

Rawlins Matthew (Orcid ID: 0000-0002-6525-1084)  
Ingram Paul Robert (Orcid ID: 0000-0001-7733-7072)

## **Moving to telehealth antimicrobial stewardship during the Covid-19 pandemic – impact on activity and adherence**

Shiva Bazargani<sup>1</sup>

Matthew DM Rawlins<sup>1\*</sup>

Duncan GJ Mclellan<sup>2</sup>

Paul R Ingram<sup>2,3,4</sup> and John R Dyer<sup>2</sup>

1. Department of Pharmacy, Fiona Stanley Hospital, 11 Robin Warren drive, Perth WA.
2. Department of Infectious Diseases, Fiona Stanley Hospital, 11 Robin Warren drive, Perth WA.
3. PathWest Laboratory Medicine, Department of Microbiology, Perth, WA.
4. School of Pathology and Laboratory Medicine, University of Western Australia, Perth, WA.

\*Corresponding author

Matthew.rawlins@health.wa.gov.au

The authors report no Conflicts of Interest, financial or otherwise, to declare.

No funding was obtained for this study.

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process which may lead to differences between this version and the [Version of Record](#). Please cite this article as doi: [10.1111/imj.15906](https://doi.org/10.1111/imj.15906)

This article is protected by copyright. All rights reserved.

This project was approved as a Quality Improvement Project (GEKO #47034) by the Fiona Stanley Hospital Quality Improvement Program and considered exempt from requiring Human Research and Ethics approval.

### **Moving to telehealth antimicrobial stewardship during the Covid-19 pandemic – impact on activity and adherence**

Telehealth has become increasingly important during the COVID-19 pandemic as it enables healthcare delivery without face-to-face contact, minimising the risk of viral transmission.<sup>1,2</sup>

Prospective audit and feedback (PAF) rounds are a core element of an effective antimicrobial stewardship (AMS) program.<sup>3</sup> Furthermore, direct engagement with treating teams during PAF rounds has been linked with increased visibility of the AMS service, and verbal communication with prescribers is a predictor of increased adherence to the advice given.<sup>4,5</sup>

Our 783- bed quaternary hospital provides daily face-to-face PAF rounds in response to requests submitted via an electronic referral system (*eReferrals* [Health Support Services, Perth, Western Australia]), primarily by clinical pharmacists. The rounds are conducted by an Infectious Diseases (ID) physician and the senior clinical ID/AMS pharmacist who review the antimicrobial regimens of inpatients throughout the hospital (excluding the Haematology ward and Intensive Care Unit [ICU]), providing clinical recommendations on antimicrobial suitability, duration, dosing and therapeutic drug monitoring.<sup>7</sup> PAF rounds review the patient's hard copy prescription chart, the laboratory clinical results application (*iCM* [DXC Technology Company, Virginia, United States]), relevant radiology (*Impax* [Agfa NV, Mortsel, Belgium]) the Electronic Medical Record (EMR) [*BOSSNet*, Core Medical Solutions, South Australia], and advice is documented in the EMR, as well as verbally communicated to the treating team during the rounds when appropriate.<sup>7</sup>

In April 2020, as a result of the increasing incidence of COVID-19 in Western Australia (WA), we transitioned from physical presence on the wards during PAF rounds to telehealth antimicrobial stewardship (telestewardship), using the EMR and laboratory clinical applications to carry out PAF rounds. Telestewardship rounds were conducted weekday mornings in a non-clinical office space by the rostered ID physician for PAF rounds that day and the senior clinical AMS/ID pharmacist using the same applications (*eReferrals*, *Impax*, *iCM* and *BOSSNet*). Hard copy medication charts were assumed to be accurate from the eReferral if the PAF request was submitted on the same day of review, otherwise the relevant clinical pharmacist was contacted to confirm current antimicrobial therapy. Advice is documented in the EMR and where this is likely to significantly change patient management, a phone call to the managing team is made at the discretion of the ID physician.

Face-to-face PAF rounds resumed in May 2020 due to the lack of community transmission and low rate of hospitalised patients with COVID-19.<sup>7</sup> When borders opened to outside travel in WA from March 2022<sup>8</sup>, the AMS service again transitioned to telestewardship for the period March through May 2022: non-urgent elective surgery was reduced.<sup>9</sup>

In order to assess the impact of this temporary variation from usual practice on the effectiveness of our service, we retrospectively audited the PAF round activity and adherence to advice<sup>7</sup> proffered by month, from January through June 2020 and again from March through May 2022 (Figure 1).

The number of patients referred for PAF review (mean +/- standard deviation) was lower for telestewardship months compared with face-to-face months (115.5 +/- 11.7 versus 136.4 +/-13.2 respectively; P = 0.02), however the adherence to advice was similar (79.1% +/- 3.6% versus 80.4% +/- 3.6%; P = 0.36). Hospital activity in occupied bed days (OBD) excluding ICU and Haematology was not different between telestewardship months and face-face round periods (15147.8 +/- 711.3 days versus 14,111.8 +/-2088.7 days; P = 0.16).

The reduction in the number of patients reviewed on PAF rounds during telestewardship periods could be attributed to a reduction of elective surgery, along with a reduced visible presence.

The three “T’s” of stewardship being trust, team and technology have been identified as key factors for adherence to telestewardship programs.<sup>6</sup> The consistently high levels of adherence to PAF round advice during telestewardship is likely due to established trust in the AMS team which has been embedded in clinical practice from hospital opening, allowing successful service provision via the EMR technology. Telestewardship provision has shown similar adherence as face-to-face PAF rounds for short time periods within our institution, facilitating reduced staff movement between clinical areas, however the reduction in activity noted suggests that they should not replace a face-to-face service in the longer term., although with further EMR rollout these results may provide encouragement for the expansion of telestewardship programs into more resource-poor areas.

1. Australian Government, Department of Health. *COVID-19 Telehealth Items Guide*. Australian Government; 2020. Accessed Mar 31, 2022.  
<https://www.health.gov.au/sites/default/files/documents/2020/07/coronavirus-covid-19-telehealth-items-guide.pdf>
2. Young JD, Abdel-Massih R, Herchline T, McCurdy L, Scott J, Moyer K et al. Infectious Diseases Society of America position statement on telehealth and telemedicine as applied to the practice of infectious diseases. *Clin Infect Dis* 2019;68(9):1437-1443.
3. Barlam T, Cosgrove S, Abbo L, MacDougall C, Schuetz A, Septimus E et al. Implementing an antibiotic stewardship program: guidelines by the Infectious Diseases Society of America and the Society of Healthcare Epidemiology of America. *Clin Infect Dis* 2016;62(10):e51–77.
4. Lesprit P, Landelle C, Brun-Buisson C. Clinical impact of unsolicited post-prescription antibiotic review in surgical and medical wards. a randomised controlled trial. *Clin Microbiol Infect* 2013;19(2):E91-97.
5. Cairns K, Rawlins M, Unwin S, Doukas F, Burke R, Tong E et al. Building on antimicrobial stewardship programs through integration with electronic medical records: the Australian experience. *Infect Dis Ther* 2021;10(1):61-73.
6. Pierce J, Stevens MP. The emerging role of telehealth in antimicrobial stewardship: a systematic review and perspective. *Curr Treat Options Infec Dis* 2021;13(4):175-191.

7. Rawlins M, Raby E, Sanfilippo F, Douglass R, Chambers J, McLellan D et al. Adaptation of a hospital electronic referral system for antimicrobial stewardship prospective audit and feedback rounds. *Int J Qual Health Care* 2018;30(8):637-641.

8. Government of Western Australia. Media statements [Internet]. Perth: Government of Western Australia; 2020 Apr 26. Cautious easing of restrictions thanks to WA's COVID-19 progress; 2020 Apr 26 [cited 2022 Mar 31]; [about 2 screens]. Available from: <https://www.mediastatements.wa.gov.au/Pages/McGowan/2020/04/Cautious-easing-of-restrictions-thanks-to-WAs-COVID-19-progress.aspx>

9. Government of Western Australia. WA's border opening from Thursday 3 March 2022. WA.gov.au. February 18, 2022. Updated February 19, 2022. Accessed 31 March, 2022. <https://www.wa.gov.au/government/announcements/was-border-opening-thursday-3-march-2022>

10. Government of Western Australia. Media statements [Internet]. Perth: Government of Western Australia; 2022 May 1. More elective surgery bookings resume at hospitals; 2022 May 1 [cited 2022 Jul 5]; [about 1 screen]. Available from: <https://www.mediastatements.wa.gov.au/Pages/McGowan/2022/05/More-elective-surgery-bookings-resume-at-hospitals.aspx>

**Figure 1: Prospective Audit and Feedback Round: Activity and Adherence**

**Face-to-face (filled) and Telestewardship (striped) periods**

**(Interrupted Time Series)**

**Left Y axis: % adherence to advice provided**

**Right Y axis: Number of patients reviewed**

**X-axis: Interrupted time series: January to June 2022 by month, then March to May 2022 by month.**

**Blue – % adherence to advice provided**

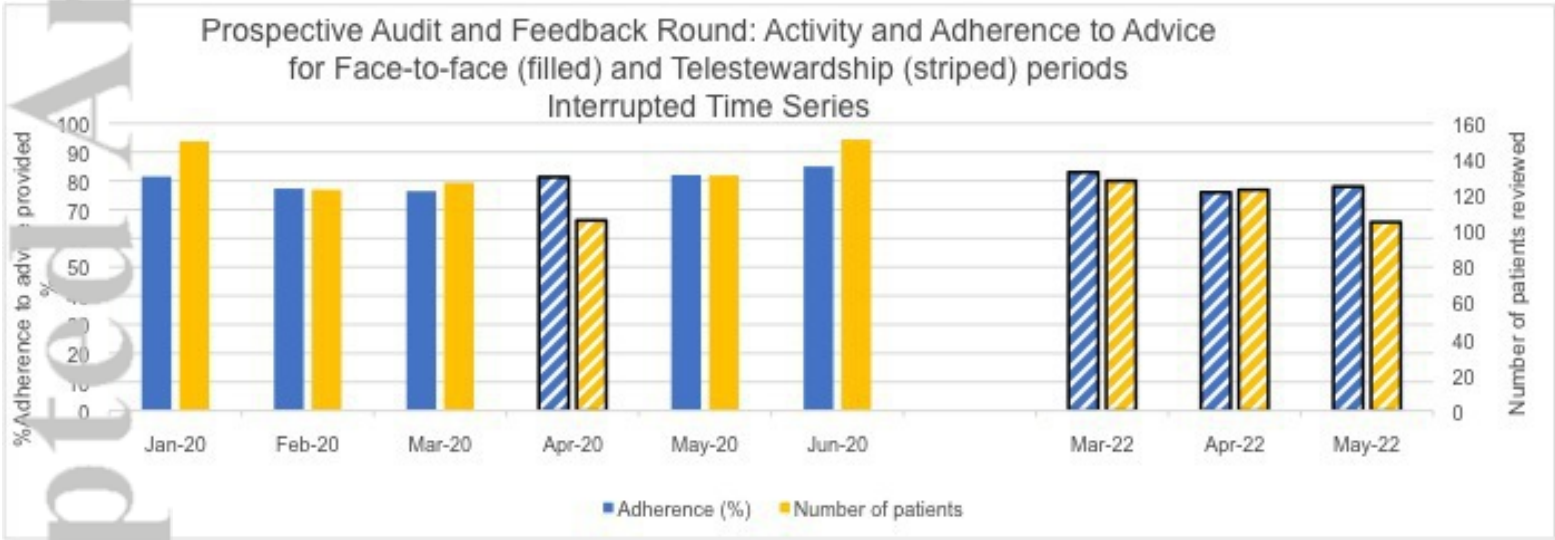
**Yellow – number of patients reviewed**

**Filled: Face-to-face periods**

**Striped: Telestewardship periods**

\*Adherence was assessed to each component of advice provided, including dosing, antimicrobial choice, duration, route of administration, laboratory monitoring, suggestion of formal ID consultation (7)

**Accepted Article**



IMJ\_15906\_Adherenceactivityrevised.jpg