Right Care, Right Time, Right Way: The Formula for Value-Based Excellence

Optimizing care for patients with cellulitis
A Combined Educational and Clinical Decision Rule Approach

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Introduction / Objectives

- **Cellulitis is a common cause of admission** to General Medicine Units, with an average length of stay (ALOS) of 3 days.
- **Prolonged hospitalizations increase patient risks (**e.g. nosocomial infections, delirium, thromboembolism) and contribute to **persistent bed shortages,** a multifaceted challenge in high-turnover acute care wards (e.g. Acute Medical Unit / AMU).
- **Focus on high-value, cost-conscious care:** Unnecessary tests contribute to rising costs and delayed discharges.
- **Blood culture overuse in cellulitis:** Of 208 acute cellulitis admissions, ~80% received blood cultures, though only 6% had appropriate indications. 48% of limb cellulitis patients were discharged from AMU within 3 days; 90% were discharged by 6 days.
- **Study Aim:** Identify reasons for prolonged hospital stays, implement evidence-based and streamlined practices, to reduce financial burden and enhance overall patient experience.

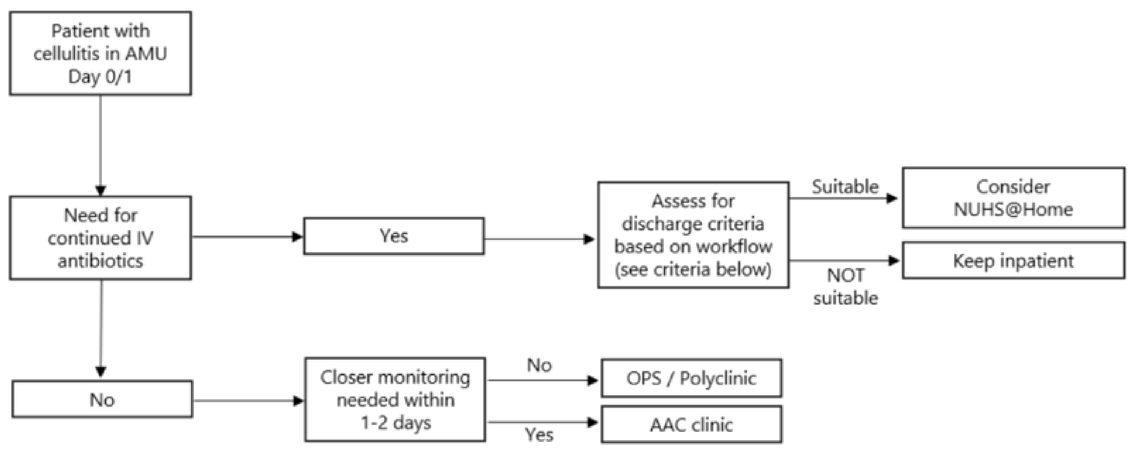
Methods

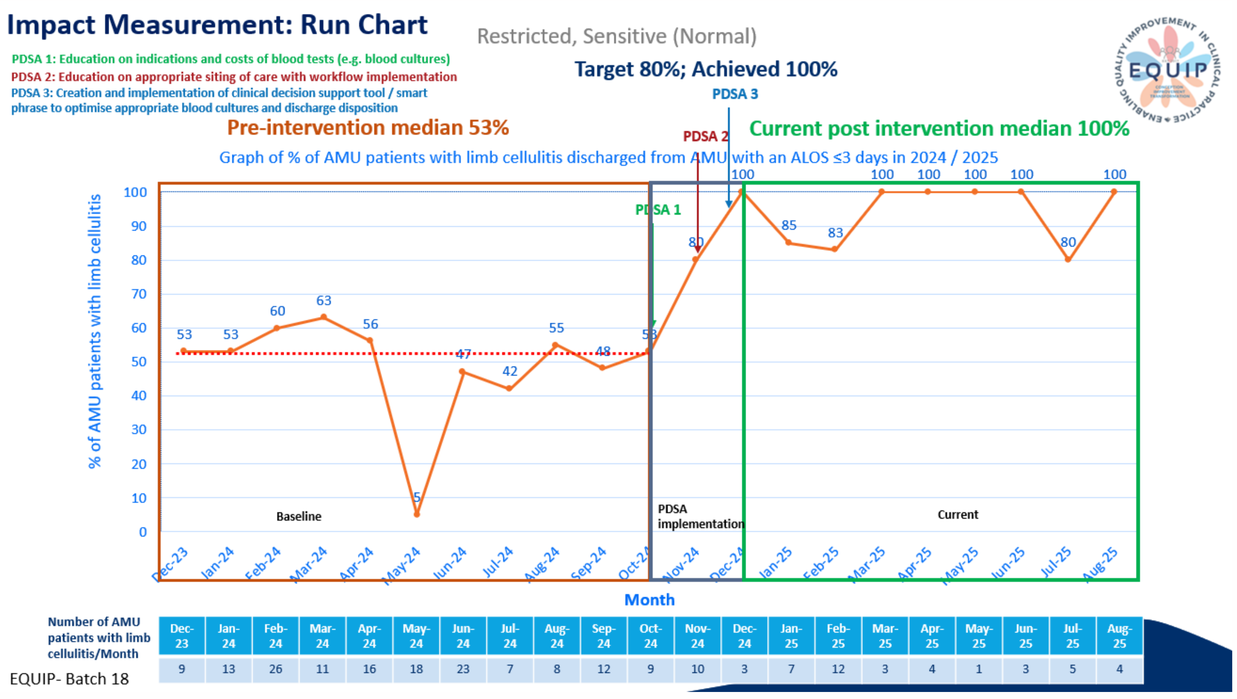
- **Study conducted in the Acute Medical Unit:** a short-stay ward with high patient turnover. **Baseline audit of 208 cellulitis admissions (Dec 2023–Jun 2024):** Only 6% of blood cultures met appropriate indications.48% discharged within 3 days; 80th percentile ALOS was 6 days.
- **Stakeholder survey of 90 junior clinicians (1–4 years' experience)** assessed knowledge, attitudes, and practices on blood culture use: overestimation of knowledge on blood culture utility in cellulitis
- **Two main drivers of prolonged stay identified:** Overuse of low-yield blood cultures & inefficient discharge processes.
- **Interventions developed:** A clinical decision support tool based on defined criteria[1,2] for appropriate blood culture use in cellulitis, targeting only high-risk patients (systemic signs, immunocompromised, implants, failed antibiotics) & implemented streamlined discharge workflows leveraging outpatient resources (e.g., OPAT, AAC clinic, NUHS@Home, community physicians/OPS). Implementation followed the **Plan-Do-Study-Act (PDSA) cycle** for iterative improvement.
- **Impact Analysis using the Kirkpatrick mode:** focusing on discharge efficiency and cost-effectiveness.

Results / Discussion / Conclusion

ROOT CAUSE	INTERVENTION	DATE OF IMPLEMENTATION
(A) Unnecessary blood tests (e.g. blood cultures)	Education on indications of certain blood tests (e.g. blood cultures) and the costs of tests **(PDSA 1)**	10 October 2024
(B) Lack of awareness of discharge dispositions	Education on appropriate siting of care (e.g. NUHS@Home, AAC clinic, OPS) with workflow implementation **(PDSA 2)**	10 November 2024
(C) Lack of confidence with outpatient management, safety nets	Education on appropriate siting of care (e.g. NUHS@Home, AAC clinic, OPS) **(PDSA 2)**	10 November 2024
(A) + (B) + (C)	Clinical decision support tool / creation of smartphrase to optimise appropriate blood cultures and discharge disposition **(PDSA 3)**	24 November 2024

Proposed discharge workflow at Day 0/1 of hospital stay





1. Jonathan H Ryder, Trevor C Van Schooneveld, Daniel J Diekema, Valeria Fabre, Every Crisis Is an Opportunity: Advancing Blood Culture Stewardship During a Blood Culture Bottle Shortage, Open Forum Infectious Diseases, Volume 11, Issue 9, September 2024
2. Mills AM, Chen EH. Are blood cultures necessary in adults with cellulitis? Ann Emerg Med. 2005 May;45(5):548-9.

- **Significant Sustained Improvement in Clinical Practices:** Appropriate blood culture use in cellulitis rose from 6% to 98%; early discharge within 3 days consistently rose from 48% to over 80%.
- **Cost and Resource Efficiency:** Achieved sustainable cost savings of ~SGD $1,000 per patient and improved bed utilization through streamlined discharge workflows.
- **Enhanced Patient Experience:** Reduced unnecessary investigations and invasiveness, leading to greater patient comfort and reduced anxiety.
- **Positive Clinical Outcomes:** Shorter hospital stays enabled more targeted management and reduced risks associated with prolonged admissions.
- **Addressed Systemic Barriers:** Tackled knowledge gaps, fear of diagnostic error, and cognitive biases (e.g., Dunning-Kruger) influencing prior clinical decisions.