

An assessment of antimicrobial prescribing 4-years-post the introduction of antibiotic guidelines in Honiara, Solomon Islands



Iris Kostas^{1,2}, Julie Zinihite², Solomon Bosa², Alex Munamua² and Beverley Snell³

¹Monash University, Parkville ²National Referral Hospital, Solomon Islands ³Burnet Institute for Medical Research and Public Health, Melbourne

Background

Availability of evidence-based, locally relevant antibiotic prescribing guidelines is an integral part of a coordinated effort against antibiotic resistance. In June 2015, the **Solomon Islands Antibiotic Guidelines (SIAG)** were made available to prescribers in the Solomon Islands, providing the first collection of antimicrobial recommendations tailored to local practice.

Since the introduction of the SIAG, annual point prevalence studies have been carried out at the country's only tertiary hospital, the 380-bed National Referral Hospital (NRH) in Honiara, to assess the impact the guidelines have had upon prescribing practice. This most recent study aims to evaluate current compliance rates to the SIAG 4 years post their introduction and was completed under the Mathew Peck Travelling Grant.

Aim

To assess current prescribing compliance with Solomon Islands Antibiotic Guidelines (2015) and/or Australian Therapeutic Antibiotic Guidelines (2018) in the context of previous compliance audits, while characterising current prescribing patterns.

Method

A point prevalence study of antibiotic prescribing within the four wards showing the greatest antimicrobial use at NRH (Medical, Surgical, Orthopaedic, and Paediatric) was conducted from November 28 – December 7, 2018. All wards were audited once (at 13:00, to coincide with standard drug rounds), to record any antimicrobial currently charted. All malarial treatment was excluded from the study as there exist separate guidelines for specific treatment of malaria. A sample size of 136 patients was achieved for the study.

All treatment charts were checked to capture all current antibiotic prescribing (ceased medications were not included). Patient progress notes located to determine diagnosis and indication. Using a paper survey key, the following information was collected:

- Patient details (ward, prescribing team, DOB and/or age, initial weight, gender, diagnosis)
- Antimicrobial details (drug, dose, route, frequency, date started, intended duration, indication)

The patient and antibiotic prescribing data were then assessed for appropriateness according to whether prescribing was found to be compliant with the SIAG and/or the Australian Antibiotic Guidelines (from the Therapeutic Guidelines). All data were then entered and evaluated using Microsoft Excel. Previous years' audit data (Apr 2015, Jun 2015, Sep 2015, Jun 2016, Mar 2017, Jun 2017) were included in the analysis to generate comprehensive trends.

Results

% charts antimicrobials correctly selected

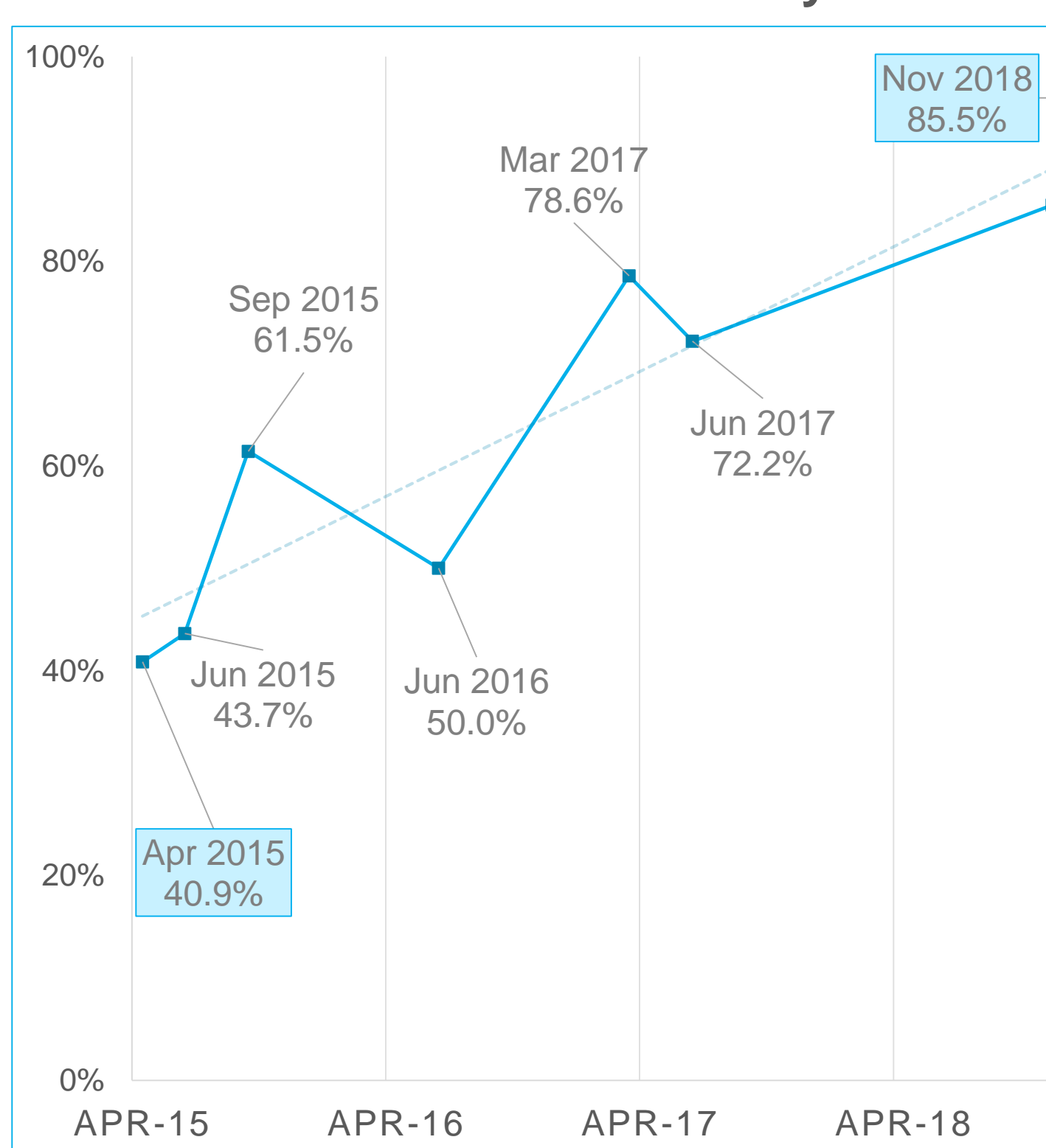


Figure 1. Hospital-wide average of correct selection of antimicrobials from Apr 2015 – Nov 2018. Compliance was measured in percentage of medication charts, where each antibiotic prescribed was appropriately selected for the given indication.

% charts fully appropriate

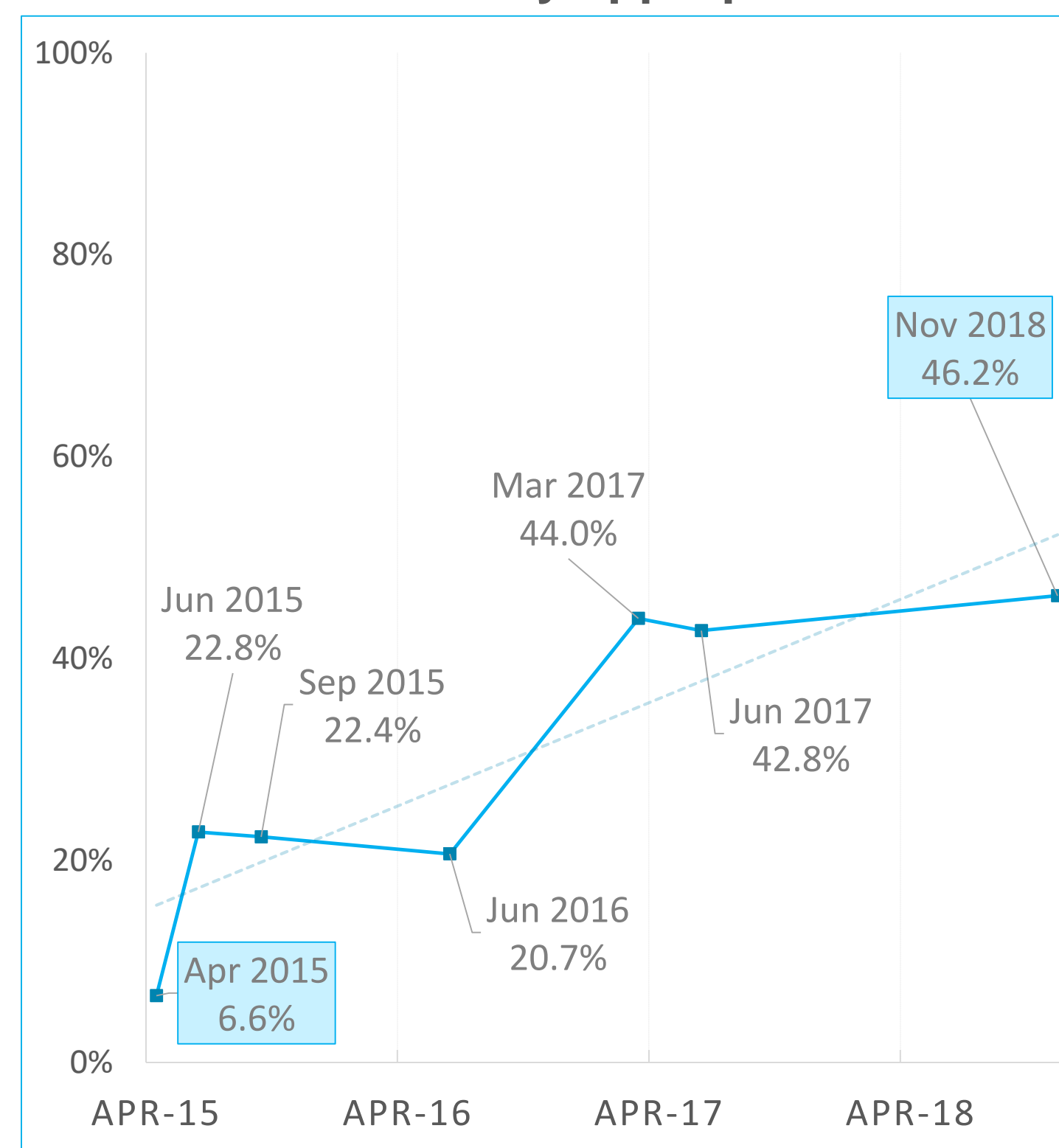


Figure 2. Hospital-wide averages for fully appropriate antimicrobial prescribing from Apr 2015 – Nov 2018. Compliance was measured in percentage of appropriate medication charts, where an appropriate chart showed each antibiotic prescribed was fully appropriate in terms of selection per indication, dose, route, frequency and duration.

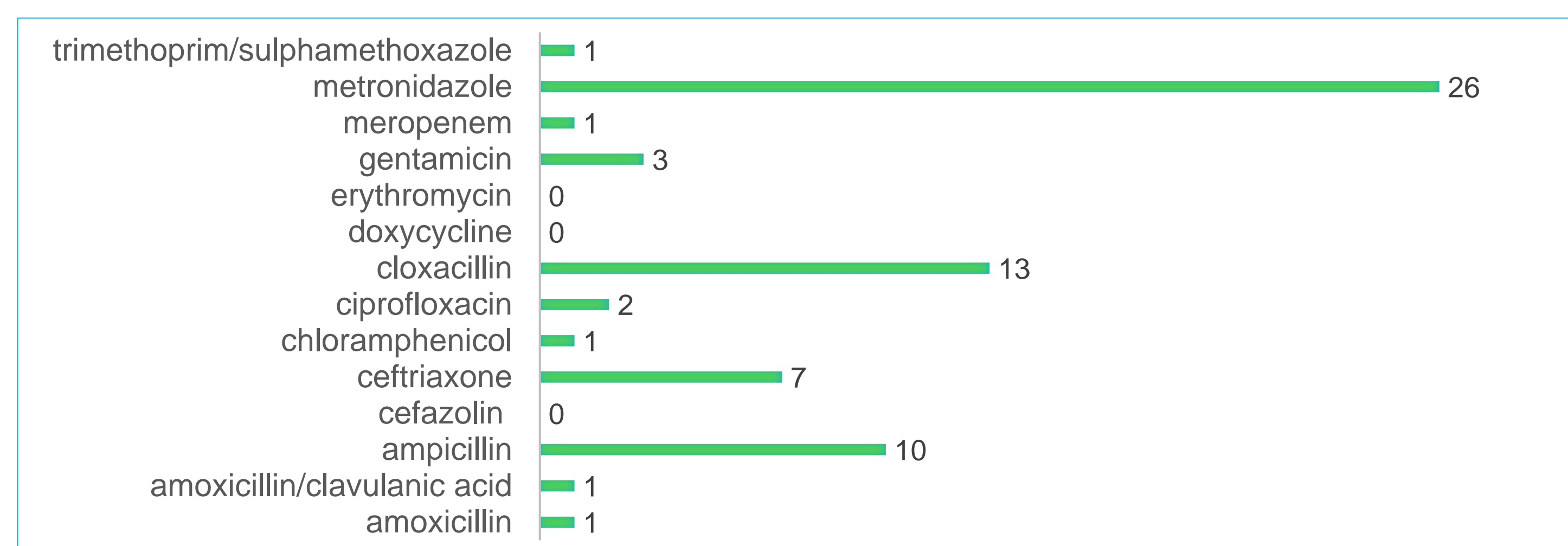


Figure 3. Number of each inappropriately prescribed antimicrobial captured during the Nov 2018 point prevalence study.

Specific Outcome Measures for Nov 2018 – Number of patients:	Medical	Orthopaedic	Surgical	Paediatric	Hospital average
On the ward	40	30	41	25	
Prescribed an antimicrobial	28 84.9%	12 40.0%	25 69.4%	19 79.2%	68.4%
Prescribed correctly selected antimicrobial	21 75.0%	9 75.0%	23 92.0%	19 100.0%	85.5%
All prescribed antimicrobials fully appropriate	9 32.1%	8 66.7%	11 44.0%	8 42.1%	46.2%

Table 1. The number of patients per specific outcome measure, broken down into each of the four high-use antimicrobial wards, for the Nov 2018 point prevalence study.

Appropriate – is done well

Medical	Doxycycline use in community-acquired pneumonia (CAP)	
Surgical	Cloxacillin use being stepped down from IV to oral in diabetic foot ulcer (DFU)	
Orthopaedic	Cephazolin use in open fracture Ciprofloxacin use always directed by sensitivity data	
Paediatric	Cloxacillin use in abscess Ampicillin use in a wide variety of conditions	
Inappropriate – room for improvement (reason for inappropriateness in parenthesis)		
Medical	Ampicillin IV route (not stepped down to amoxicillin PO in CAP)	
	Ceftriaxone dosing and frequency, depending on condition: <ul style="list-style-type: none"> o Meningitis: 1g BD (in place of 2g BD) o CAP: 1g BD (in place of 1g daily) o Spontaneous bacterial peritonitis: 1g BD (in place of 2g daily) 	
	Cloxacillin 1g dosing (in place of 2g)	
	Metronidazole: <ul style="list-style-type: none"> o Frequency: TDS (in place of BD) o Dosing: 400mg PO TDS in likely <i>Shigella</i> enteritis (in place of 600mg PO TDS) 	
	Gentamicin omitted in: <ul style="list-style-type: none"> o Severe DFU o Septicaemia – no obvious infection source o Severe pyelonephritis 	
	Surgical	Metronidazole TDS dosing frequency (in place of BD)
		Gentamicin omitted in severe DFU
	Orthopaedic	Metronidazole: <ul style="list-style-type: none"> o Frequency: TDS (in place of BD) o Dosing: 1g in odontogenic infections (in place of 500mg)
		Paediatric

Table 2. Summary of most commonly observed appropriate and inappropriate antibiotic use, presented by ward, for Nov 2018.

Discussion

Trends from April 2015 – November 2018

The number of patients prescribed antimicrobials was not significantly affected by the introduction of guidelines, with only a slight upward trend of a 1.2% increase per year seen over the 4 years. The instances of correct antibiotic selection saw a notable increase in number following the introduction of the SIAG, more than doubling from pre-guidelines (40.9% hospital average) to the most recent study (85.5%), suggesting a substantial impact, which is continuing to trend steadily upwards (see Figure 1.). A similar upward trend was seen for complete prescribing appropriateness, though the figure was more modest at 46.2% (see Figure 2.).

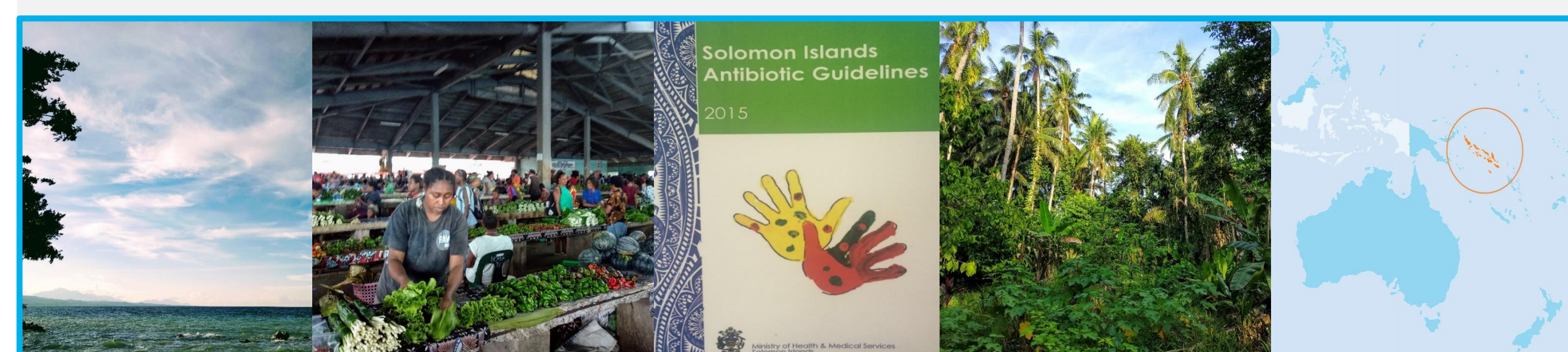
The guidelines included a number of recommendations that deviated from long-standing prescribing practices common at the time of introduction (e.g. metronidazole has traditionally been dosed three times daily as opposed to the current recommendation of twice daily), and these now superseded practices came to represent the majority of inappropriate antibiotic orders observed. These results highlight that the time required to change prescribing habits is substantial, and recognise that complete adoption of guidelines is a long-term goal.

Individual antimicrobial use by ward – November 2018

Comparative inappropriateness between different antibiotics is shown in Figure 3., while Table 1. compares antimicrobial use between wards. On average, metronidazole was prescribed inappropriately 83.9% of the time, ranging from 66.7% in the Paediatric ward to 100.0% in the Orthopaedic ward. Cloxacillin ranged significantly in inappropriateness, from only 11.1% in Paediatric to 83.3% in Medical, as did ampicillin (22.2% in Paediatric to 87.5% in Medical). Ceftriaxone, while not commonly prescribed, was found to be not fully appropriate in 7 out of 9 patients. Of the 4 patients prescribed gentamicin, 3 were not fully appropriate. In addition, it should be noted that there were 10 cases where, according to prescribing guidelines, gentamicin should have been concomitantly prescribed but was omitted. Common explanations for inappropriateness have been compiled in Table 2.

Conclusion

The overall prescribing compliance with the Solomon Islands Antibiotic Guidelines (2015) and/or Australian Therapeutic Antibiotic Guidelines (2018) for November 2018 was found to be 46.2%; the highest aggregate percentage for the hospital since the introduction of local guidelines in 2015. A percentage of 82.9% for correct antimicrobial selection was also the highest observed to date. These results point to the positive and measurable impact the guidelines have had on prescribing practices, though recurring examples for inappropriate prescribing over the 4-year period point to further opportunities for targeted Antimicrobial Stewardship. In line with the finding of Harvey et al in Australia (1983), Antibiotic Guidelines facilitate the auditing of use and aid prescribing decisions, but additional methods appear to be needed if specific use patterns need to be addressed.



Solomon Islands in a nutshell (from left to right): Looking out over the Iron Bottom Sound; Honiara Central Market; the 2015 Solomon Islands Antibiotic Guidelines; roadside jungle outside of Tanaghai; Solomon Islands is located 3 hours by plane, north-east of Brisbane.



This research was made possible thanks to the generosity of both the Mathew Peck family, founders of the Mathew Peck Travelling Grant, as well as the opportunity provided by Monash University, facilitators of the Grant for Monash Pharmacy students. Lastly, thank you to Susie Lake and the NRH Pharmacy Department for their invaluable guidance and warmth during my stay in Honiara.