



# GLOBAL POINT PREVALENCE SURVEY OF ANTIMICROBIAL CONSUMPTION AND RESISTANCE (GLOBAL-PPS)

**15<sup>th</sup>** Professor Alborzi  
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## Burden and current global management of sepsis worldwide Lessons from the Global-PPS

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22<sup>nd</sup> October 2021

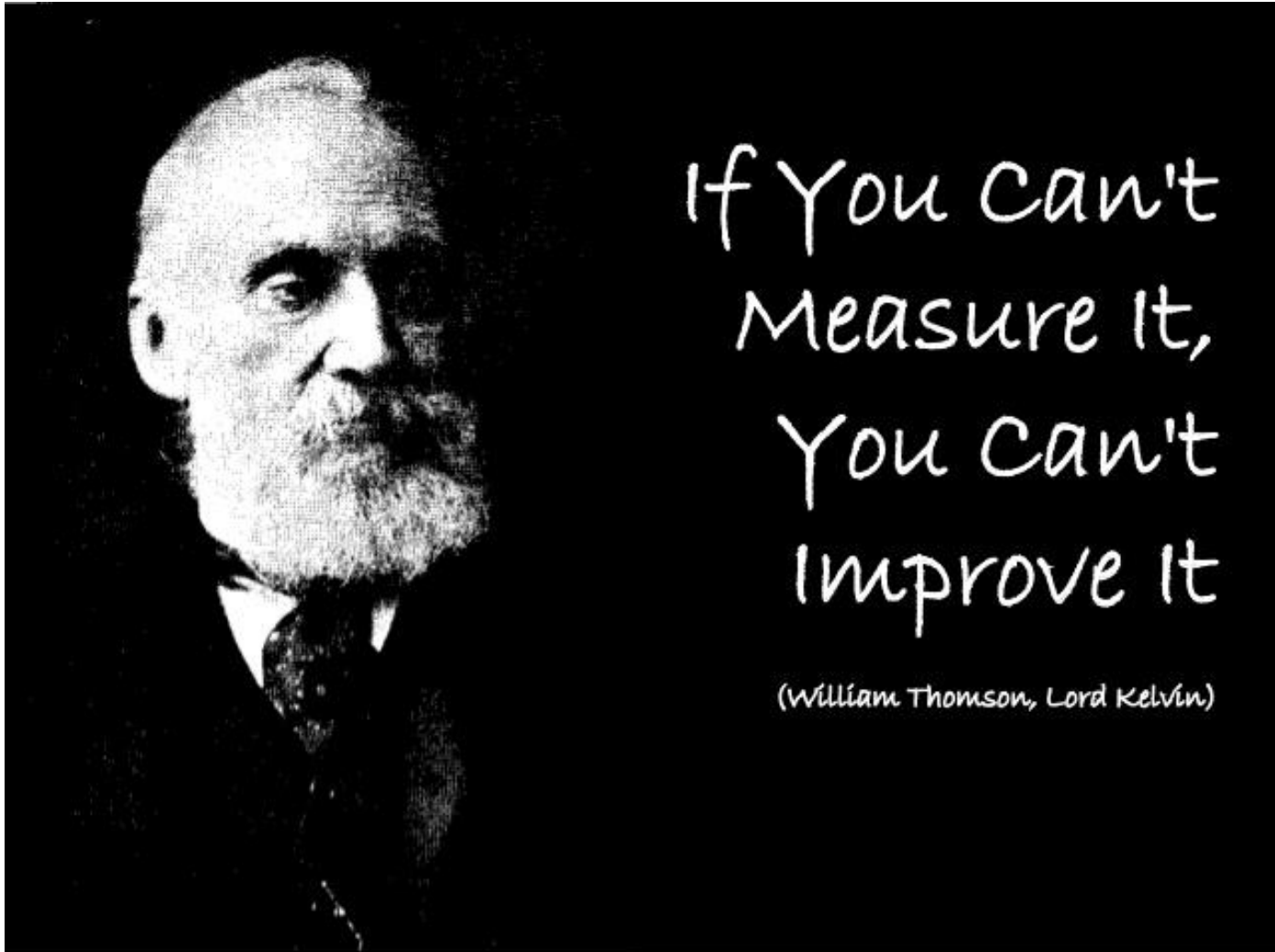
<https://www.global-pps.com/>

The Global-PPS is coordinated  
by the University of Antwerp  
and supported by bioMérieux





# Surveillance



(Lord Kelvin, 1824-1907)



# Method of the Global-PPS

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- Uniform, **standardized methodology**
- Simple, web-based tool for data entry** : quality assurance, data validation process and feedback reporting
- A **one-day cross sectional PPS** during which all wards admitting inpatients were audited once
- Data are completely **anonymously** entered to the database and safeguarded at the University of Antwerp
- Freely available** for all hospitals worldwide
- Participation on a **voluntary** basis



# Method Global-PPS, next

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- **Denominator** = total N patients present on the ward at 8 am
- Detailed data (**numerator**) are collected for each patient receiving at least one antimicrobial
  - Patient characteristics
  - Details on antimicrobial agent
  - Indication for treatment
  - Quality indicators.
- Drugs are classified according to the standardized WHO Anatomical Therapeutic Chemical (**ATC**) **classification system**
- The **WHO AWaRe Classification** list (Access-Watch-Reserve )
- Sepsis analyses : use of 2015-2021\_P1 data



# AWaRe : Access – Watch - Reserve

4 categories

## Access

- 1st or 2nd choice for empiric treatment of the most common infections
- Lower risk of resistance selection
- Amoxicillin, cefazolin, cloxacillin, clindamycin...

## Watch

- 1st or 2nd choice for limited indications only
- Higher risk of resistance selection
- Quinolones, carbapenems, cephalosporins 2<sup>e</sup> / 3<sup>e</sup> gen...

## Reserve

- To be used only as a 'last resort', when all other antibiotics have failed
- Colistin, linezolid, tigecyclin...

## Not recommended (new category 2019)

Mainly fixed-dose combinations of broad-spectrum antibiotics



# Number of patients – antimicrobials 2015-2021\_P1

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	<b>N admitted patients</b>	<b>N patients on antimicrobials</b>	<b>N antimicrobials</b>
<b>Adults</b>	314,923	121,070	174,456
<b>Children</b>	45,668	19,386	29,695
<b>Neonates</b>	17,028	5,362	10,057
<b>TOTAL</b>	<b>377,619</b>	<b>145,818</b>	<b>214,208</b>



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# Sepsis in hospitalized adults and children





# Number of patients with sepsis by region worldwide (Global-PPS 2015-2021 data)

Denominator	North			South			Total
	SE Asia	WC Asia	America	America	Europe	Africa	
N treated adults	39967	5693	10539	10123	40265	12853	121070
N treated children	7769	3540	848	1714	5841	4960	24748
N sepsis adults	948	224	280	291	1009	452	3204
N sepsis children	1067	264	110	114	380	808	2743
<b>% sepsis adults</b>	<b>2,4</b>	<b>3,9</b>	<b>2,7</b>	<b>2,9</b>	<b>2,5</b>	<b>3,5</b>	<b>2,6</b>
CAI %	51,8	47,8	50,4	24,1	49,5	64,6	49,9
HAI %	42,9	45,1	43,2	72,9	48,0	32,1	45,9
<b>% sepsis children</b>	<b>13,7</b>	<b>7,5</b>	<b>13,0</b>	<b>6,7</b>	<b>6,5</b>	<b>16,3</b>	<b>11,1</b>
CAI %	65,4	53,8	55,5	33,3	50,0	61,6	59,3
HAI %	27,3	40,5	36,4	59,6	46,8	33,3	34,7

Note: Calculation of sepsis prevalence (%) = N patients with sepsis/all patients receiving at least one antimicrobial for treatment or prophylaxis !



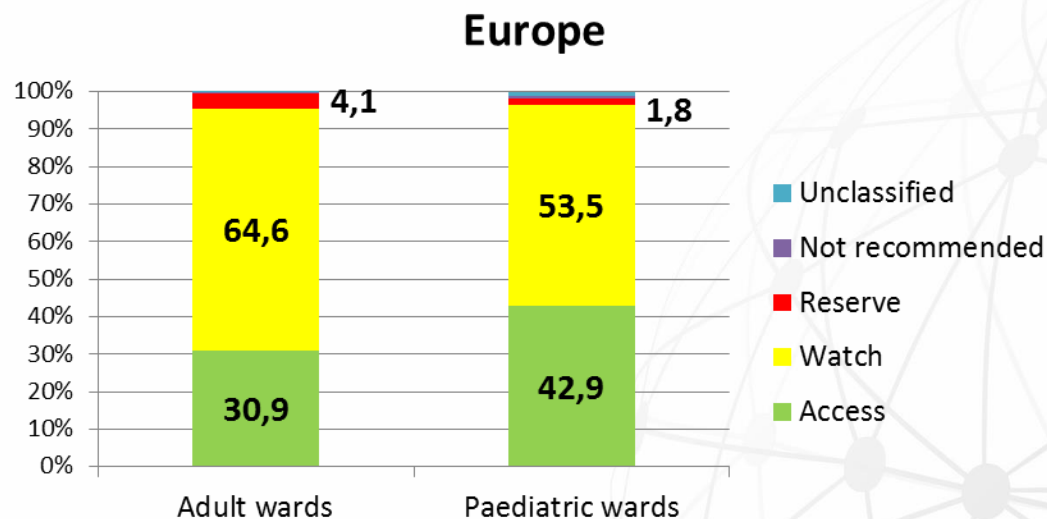
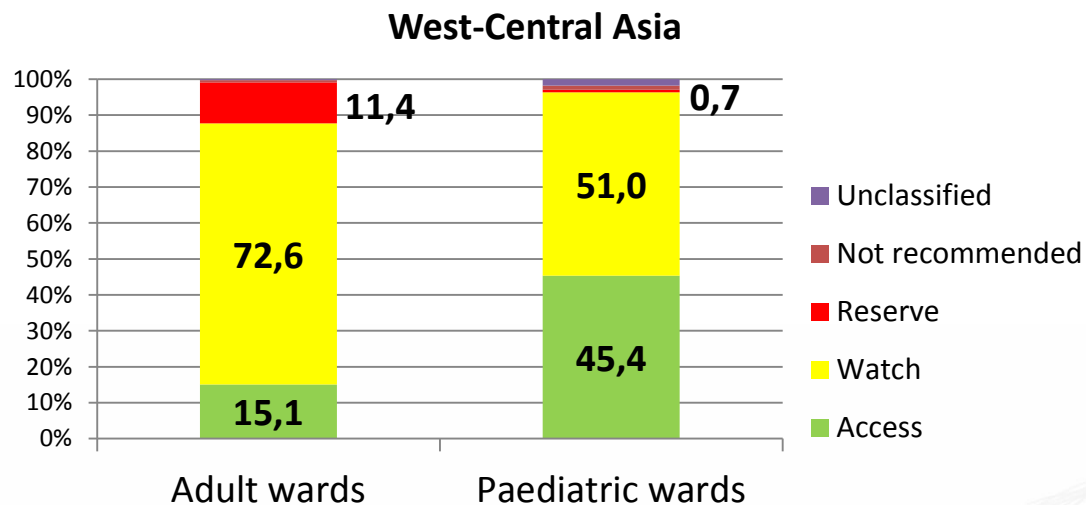


# Number of antimicrobials prescribed to treat sepsis worldwide (Global-PPS 2015-2021 data)

	N antimicrobials prescribed to treat sepsis	Antibacterials for systemic use (ATC J01)	Antimycotics for systemic use (ATC J02)	Other anti-microbials
East & South Asia	3159	94.6	4.9	0.5
West & Central Asia	766	95.9	3.8	0.4
North America	550	93.9	5.1	1.0
South America	639	88.6	9.7	1.7
Europe	1783	95.1	3.8	1.1
Africa	2179	96.2	1.9	1.9
<b>Grand Total</b>	<b>9076</b>	<b>94.7</b>	<b>4.3</b>	<b>1.0</b>



# Antibiotics prescribed for sepsis according to AWaRe classification





# Type of antibiotics (ATC code J01) prescribed for sepsis in **adults** (Global-PPS 2015-2021 data)

## West-Central Asia

Substance (ATC code J01)	AWaRE class	Adults % (n=351)
Vancomycin	Watch	14.8
Meropenem	Watch	14.2
Piperacillin/tazobactam	Watch	12.3
Imipenem/cilastatin	Watch	8.0
Ceftriaxone	Watch	6.0
Colistin	Reserve	6.0
Metronidazole	Access	4.6
Levofloxacin	Watch	3.7
Linezolid	Reserve	3.1
Gentamicin	Access	2.8

## Europe

Substance (ATC code J01)	AWaRE class	Adults % (n=1239)
Piperacillin/tazobactam	Watch	21.1
Amoxicillin/beta-lactam	Access	14.0
Meropenem	Watch	9.4
Vancomycin	Watch	8.8
Ceftriaxone	Watch	5.2
Ciprofloxacin	Watch	4.3
Flucloxacillin	Access	3.6
Teicoplanin	Watch	2.7
Levofloxacin	Watch	2.2
Ceftazidime	Watch	2.1



# Type of antibiotics (ATC code J01) prescribed for sepsis in **adults** (Global-PPS 2015-2021 data)

## Iran

Substance (ATC code J01)	AWaRE class	Adults % (n=99 J01)
Meropenem	Watch	26,3
Vancomycin	Watch	25,3
Ceftriaxone	Watch	11,1
Ciprofloxacin	Watch	9,1
Teicoplanin	Watch	6,1
Imipenem/enz.inh.	Watch	5,1
Ampicillin/enz.inh.	Access	4,0
Amikacin	Access	2,0
Cefepime	Watch	2,0
Colistin	Reserve	2,0

## Europe

Substance (ATC code J01)	AWaRE class	Adults % (n=1239 J01)
Piperacillin/tazobactam	Watch	21.1
Amoxicillin/beta-lactam	Access	14.0
Meropenem	Watch	9.4
Vancomycin	Watch	8.8
Ceftriaxone	Watch	5.2
Ciprofloxacin	Watch	4.3
Flucloxacillin	Access	3.6
Teicoplanin	Watch	2.7
Levofloxacin	Watch	2.2
Ceftazidime	Watch	2.1



# Type of antibiotics (ATC code J01) prescribed for sepsis in **children** (Global-PPS 2015-2021 data)

## West-Central Asia

Substance (ATC code J01)	AWaRE class	Children % (n=443)
<b>Ampicillin (1st line)</b>	Access	19.0
Vancomycin	Watch	16.5
<b>Gentamicin (1st line)</b>	Access	11.5
Meropenem	Watch	10.4
Amikacin	Access	9.3
<b>Ceftriaxone (2<sup>nd</sup> line)</b>	Watch	7.4
Cefotaxime	Watch	7.0
Piperacillin/tazobactam	Watch	5,4
Cloxacillin	Access	2,3
Metronidazole	Access	1,1

## Europe

Substance (ATC code J01)	AWaRE class	Children % (n=611)
Cefotaxime	Watch	12.4
Vancomycin	Watch	11.3
Meropenem	Watch	10.8
Gentamicin	Access	9.8
<b>Ampicillin</b>	Access	7.9
<b>Amikacin</b>	Access	7.2
Benzympenicillin	Access	6.4
<b>Ceftriaxone</b>	Watch	5.7
Amoxicillin	Access	4.3
Piperacillin/tazobactam	Watch	2.9

WHO-recommendation:

- first-line: gentamicin/ampicillin or gentamicin/benzympenicillin
- second-line: ceftriaxone

Ref: World Health Organization. *Pocket Book of Hospital Care for Children: Second Edition*. 2013.

Available at <https://www.ghdonline.org/nursing/discussion/pocket-book-of-hospital-care-for-children-guidelin/index.html>



# Type of antibiotics (ATC code J01) prescribed for sepsis in **children** (Global-PPS 2015-2021 data)

## Iran

Substance (ATC code J01)	AWaRE class	Children % (n=170 J01)
<b>Ampicillin</b>	Access	22,9
Cefotaxime	Watch	17,6
Vancomycin	Watch	17,1
Ceftriaxone	Watch	15,3
Meropenem	Watch	12,4
<b>Gentamicin</b>	Access	8,8
Amikacin	Access	2,9
Ciprofloxacin	Watch	1,2
Clindamycin	Access	0,6
Metronidazole	Access	0,6

## Europe

Substance (ATC code J01)	AWaRE class	Children % (n=611 J01)
Cefotaxime	Watch	12.4
Vancomycin	Watch	11.3
Meropenem	Watch	10.8
<b>Gentamicin</b>	Access	9.8
<b>Ampicillin</b>	Access	7.9
Amikacin	Access	7.2
<b>Benzylpenicillin</b>	Access	6.4
Ceftriaxone	Watch	5.7
Amoxicillin	Access	4.3
Piperacillin/tazobactam	Watch	2.9

WHO-recommendation:

- first-line: gentamicin/ampicillin or gentamicin/benzylpenicillin
- second-line: ceftriaxone

Ref: World Health Organization. *Pocket Book of Hospital Care for Children: Second Edition*. 2013. Available at <https://www.ghdonline.org/nursing/discussion/pocket-book-of-hospital-care-for-children-guidelin/index.html>

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# Selected Antibiotic Quality Indicators



# Summary of antibiotic (J01) quality indicators for treatment of sepsis in adults

	reason in notes	stop/review date	guidelines missing	guideline compliance	targeted
<b>Iran</b>	<b>92,1</b>	<b>58,4</b>	<b>3,0</b>	<b>62,5</b>	<b>40,0</b>
East & South Asia	78,4	40,2	21,1	80,5	23,8
West & Central Asia	71,8	22,9	28,2	72,1	25,1
North America	95,4	46,6	24,5	85,4	26,0
South America	89,7	50,5	16,9	84,1	20,7
Europe	87,0	34,2	14,2	84,2	45,8
Africa	78,1	33,1	39,2	67,8	10,2
<b>Grand Total</b>	<b>82,8</b>	<b>37,9</b>	<b>22,9</b>	<b>80,5</b>	<b>26,9</b>





# Summary of antibiotic (J01) quality indicators for treatment of sepsis in Children/Neonates

	Reason in notes	Stop/review date	Guidelines missing	Guideline compliance	Targeted
<b>Iran</b>	<b>80,1</b>	<b>11,1</b>	<b>8,2</b>	<b>22,9</b>	<b>2,3</b>
East & South Asia	77,1	34,5	6,8	85,0	12,9
West & Central Asia	78,3	35,0	21,0	90,4	18,4
North America	90,6	56,0	15,2	96,9	4,7
South America	93,5	41,3	27,4	76,8	24,4
Europe	90,9	45,7	17,2	94,8	20,5
Africa	86,3	39,6	32,1	80,4	8,2
<b>Grand Total</b>	<b>83,0</b>	<b>38,6</b>	<b>18,4</b>	<b>85,9</b>	<b>13,0</b>

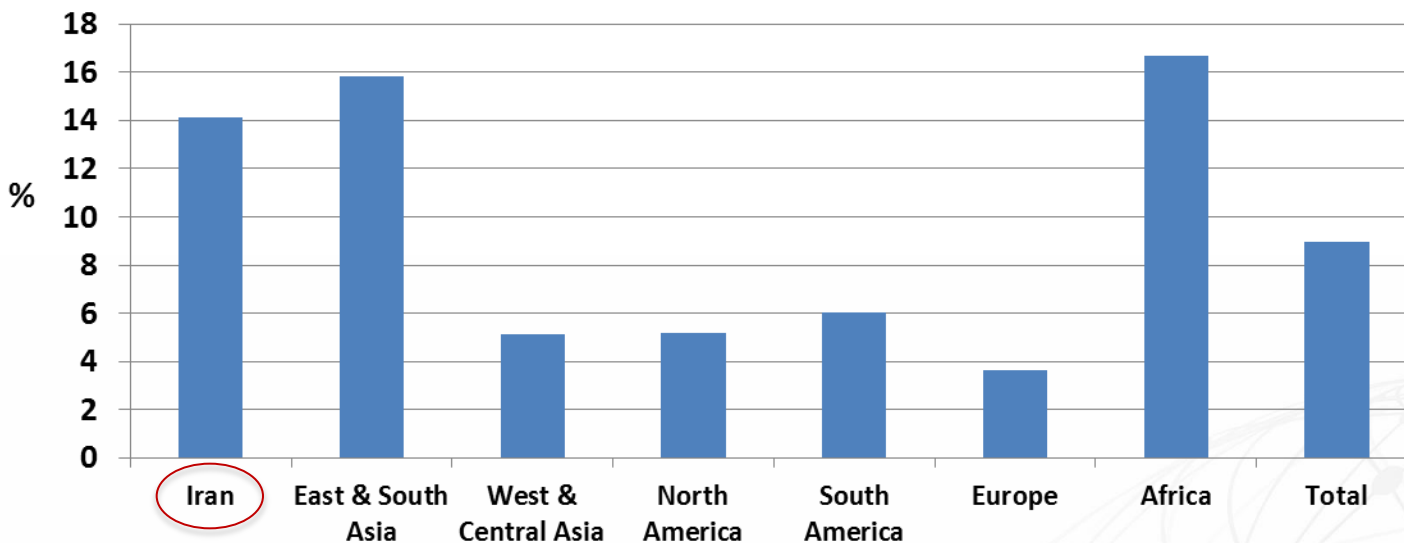
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# Neonatal sepsis



# Sepsis in neonates admitted to NICU and General Medical Neonatal Wards

Proportion (%) of neonates admitted on neonatal wards (NICU & GNMW) receiving treatment for sepsis



	Iran	East & South Asia	West & Central Asia	North America	South America	Europe	Africa	Total
N admitted patients	461	3942	2803	1549	1095	4979	2488	16856
N treated patients	332	1851	542	231	278	904	1519	5325
<b>Treated with at least 1 AM %</b>	<b>72,0</b>	<b>47,0</b>	<b>19,3</b>	<b>14,9</b>	<b>25,4</b>	<b>18,2</b>	<b>61,1</b>	<b>31,6</b>
N pat. treated for Sepsis	65	624	143	80	66	180	415	1508
<b>Treated Sepsis %</b>	<b>14,1</b>	<b>15,8</b>	<b>5,1</b>	<b>5,2</b>	<b>6,0</b>	<b>3,6</b>	<b>16,7</b>	<b>8,9</b>



# Type of antibiotics (ATC code J01) prescribed for sepsis in **neonates** (Global-PPS 2015-2021 data)

## Iran

Substance (ATC code J01)	AWaRE class	Neonates % (n=126)
Ampicillin	Access	30,2
Cefotaxime	Watch	22,2
Vancomycin	Watch	17,5
Meropenem	Watch	12,7
Gentamicin	Access	11,9
Amikacin	Access	4,0
Ciprofloxacin	Watch	0,8
Metronidazole	Access	0,8

## West-Central Asia

Substance (ATC code J01)	AWaRE class	Neonates % (n=234)
Ampicillin	Access	22,6
Gentamicin	Access	16,7
Vancomycin	Watch	16,7
Amikacin	Access	11,5
Meropenem	Watch	11,1
Cefotaxime	Watch	4,7
Cloxacillin	Access	3,8
Piperacillin/tazobactam	Watch	2,1

## Europe

Substance (ATC code J01)	AWaRE class	Neonates % (n=315)
Gentamicin	Access	15,9
Vancomycin	Watch	13,0
Amikacin	Access	11,7
Benzylpenicillin	Access	10,8
Ampicillin	Access	9,8
Meropenem	Watch	7,9
Cefotaxime	Watch	4,8
Amoxicillin	Access	3,5



# Discussion

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## Challenges related to antibiotic prescribing for sepsis

- High use of broad-spectrum agents (Watch-reserve agents)
- low documentation of stop/review date
- Low use of microbiology to inform treatment



## Contact

[global-PPS@uantwerpen.be](mailto:global-PPS@uantwerpen.be)

Any hospital can participate!



We warmly welcome you to  
join the network !

[www.global-pps.com](http://www.global-pps.com)

