



Reducing inappropriate investigations for minor lower limb cellulitis

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Background of the Problem

Patients with mild lower limb cellulitis have **high numbers of lower limb X-rays (XRs) and blood cultures** performed. These likely unnecessary investigations may be carried out due to legacy practices and **lack of guidance or lack of awareness** of updated guidelines. This in turn results in **higher costs of care**.

Aim: to reduce the percentage of patients in SGH with lower limb cellulitis who have lower limb X-rays and blood cultures performed.

Mission Statement

To reduce the percentage of patients with lower limb XRs and blood cultures performed for the SGH Cellulitis Value Driven Care defined population* from 68.8% to 50% and 73% to 60% respectively over a period of 3 months.

*SGH Cellulitis Value Driven Care population: Patient discharged from the Department of Emergency Medicine with SNOMED diagnosis of cellulitis; and inpatients discharged from the Department of Internal Medicine with predefined ICD-10 and DRG codes for cellulitis.

Analysis of Problem

A root-cause analysis conducted was performed (Figure 1). Duplicate causes were dropped and 9 unique causes were identified.

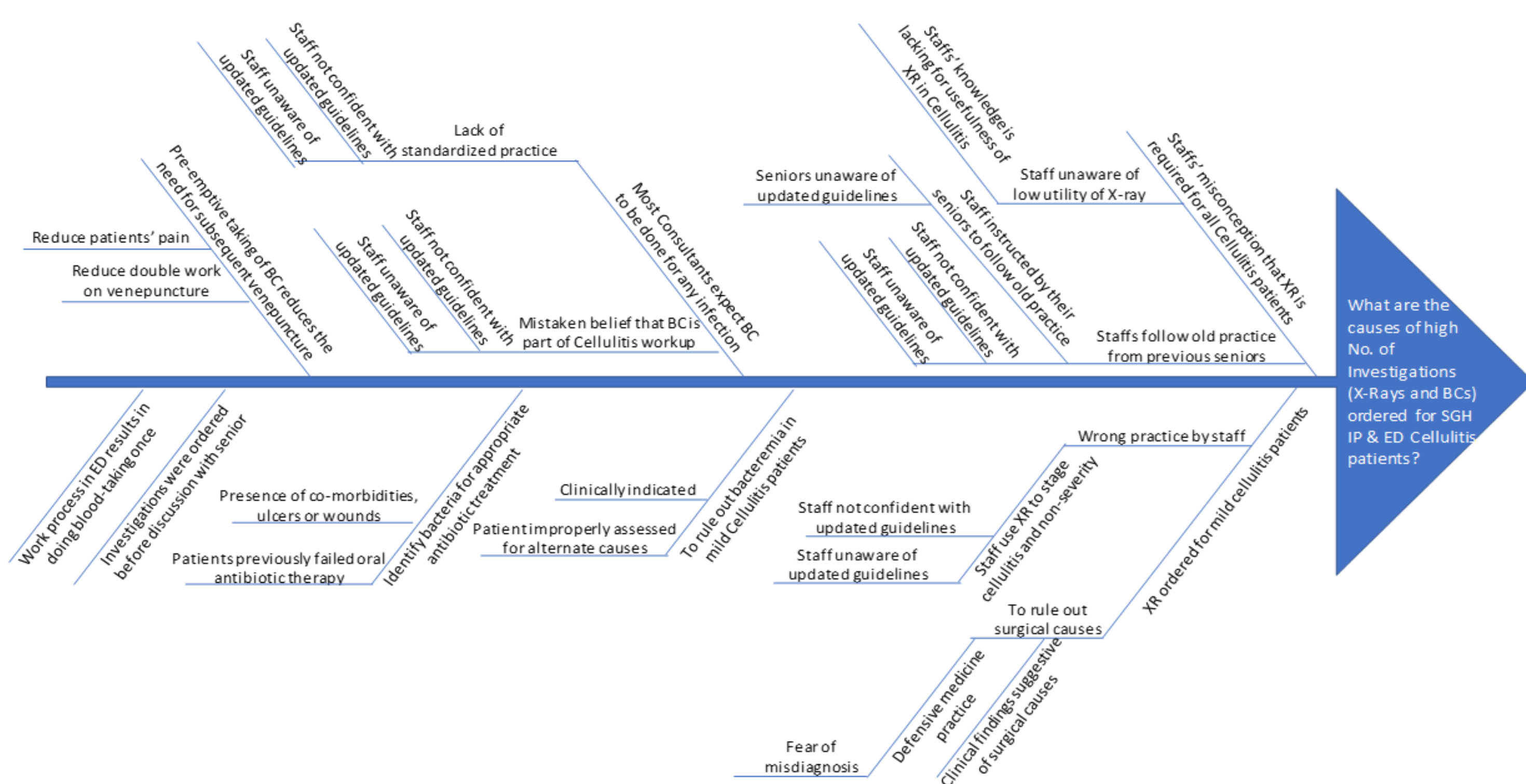


Figure 1: Cause & Effect Diagram

A vote was conducted with 7 participants. The vital causes identified were: **fear of misdiagnosis; lack of knowledge on usefulness of XRs in Cellulitis; lack of awareness of updated guidelines** (Figure 2). To reduce patients' pain was dropped due to an inability to address this root cause.

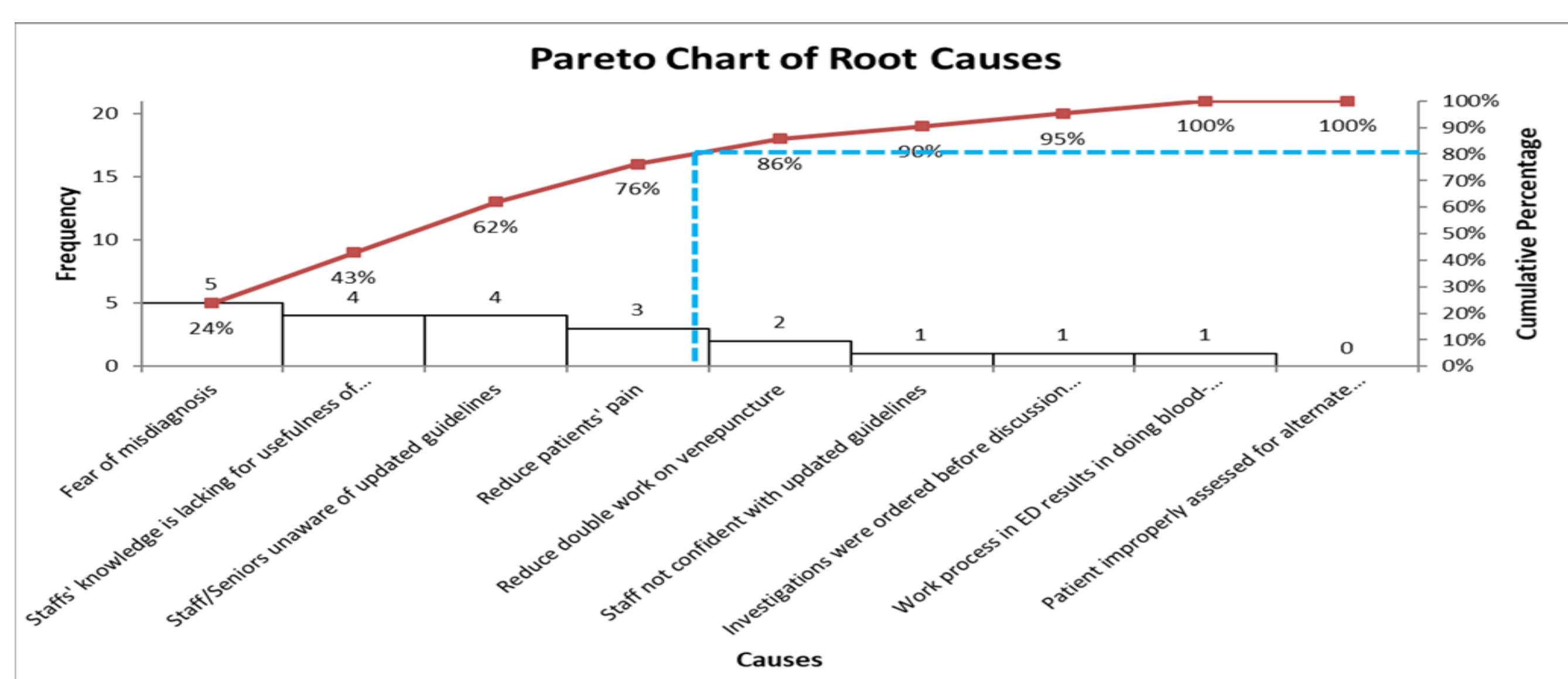


Figure 2: Pareto Chart

A brainstorming session by the project team was used to create solutions to address the three identified root causes. Solutions were then assessed using a Prioritization Matrix to select those which were most suitable.

Interventions

1. SCM (Sunrise Clinical Manager) order sets for DIM and DEM were created to incorporate cellulitis management guidelines (Figure 4), improve accessibility to relevant information and guide appropriate clinical management.
2. An educational roadshow was implemented with department sharings and via email and TigerConnect. Educational posters (Figure 5) containing links to guidelines were also created and placed in the ward and A&E consultation rooms as a visual reminder and to facilitate accessibility to guidelines via the use of QR codes.
3. Incorporation of updated guidelines into SingHealth Orientation Handbook

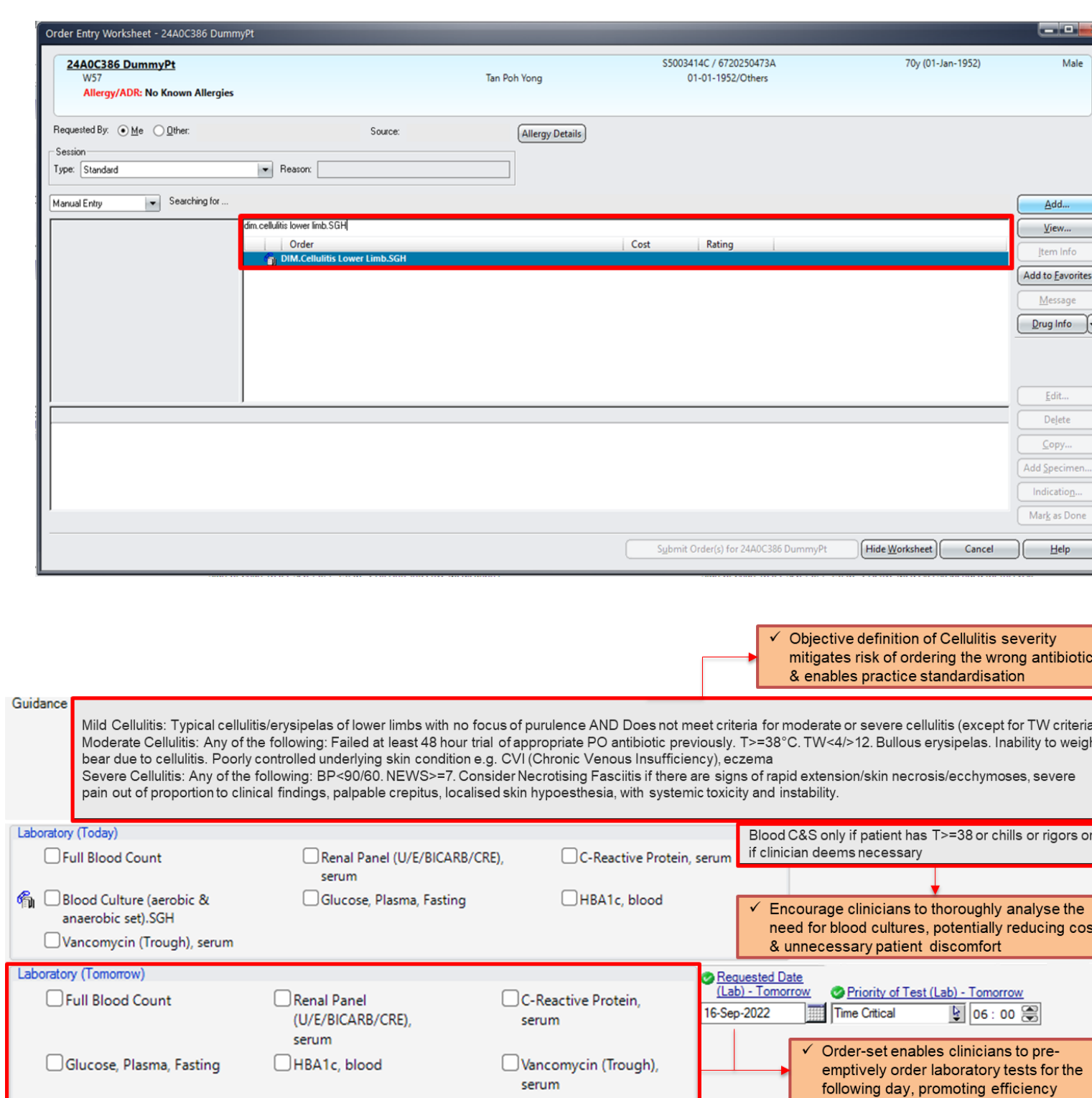


Figure 4: SCM Order Set



Figure 5: Educational Poster (DIM version)

Results

- ✓ **Reduction in percentage of cases with blood cultures** done from a baseline median of 73.3% to a post-intervention median of 52.3% (Figure 6).
- ✓ **No change observed for percentage of cases with LL XRs performed** (Figure 7).

*Total number of XRs and blood cultures done were used as a surrogate – not feasible to do manual chart review to determine appropriateness of investigations for each case.

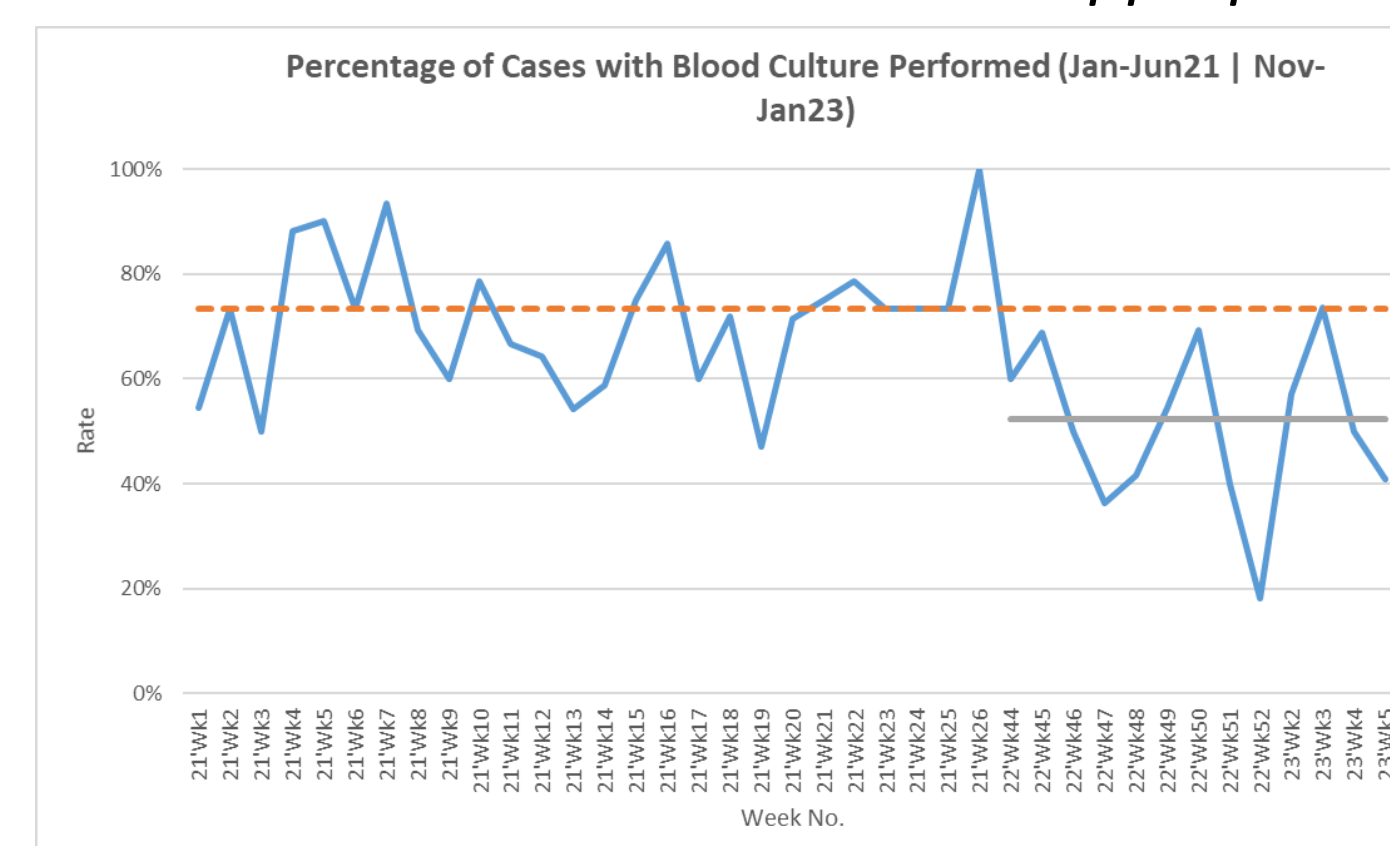


Figure 6: Weekly % of cases with blood cultures performed

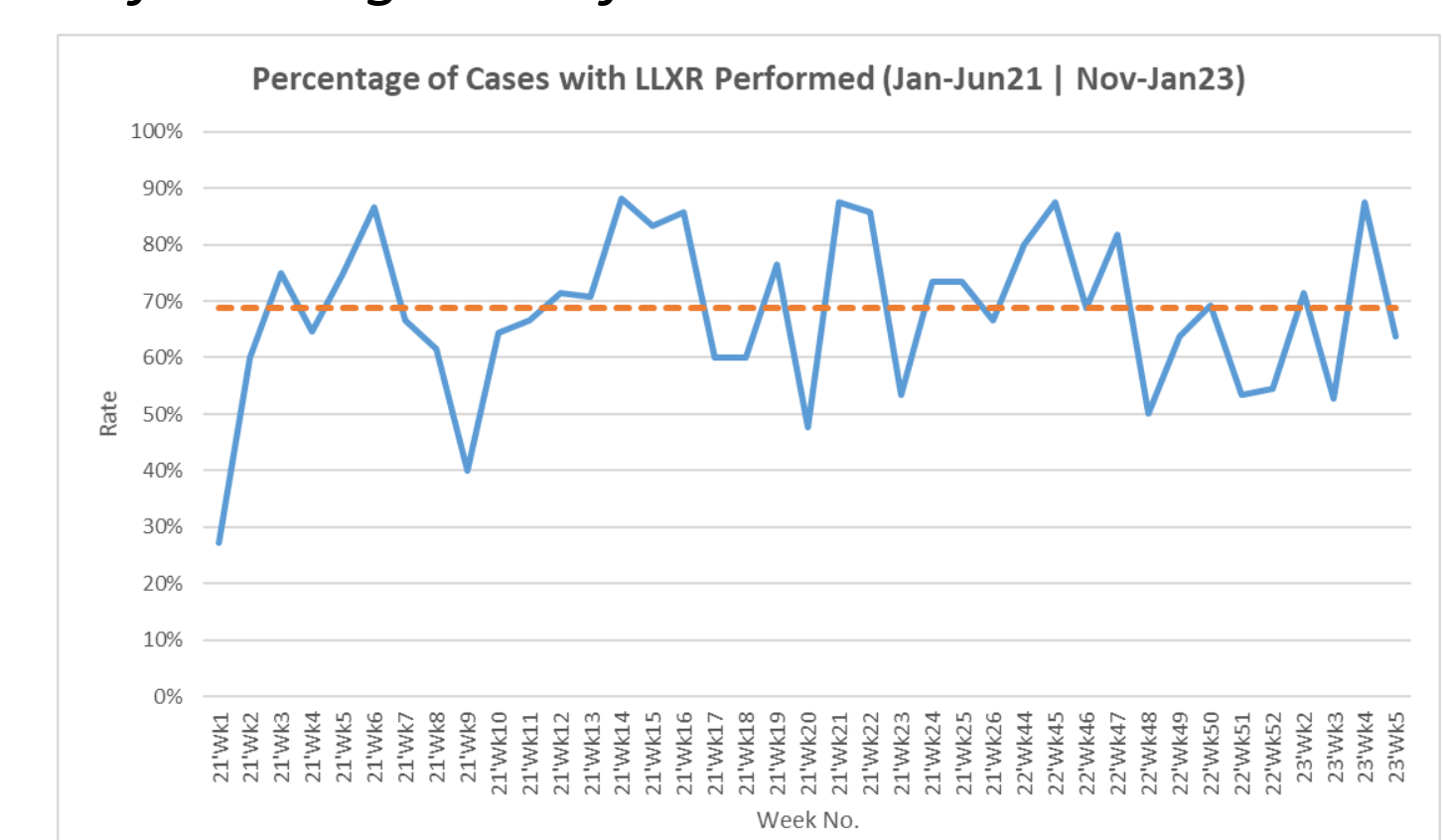


Figure 7: Weekly % of cases with LL XRs performed

Sustainability Plans

Implemented	For Consideration
Education/Awareness: <ul style="list-style-type: none"> • Long-Term Posters in Medical Wards • Incorporation into SingHealth Orientation Handbook Accessibility <ul style="list-style-type: none"> • "cellulitisplans" SCM Acronym Expansion 	Education/Awareness: <ul style="list-style-type: none"> • Incorporation into department teaching content • Incorporation in DEM MO Handbook Accessibility: <ul style="list-style-type: none"> • One-stop infopedia page with links to useful protocols
In Progress <ul style="list-style-type: none"> • Incorporation into DIM Posting Briefing for HO/MOs • Incorporation into IM Residency Project Hope Handbook • Synergising with Choosing Wisely Campaign (SGH Office of Value Based Healthcare) 	Auditing: <ul style="list-style-type: none"> • Continued monitoring of prevalence of investigations ordered (with reminders auto-triggered) Innovating: <ul style="list-style-type: none"> • Auto-linking/triggering of order set when ICD diagnosis of cellulitis entered into admission notes