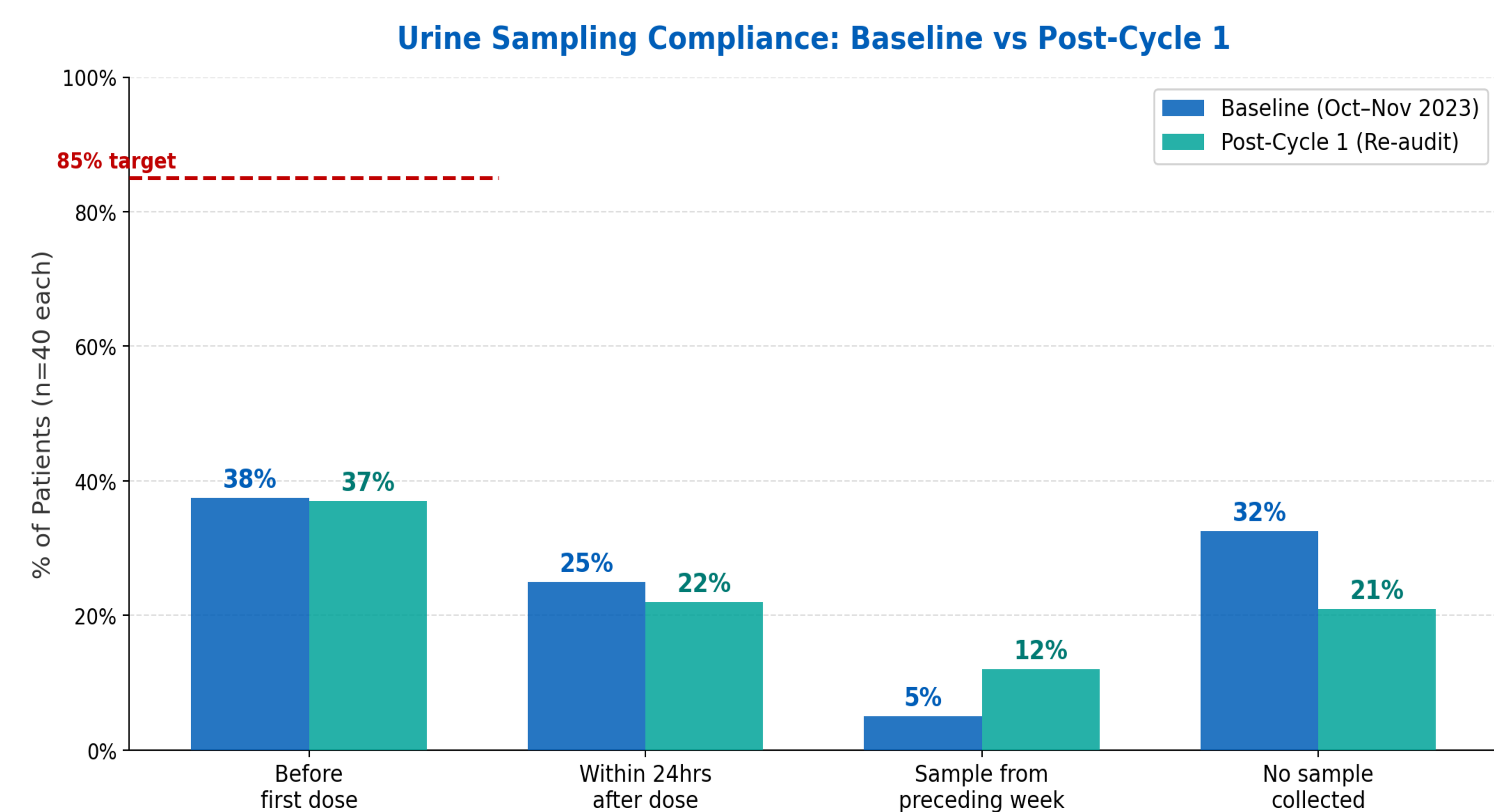
PDSA Cycles

Cycle 1: Staff Education & Communication (Apr–Jun 2024)
EPR ordering guidance included in weekly/monthly trust newsletters (April)
Audit findings presented to pharmacy department and QI team meetings
Board round communication reminder issued to doctors and nursing managers (May)
Laminated ward stickers created for patient information boards (June)

Cycle 2: County-Wide UTI Bundle Development (initiated 2024)
Collaboration with Microbiology, community GPs and nursing teams to develop a county-wide UTI care bundle - similar in structure to the existing Sepsis 6 bundle

• *Project expanded to county-wide scope; handed over to microbiology team following change of role*

Plan, Do, Study, Act



Results

Baseline (Oct–Nov 2023, n=40, 80% medical):
37.5% before dose ✓ | 25% within 24hrs | 5% prior week | 32.5% no sample ✗ | 0% sample ordered but not collect | EPR request: 47.5%
62.5% non-compliant — well below the 85% target

Post-Cycle 1 Re-audit (n=40, 85% medical):
37% before dose ✓ | 22% within 24hrs | 12% prior week | 21% no sample ✗ | 8% sample ordered but not collected | EPR request: 45%
"No sample collected" reduced: 32.5% → 21% (↓11.5pp).
Prior week samples improved: 5% → 12%.

Key reasons for residual non-compliance: EPR training gaps, verbal handover failures, patient barriers (incontinence, delirium), acute workload pressures. Target of 85% before first dose not yet reached - further cycles required.

Sustainability & Next Steps

What the data tells us

Cycle 1 produced meaningful but insufficient change. The "no sample" rate fell (32.5%→21%) and prior-week samples improved (5%→12%), demonstrating that education and communication had some effect. However, the headline metric - sampling before the first dose - barely moved (37.5%→37%). This confirms the problem is systemic: individual awareness alone cannot drive compliance to 85%. A pathway-level intervention is essential.

Priority next step: Cycle 2 UTI bundle

A county-wide UTI care bundle would make urine sampling a mandatory, time-bound default, removing reliance on individual recall and making non-compliance the exception, not the norm.

Re-audit post-Cycle 2 rollout • Expand to oral antibiotic prescribing in primary care • Embed in trust antimicrobial stewardship audit programme

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