

Meat and Potatoes Matter – Effects of a virtual antimicrobial stewardship program focusing on all prescribed antimicrobials

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Introduction

Typically, antimicrobial stewardship (AMS) programs have capacity to review patients prescribed a restricted antimicrobial only. Resourcing rarely permits the routine review of all patients prescribed antimicrobial therapy and popular opinion is that the routine review of narrow spectrum agents does not require any specialty services or provides limited benefit.

Aims

To review the impact of daily review of all antimicrobial prescriptions on antimicrobial usage patterns and patient outcomes.

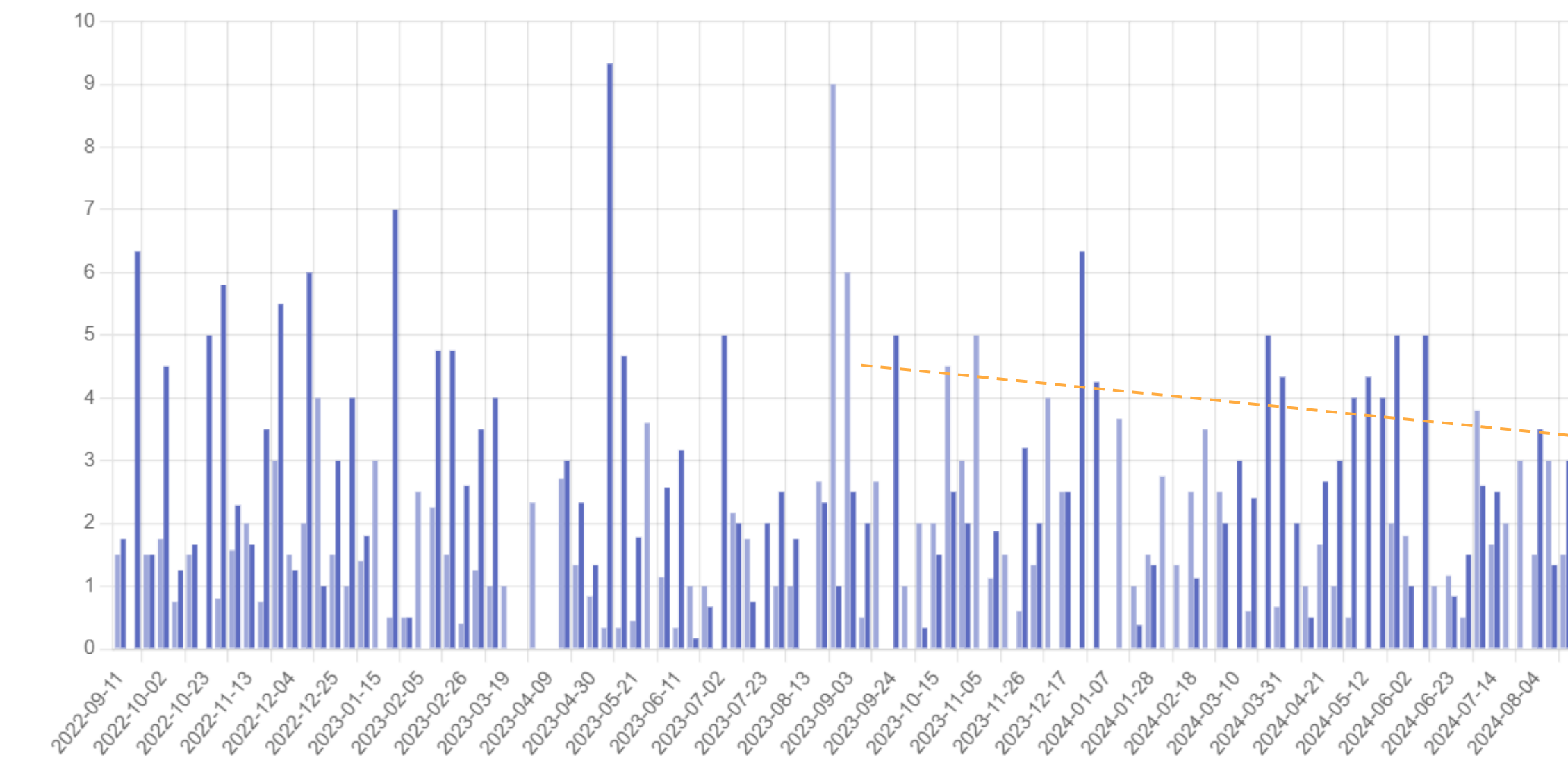
Method

Daily virtual review of all antimicrobial prescriptions was conducted for a 12-month period across Broken Hill Hospital. This was supported by twice weekly infectious disease rounds, a digital prescription prioritisation and decision support system, development of routine AMS support resources (posters and guidelines) and participation in daily medical and surgical team handover meetings. Use of approval codes were not enforced over the review period.

Evaluation

Impact on Length of Stay (LOS)

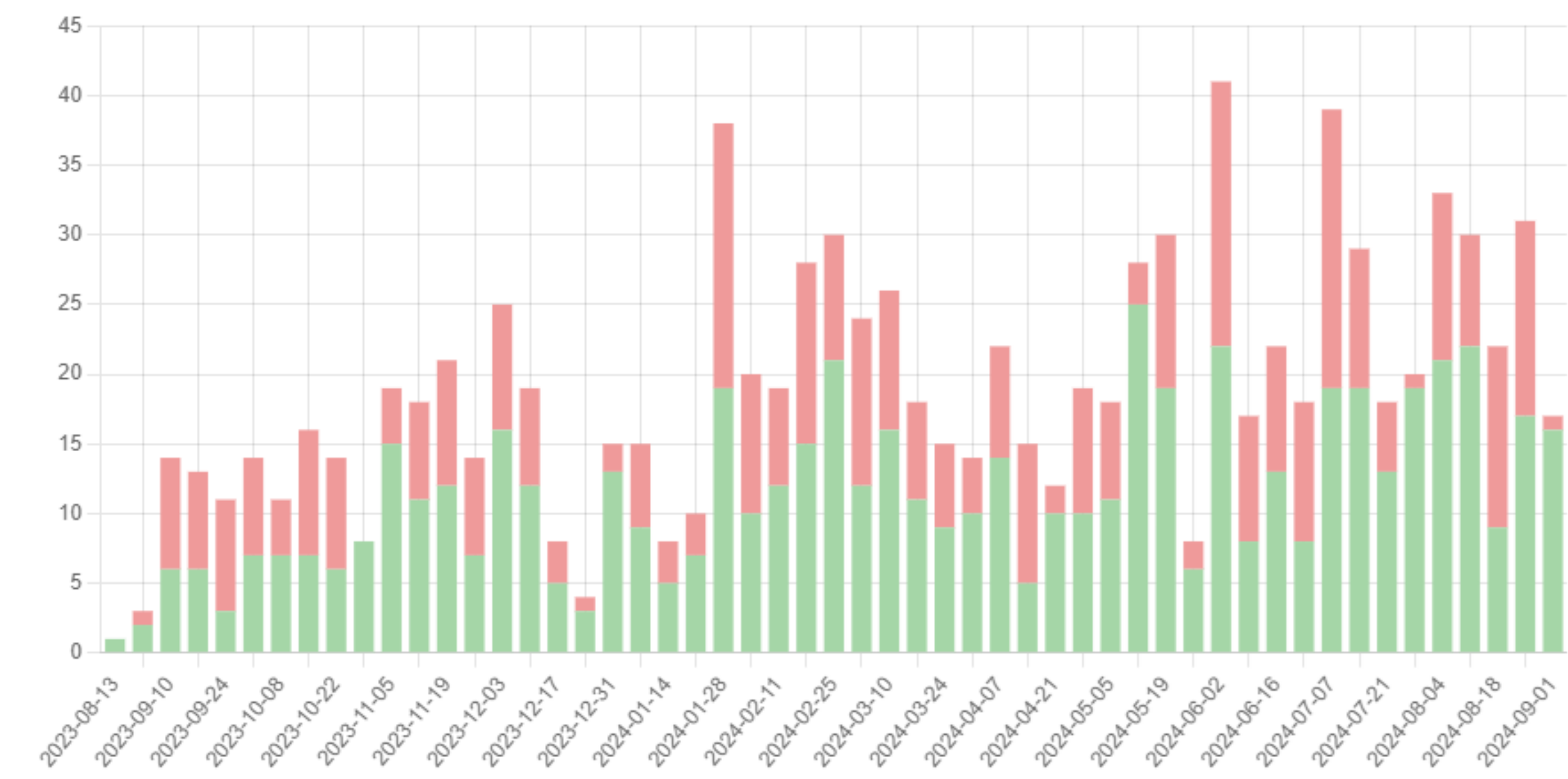
The length of stay for all overnight patients charted one or more antimicrobials was calculated pre and post program implementation. A modest decrease in average length of stay was observed (from 6.24 days +/- 0.45 to 5.92 days +/- 0.43) (95% CI [-0.90, 0.26]), with greatest reductions in LOS for patients with cellulitis or pyelonephritis. This equated to a possible \$2M in bed day savings for the hospital. As there are multiple contributing factors affecting hospital length statistical significance was not met over the review period. Ongoing LOS measurements will be collated until statistical significance is achieved.



The chart above shows average weekly length of stay for patients charted one or more antimicrobials. A weak trend (orange dotted line) toward reduced length of stay for all admissions is emerging since program implementation and with AMS rounds recommendation recording from September 2023 (see next chart).

Recommendation Uptake

Recommendation uptake was reviewed the morning after each daily AMS round to determine uptake rate. Early in the program both the number of recommendations and uptake rate were low, with initial uptake rate below 45%. As the program progressed total weekly recommendations and uptake rate improved to over 65% uptake on recommendations.



The chart above shows the number of recommendations to change therapy per week made by the AMS program and uptake rate ('followed' green) vs non uptake ('not followed' red). Uptake was recorded at 8am the morning following the recommendation. If a recommendation was followed later in the next day, it was still marked as 'not followed'.

Broad-Spectrum Antimicrobial Use

A significant reduction in ceftriaxone usage was observed since program implementation. This was of particular importance as FWLHD was observing increasing rates of ceftriaxone resistance in urine E.coli isolates and increasing rates of MRSA.

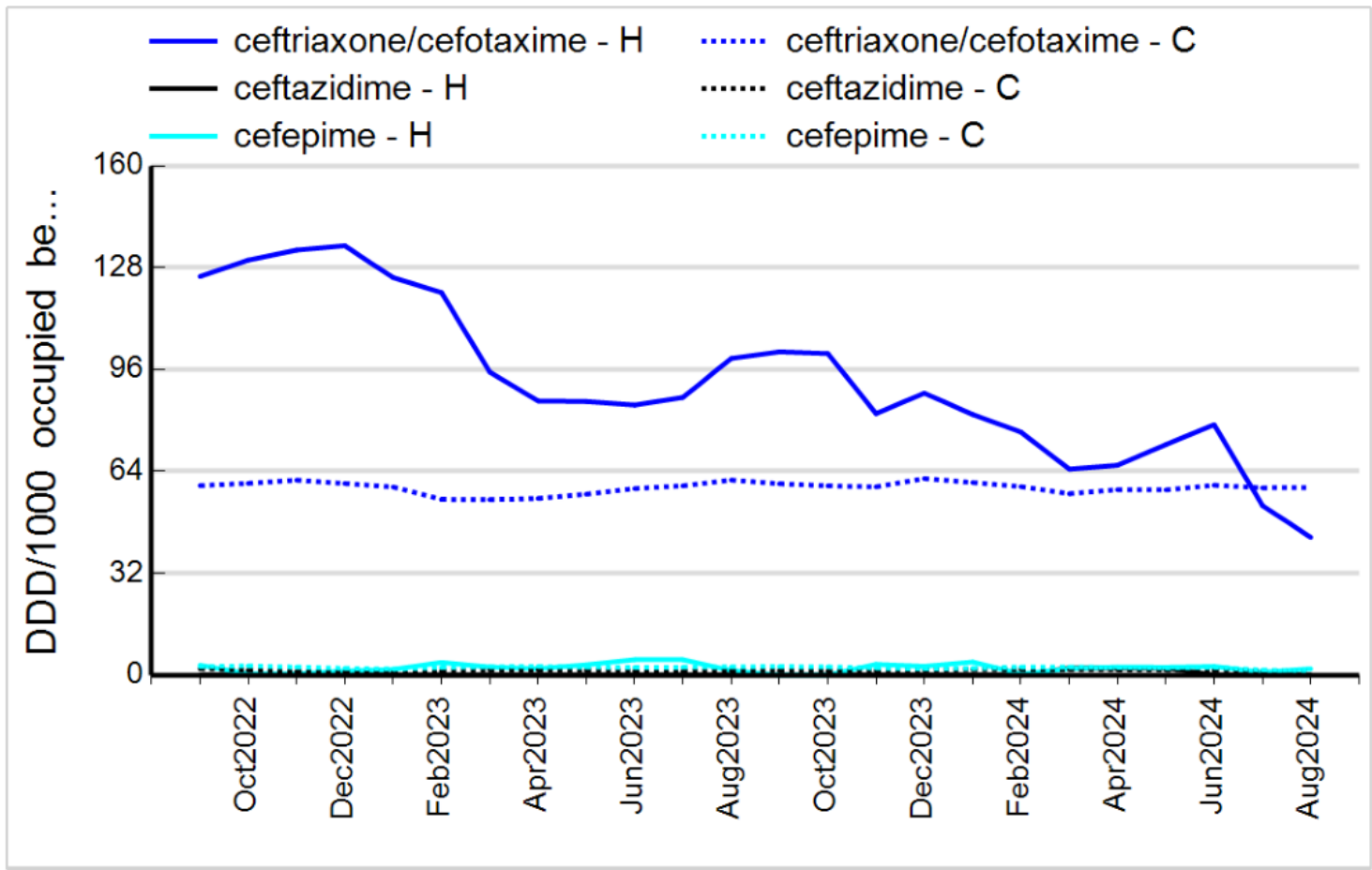


Chart 3: 3rd/4th generation cephalosporins (ceftriaxone and cefotaxime grouped together).

The chart above shows a reduction in ceftriaxone usage from ~128 defined daily doses per 1000 occupied bed days to 40 DDD / 1000 OBD, this is a 69% reduction in ceftriaxone usage since program implementation.

Electronic Decision Support Review

The freeware Rolling Antimicrobial Prescribing Audit (RAPA) was used to triage patients for review using a set of computer-generated hints to guide patient prioritisation. The appropriateness of hints were assessed daily as a part of the review workflow.

An example of a RAPA review card to assist in identification of potential AMS interventions and track recommendation uptake rates.

84% of hints were flagged as being useful for therapy change. Hints deemed most useful (>75% flagged as useful) included antibiotic interaction checks, dose vs renal function checks, dosing vs indication checks and indication vs therapy checks. Hints which were less useful (≤75% useful) included shifting creatinine checks and appropriate switch to oral flags. Overall, use of computer-generated hints greatly assisted the function of the AMS program over manual review alone.

Daily Handover

A cornerstone of the AMS program included participation at daily handover meetings for medical and surgical teams.

Rationale for recommendations to change therapy were raised for all teams present, improving awareness for common AMS interventions. Frequent recommendations were made to increase antimicrobial doses and to escalate narrow spectrum or oral therapy alongside recommendations made to de-escalate.

Review of all antimicrobial prescriptions permitted recommendation to escalate and de-escalate therapy, which improved the uptake rate of recommendations and improved the relationship between the AMS and medical and surgical teams.

Conclusions

The implementation of a virtual AMS program for FWLHD can be considered a success, and comes with a few key findings:

- Review of both broad spectrum and narrow spectrum agents is important to improve rapport and potentially improve LOS.
- Reductions in antimicrobial usage can be observed without any use of pre-authorisation or post prescribing approval codes.
- In regional and remote hospitals, a virtual system for review is feasible provided the interactions are provided directly (i.e. via journey board meetings and virtual rounds)