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Antimicrobial Usage (AMU) Surveillance in Public Hospitals and Clinics - Hospital Authority Antimicrobial Dispensing Data (2019)

May 2021

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Department of Health

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Background

Background

- The Hong Kong Strategy and Action Plan on Antimicrobial Resistance 2017-2022 was issued in July 2017
- Activity 3.2.1 suggests collecting antimicrobial dispensing data from Hospital Authority (HA) and monitoring antimicrobial usage in public hospitals and clinics
- This presentation briefly accounts the surveillance findings for year 2019

Methodology

Scope of Data

- Antimicrobials dispensing records from the following HA services during 2016 to 2019 were included:
  - Non-inpatient service
    - Primary Care (GOPC)
    - Specialist Out-patient (Clinical)
    - Accident and Emergency (A&E)
  - Inpatient service
    - Medicine
    - Surgery
    - Orthopaedics and Traumatology (O&T)
    - Intensive Care Unit/ High Dependency Unit (ICU/ HDU)
    - Others

Definitions

- Surveillance period is defined by calendar year
- Anatomical Therapeutic Chemical (ATC) classification
  - This system is developed by WHO
  - It divides drugs into different groups according to the organ or system on which they act and their therapeutic, pharmacological and chemical properties
- Defined Daily Dose (DDD)
  - A standardised unit adopted by WHO to facilitate comparison of drug usage
  - Defined as “the assumed average maintenance dose per day for a drug used for its main indication in adults”
  - Each antimicrobial was assigned a DDD constant per route of administration
  - DDD constants are updated by WHO annually
  - As the year 2019 version of ATC/DDD was adopted in this report, the DDD figures of previous years have been re-calculated which would be different from the figures presented in the past reports
    - For example, DDD constant for oral use of amoxicillin was changed from 1000mg in 2018 to 1500mg in 2019

Antimicrobials Monitored

- Antimicrobials fall under the following WHO ATC classification (2019) were monitored:
  - J01 – Antibacterials for systemic use
  - P01AB – Nitroimidazole derivatives, agents against amoebiasis and other protozoal diseases
  - A07AA – Antibiotics, intestinal antiinfectives
- Antimicrobials administered by the following routes were included as recommended by WHO
  - Oral
  - Parenteral
  - Rectal
  - Inhalation
- Preparations for topical use were excluded

Broad-spectrum Antimicrobials (Big Guns)

The following 15 broad-spectrum antimicrobials identified by experts in HA were examined because of their importance on treating resistant infections:

- Piperacillin/tazobactam
- Ceftazidime
- Cefoperazone/sulbactam
- Cefepime
- Ceftaroline fosamil
- Ceftolozane/tazobactam
- Ceftazidime/avibactam
- Meropenem
- Ertapenem
- Imipenem/cilastatin
- Vancomycin
- Linezolid
- Daptomycin
- Colistin
- Teicoplanin

Measurement

- The following units* were used:

Unit of Measurement	Dispensing Quantity in HA
DDD	non-inpatient + inpatient service
DDD per 1,000 attendances	non-inpatient service
DDD per 1,000 patient-days	inpatient service

- The following measurements were calculated:
  - Overall dispensing quantity from 2016 to 2019
  - The five most dispensed antimicrobial groups (ATC) in 2019
  - The ten most dispensed antimicrobials in 2019
  - Dispensing quantity of broad-spectrum antimicrobials from 2016 to 2019

*The ATC/DDD Index (2019) published by the WHO Collaborating Centre for Drug Statistics Methodology were adopted

Statistical Method

- Year 2016 was chosen as the baseline for comparison as the Hong Kong Strategy and Action Plan on Antimicrobial Resistance 2017-2022 was issued in mid-2017 and such decision was endorsed by the High Level Steering Committee (HLSC)
- Following ECDC, we used compound annual growth rate (CAGR) to illustrate average annual rate of change when comparing antimicrobials dispensed in 2019 with that in 2016.

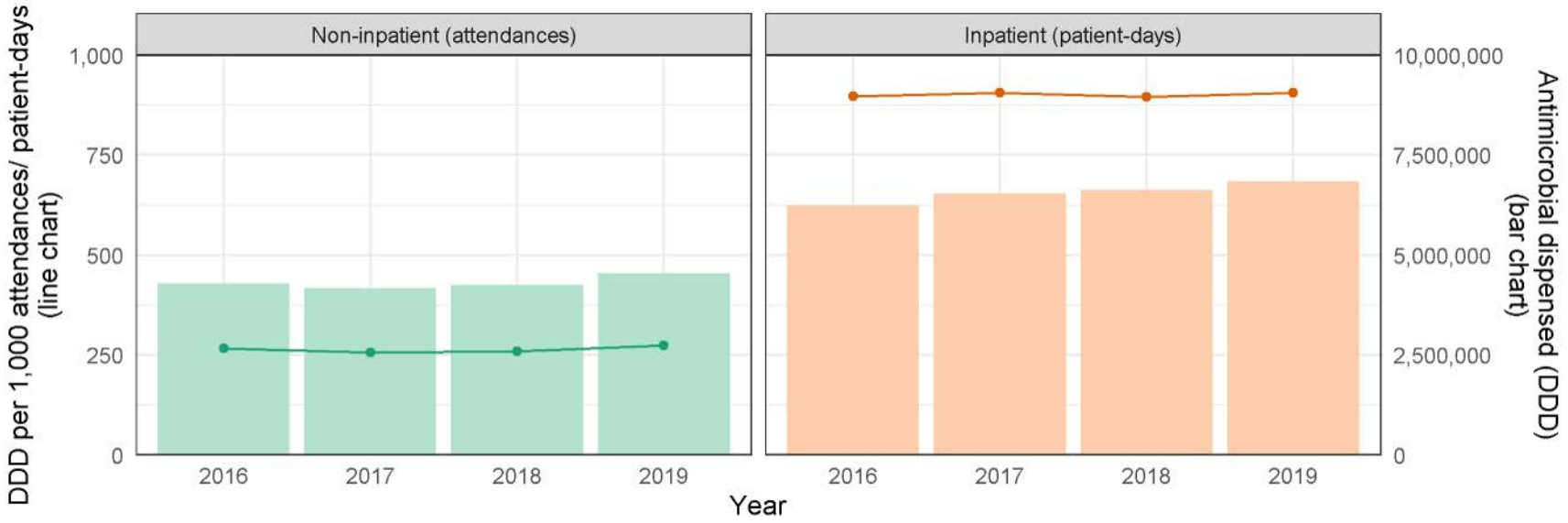
$$\text{CAGR}=(SU_{2019}/SU_{2016})^{(1/3)}-1$$

- In this equation, SU_{2019} is the total amount of antimicrobials dispensed in year 2019, SU_{2016} is the total amount of antimicrobials dispensed for year 2016

Results

1. Total antimicrobials dispensed in public hospitals and clinics by service type

Total Antimicrobials Dispensed in Public Hospitals and Clinics by Service Type



Year	Non-inpatient Service	Inpatient Service
	DDD per 1,000 attendances*	DDD per 1,000 patient-days*
2016	266.27	896.40
2017	256.16	905.35
2018	259.05	895.87
2019	274.41	906.10

*Rounded to two decimal places

- Total antimicrobials dispensed showed increases for both non-inpatient service (8.14 DDD/ 1,000 attendances; CAGR: 1.01%) and inpatient service (9.70 DDD/ 1,000 patient-days; CAGR: 0.36%) in 2019 compared with that of 2016

Five Most Dispensed Antimicrobial Groups in Public Hospitals and Clinics

ATC Pharmacological Subgroup		Antimicrobial dispensed in DDD				Compound annual growth rate (16 to 19)†
Code	Description	Year 2016*	Year 2017*	Year 2018*	Year 2019*	
J01C	Beta-lactam Antibacterials, Penicillins	6,128,000	6,223,000	6,236,000	6,451,000	1.72%
J01A	Tetracyclines	643,000	747,000	873,000	1,060,000	18.11%
J01M	Quinolone Antibacterials	1,006,000	1,022,000	1,040,000	1,019,000	0.42%
J01F	Macrolides, Lincosamides and Streptogramins	955,000	933,000	882,000	934,000	-0.72%
J01D	Other Beta-lactam Antibacterials	856,000	814,000	840,000	858,000	0.10%
	Others	942,000	965,000	1,000,000	1,062,000	4.08%
	Total	10,531,000	10,704,000	10,873,000	11,385,000	2.63%

Note:
The five most dispensed antimicrobial groups were identified from year 2019 data

*Rounded to nearest thousand

†Rounded to two decimal places; due to rounding, percentages may not precisely reflect the absolute figures

- The five most dispensed antimicrobial groups contain antimicrobials commonly prescribed as empirical treatment for suspected bacterial infections
- In 2019, tetracyclines group was the one with the most obvious increase (CAGR: 18.11%)

Ten Most Dispensed Antimicrobials in Public Hospitals and Clinics

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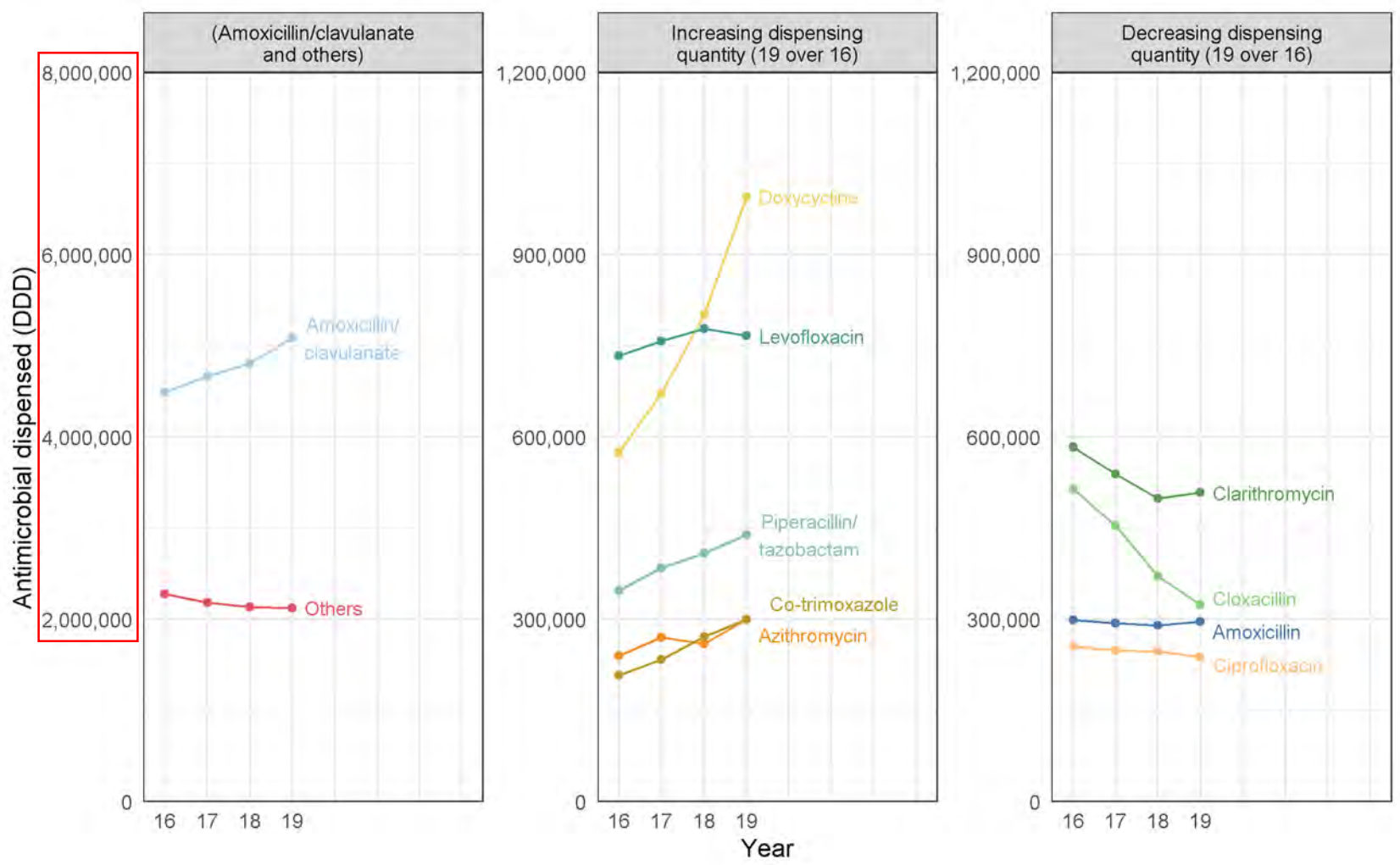

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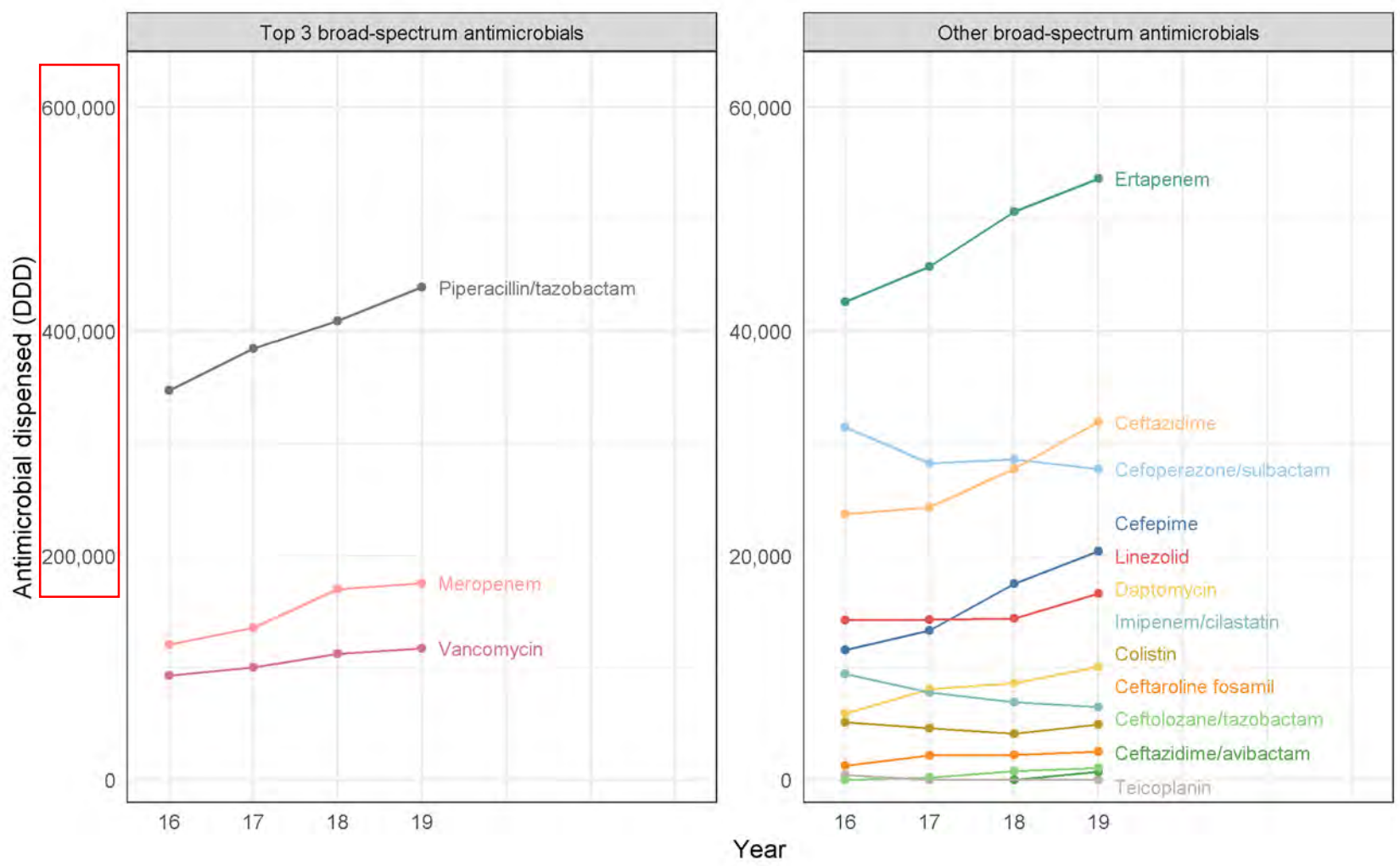
Ten Most Dispensed Antimicrobials in Public Hospitals and Clinics

ATC Chemical Substance		Antimicrobial dispensed in DDD				Compound annual growth rate (16 to 19)†
Code	Description	Year 2016*	Year 2017*	Year 2018*	Year 2019*	
J01CR02	Amoxicillin/clavulanate	4,493,000	4,664,000	4,807,000	5,087,000	4.23%
J01AA02	Doxycycline	575,000	671,000	801,000	996,000	20.10%
J01MA12	Levofloxacin	734,000	758,000	779,000	767,000	1.48%
J01FA09	Clarithromycin	583,000	540,000	500,000	509,000	-4.42%
J01CR05	Piperacillin/tazobactam	347,000	385,000	409,000	439,000	8.15%
J01CF02	Cloxacillin	515,000	455,000	372,000	324,000	-14.27%
J01EE01	Co-trimoxazole	208,000	234,000	271,000	300,000	12.97%
J01FA10	Azithromycin	240,000	270,000	260,000	300,000	7.65%
J01CA04	Amoxicillin	299,000	294,000	290,000	297,000	-0.28%
J01MA02	Ciprofloxacin	256,000	249,000	247,000	238,000	-2.34%
	Others	2,280,000	2,184,000	2,136,000	2,127,000	-2.29%
	Total	10,531,000	10,704,000	10,873,000	11,385,000	2.63%

Note:
The ten most dispensed antimicrobials were identified from year 2019 data
*Rounded to the nearest thousand
†Rounded to two decimal places. Due to rounding, percentages may not precisely reflect the absolute figures

- Amoxicillin/clavulanate was the most dispensed antimicrobial from 2016 to 2019
- Doxycycline showed the largest increase in dispensing quantity from 2016 to 2019 (CAGR: 20.10%), followed by co-trimoxazole (CAGR: 12.97%), piperacillin/tazobactam (CAGR: 8.15%), azithromycin (CAGR: 7.65%) and amoxicillin/clavulanate (CAGR: 4.23%)
- Cloxacillin showed the largest decrease in dispensing quantity from 2016 to 2019 (CAGR: -14.27%), followed by clarithromycin (CAGR: -4.42%)

Broad-spectrum Antimicrobials Dispensed in Public Hospitals and Clinics



Broad-spectrum Antimicrobials Dispensed in Public Hospitals and Clinics

	ATC Chemical Substance		Antimicrobial Dispensed in DDD				Compound annual growth rate (16 to 19)†
	Code	Description	Year 2016*	Year 2017*	Year 2018*	Year 2019*	
Beta-lactam Antibacterials, Penicillins	J01CR05	Piperacillin/tazobactam	347,000	385,000	409,000	439,000	8.15%
Other Beta-lactam Antibacterials (Cephalosporins)‡	J01DD02	Ceftazidime	24,000	24,000	28,000	32,000	10.41%
	J01DD62	Cefoperazone/sulbactam	31,000	28,000	29,000	28,000	-4.05%
	J01DE01	Cefepime	12,000	13,000	18,000	20,000	20.75%
	J01DI02	Ceftaroline fosamil	1,000	2,000	2,000	3,000	26.03%
	J01DI54	Ceftolozane/tazobactam	<500	<500	1,000	1,000	Not Applicable§
	J01DD52	Ceftazidime/avibactam	-	-	<500	1,000	-
Other Beta-lactam Antibacterials (Carbapenems)‡	J01DH02	Meropenem	121,000	136,000	170,000	176,000	13.24%
	J01DH03	Ertapenem	43,000	46,000	51,000	54,000	7.95%
	J01DH51	Imipenem/cilastatin	9,000	8,000	7,000	7,000	-11.71%
Other Antibacterials	J01XA01	Vancomycin	93,000	101,000	113,000	118,000	8.16%
	J01XX08	Linezolid	14,000	14,000	14,000	17,000	5.26%
	J01XX09	Daptomycin	6,000	8,000	9,000	10,000	19.39%
	J01XB01	Colistin	5,000	5,000	4,000	5,000	-1.01%
	J01XA02	Teicoplanin	<500	<500	<500	<500	-77.88%
		Total	708,000	770,000	854,000	910,000	8.73%

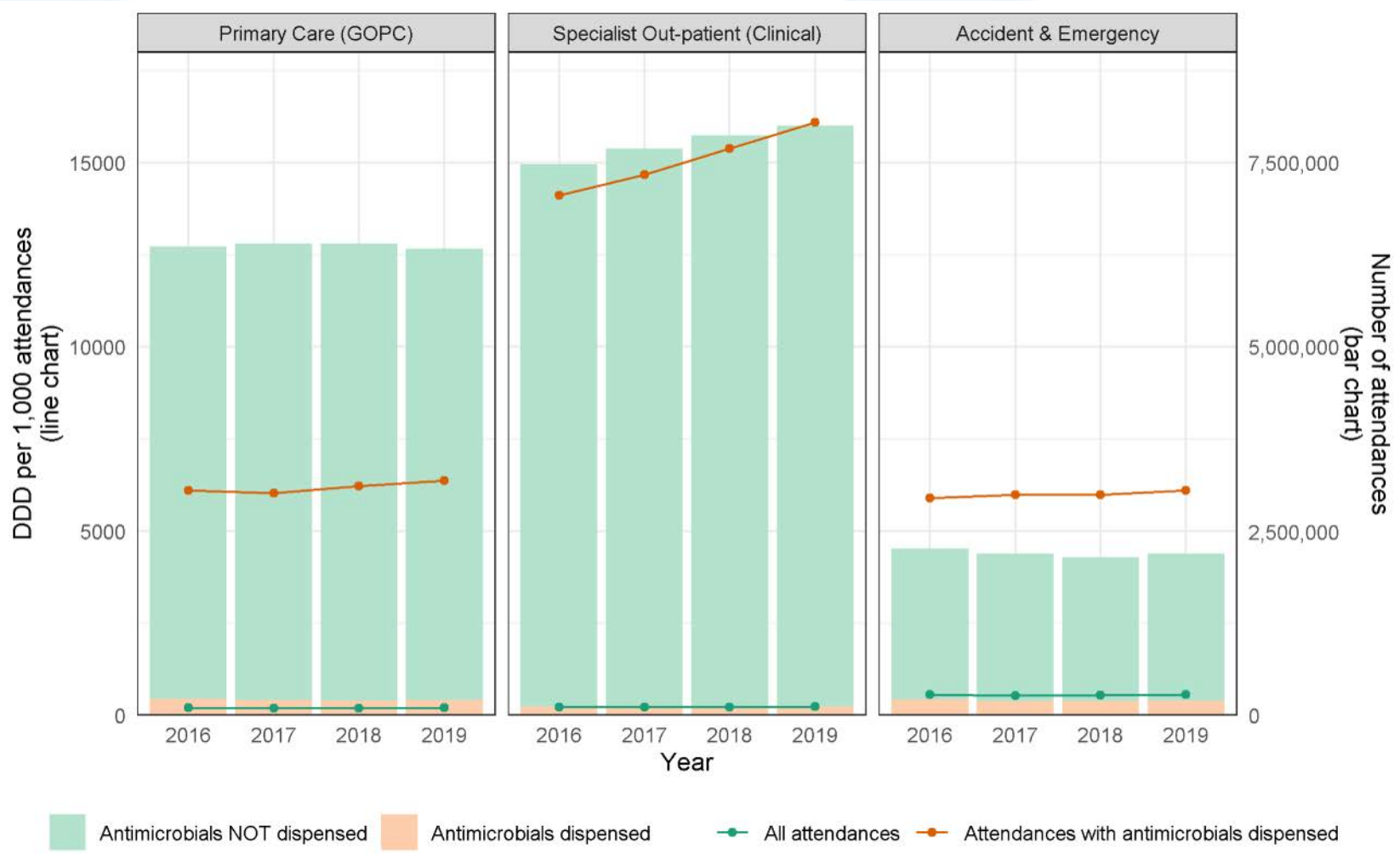
*Rounded to the nearest thousand
†Rounded to two decimal places
‡WHO ATC Pharmacological subgroup "Other Beta-lactam Antibacterials (J01D)" is further categorized into Cephalosporins and Carbapenems groups
§ Ceftolozane/ tazobactam was listed in the HA drug formulary since April 2019, it was supplied on named patient basis before enlistment

- The 15 broad-spectrum antimicrobials accounted for about 7.99% of total antimicrobials dispensed in HA in 2019
- From 2016 to 2019, dispensing quantity has shown an increase in CAGR of 8.73%
- Majority of broad-spectrum antimicrobials were dispensed in inpatient services
- The most dispensed broad-spectrum antimicrobial from 2016 to 2019 was piperacillin/tazobactam, contributed to 48.31% of all broad-spectrum antimicrobials dispensed in 2019, followed by meropenem and then vancomycin

Results

2. Antimicrobials dispensed in HA non-inpatient service by service

Total Antimicrobials Dispensed in HA Non-inpatient Service by Service



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Non-inpatient Service by Specialty

Year		Primary Care (GOPC)	Specialist Out-patient (Clinical)	Accident & Emergency	All Non-inpatient Services
2016	Percentage of attendance with antimicrobials dispensed‡§	3.48%	1.57%	9.57%	3.45%
	DDD per 1,000 attendances (all attendances)‡	212.76	221.72	564.30	266.27
	DDD per 1,000 attendances (attendances with antimicrobial dispensed)‡	6108.59	14116.11	5897.26	7720.07
2017	Percentage of attendance with antimicrobials dispensed‡§	3.33%	1.51%	9.03%	3.24%
	DDD per 1,000 attendances (all attendances)‡	200.68	221.27	540.03	256.16
	DDD per 1,000 attendances (attendances with antimicrobial dispensed)‡	6032.00	14673.67	5981.24	7914.66
2018	Percentage of attendance with antimicrobials dispensed‡§	3.21%	1.49%	9.13%	3.16%
	DDD per 1,000 attendances (all attendances)‡	199.31	229.10	547.12	259.05
	DDD per 1,000 attendances (attendances with antimicrobial dispensed)‡	6218.19	15388.93	5994.59	8207.22
2019	Percentage of attendance with antimicrobials dispensed‡§	3.26%	1.53%	9.31%	3.23%
	DDD per 1,000 attendances (all attendances)‡	207.26	246.90	568.23	274.41
	DDD per 1,000 attendances (attendances with antimicrobial dispensed)‡	6367.35	16090.61	6102.49	8503.40
Compound annual growth rate (16 to 19)	Percentage of attendance with antimicrobials dispensed‡§	-2.23%	-0.77%	-0.90%	-2.19%
	DDD per 1,000 attendances (all attendances)‡	-0.87%	3.65%	0.23%	1.01%
	DDD per 1,000 attendances (attendances with antimicrobial dispensed)‡	1.39%	4.46%	1.15%	3.27%

‡Rounded to two decimal places

§Due to rounding, figures may not precisely reflect the absolute figures

- Total antimicrobials dispensed in all HA non-inpatient service showed an increase in CAGR of 1.01% from 2016 to 2019 when all attendances were considered. However, if only considered those attendances with antimicrobial dispensed, CAGR reached 3.27%
- Overall 2.19% decrease in CAGR of attendance with antimicrobials dispensed was observed from 2016 to 2019 and decreases were observed among all non-inpatient services
- By service, Specialist Out-patient (Clinical) showed an increase in CAGR of 4.46% while Primary Care (GOPC) and Accident & Emergency showed increase of 1.39% and 1.15% respectively from 2016 to 2019 (only considered those attendances with antimicrobial dispensed)

Five Most Dispensed Antimicrobial Groups in Non-inpatient Service

ATC Pharmacological Subgroup		DDD per 1,000 attendances				Compound annual growth rate (16 to 19)*†
Code	Description	Year 2016*	Year 2017*	Year 2018*	Year 2019*	
J01C	Beta-lactam Antibacterials, Penicillins	151.73	144.14	144.56	151.39	-0.07%
J01F	Macrolides, Lincosamides and Streptogramins	36.63	35.00	33.95	36.20	-0.39%
J01A	Tetracyclines	22.36	23.23	26.15	30.09	10.41%
J01M	Quinolone Antibacterials	22.14	21.34	21.53	21.48	-1.01%
J01X	Other Antibacterials	12.56	11.85	11.17	11.63	-2.53%
	Others	20.86	20.60	21.70	23.62	4.22%
	Total	266.27	256.16	259.05	274.41	1.01%

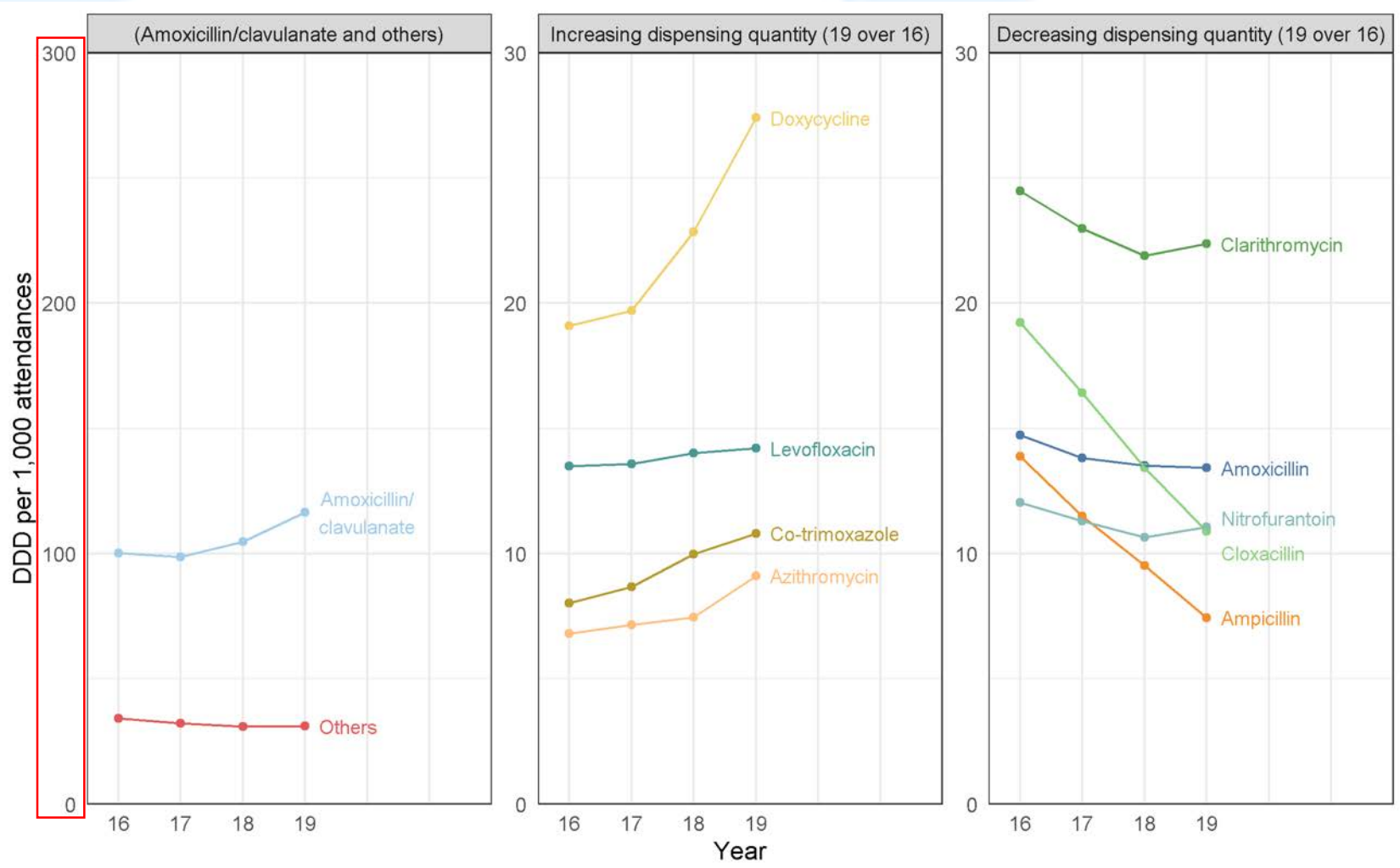
Note:
The five most dispensed antimicrobial groups were identified from year 2019 data

*Rounded to two decimal places

†Due to rounding, percentages may not precisely reflect the absolute figures

- Beta-lactam Antibacterials, Penicillins group was the most dispensed group from 2016 to 2019
- Tetracyclines group showed the largest increase in CAGR of 10.41% from 2016 to 2019

Ten Most Dispensed Antimicrobials in Non-inpatient Service



Ten Most Dispensed Antimicrobials in Non-inpatient Service

ATC Chemical Substance		DDD per 1,000 attendances				Compound annual growth rate (16 to 19)*†
Code	Description	Year 2016*	Year 2017*	Year 2018*	Year 2019*	
J01CR02	Amoxicillin/clavulanate	100.13	98.74	104.72	116.51	5.18%
J01AA02	Doxycycline	19.10	19.70	22.86	27.41	12.80%
J01FA09	Clarithromycin	24.48	22.98	21.90	22.37	-2.96%
J01MA12	Levofloxacin	13.50	13.58	14.02	14.21	1.73%
J01CA04	Amoxicillin	14.74	13.82	13.53	13.43	-3.05%
J01XE01	Nitrofurantoin	12.05	11.31	10.64	11.08	-2.76%
J01CF02	Cloxacillin	19.22	16.42	13.43	10.89	-17.25%
J01EE01	Co-trimoxazole	8.04	8.68	9.98	10.81	10.40%
J01FA10	Azithromycin	6.80	7.16	7.46	9.12	10.27%
J01CA01	Ampicillin	13.88	11.51	9.53	7.45	-18.73%
	Others	34.34	32.26	30.97	31.13	-3.22%
	Total	266.27	256.16	259.05	274.41	1.01%

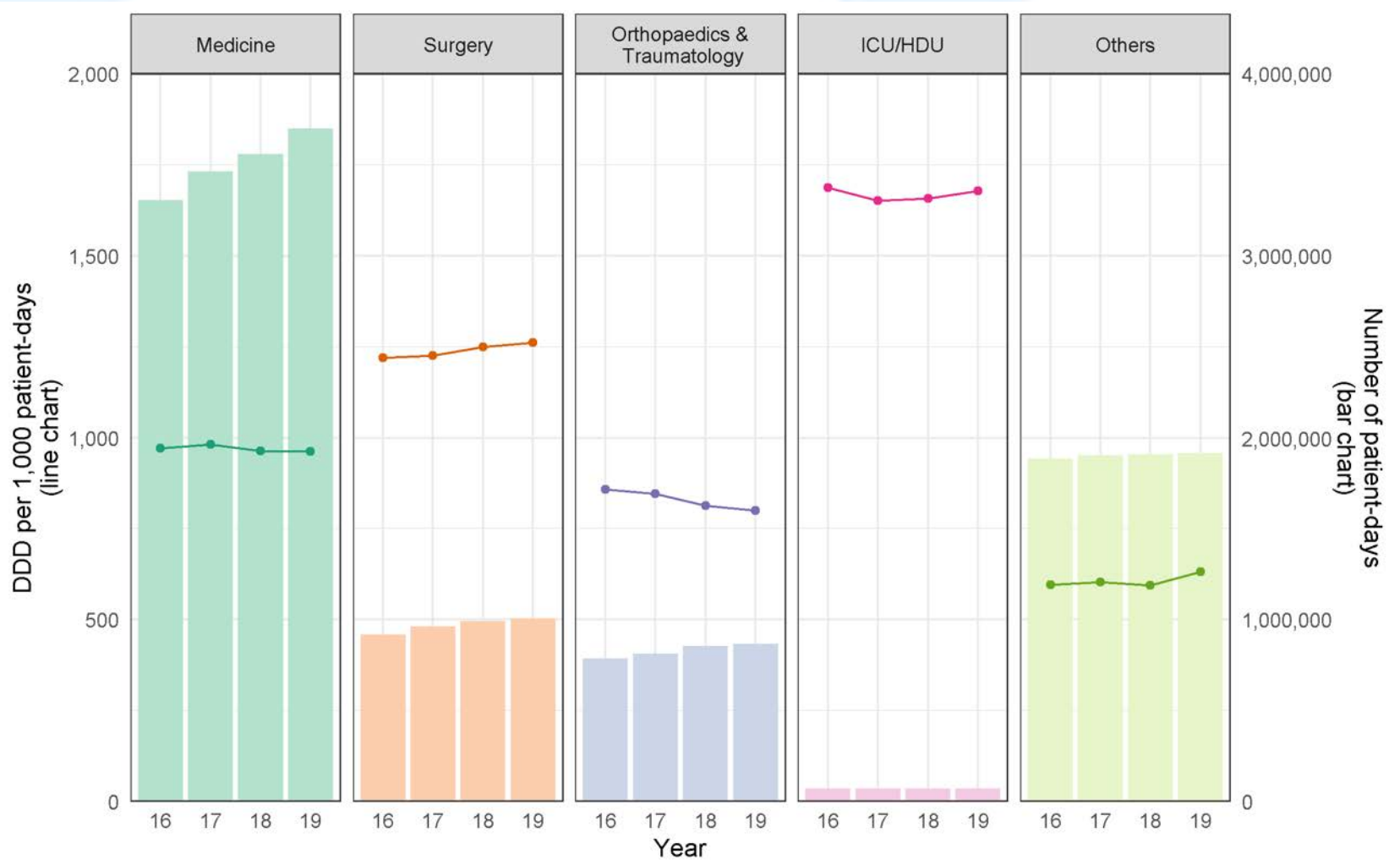
Note:
The ten most dispensed antimicrobials were identified from year 2019 data
*Rounded to two decimal places
†Due to rounding, percentages may not precisely reflect the absolute figures

- Amoxicillin/clavulanate was the most dispensed antimicrobial from 2016 to 2019
- Doxycycline showed the largest increase in CAGR of 12.80% from 2016 to 2019, followed by co-trimoxazole (CAGR: 10.40%), azithromycin (CAGR: 10.27%), amoxicillin/clavulanate (CAGR: 5.18%) and levofloxacin (CAGR: 1.73%)
- Ampicillin showed the largest decrease in CAGR of -18.73% from 2016 to 2019, followed by cloxacillin (CAGR: -17.25%)

Results

3. Antimicrobials dispensed in HA inpatient service by specialty

Total Antimicrobials Dispensed in HA Inpatient Service by Specialty



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Total Antimicrobials Dispensed in HA Inpatient Service by Specialty

Year		Medicine	Surgery	O&T	ICU/HDU	Others	All Inpatient Services
2016	DDD per 1,000 patient-days‡	970.57	1220.10	858.00	1687.98	595.59	896.40
2017	DDD per 1,000 patient-days‡	981.25	1225.26	845.91	1651.98	603.51	905.35
2018	DDD per 1,000 patient-days‡	963.87	1250.22	812.59	1658.41	593.68	895.87
2019	DDD per 1,000 patient-days‡	961.52	1261.29	800.37	1678.31	631.31	906.10
Compound annual growth rate (16 to 19)	DDD per 1,000 patient-days‡§	-0.31%	1.11%	-2.29%	-0.19%	1.96%	0.36%

‡Rounded to two decimal places

§Due to rounding, percentages may not precisely reflect the absolute figures

- Total antimicrobials dispensed in HA inpatient service showed an increase in CAGR of 0.36% from 2016 to 2019
- By specialty, ‘Others’ specialty showed the largest increase in CAGR of 1.96% from 2016 to 2019, while Orthopaedics & Traumatology showed the largest decrease in CAGR of -2.29%

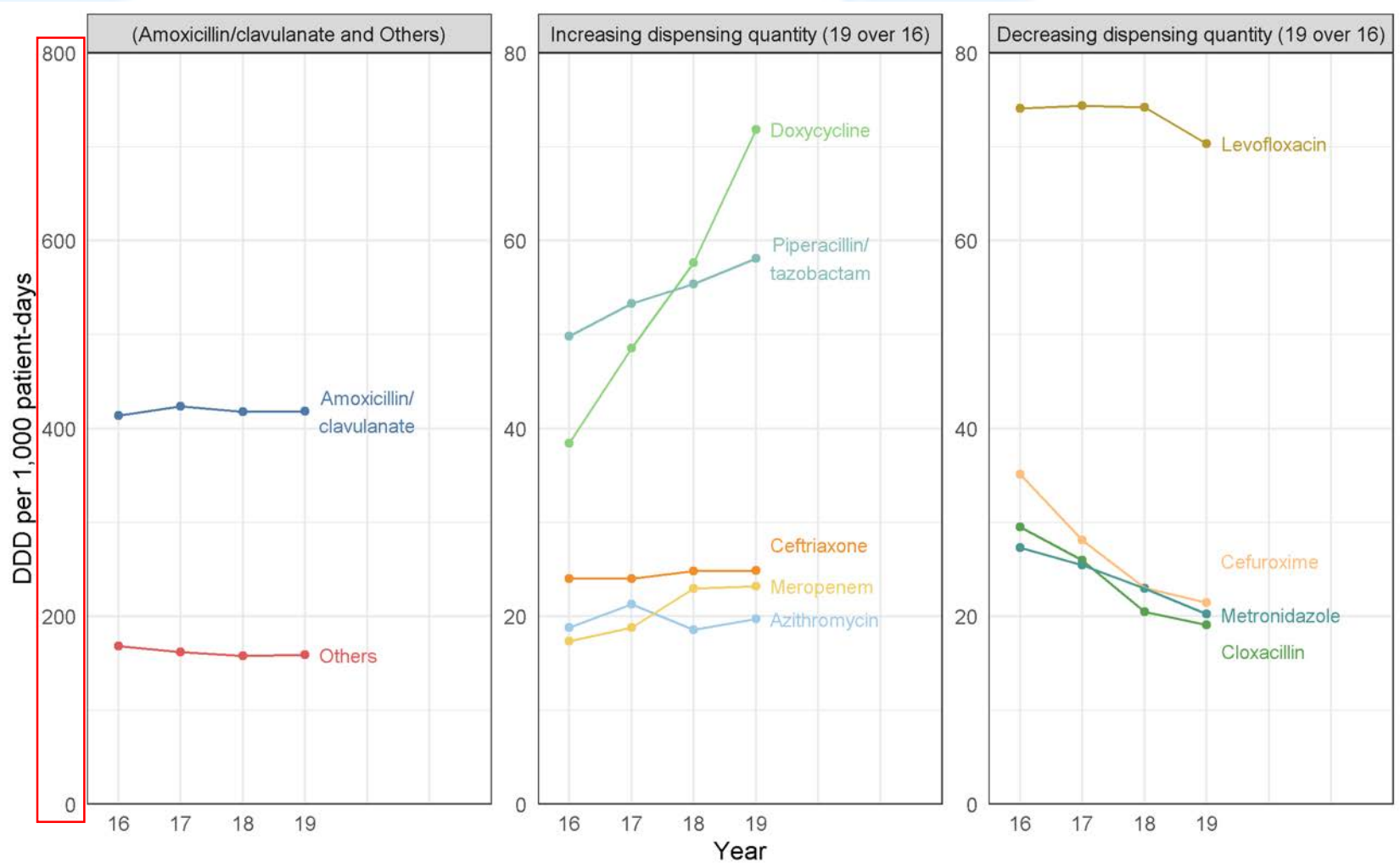
Five Most Dispensed Antimicrobial Groups in Inpatient Service

ATC Pharmacological Subgroup		DDD per 1,000 patient-days				Compound annual growth rate (16 to 19)*†
Code	Description	Year 2016*	Year 2017*	Year 2018*	Year 2019*	
J01C	Beta-lactam Antibacterials, Penicillins	529.12	537.11	522.80	522.34	-0.43%
J01D	Other Beta-lactam Antibacterials	107.60	100.02	101.50	101.70	-1.86%
J01M	Quinolone Antibacterials	93.29	93.48	92.93	87.84	-1.98%
J01A	Tetracyclines	40.69	51.13	60.10	74.43	22.30%
J01F	Macrolides, Lincosamides and Streptogramins	52.43	50.24	43.98	44.42	-5.37%
	Others	73.27	73.37	74.57	75.36	0.94%
	Total	896.40	905.35	895.87	906.10	0.36%

Note:
The five most dispensed antimicrobial groups were identified from year 2019 data
*Rounded to two decimal places
†Due to rounding, percentages may not precisely reflect the absolute figures

- Tetracyclines group was the only group among the five most dispensed groups showed the largest increase in CAGR of 22.30% from 2016 to 2019
- Most groups showed a slight decrease (except Others), but macrolides, lincosamides and streptogramins group showed the largest decrease in CAGR of -5.37% from 2016 to 2019

Ten Most Dispensed Antimicrobials in Inpatient Service



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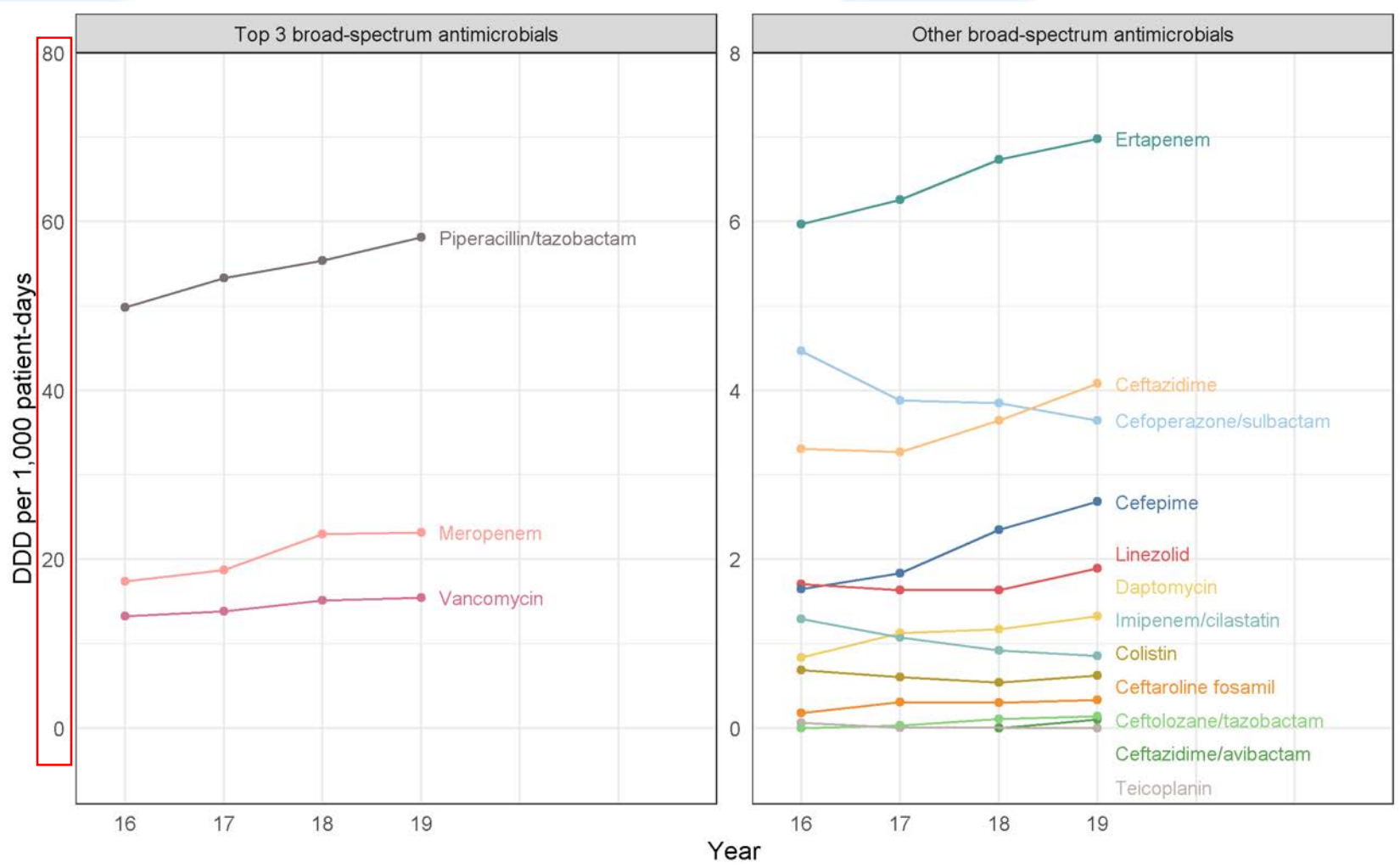
Ten Most Dispensed Antimicrobials in Inpatient Service

ATC Pharmacological Subgroup		DDD per 1,000 patient-days				Compound annual growth rate (16 to 19)*†
Code	Description	Year 2016*	Year 2017*	Year 2018*	Year 2019*	
J01CR02	Amoxicillin/clavulanate	413.56	423.55	417.86	418.20	0.37%
J01AA02	Doxycycline	38.42	48.54	57.66	71.84	23.20%
J01MA12	Levofloxacin	74.11	74.36	74.22	70.35	-1.72%
J01CR05	Piperacillin/tazobactam	49.85	53.31	55.38	58.13	5.26%
J01DD04	Ceftriaxone	23.98	24.01	24.84	24.86	1.21%
J01DH02	Meropenem	17.36	18.77	22.99	23.21	10.16%
J01DC02	Cefuroxime	35.13	28.13	23.02	21.49	-15.12%
P01AB01/ J01XD01	Metronidazole	27.28	25.43	22.98	20.24	-9.47%
J01FA10	Azithromycin	18.78	21.29	18.60	19.72	1.64%
J01CF02	Cloxacillin	29.51	25.98	20.45	19.11	-13.49%
	Others	168.42	161.98	157.87	158.96	-1.91%
	Total	896.40	905.35	895.87	906.10	0.36%

Note:
The ten most dispensed antimicrobials were identified from year 2019 data
*Rounded to two decimal places
†Due to rounding, percentages may not precisely reflect the absolute figures

- Amoxicillin/clavulanate was the most dispensed antimicrobial from 2016 to 2019
- Doxycycline showed the largest increase in CAGR of 23.20% from 2016 to 2019, followed by meropenem (CAGR: 10.16%), piperacillin/tazobactam (CAGR: 5.26%), azithromycin (CAGR: 1.64%) and then ceftriaxone (CAGR: 1.21%)
- Cefuroxime showed the largest decrease in CAGR of -15.12% from 2016 to 2019, followed by cloxacillin (CAGR: -13.49%)

Broad-spectrum Antimicrobials Dispensed in Inpatient Service



Broad-spectrum Antimicrobials Dispensed in Inpatient Service

	ATC Chemical Substance		DDD per 1,000 patient-days				Compound annual growth rate (16 to 19)*
	Code	Description	Year 2016*	Year 2017*	Year 2018*	Year 2019*	
Beta-lactam Antibacterials, Penicillins	J01CR05	Piperacillin/tazobactam	49.85	53.31	55.38	58.13	5.26%
Other Beta-lactam Antibacterials (Cephalosporins)†	J01DD02	Ceftazidime	3.31	3.27	3.65	4.08	7.23%
	J01DD62	Cefoperazone/sulbactam	4.47	3.88	3.85	3.65	-6.57%
	J01DE01	Cefepime	1.65	1.84	2.35	2.69	17.73%
	J01DI02	Ceftaroline fosamil	0.18	0.31	0.30	0.34	22.88%
	J01DI54	Ceftolozane/tazobactam	<0.005	0.03	0.11	0.14	Not applicable §
	J01DD52	Ceftazidime/avibactam	-	-	<0.005	0.10	-
Other Beta-lactam Antibacterials (Carbapenems)†	J01DH02	Meropenem	17.36	18.77	22.99	23.21	10.16%
	J01DH03	Ertapenem	5.97	6.26	6.74	6.98	5.38%
	J01DH51	Imipenem/cilastatin	1.29	1.07	0.92	0.86	-12.78%
Other Antibacterials	J01XA01	Vancomycin	13.26	13.84	15.12	15.46	5.26%
	J01XX08	Linezolid	1.71	1.63	1.64	1.89	3.46%
	J01XX09	Daptomycin	0.84	1.13	1.17	1.33	16.43%
	J01XB01	Colistin	0.69	0.60	0.54	0.62	-3.36%
	J01XA02	Teicoplanin	0.07	<0.005	0.01	<0.005	-78.47%
		Total	100.64	105.97	114.76	119.48	5.89%

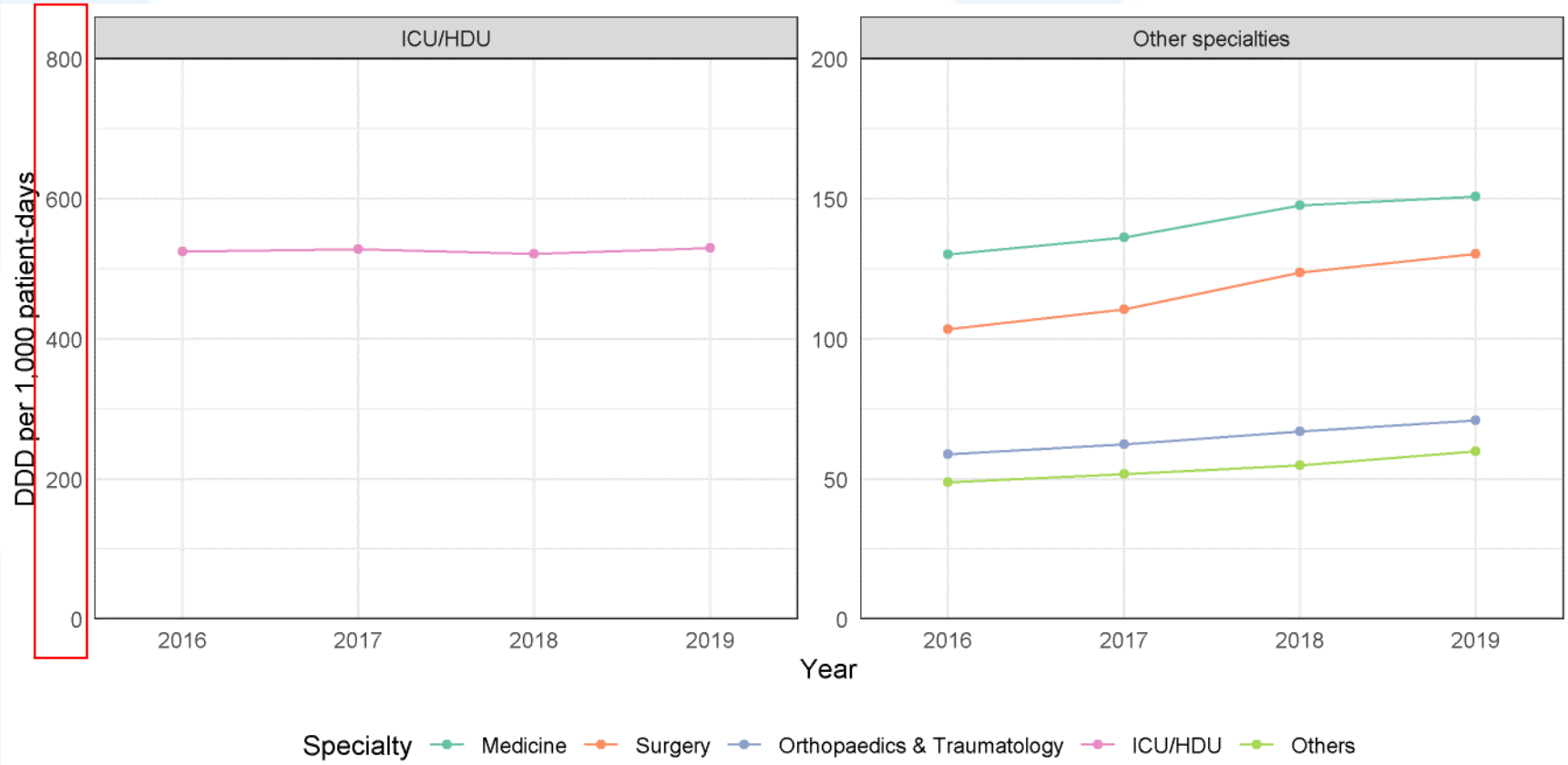
*Rounded to two decimal places

†WHO ATC Pharmacological subgroup "Other Beta-lactam Antibacterials (J01D)" is further categorized into Cephalosporins and Carbapenems groups

§ Ceftolozane/tazobactam was listed in the HA drug formulary since April 2019, it was supplied on named patient basis before enlistment

- The increase in CAGR was 5.89% from 2016 to 2019
- Piperacillin/tazobactam was the most dispensed broad-spectrum antimicrobial from 2016 to 2019, followed by meropenem and then vancomycin
- Ceftaroline fosamil showed the largest increase in CAGR of 22.88% from 2016 to 2019, followed by cefepime (17.73%), daptomycin (16.43%), meropenem (10.16%) and then ceftazidime (7.23%)

Broad-spectrum Antimicrobials Dispensed in Inpatient Service by Specialty



- By specialty, all specialties of inpatient service showed a steady increase of usage of the overall selected broad spectrum antimicrobials from 2016 to 2019 except ICU/HDU

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Broad-spectrum Antimicrobials Dispensed in Inpatient Service by Specialty

Specialty	DDD per 1,000 patient-days				Compound annual growth rate (16 to 19)*†
	Year 2016*	Year 2017*	Year 2018*	Year 2019*	
Medicine	130.19	136.18	147.66	150.86	5.03%
Surgery	103.45	110.56	123.78	130.34	8.00%
Orthopaedics & Traumatology	58.94	62.39	67.07	70.97	6.38%
ICU/HDU	524.94	528.31	521.75	530.14	0.33%
Others	48.94	51.72	54.84	59.82	6.92%
All Inpatient Services	100.64	105.97	114.76	119.48	5.89%

*Rounded to two decimal places

†Due to rounding, percentages may not precisely reflect the absolute figures

- By specialty, ICU/ HDU was the specialty with largest quantity of broad-spectrum antimicrobials dispensed from 2016 to 2019, followed by Medicine, Surgery, O&T and Others
- Dispensing of broad-spectrum antimicrobials in Surgery showed the largest increase in CAGR of 8.00% from 2016 to 2019, followed by Others (6.92%), Orthopaedics & Traumatology (6.38%) and then Medicine (5.03%). ICU/HDU only had 0.33% increase in CAGR

Remarks on interpretation of results

- DDD is a technical unit of use that does not necessarily reflect the recommended or average prescribed dose
- There are no separate DDDs for children which makes the DDD estimates for paediatric formulations more difficult to interpret
- The amount of antimicrobials dispensed was used as a proxy for the amount consumed
- The surveillance results cannot be used to judge the appropriateness of usage in the absence of the relevant clinical information

* WHO ATC 2019 version was adopted for DDD calculation

Summary

- Amoxicillin/clavulanate was the most commonly dispensed antimicrobials for both non-inpatient and inpatient service in HA
- Total antimicrobials dispensed showed a compound annual growth rate (CAGR) of 1.01% and 0.36% for non-inpatient and inpatient service respectively from 2016 to 2019
- Among the ten most dispensed antimicrobials
  - Dispensing quantity of doxycycline showed the largest increase in CAGR of 12.80% and 23.20% for non-inpatient and inpatient service respectively
  - Dispensing quantity of cloxacillin and clarithromycin in HA overall showed the largest decrease in CAGR of -14.27% and -4.42% respectively
- The dispensing quantity of broad-spectrum antimicrobials showed an increase in CAGR of 5.89% while piperacillin/tazobactam was the most commonly dispensed broad-spectrum antimicrobial for inpatients service from 2016 to 2019

Recommendations

- An increase in total antimicrobials dispensed necessitates to have Antibiotics Stewardship Programmes (ASP) in place to monitor and promote optimisation of antimicrobial usage at various levels
- Findings in relation to dispensing of doxycycline (sharpest increase among the top 10 most commonly dispensed antibiotics) and piperacillin/tazobactam (the most commonly dispensed broad spectrum antimicrobial) would warrant further exploration

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THE END

Thank you

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