Table 1.

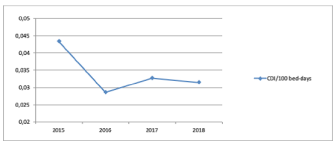
Variables	Non-Transplant (N=379)	Transplant (N=93)	P value*
Demographics			
Age in Years (Mean, SD)	54, 14	54, 14	0.1002
Male (%)	185, 49.3%	51, 54.8%	0.3418
Race:			
White	210, 56%	70, 75.3%	0.0068
Black	121, 32.3%	19, 20.4%	
Asian	8, 2.13%	1, 1.1%	
Other	36, 9.6%	3, 3.2%	
Candida Score (Mean, SD)	1.14, 1.05	0.98, 0.99	0.1736
Candidemia Risk High	38, 10%	4, 4.3%	0.0623
ICU	331, 88%	47, 52.2%	< 0001
Clinical characteristics			
Co-morbidities:			
Renal Failure	214, 56.5%	63, 67.7%	0.0478
HIV	8, 2.13%	3, 3.23%	0.2894
Malignancy on chemotherapy	42, 11.2%	26, 28%	< 0001
Antibiotics ≥48hrs preceding test	367, 97.87%	90, 96.77%	0.4632
Fever/Hypothermia (Tmax >38 or <36 °C)	157, 41.87%	33, 35.48%	0.2619
Neutropenia (ANC < 1000 cells/cc)	22, 5.9%	15, 16.1%	0.001
Severe Sepsis†	85, 22.7%	19, 20.4%	0.6424
Vasopressor Required	103, 27.5%	15, 16.1%	0.0242
Ventilator Required	264, 69.7%	28, 30.1%	< 0001
Presence of CVC	185, 49.6%	33, 35%	0.0146
Presence of prosthesis or ICD	22, 5.8%	7, 7.5%	0.5354
TPN	90, 24%	18, 19.8%	0.3921
Tube Feeding	193, 51.5%	28, 30.8%	0.0004
Surgery	173, 46.1%	36, 38.5%	0.1868
Abdominal Infection	30, 8%	0, 0%	0.0053
GI perforation	32, 8.5%	3, 3.3%	0.0891
Abscess	17 4.55%	1 1.08%	0.1429
ID consult	258, 67.55%	71, 76.34%	0.0904
Outcomes			
Antifungal started	202, 53.3%	62, 66.67%	0.0200
Antifungal discontinuation after negative T2	199, 62.51%	60, 64.52%	0.0370
In-patient Mortality	128, 34%	13, 14%	0.0002
30-Day Mortality	28, 7.5%	7, 7.5%	0.979

*p<0.05 significant
†Severe sepsis: at least 2/4 SIRS criteria with multi-organ dysfunction or vasopressor support

Table 3. Antibiotic consumption per year (from 2015 to 2018) measured in DDD/100 bed-days in the districts involved in the ASP and difference (expressed in %, Δ %) between pre-ASP and post-ASP.

	2015	2016	2017	2018	Δ % 2015-2018		2015	2016	2017	2018	Δ % 2015-2018
Spedali Civili General Hospital (units involved in the ASP)						Osteoarticular					
piperacillin/tazobactam	5.55	7.04	7.90	8.46	53%	piperacillin/tazobactam	1.15	1.06	1.93	2.25	96%
3-4 G cephalosporins	11.70	12.66	10.90	11.42	-3%	3-4 G cephalosporins	7.50	7.20	3.03	4.12	-46%
carbapenemes	5.77	6.24	5.51	4.87	-16%	carbapenemes	0.50	1.28	1.54	3.82	218%
fluoroquinolones	14.45	13.57	11.01	9.84	-32%	fluoroquinolones	13.15	13.62	10.27	9.62	-27%
glycopeptides	6.07	3.95	3.71	3.83	-6%	glycopeptides	5.52	9.92	10.16	7.72	40%
Cardiothoracic						Onchematological					
piperacillin/tazobactam	4.20	4.92	4.90	6.50	55%	piperacillin/tazobactam	3.31	3.95	3.94	6.99	111%
3-4 G cephalosporins	5.75	6.72	6.62	7.31	27%	3-4 G cephalosporins	21.16	30.16	15.77	17.56	-17%
carbapenemes	2.40	2.42	2.23	2.17	-10%	carbapenemes	10.02	12.10	8.19	9.51	-5%
fluoroquinolones	10.18	8.60	8.01	7.60	-25%	fluoroquinolones	24.98	23.69	21.52	25.53	-7%
glycopeptides	3.56	2.69	3.02	2.75	-10%	glycopeptides	8.37	8.59	7.48	11.65	39%
Cervicospinal						Internal Medicine					
piperacillin/tazobactam	1.69	1.57	1.77	2.53	50%	piperacillin/tazobactam	8.07	10.60	11.37	13.31	65%
3-4 G cephalosporins	6.20	7.51	7.02	6.91	11%	3-4 G cephalosporins	15.47	16.56	15.59	17.01	10%
carbapenemes	3.12	3.69	2.56	2.29	-27%	carbapenemes	7.60	7.86	7.16	6.71	-12
fluoroquinolones	10.30	11.55	10.51	9.06	-4%	fluoroquinolones	16.98	16.22	14.20	14.98	-12%
glycopeptides	2.02	2.60	1.76	2.41	-15%	glycopeptides	3.53	3.10	3.20	3.44	-3%
Abdominopelvic						Intensive Care					
piperacillin/tazobactam	4.51	6.32	8.30	7.42	64%	piperacillin/tazobactam	16.72	16.25	16.87	21.53	68%
3-4 G cephalosporins	9.52	8.56	7.00	6.20	-35%	3-4 G cephalosporins	21.45	27.29	24.54	15.94	-26%
carbapenemes	2.08	2.76	2.62	2.13	-26%	carbapenemes	14.69	26.01	24.63	17.56	20%
fluoroquinolones	11.83	9.60	7.06	7.77	-34%	fluoroquinolones	16.07	13.11	13.72	16.90	5%
glycopeptides	2.02	1.72	1.40	1.47	-27%	glycopeptides	13.91	12.36	9.51	12.23	-10%

Figure 1. *Clostridium difficile* infection rates per year (from 2015 to 2018) measured in cases/100 bed-days.



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

2026. A Current Status of Antimicrobial Stewardship Programs in Korean Large Hospitals: A Nationwide Survey in 2018

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Background. The aim of this study was to examine the current status of antimicrobial stewardship program (ASP) in large hospitals in South Korea, identifying problems and hurdles for implementation of proper ASP, and providing a reference for the proposal of ASP policies.

Methods. The questionnaire was designed based on the "Seven Core Elements of Hospital Antibiotic Stewardship Programs" from Centers for Diseases Control and Prevention of the U.S. and modified from the questionnaire of the previous survey on ASP in Korea, 2015. The survey targeted all the hospitals with 500 beds or more in South Korea in 2018. The online-based survey using SurveyMonkey® platform was conducted for 3 weeks from June to July 2018. Only one ASP-associated physician per hospital participated in the survey.

Results. The response rate to the survey was 88.4% (84/95). The median number of medical personnel participating in ASP was 4 [interquartile range (IQR) 2.25–5], most of which were infectious diseases specialists (median 2, IQR 1–2). Besides, some pediatric infectious diseases specialists, pharmacists, etc. were participating in the ASPs. Only 6.0% (5/84) of hospitals had full-time workers for ASP. Restrictive measures for designated antibiotics was a widely accepted ASP strategy among Korean hospitals (88.1%, 74/84) and the median number of designated antibiotic classes was 16 (IQR 11–19). An 11.9% (10/84) of hospitals introduced monitoring and intervention program against inappropriate antibiotic combination therapy. The proportion of hospitals which had interventions for inappropriate long-term antibiotic use and parenteral to oral conversion strategy were 9.5% (8/84) and 1.2% (1/84), respectively. Lack of time, personnel, and appropriate reward were perceived as the major barriers to establishing ASP in Korean hospitals.

Conclusion. ASP in Korean hospitals were mainly carried out by 1–2 infectious diseases specialists and it heavily depended on restrictive measures for designated antibiotics. Supporting manpower and establishment of the appropriate reward system is necessary for improvement of ASP in Korean hospitals.

Table 1. Characteristics and resources of study hospitals

	Total (n=84)
Hospital information	
No. of inpatient beds (%)	
500 – 999	68 (81.0)
≥ 1,000	16 (19.0)
Hospital types (%)	
University-affiliated hospital	63 (75.0)
Other teaching hospital	16 (19.0)
Non-teaching hospital	5(6.0)
No. of ICU* beds (%)	
<20	7 (8.3)
20-29	18 (21.4)
≥30	59 (70.2)
Human resources	
No. of infectious diseases specialists (%)	
0	10 (11.9)
1	21 (25.0)
2	31 (36.9)
3	13 (15.5)
≥4	9 (10.7)
No. of medical personnel participating in ASP, median (IQR)	
Infectious disease specialists	2 (1-2)
Pediatric infectious disease specialists	0 (0-0)
Pharmacists	0 (0-0)
Laboratory microbiology specialists	0 (0-0)
Other specialists	0 (0-0)
Clinical fellows	0 (0-1)
Residents	0 (0-0)
Nurses	0 (0-0)
Presence of full-time worker for ASP (%)	5 (6.0)
The leader of ASP (%)	
Infectious disease specialists	69 (82.)
Pediatric infectious disease specialists	2 (2.4)
Other specialists	13 (15.5)
Presence of antimicrobial management committee (%)	63 (75.0)
Reward for operating ASP from the administration (%)	18 (21.4)

Abbreviations: ASP, antimicrobial stewardship programs; ICU, intensive care units; IQR, interquartile range

* It includes medical ICU, surgical ICU, medical-surgical ICU, and neurosurgery ICU

Table 2. Strategies of antimicrobial stewardship programs

A. Tracking and reporting

	Total (n=84)	Hospital with IDS (n=74)	Hospital without IDS (n=10)	*P*[a]
Monitoring for antibiotic consumption, quantitative evaluation (%)				
Regular monitoring	42 (50.0)	40 (54.1)	2 (20.0)	0.088
Irregular monitoring	11 (13.1)	9 (12.2)	2 (20.0)	0.613
Monitoring level for antibiotic consumption (%)				
Antibiotic ingredient name	40 (47.6)	36 (48.6)	4 (40.0)	0.741
Antibiotic brand name	17 (20.2)	16 (21.6)	1 (10.0)	0.679
Data collection for antibiotic consumption (%)				
With computerized program	23 (27.4)	22 (29.7)	1 (10.0)	0.272
Request to hospital data processing department	25 (29.8)	23 (31.1)	2 (20.0)	0.716
Regular report of antibiotic consumption (%)	35 (41.7)	**35 (47.3)**	**0 (0)**	**0.004**
Target audience of regular report of antibiotic consumption (%)				
Hospital administration	17 (20.2)	17 (23.0)	0 (0)	0.201
High prescribers of antibiotics	13 (15.5)	13 (17.6)	0 (0)	0.349
Whole hospital staffs	6 (7.1)	6 (8.1)	0 (0)	1.000
No existence of regular report	49 (58.3)	**39 (52.7)**	**10 (100)**	**0.004**
Monitoring for compliance with guideline of antibiotic use (%)	15 (17.9)	14 (18.9)	1 (10.0)	0.682
Monitoring for compliance with use of antibiotic recommended by IDS (%)	21 (25.0)	21 (28.4)	0 (0)	0.060
Monitoring for *C. difficile* infection rate (%)	57 (67.9)	52 (70.3)	5 (50.0)	0.279
Monitoring for adverse event by antibiotic use (%)	57 (67.9)	**68 (91.9)**	**5 (50.0)**	**0.003**

Abbreviations: IDS, infectious diseases specialist

[a] comparison between hospital with IDS and hospital without IDS

B. Action

	Total (n=84)	Hospital with IDS (n=74)	Hospital without IDS (n=10)	*P*[b]
Restrictive measures for designated antibiotics (%)	74 (88.1)	**68 (91.9)**	**6 (60.0)**	**0.016**
Prospective audit and feedback (%)				
For patients using specific antibiotics	41 (48.8)	39 (52.7)	2 (20.0)	0.089
For patients having specific diseases	4 (4.8)	4 (5.4)	0 (0.0)	1.000
For patients in specific departments or wards	10 (11.9)	10 (13.5)	0 (0.0)	0.600
Frequency of prospective audit and feedback (%)				
Everyday	16 (19.0)	15 (20.3)	1 (10.0)	0.679
Every 2-21 days	10 (11.9)	10 (13.5)	0 (0)	0.600
Irregular	18 (21.4)	17 (23.0)	1 (10.0)	0.682
Monitoring and intervention on antibiotic use (%)				
Inappropriate antibiotic combination therapy	10 (11.9)	9 (12.2)	1 (10.0)	1.000
Inappropriate long-term antibiotic use	8 (9.5)	7 (9.5)	1 (10.0)	1.000
Inappropriate perioperative antibiotic use	36 (42.9)	34 (45.9)	2 (20.0)	0.177
Inappropriate antibiotic administration	8 (9.5)	8 (10.8)	0 (0)	0.587
Inappropriate antibiotic dosage	17 (20.2)	17 (23.0)	0 (0)	0.201
High-risk antibiotics for *C. difficile* infection[a]	5 (4.8)	0 (0)	4 (5.4)	1.000
Automatic stop order (%)	13 (15.5)	12 (16.2)	1 (10.0)	1.000
Formulary restriction (%)	13 (15.5)	12 (16.2)	1 (10.0)	1.000
Automated intervention system linked with antimicrobial susceptibility results (%)	10 (11.9)	9 (12.2)	1 (10.0)	1.000
Computerized clinical decision support program (%)	35 (41.7)	**34 (45.9)**	**1 (10.0)**	**0.040**
Intravenous to oral conversion strategy (%)	1 (1.2)	1 (1.4)	0 (0)	1.000
Antibiotic rotation/cycling (%)	0 (0)	0 (0)	0 (0)	-

Abbreviations: IDS, infectious diseases specialist

[a] it depends on policies of each hospital

[b] comparison between hospital with IDS and hospital without IDS

C. Education

	Total (n=96)	Hospital with IDS (n=74)	Hospital without IDS (n=10)	P^a
Documented guidelines for antibiotic use (%)				
For community-acquired infectious diseases	11 (13.1)	11 (14.9)	0 (0)	0.345
For surgical prophylactic antibiotics	36 (42.9)	**35 (47.3)**	**1 (10.0)**	**0.038**
For designated antibiotics included in restrictive measures	25 (29.8)	23 (31.1)	2 (20.0)	0.716
Guidelines for antibiotics use reflect antimicrobial susceptibility results in the hospital (%)	11 (13.1)	11 (14.9)	0 (0)	0.345
Education programs about proper antibiotic use (%)	65 (77.4)	**62 (83.8)**	**3 (30.0)**	**0.001**
For physicians, specialists	34 (40.5)	**33 (44.6)**	**1 (10.0)**	**0.044**
For physicians, internship or residents	58 (69.0)	**56 (75.7)**	**2 (20.0)**	**0.001**
For other medical staffs	23 (27.4)	22 (29.7)	1 (10.0)	0.272
For patients and caretaker		0 (0)	0 (0)	
Requester of education programs about proper antibiotic use (%)				
Hospital administration	2 (2.4)	1 (1.4)	1 (10.0)	0.225
Medical departments in need	38 (45.2)	36 (48.6)	2 (20.0)	0.104
Carrying out voluntarily by medical staffs conducting ASPs	33 (39.3)	**33 (44.6)**	**0 (0)**	**0.005**
Issuing newsletters about antimicrobial stewardship (%)	1 (1.2)	1 (1.4)	0 (0)	1.000

Abbreviations: IDS, infectious diseases specialist; ASP, antimicrobial stewardship programs

[a] comparison between hospital with IDS and hospital without IDS

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

2027. What Are the Views Among Pakistani Physicians Toward Antimicrobial Resistance and Hospital Antimicrobial Stewardship Programs? A Multi-Site Qualitative Study

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Background. Antimicrobial resistance (AMR) is a major public health issue that the world is facing in the 21st century and implementation of antimicrobial stewardship program (ASP) is one of the recognized approaches to combat AMR. Little is known on the views among Pakistani physicians regarding AMR and the benefits of hospital ASP implementation. This study was aimed to investigate the perception and attitude of physicians about AMR and ASP.

Methods. Qualitative face-to-face and telephonic interviews were conducted by using purposive sampling method with 22 physicians working in seven tertiary care public hospitals of Punjab, Pakistan. All interviews were audio-recorded and transcribed verbatim. Qualitative software was used, and a thematic analysis conducted.

Results. Three major themes were identified: (1) the growing concern of AMR in Pakistan, (2) the role(s) of healthcare professionals in antibiotic prescribing and infection control, and (3) managing antibiotic resistance in hospitals. Poor healthcare facilities, insufficient trained medical staff, and inadequate resources were the key barriers in the implementation of ASP in Pakistan.

Conclusion. Physicians of public sector tertiary care teaching hospitals have shown poor familiarity toward hospital ASPs but the concept of hospital ASPs in Pakistan can be established by using the distinct themes that originated during this study. Overall, the attitude of physicians was positive toward its enforcement in all types of hospital settings including teaching hospitals.

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

2028. A Survey of Antimicrobial Availability, Training, and Antimicrobial Recommendations by Staff in Pharmacies and Non-pharmacy Stores in the Dominican Republic

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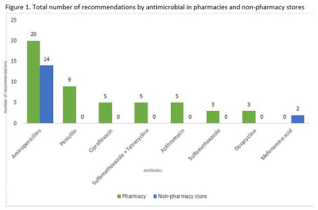
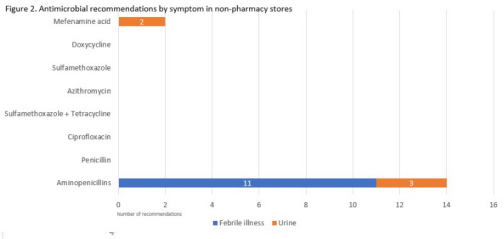
Background. Antimicrobial resistance (AMR) is a rising global health challenge. Antimicrobial use (AU) is a key factor in the development of AMR, but knowledge gaps remain on AU and dispensation in low- and middle-income countries (LMICs). AU can be purchased without prescriptions in many LMICs and are available in pharmacies and non-pharmacy stores. We seek to describe the availability, training and AU recommendations in pharmacies and non-pharmacy stores in the Dominican Republic (DR).

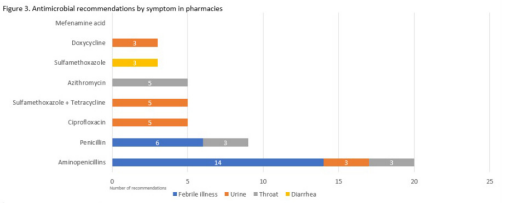
Methods. We conducted a survey of pharmacies and non-pharmacy stores that dispense antimicrobials from March to April 2019 in randomly selected locations throughout metropolitan Santo Domingo. Data on the availability of antimicrobials and training on AU was obtained. Antimicrobial of choice for common symptoms such as dysuria, throat pain, diarrhea, fever, and cough were queried, and data tabulated. Availability of antimicrobials by phone and online delivery was assessed.

Results. A total of 35 stores were surveyed. Ten pharmacies and 15 nonpharmacy stores agreed to participate. Ten refused and were excluded. Fifty AU recommendations were given in pharmacies and 16 in non-pharmacy stores. The most common type of antimicrobial recommended were aminopenicillins (Figure 1). Staff received prior training on antimicrobials in 70% of pharmacies and 0% of non-pharmacy stores. Antimicrobial recommendations by symptom in pharmacies and non-pharmacy stores are seen in Figure 2 and 3. Antimicrobials are available for phone delivery in 100% of pharmacies and 90% of non-pharmacy stores. No antimicrobials were available via online delivery apps.

Conclusion. Antimicrobials are widely available in the DR without prescriptions and can be purchased in person or via phone delivery. Aminopenicillins are commonly prescribed and may contribute to high rates of ESBL in the DR. Pharmacy staff gave more specific symptom-based recommendations than non-pharmacy staff and commonly had prior training on antibiotic use. In LMICs with easy access to antimicrobials, frontline staff in pharmacies and non-pharmacy stores are gatekeepers for AU and may benefit from further education and training. Further studies on attitudes and perceptions related to antimicrobial use in the community are needed.







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

2029. Prevalence of Antibiotic Use and Administration among Hospitalized Adult Patients at a Tertiary Care Hospital in Kilimanjaro, Tanzania

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Background. Antimicrobial stewardship programs (ASPs) have been shown to improve the appropriate use of antimicrobials, especially in high-income countries. However, ASPs are relatively less well implemented in low-or-middle income countries. To improve the effectiveness of ASPs in these settings, it is important to determine the core actions and targets for improving antimicrobial use. We sought to describe the prevalence and patterns of antibiotic use at a tertiary care hospital in Tanzania.

Methods. Consecutive patients admitted to an adult medical ward at a tertiary care hospital, Kilimanjaro Christian Medical Centre, in Moshi, Tanzania were enrolled from June 2018 to March 2019. The medical record was reviewed for data regarding the type of antibiotics prescribed, indications for use, and microbiologic testing ordered.

Results. A total of 1103 patients were enrolled during the study period. The majority of patients were males (663, 60.1%), with the median age being 54 years (IQR 39–70). About one-third (390, 35.4%) of the admitted patients received antimicrobials during hospitalization, with pneumonia being the leading indication for antimicrobial use (158, 40.5%). The most commonly used antibiotics included ceftriaxone in 285 (73.1%), metronidazole in 155 (39.7%), and amoxicillin/ ampicillin in 46 (11.8%) patients. The median duration of antimicrobial use was 5 days (IQR 3–7). Few patients on antimicrobials (27, 6.9%) had culture results, of which half (15, 55.6%) were positive for an organism and a minority (8, 29.6%) were susceptible to the antibiotics being used. Overall, mortality in the cohort was 22.7% and the median duration of hospitalization was 5 days (IQR 3–8).

Conclusion. Antibiotics were used in a substantial proportion of admitted patients. However, in most cases, treatment was empirical with limited use of culture results. Future ASP efforts can target the improved use of microbiologic cultures to target antimicrobial use.

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