## The Global Point Prevalence Survey of Antimicrobial Consumption and Resistance (Global-PPS): Characteristics of Antimicrobial Prescribing in Cancer Patients

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## **INTRODUCTION AND PURPOSE**

A standardized and validated surveillance system is crucial for evaluating antimicrobial stewardship in cancer patients. Yet to date no antimicrobial prescribing patterns for febrile neutropenia have been published because global surveillance data was still lacking. The aim of this study is to describe and assess the baseline characteristics of antimicrobial prescribing for promoting prudent use of antimicrobials in cancer patients worldwide.

A one-day point prevalence survey (PPS) was conducted between February and September 2015 in 335 hospitals in 53 countries. Data on patients admitted to adult haematology-oncology wards on the day of the survey were extracted and analysed to assess worldwide variation in antimicrobial drug utilization for pneumonia and febrile neutropenia, the indication for prescription, and quality indicators such as guideline compliance.

RESULTS

A total of 3298 patients admitted to 149 wards were included in the analysis. Overall antimicrobial prevalence rate was 45.1% (*Table 1*). In addition, 43.9% of patients received multiple antimicrobial prescriptions. Among all antimicrobial prescriptions (n=2464), antibiotics and antimycotics were most often prescribed (73.0% and 20.6%, respectively). Broad-spectrum antibiotics were highly used in most regions, mainly penicillins with betalactamase inhibitors (19.5%), fluoroquinolones (16.1%), sulfonamides and trimethoprim (14.7%), and carbapenems (12.0%) (*Table 2*). Of note, 89.4% of sulfonamides and trimethoprim and 46.4% of fluoroquinolones were prescribed for medical prophylaxis. Therapeutic antimicrobials were most often prescribed for pneumonia (17.1%; range 5.3% in West and Central Asia to 20.4% in West Europe) and febrile neutropenia (13.3%; range 8.5% in East and South Asia to 26.9% in South America). Most commonly used antimicrobials were penicillins with beta-lactamase inhibitors (30.8%), fluoroquinolones (10.9%), and carbapenems (8.8%) for pneumonia; penicillins with beta-lactamase inhibitors (25.1%), carbapenems (22.9%), and glycopeptides (10.3%) for febrile neutropenia. High rates of carbapenem use were observed in hospital-acquired infections compared to community-acquired infections (Figure 1 & Figure 2). Guideline compliance for both prophylactic and therapeutic use was high (95.2% and 85.9%, respectively) and reasons for prophylactic use were less frequently noted (58.2% of prescriptions). Table 2. Most prescribed antibiotics (J01, ATC 4 level) by region Table 1. Antimicrobial prevalence by region

(%)

UN region	Number of patients	Antimicrobial prevalence rates -Overall-	Antimicrobial prevalence rates -Pneumonia-	Antimicrobial prevalence rates -Febrile Neutropenia-	Austalia & New Zealan % (n=27)
Australia & New Zealand	46	54.3%	8.7%	8.7%	Penicillins with BLIs
East & South Asia	847	54.0%	8.4%	4.5%	TMP-SUL
West & Central Asia	156	48.1%	1.9%	6.4%	3 <sup>rd</sup> generation Cepl
North America	202	55.4%	5.4%	7.9%	<b>BL-resistant penicill</b>
South America	92	28.3%	2.2%	7.6%	FQs
North Europe	242	49.6%	8.7%	7.9%	GPs
South Europe	646	33.6%	6.3%	4.8%	Others
West Europe	1048	43.1%	8.7%	5.8%	South Ameri
Note. Africa and East Europe w	vere excluded in th	ne analysis due to the limi	ted number of patients.		9/ (m-24)

Figure 1. Most prescribed therapeutic antimicrobials for pneumonia worldwide

CAI	39.9		<b>5.1</b> 2.5	13.9	6.3	12.0	20.3
(n=158)							
HAI	25.3	14.3	12.3	9.1	8.4	5.8 <mark>3.2</mark>	21.4
(n=154) Figure	2. Most prescribed thera	peutic antimic	robials for f	ebrile neu	tropeni	a worldwide	(%

CAI (n=93)	16.1		41.9		7.5	8.6	7.5	18.3	
HAI (n=173)	26.6		16.2	15.0	13.3	5	.8 5.8	<mark>4.0</mark> 2.9	7.5
	<ul> <li>Carbapenems</li> <li>3rd generation</li> <li>Amphotericing</li> </ul>	<ul> <li>Carbapenems</li> <li>3rd generation Cephs</li> <li>Amphotericin B</li> </ul>		Is GPs AGs es MLs		■ 4th ge ■ FQs ■ Others		ration Cephs	

\*Abbreviations. CAI, community-acquired infection; HAI, hospital-acquired infection; BLIs, beta-lactamase inhibitors; TMP-SUL, sulfonamides and trimethoprim; BL, beta-lactamase; FQs, fluoroquinolones; GPs, glycopeptides; Cephs, cephalosporins; AGs, aminoglycosides; MLs, macrolides

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3<sup>rd</sup> generation Cephs TMP-SUL Carbapenems **Penicillins with BLIs** AGs FQs GPs Others

Disclosures: "bioMérieux is the sole sponsor of the GLOBAL Point Prevalence Survey. The funder has no role in study design, data analysis, data interpretation, or writing the report. Data are strictly confidential and stored anonymous at the coordinating centre of the University of Antwerp."



## **METHODS**

			- 3 -		
	East & South Asia % (n=591)		West & Central Asia % (n=99)	North America % (n=137)	
37.0	TMP-SUI	20.1	Carbanenems	27.3 FOs	24.8
10 E	EOc	10.1	2 <sup>rd</sup> gaparation Conhs		16 1
10.5		10.4	5 generation ceptis	17.2 HVIF-30L	10.1
14.8	Penicillins with BLIs	15.9	Penicillins with BLIs	12.1 GPs	11.7
7.4	Carbapenems	15.4	GPs	8.1 Penicillins with BLIs	10.2
7.4	GPs	7.6	AGs	6.1 Carbapenems	9.5
7.4	3 <sup>rd</sup> generation Cephs	6.6	FQs	5.1 4 <sup>th</sup> generation Cephs	7.3
7.4	Others	15.9	Others	24.2 Others	20.4
	North Europe % (n=144)		South Europe % (n=278)	West Europe % (n=482)	
20.6	North Europe % (n=144) Penicillins with BLIs	33.3	South Europe % (n=278) FQs	West Europe % (n=482) 21.6 Penicillins with BLIs	28.6
20.6 17.6	North Europe % (n=144) Penicillins with BLIs TMP-SUL	33.3 10.4	South Europe % (n=278) FQs 3 <sup>rd</sup> generation Cephs	West Europe % (n=482) 21.6 Penicillins with BLIs 11.5 TMP-SUL	28.6 13.7
20.6 17.6 11.8	North Europe % (n=144) Penicillins with BLIs TMP-SUL FQs	33.3 10.4 8.3	South Europe % (n=278) FQs 3 <sup>rd</sup> generation Cephs Penicillins with BLIs	West Europe % (n=482) 21.6 Penicillins with BLIs 11.5 TMP-SUL 11.2 FQs	28.6 13.7 13.1
20.6 17.6 11.8 8.8	North Europe % (n=144) Penicillins with BLIs TMP-SUL FQs Carbapenems	33.3 10.4 8.3 6.9	South Europe % (n=278) FQs 3 <sup>rd</sup> generation Cephs Penicillins with BLIs Carbapenems	West Europe % (n=482) 21.6 Penicillins with BLIs 11.5 TMP-SUL 11.2 FQs 11.2 Carbapenems	28.6 13.7 13.1 7.7
20.6 17.6 11.8 8.8 8.8	North Europe % (n=144) Penicillins with BLIs TMP-SUL FQs Carbapenems AGs	33.3 10.4 8.3 6.9 6.3	South Europe % (n=278) FQs 3 <sup>rd</sup> generation Cephs Penicillins with BLIs Carbapenems TMP-SUL	West Europe % (n=482) 21.6 Penicillins with BLIs 11.5 TMP-SUL 11.2 FQs 11.2 Carbapenems 10.8 GPs	28.6 13.7 13.1 7.7 6.4
20.6 17.6 11.8 8.8 8.8 8.8	North Europe % (n=144) Penicillins with BLIs TMP-SUL FQs Carbapenems AGs BL-sensitive penicillins	33.3 10.4 8.3 6.9 6.3 5.6	South Europe % (n=278) FQs 3 <sup>rd</sup> generation Cephs Penicillins with BLIs Carbapenems TMP-SUL GPs	West Europe % (n=482) 21.6 Penicillins with BLIs 11.5 TMP-SUL 11.2 FQs 11.2 Carbapenems 10.8 GPs 7.6 3 <sup>rd</sup> generation Cephs	28.6 13.7 13.1 7.7 6.4 6.2
20.6 17.6 11.8 8.8 8.8 8.8 8.8 8.8	North Europe % (n=144) Penicillins with BLIs TMP-SUL FQs Carbapenems AGs BL-sensitive penicillins MLs	33.3 10.4 8.3 6.9 6.3 5.6 5.6	South Europe % (n=278) FQs 3 <sup>rd</sup> generation Cephs Penicillins with BLIs Carbapenems TMP-SUL GPs Others	West Europe % (n=482)21.6 Penicillins with BLIs11.5 TMP-SUL11.2 FQs11.2 Carbapenems10.8 GPs7.6 3 <sup>rd</sup> generation Cephs26.3 Others	28.6 13.7 13.1 7.7 6.4 6.2 24.3

## CONCLUSION

Distinct features of antimicrobial prescriptions were shown among cancer patients including high rates of antimicrobial prevalence, wide use of broad-spectrum antibiotics, and heavy burden of pneumonia and febrile neutropenia. This global study provides basic data for promoting antimicrobial stewardship in cancer patients.