Results. Of 240 hospitals, 39 (16%; 18 large and 21 small/medium-sized) responded. Preauthorization of using broad-spectrum antibiotics and antifungals was found in 4 (10%) and 1 (3%) hospital(s), respectively. Notification of broad-spectrum antibiotics and antifungals was found in 37 (95%) and 2 (5%) hospitals, respectively. The numbers of hospitals that intervened in the use of broad-spectrum antibiotics within 7 and 28 days were 17 (44%) and 34 (87%), respectively; those of antifungals were 3 (8%) and 10 (26%), respectively (Table 1). Interventions to use broad-spectrum antibiotics within 7 days were statistically more frequent in small-/medium-sized hospitals than in large hospitals [13 (61.9%) vs. 4 (22.2%),odds ratio = 5.7, 95% confidence interval = 1.4–23.3, p = 0.023]. All hospitals had less-frequent interventions to use antifungals within 7 days than those for antibiotics[3 (14.3%) vs. 0 (0%)] (Table 2).

Conclusion. Small-/middle-sized hospitals had more frequent interventions within 7 days of broad-spectrum antibiotics than those of large hospitals, possibly because small-/medium-sized hospitals are agile and have few barriers against interventions to use broad-spectrum antibiotics. Compared with broad-spectrum antibiotics, interventions of antifungals were less frequently conducted in all hospitals. We need to emphasize the importance of AFS in Japan. Further studies on related factors are needed.

Table 1. Intervention for AMS and AFS

	Broad-spectrum antibiotics[a] n=39		Antifungals n=39	
Preauthorization	4	(10.3%)	1	(2.6%)
Notification	37	(94.9%)	2	(5.1%)
Intervention within 7 days	17	(43.6%)	3	(7.7%)
Intervention within 28 days	34	(87.2%)	10	(25.6%)

Unless otherwise stated, data are presented as n (%)

AMS, Antimicrobial stewardship; AFS, Antifungal stewardship

[a]3rd-generation and 4th-generation cephalosporins and piperacillin-tazobactam, carbapenem, intravenous quinolone

Table 2. Comparison between large and small/middle-sized hospitals regarding intervention within 7 days

	Small/middle-sized hospitals (≥ 501 beds) n=21		Large-sized hospital (≤ 500 beds) n=18		OR	95% CIs	p value
Broad-spectrum antibiotics[a]	13	(61.9%)	4	(22.2%)	5.7	1.4–23.3	0.023
Antifungals	3	(14.3%)	0	(0%)	-	-	-

Unless otherwise stated, data are presented as n (%)

ASP, Antimicrobial stewardship program; AFP, Antifungal stewardship program; OR, Odds ratio; CI, Confidence interval

[a]3rd-generation and 4th-generation cephalosporins and piperacillin-tazobactam, carbapenem, intravenous quinolone

Disclosures. **All authors:** No reported disclosures.

2033. A Systematic Review of Systematic Reviews: Procalcitonin in the ICU to Guide Antibiotic Therapy

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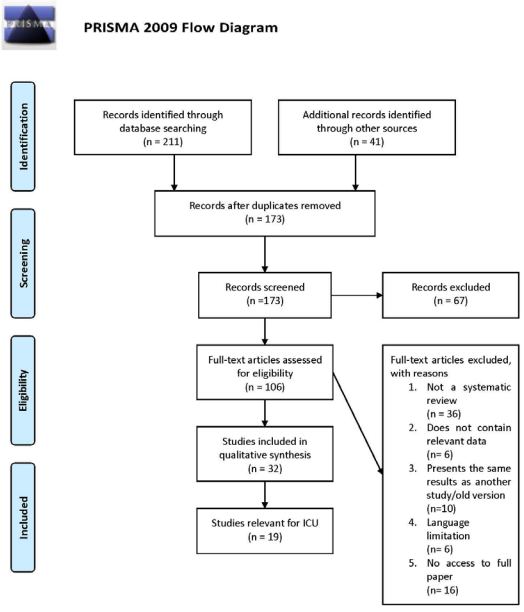
Background. Antimicrobial resistance is an emerging global health crisis with overall antimicrobial use a key contributor. Strategies to safely reduce antibiotic course length are important. Procalcitonin (PCT) is a serum biomarker produced in the presence of bacterial infection. There have been many systematic reviews (SRs) evaluating PCT in various populations but its use remains controversial. The aim of this SR of SRs was to evaluate the extent to which PCT in critical care (ICU) impacts antibiotic duration and other reported outcomes.

Methods. A systematic search of major databases using an "a priori" strategy and protocol was performed. SRs were included if one of the reported outcomes related to antibiotic duration or initiation in the ICU. Data were extracted by an author, checked and corrected independently by another author. The quality of SRs was assessed by 2 authors independently using AMSTAR II. Disagreements were resolved by consensus with a third author. Results are presented narratively and in tabular format (Table 1).

Results. Figure 1 shows the PRISMA diagram. 19 SRs were included. The number of patients included ranged from 308 to 6,037 (median = 1,316) across SRs. Overall, there was a consistent finding of a statistically significant (sf) reduction in antibiotic duration in study groups using PCT cessation protocols (all studies in Table 1). 3 SRs did not contain suitable statistics for inclusion in Table 1. SRs that presented the antibiotic duration outcome as a mean or median difference in exposure days (N = 16) showed a median reduction of 2.10 days (range −1.19 to -5) with PCT use. 1 SR found an sf decrease in mortality with PCT use. 4 SRs included antibiotic initiation as an outcome: 2 found an sf decrease in antibiotic prescription rate with PCT; 2 found no difference.

Conclusion. SRs have found that PCT use in ICU leads to an sf reduction in antibiotic duration without impacting mortality. There are no data presented in the SRs about the impact of this on antimicrobial resistance. Few SRs detail the infections included; thus the applicability of these findings to a single ICU remains challenging. Other outcomes, such as length of stay, are not affected by PCT use in ICU.



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement.* PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org.

Table 1: Summary of mean / median difference in antibiotic duration with the use of PCT

Population	First Author.	Year	Overall number of studies	Overall number of participants	Mean/ median difference (Days)
Mixed ICU	Lam SW	2018	15	6037	-2
Mixed ICU	Agarwal R	2011	6	1476	-5
Mixed ICU	Kip MMA	2015	6	979	-1.71
Sepsis (all in ICU)	Iankova I	2017	10	3989	-1.49
Mixed ICU subset	Shafiq N	2017	8	2464	-2.36
Mixed ICU	Huang HB	2017	13	5136	-1.76
Sepsis (all in ICU)	Wirz Y	2018	11	4482	-1.19
HAP and VAP in ICU	Pugh R	2011	3	308	-3.2
Mixed ICU	Westwood M	2015	8	1572	-3.19
Mixed ICU	Zhang T	2017	15	5486 1275	-2.25
Mixed ICU subset	Soni NJ	2013	5	938	-2.05
Mixed ICU	Mathaiou DK	2012	7	1131	-3.15
Mixed ICU	Heyland DK	2011	5	826	-2.14
Mixed ICU	Kopterides P	2010	6	1155 2800	-3.17
Sepsis (all bar 1 study in ICU)	Andriolo BNG	2017	10	1010	-1.28
Respiratory tract infections in ICU	Schuetz P	2017	16	938	-2.23

Disclosures. **All authors:** No reported disclosures.

2034. Standardized Point Prevalence Survey on Antibiotic Use to Inform Antimicrobial Stewardship Strategies in the Caribbean

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Background. Inappropriate use of antimicrobials is one of the core contributors to antimicrobial resistance. While hospitals create high selection pressures on bacteria due to the high quantity and broader spectrum of antibiotics used, information on antimicrobial use at the patient level in the Caribbean is sparse. In response, PAHO implemented a standardized WHO methodology to engage national leaderships, build local capacity, and facilitate the use of data to inform antimicrobial stewardship programs (ASP) in the Caribbean.

Methods. Point prevalence surveys (PPS) were performed in four acute care hospitals in Barbados, Guyana and Saint Lucia between June and July 2018. Medical records of all inpatients were reviewed to collect information on antibiotic use, indications and use of laboratory services (Figure 1). A hospital questionnaire was used to assess hospital infrastructure, policy and practices, and monitoring and feedback systems (Figure 2). Training on PPS methods and electronic data collection tool in REDCap™ were provided to build local capacity and identify potential ASP leaderships. A standardized data validation, analysis and reporting system was built in R to streamline the process. Results and recommendations were disseminated to national authorities and stakeholders to support hospital and national decision-making and training for healthcare providers (Figure 3).

Results. A total of 60 physicians, nurses, pharmacists, laboratory technicians, and infection control specialists were trained and participated in the PPS. The survey collected records of 816 patients in which 442 (54%) were females and 374 (46%) were males. In total, 356 (44%) patients received 551 antibiotics. Overall, 300 (75%) of 398 indications for antibiotic use were treatment and 72 (18%) were prophylaxis. A higher use of parenteral antibiotics (79%) was observed compared with oral antibiotics (21%). Antibiotic prescribing patterns differed across hospitals. The most commonly used antibiotics were metronidazole (12%) and amoxicillin/clavulanate (11%).

Conclusion. The PPS method provided a feasible and effective way to collect baseline data and identify target areas for interventions. Engaging national leaderships and building local capacity offered a sustainable way in optimizing antimicrobial use in resource-limited settings.

Fig 1. PAHO/WHO Point Prevalence Survey Design

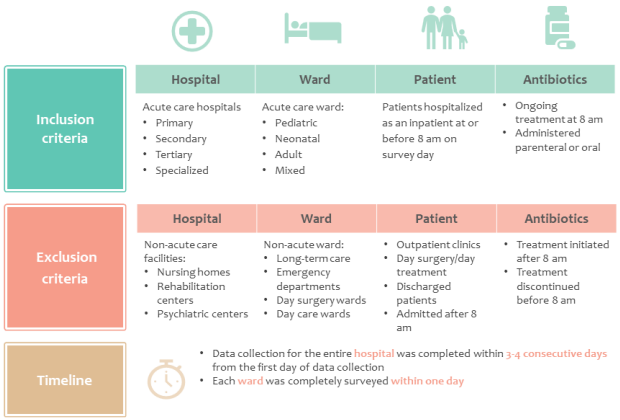


Fig 2. PAHO/WHO Point Prevalence Survey Data Structure

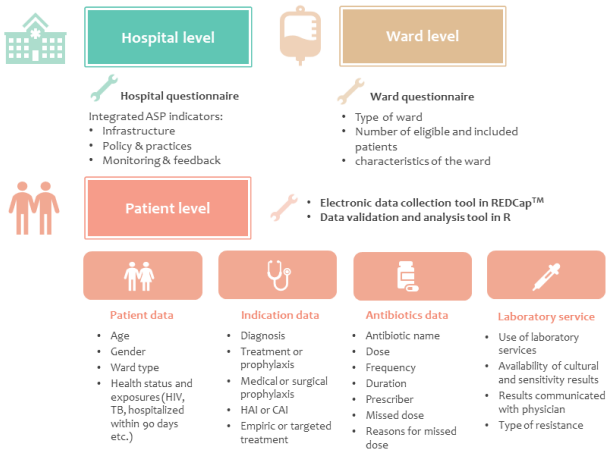
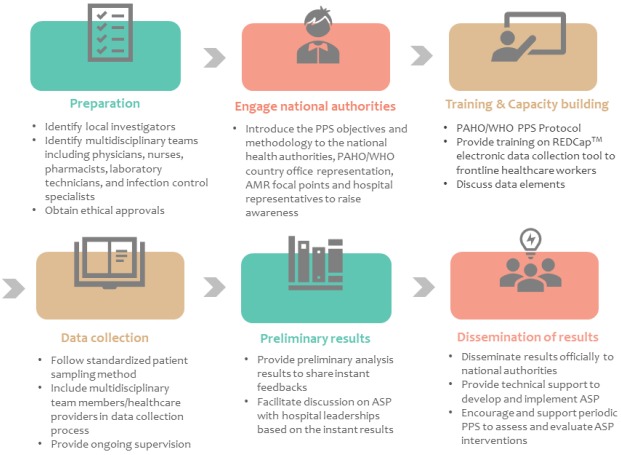


Fig 3. PAHO/WHO Point Prevalence Survey Methodology



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2035. Clinical and Economic Outcomes in Patients with Complicated Urinary Tract Infection (cUTI) and Complicated Intra-Abdominal Infection (cIAI) in Perú: Impact of Gram-Negative Organisms (GNO) Resistant to Antibiotics

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Background. Delays in appropriate therapy of infections affect clinical outcomes. The aim of this study was to compare the clinical and economic outcomes of patients with cUTI and cIAI due to cephalosporin- and carbapenem-resistant GNOs to similar infections caused by nonresistant GNOs.

Methods. A retrospective cohort study of patients admitted to two tertiary care hospitals in Lima-Callao, Peru between January and December 2017. Patients with resistant strains were compared with those with nonresistant strains for the failure of initial antibiotic regimen (defined as worsened clinical status, change of initial antibiotic treatment, or in-hospital mortality), median length of stay (LOS), hospitalization ward cost and total hospitalization cost.

Results. A sample of 500 consecutive culture-positive patients were included: 429 (86%) with cUTI and 71 (14%) with cIAI (table).

Conclusion. cUTI caused by GNOs resistant to cephalosporins or carbapenems are associated with an incremental clinical and economic burden. The proportion of inappropriate therapy in patients with resistant infections is high. The cost of care for carbapenem-resistant cUTI was highest. The appropriate initial antibiotic choice may minimize the impact of GNO resistance on outcomes of patients with cIAI and cUTI.

	cUTI N=429						cIAI N=71					
	Cephalosporin resistance N=363	Cephalosporin non-resistance N=16	P value	Carbapenem resistance N=19	Carbapenem non-resistance N=16	P value	Cephalosporin resistance N=56	Cephalosporin non-resistance N=4	P value	Carbapenem resistance N=9	Carbapenem non-resistance N=4	P value
Failure of initial antibiotic regimen (%)	68	0	***0.001***	74	0	***0.001***	86	75	0.5	100	75	0.1
Median LOS (days)	41	19	0.2	55	19	0.08	39	41	0.9	68	41	0.6
Median Hospitalization ward cost USD $	133.4	119.5	***0.001***	125.2	119.5	0.1	122.2	119.5	0.5	119.5	119.5	ND**
Median total hospitalization cost USD $	25839	3072	0.3	26575	3072	***0.006***	16416	13408	0.9	17084	13408	0.7
** Not determinable												

Disclosures. **All authors:** No reported disclosures.

2036. A Quasi-Experimental Survey Study of Antimicrobial Stewardship Education for Registered Nurses

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Background. Antimicrobial stewardship (AS) efforts have led to improved patient outcomes, reduction in unnecessary costs, and decrease in antimicrobial resistance (AR). Loyola University Medical Center (LUMC) is a quaternary care-system that has a comprehensive multidisciplinary Antimicrobial Stewardship Program (ASP). Registered nurses (RNs) have been shown to be a vital part of ASP; however their role and engagement in ASP should continue to be investigated and explored.

Methods. In February 2018, a voluntary online survey was created and disseminated to all RNs at LUMC to evaluate their baseline knowledge and perception of AS and AR, as well as to further investigate their role in AS at LUMC. Based on the results of the survey, our AS team implemented a multi-faceted education program. This included a series of lectures which were emailed to all RNs, as well as live education sessions by the AS team during nursing huddles. In March 2019, a second survey was distributed to all nurses with the primary goal of evaluating changes in the knowledge and perception of AS and AR after targeted education efforts. The secondary goal was to gather feedback to target further efforts of engaging RNs in AS.

Results. A total of 179 RNs completed the first survey and 117 completed the second survey. In both surveys, over 90% of RNs agree that they play an important role in AS, and that AS can decrease AR and adverse effects of antimicrobials. The majority in both surveys also agreed that AR can be caused by misuse/overuse of antimicrobials and this can be harmful to patients. Unfamiliarity with AS practices among RNs remains an issue, however this increased from 70% strongly agree/agree in the first survey to 74% in the second survey. Sixty-nine percent of RNs recalled reading the PowerPoint education slides, while only 38% recalled being educated in person by the AS team. A similar number of RNs (58% and 60%, respectively) prefer to be educated in person vs. through email.