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Wholesale Supply Data of Antibiotics in Hong Kong (2014 - 2017)

July 2019

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Background

- The HKSAR Government issued the Hong Kong Strategy and Action Plan on Antimicrobial Resistance 2017 - 2022 (the Action Plan) in July 2017 to address the threat of Antimicrobial Resistance (AMR)
- Activity 3.1.2 in the Action Plan suggested collecting supply data of antibiotics from different sectors
- First-ever territory-wide report of antibiotics supplied to different sectors based on the wholesale supply data (2014 - 2016) published in April 2018
- An ongoing annual surveillance exercise since 2018

Sectors included in the Antimicrobial Use (AMU) Surveillance

Wholesale supply data to the following eight sectors were included in the surveillance:

1. Department of Health
2. Hospital Authority
3. Private hospitals
4. Private doctors (mutually exclusive with private hospitals)
5. Registered dentists
6. Veterinary surgeons
7. Community pharmacies
8. Farmers

Classes of Antibiotics Covered

WHO Anatomical Therapeutic Chemical (ATC) under:

- J01 (Antibacterials for Systemic Use);
- A07AA (Antibiotics, Intestinal Antiinfectives, under Antidiarrheals, Intestinal Antiinflammatory/ Antiinfective Agents, e.g. nystatin and rifaximin); and
- P01AB (Nitroimidazole derivatives, Agents against Amoebiasis and Other Protozoal Diseases, under Antiprotozoals, e.g. metronidazole and tinidazole through oral or rectal administration)

Classification of Antibiotics

Code	Classes of antibiotics
J01A	Tetracyclines
J01B	Amphenicols
J01C	Beta-lactam Antibacterials, Penicillins
J01D	Other Beta-lactam Antibacterials
J01E	Sulfonamides and Trimethoprim
J01F	Macrolides, Lincosamines and Streptogramins
J01G	Aminoglycoside Antibacterials
J01M	Quinolone Antibacterials
J01R	Combinations of Antibacterials
J01X	Other Antibacterials
A07AA	Antibiotics, Intestinal Antiinfectives
P01AB	Nitroimidazole Derivatives, Agents against Amoebiasis and Other Protozoal Diseases

Anatomical Therapeutic Chemical (ATC) Classification System, World Health Organization

Broad Spectrum Antibiotics

Some locally-important broad spectrum antibiotics

- Antibiotics with a broad spectrum of coverage are reserved for treating infections caused by resistant bacteria
- Some are regarded as last resort antibiotics for treating resistant bacterial infections
  - Examples: carbapenems, colistin

Examples of Broad Spectrum Antibiotics

ATC Pharmacological Group	Some locally-important broad spectrum antibiotics
Beta-Lactam Antibacterials, Penicillins (J01C)	Piperacillin/ Tazobactam
Other Beta-Lactam Antibacterials (J01D)	Cefepime
	Cefoperazone/ Sulbactam
	Ceftaroline Fosamil
	Ceftazidime
	Ceftolozane/ Tazobactam
	Ertapenem
	Imipenem/ Cilastatin
	Meropenem
Other Antibacterials (J01X)	Colistin
	Daptomycin
	Linezolid
	Teicoplanin
	Vancomycin

Quantification of Antibiotic Usage

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Defined Daily Dose (DDD)

- Defined as the assumed average maintenance dose per day for a drug used for its main indication in adults
- Commonly used across many overseas health authorities for comparison of drug usage and research

DDD per 1,000 inhabitants per day (DID)

- A standardised unit used internationally to measure antibiotic use among a population

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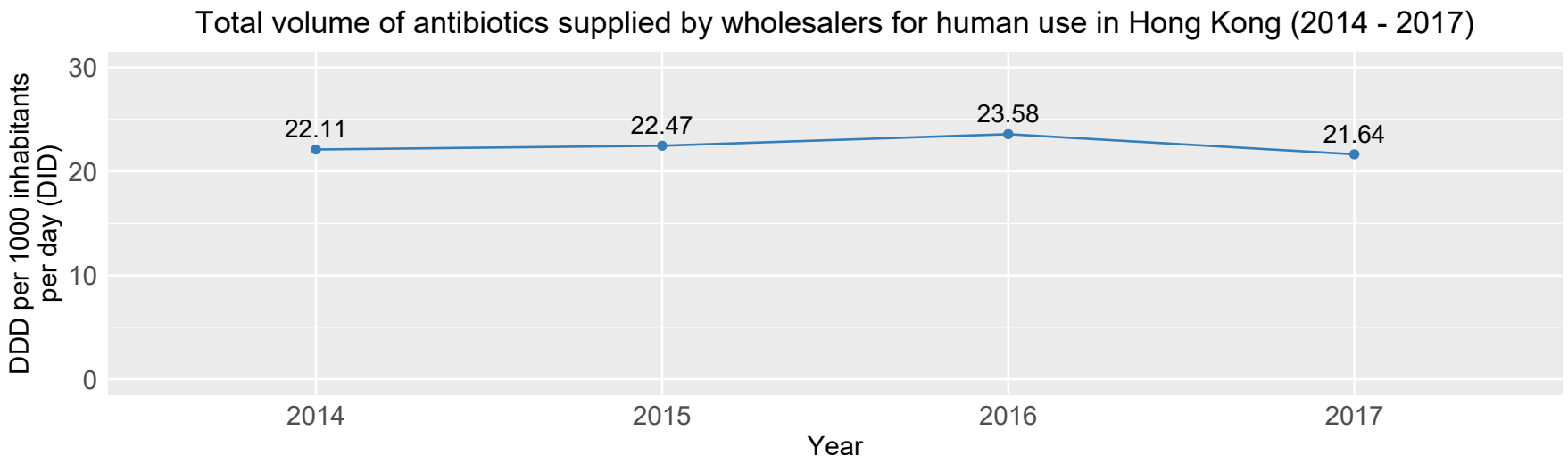
Results - Total Wholesale Supply

- The wholesale supply of antibiotics in 2014 - 2017 (human use only) were:

Year	2014	2015	2016	2017
Total Wholesale Supply of Antibiotics (DID)	22.11	22.47	23.58	21.64

- The trend was increasing with an increase of 6.7% (1.47 DID) from 2014 to 2016 but a decrease of 8.2% (-1.94 DID) from 2016 to 2017 was observed



Results - by Classes of Antibiotics (1)

- The top three classes of antibiotics with highest volume of wholesale supply in 2017 were:
  - Beta-Lactam Antibacterials, Penicillins (11.11 DID, 51.4%)
  - Macrolides, Lincosamides and Streptogramins (2.95 DID, 13.6%)
  - Other Beta-Lactam Antibacterials (2.32 DID, 10.7%)
- They accounted for about 75.7% of the overall antibiotics supplied for human in HK in 2017

Results - by Classes of Antibiotics (2)

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Wholesale Supply of Antimicrobials in Hong Kong, Stratified by ATC Pharmacological Subgroup (2014 - 2017)

ATC Pharmacological Subgroup		Year							
		2014		2015		2016		2017	
Code	Description	DID	%	DID	%	DID	%	DID	%
J01A	Tetracyclines	2.14	9.69	2.04	9.07	2.06	8.74	1.84	8.50
J01B	Amphenicols	0.01	0.03	§	0.02	§	0.02	§	0.01
J01C	Beta-Lactam Antibacterials, Penicillins	11.10	50.20	11.37	50.60	11.93	50.59	11.11	51.36
J01D	Other Beta-Lactam Antibacterials	2.73	12.34	2.87	12.77	2.86	12.14	2.32	10.73
J01E	Sulfonamides and Trimethoprim	0.24	1.07	0.22	0.97	0.21	0.89	0.19	0.88
J01F	Macrolides, Lincosamides and Streptogramins	2.94	13.28	2.91	12.97	3.32	14.08	2.95	13.65
J01G	Aminoglycoside Antibacterials	0.05	0.23	0.05	0.23	0.05	0.22	0.05	0.24
J01M	Quinolone Antibacterials	2.18	9.88	2.29	10.19	2.42	10.27	2.29	10.56
J01R	Combinations of Antibacterials*	-	-	-	-	-	-	-	-
J01X	Other Antibacterials	0.28	1.25	0.28	1.24	0.29	1.24	0.31	1.45
A07AA	Antibiotics, Intestinal Antiinfectives	-	-	-	-	-	-	0.10	0.46
P01AB	Nitroimidazole Derivatives, Agents Against Amoebiasis and Other Protozoal Diseases	0.45	2.02	0.43	1.92	0.43	1.82	0.47	2.17

* There was no registered product under "Combinations of Antimicrobials" (J01R) in Hong Kong

§ Less than 0.005

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Results - Supply of Broad Spectrum Antibiotics (1)

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- The 14 locally-important broad spectrum antibiotics only accounted for 1.5% (increased in 2017) of the total wholesale supply in 2017
- Most (99.4%) were supplied to hospitals
- The top three locally-important broad spectrum antibiotics with highest volume of wholesale supply were:
  - Piperacillin/ Tazobactam (0.13 DID)
  - Meropenem (0.08 DID)
  - Vancomycin (0.03 DID)
- These three antibiotics accounted for 1.1% of the total wholesale supply in 2017

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Results - Supply of Broad Spectrum Antibiotics (2)

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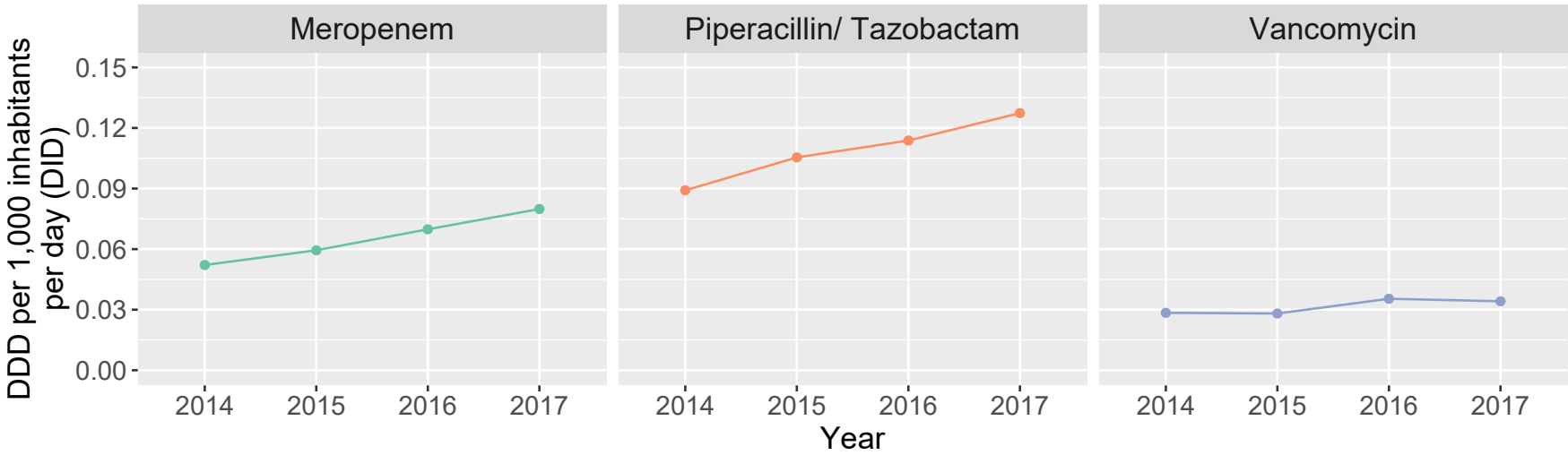
ATC Chemical Substance		Year							
		2014		2015		2016		2017	
Code	Description	DID	%	DID	%	DID	%	DID	%
Beta-Lactam Antibacterials, Penicillins									
J01CR05	Piperacillin/ Tazobactam	0.089	0.403	0.105	0.469	0.114	0.483	0.127	0.589
Other Beta-Lactam Antibacterials									
J01DD02	Ceftazidime	0.008	0.035	0.008	0.035	0.009	0.038	0.009	0.041
J01DD62	Cefoperazone/ Sulbactam	0.010	0.044	0.010	0.044	0.010	0.044	0.009	0.043
J01DE01	Cefepime	0.005	0.022	0.009	0.039	0.009	0.040	0.011	0.049
J01DH02	Meropenem	0.052	0.236	0.059	0.265	0.070	0.296	0.080	0.369
J01DH03	Ertapenem	0.022	0.097	0.024	0.105	0.024	0.104	0.026	0.122
J01DH51	Imipenem/ Cilastatin	0.004	0.020	0.004	0.020	0.004	0.016	0.003	0.014
J01DI02	Ceftaroline Fosamil	0.001	0.004	0.001	0.004	0.001	0.005	0.002	0.008
J01DI54	Ceftolozane/ Tazobactam	-	-	-	-	-	-	§	0.001
Other Antibacterials									
J01XA01	Vancomycin	0.028	0.129	0.028	0.125	0.035	0.150	0.034	0.158
J01XA02	Teicoplanin	§	0.001	§	0.001	§	0.001	-	-
J01XB01	Colistin	0.007	0.030	0.007	0.032	0.006	0.026	0.003	0.012
J01XX08	Linezolid	0.004	0.019	0.002	0.010	0.002	0.009	0.008	0.036
J01XX09	Daptomycin	0.002	0.007	0.002	0.010	0.003	0.012	0.004	0.017

§ Less than 0.0005

Results - Supply of Broad Spectrum Antibiotics (3)

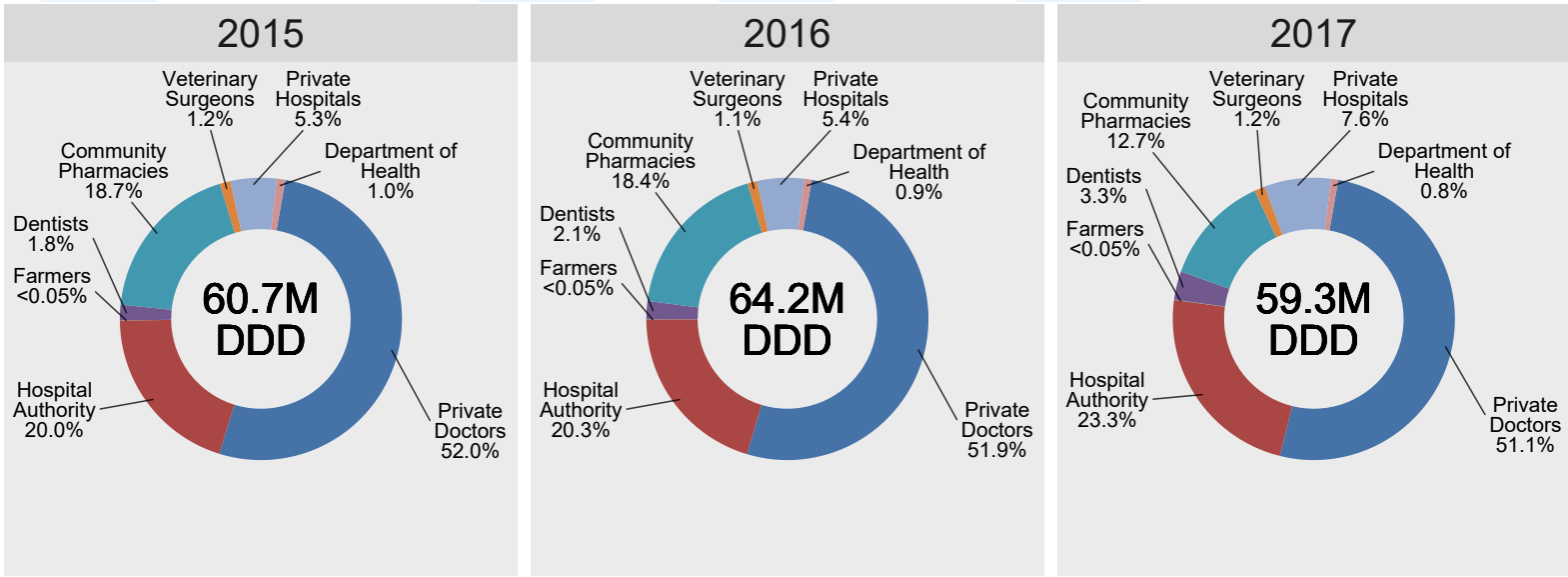
- Among top three locally-important broad spectrum antibiotics with highest volume of wholesale supply, an increasing trend of supply from 2014 to 2017 was observed



Top three locally-important broad spectrum antibiotics	Change in Wholesale Supply		
	2014 - 2015	2015 - 2016	2016 - 2017
Meropenem	0.0073 DID (14.0%)	0.0104 DID (17.5%)	0.0100 DID (14.4%)
Piperacillin/ Tazobactam	0.0163 DID (18.3%)	0.0084 DID (7.9%)	0.0136 DID (11.9%)
Vancomycin	-0.0003 DID (-1.2%)	0.0073 DID (26.0%)	-0.0013 DID (-3.5%)

Results - Among Different Sectors (1)

- The top three sectors supplied with the largest proportion of overall antibiotics in 2015 - 2017 were:
  - Private Doctors (51.1 - 52.0%)
  - Hospital Authority (20.0 - 23.3%)
  - Community Pharmacies (12.7 - 18.7%)



Wholesale data cannot tell the appropriateness of AMU by different sectors as there is no information on the casemix and case load of each sector.

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Results - Among Different Sectors (2)

- Excluding those supplied to veterinary surgeons and farmers, antibiotics supplied to various sectors for human use is as follow:-

Sector	Wholesale Supply of Antibiotics (DID)			
	2014	2015	2016	2017
Private Doctors	11.71	11.83	12.37	11.20
Community Pharmacies	4.09	4.25	4.39	2.78
Dentists	0.35	0.40	0.50	0.71
Department of Health	0.23	0.22	0.21	0.18
Subtotal[*]	16.39	16.70	17.46	14.87
Hospital Authority	4.64	4.56	4.84	5.10
Private Hospitals	1.08	1.20	1.28	1.67
Subtotal[†]	5.72	5.76	6.12	6.77

[*] This figure only roughly reflects the volume of antibiotics supplied to the community settings as some of the antibiotics supplied to Hospital Authority and Private Hospitals and used in the clinics of community settings is not reflected here.

[†] This figure only rougly reflects the volume of antibiotics supplied to hospital settings but includes some antibiotics used in the clinics of community settings

Summary (1)

- The total wholesale supply of antibiotics in HK has decreased by 1.94 DID (4.93 million DDD) from 2016 to 2017
- Comparison of data with overseas countries are tricky as
  - Different methodologies were used to collect antibiotics usage or supply information
  - Different healthcare provision systems
  - Different coverage of drugs due to different availability
- Direct comparison of data among different countries must be interpreted with caution or it can be misleading

Summary (2)

- The top three most supplied antibiotic classes were: i) beta-lactam antibacterials, penicillins; ii) macrolides, lincosamides and streptogramins and iii) other beta-lactam antibacterials. They are:
  - For treating common bacterial infections and usually prescribed as first-line treatment if bacterial infections are suspected
  - Used in both hospitals and community
- Wholesale supply of the 14 locally-important broad spectrum antibiotics only accounted for a very small proportion (1.5%) of the total supply in HK
  - Majority of them were supplied to Hospital Authority and private hospitals

Summary (3)

- Private doctors, Hospital Authority and community pharmacies were still the three sectors supplied with the highest volume of antibiotics in HK in 2017
  - As private doctors and Hospital Authority are the major sectors providing primary care service and in-patient service respectively in Hong Kong, these sectors being supplied with the largest volume of antibiotics is not unexpected
  - A rather sharp decrease (-36.4%, representing 4.3 million DDD) in supply to the sector of community pharmacies was seen in 2017 (from 18.4% of the overall supply in 2016 dropped to 12.7% in 2017)
  - The Department of Health will continue with education, enhanced regulatory actions and closely monitor the situation

Summary (4)

- Apart from community pharmacies, the supply to private doctors in 2017 was also decreased by 3.00 million DDD (from 12.37 DID to 11.20 DID), which represents 9.4% reduction
- Increase was observed with the following three human sectors:
  - Private hospitals (from 5.4% to 7.6% of the overall supply[1], representing 1.07 million DDD increase)
  - Hospital Authority (from 20.3% to 23.3% of the overall supply[1], representing 0.77 million DDD increase)
  - Dentists (from 2.1% to 3.3% of the overall supply[1], representing 0.59 million DDD increase)
- The Department of Health (DH) will relay the results to the relevant stakeholders for them to discuss the possible measures to bring the consumption down

[1] Including the supply to all sectors, please refer to slide 15

Limitations

- Wholesale supply data only provides indirect information to reflect antibiotics use but it is never equal to dispensing or consumption data
- Whether the use of antibiotics is appropriate depends on the clinical situation, wholesale supply data contains no information to reflect the appropriateness of the use by each sectors

Way Forward (1)

Communication and Education

- DH has disseminated and discussed the wholesale supply results with the relevant stakeholders and will publish the surveillance results at CHP website for public information
- DH will work closely with all the stakeholders to promote prudent use of antibiotics in all settings

Way Forward (2)

Communication and Law Enforcement

- DH will continue reminding community pharmacies of their role in fight AMR and compliance with the law in handling antibiotics
- DH will closely monitor the situation and further enhance the law enforcement actions against illegal sales of antibiotics if necessary

Way Forward (3)

Surveillance

- Wholesale data can provide part of the information of overall AMR situation in HK only
- In joint effort with other government departments and organisations, the Department of Health will initiate other surveillance activities to provide a more comprehensive picture on the overall AMR situation in HK

Advices to Public

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- Do not purchase antibiotics without a prescription
- Do not request antibiotics from your doctor
- Follow your doctor's advice when taking antibiotics
- To prevent AMR, maintaining good personal hygiene and receiving up-to-date vaccination are equally important

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Advices to Community Pharmacies

- Only supply antibiotics in accordance with the law
- Illegal sale of antibiotics is a criminal offence
  - e.g. supply of prescription antibiotics to the general public without the authorisation of a prescription
- The maximum penalty is a fine of $30,000 and 12 months of imprisonment

Advices to Healthcare Workers

- Antibiotics are precious resources against infections. Healthcare workers play an essential role in preserving them:
  - Continue to prescribe antibiotics in accordance with therapeutic guidelines in consideration of clinical situations
  - Discuss with your patients about the importance of appropriate antibiotic use and the dangers of AMR
  - Apply best practice of infection prevention and control
  - Educate patients about how to prevent infections and their spread
    - e.g. vaccination, maintain good personal hygiene and hand hygiene

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THE END

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