




Results of Pilot Study of Single-Point Healthcare-Associated Infections Prevalence and Antimicrobial Use in the Republic of Kazakhstan (2022)

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With the support of: WHO Country Office in the Republic of Kazakhstan

1. HAI Burden

HAI prevalence in the Republic of Kazakhstan:

According to RoK data: for 2019 – **0.32%**

for 2021 – **0.67%**



The most recent HAI prevalence study in the European Region in 2017-2018: prevalence **6.5%**

According to the results of this European-wide study, the immediate HAI prevalence varied from country to country and ranged **from 3 to 12%**

in accordance with the estimation, **8.8 million cases of** HAI occur annually in hospitals and long-term care facilities in the EU as a whole

2. PPS Goals

1. **Investigate the HAI prevalence and the use of antimicrobials in inpatient care;**
2. **Use PPS results to measure the HAI burden in selected hospitals and extrapolate to determine the potential HAI burden at the national level.**
3. **Disseminate the results locally, regionally and nationally to stakeholders in order to:**
 - *develop and strengthen structures and skills in epidemiological surveillance,*
 - *identify common problems and determine appropriate priorities,*
 - *identify local/regional/national policies for the future (repeat PPS),*
 - *provide a standardized and validated tool for setting quality improvement targets for hospitals,*
 - *improve the quality of medical care and patient safety,*
 - *improve the competence of health care workers, including the avoidance of HAI.*



PPS Methodology and Process

- The pilot PPS was performed according to the standardized **protocol and methodology developed by the ECDC**;
- **Four tertiary care hospitals** were selected for the pilot study;
- The WHO Country Office conducted **training sessions for the experts involved in the data collection and the team that conducted the validation study**;
- The pilot PPS was conducted **during April-May 2022**, with data analysis conducted in May 2022 using HelicsWin software;
- Data of **1,676 patients** were collected and analyzed as a result of the pilot PPS;
- **Data validation** was performed by high-risk department



Study limitation:

Insufficient sample to extrapolate data to the whole country!

3.1. Main results: Data of the IPC program

Component	Unit of measure	Value
Personnel responsible for IPC	% from rec.	100
Wards for patients with airborne infections	Q-ty	1
Availability of SOP on IPC	% from rec.	75
IPC training sessions in situ	% from rec.	50
IPC practice monitoring	% from rec.	25
Blood culture	Q-ty/100	8.3
C.difficile tests	Q-ty	0
WHO hand hygiene assessment	% from rec.	25
Beds are equipped with a dispenser with hand sanitizer	% from rec.	19

Use of alcohol-based antiseptic in the medical organizations (MO) included in the study, for 2022

MO Code	Used antiseptic, liters per year	Number of patient-days per year	Used liters of antiseptic per 1,000 patient-days per year.	Number of beds equipped with a dispenser	
001	25,498	248,333	102.7	0	0%
002	5,790	142,184	40.7	353	70.6%
003	706	62,596	11.3	0	0%
004	3,525	128,752	27.3	44	11.4%
Total:	35,519	581,865	61.0	397	19%

N = 20/1,000 pat.

N = 100%

3.2. Main results: HAI prevalence

Indicator	Value
HAI prevalence, %	3.2* %
95% confidence interval for the HAI prevalence rate	(2.5- 4.2%)

**The relatively low HAI prevalence can be explained by:*

- a) Hospitalizations of patients in a mild to moderate condition, especially in therapeutic departments;*
- b) Prescribing antimicrobials for prophylactic purposes;*
- c) Lack of clinical evidence (criteria) for HAI diagnosing*

HAI Burden

Indicator (pilot PPS)	Value
Number of HAI patients	53
HAI number	55
HAI number per infected patient	1.04
<u>Estimated number</u> of HAI in pilot hospitals per year	2,615



In each MO **650 HAI per year** = additional **3,000 bed-days**

Results of the Main Study and Validation Study in High-risk Departments

Indicator	Value
HAI prevalence (high-risk department), % - main	5.1%
95% confidence interval for the HAI prevalence rate (high-risk department)	(2.8 – 7.4)
HAI prevalence (high-risk department), % - validation	5.8%
95% confidence interval for the HAI prevalence rate (high-risk department)	(3.5 – 8.7%).

HAI Origin

Indicator	%
HAI present at the time of hospitalization	9.3
HAI acquired during the current hospitalization	71.4

3.8% of all detected HAI are observed in patients who were in the same medical institution where they were hospitalized, i.e., in **repeated hospitalizations**

HAI Distribution by Type

HAI Type	%
Infections in the area of surgery of which:	25.9%
<i>superficial</i>	64.2%
<i>deep</i>	21.4%
<i>organ/cavity</i>	14.2%
Pneumonia	18.5%
Urinary tract infections	13.0%
Other infections (gastroenterology, hepatitis, ENT, etc.)	9.2%
Other lower respiratory tract infections (bronchitis)	7.4%
Systemic infections	5.6%
Skin and soft tissue infections	5.6%
Bloodstream infections of which:	4.8%
<i>catheter-associated infections</i>	14.8%

Incidence of HAI Among Patients with Invasive Devices at the Time of the Study

Risk factors at the time of the study	Number of patients with an invasive device, %	Number of HAI among patients with an invasive device, %	Relative risk (RR)
Central venous catheter	14	15.9	14.6
Intubation	2.3	31.6	11.9
Urinary catheter	9.6	15.6	7.8
Peripheral venous catheter	12.7	3.8	1.2

HAI Distribution by Age

Age intervals (years)	HAI number	Percentage of the total number, %
0-18	8	14.5
19-38	13	23.6
39-58	10	18.2
59-78	21	38.2
79 and older	3	5.5
In totality:	55	100

Classification of Microorganisms Detected in Patients with HAI

Description	Quantity	%
HAI number, total	55	
HAI number with microorganisms, total	23	41.8%
Number of microorganisms	14 24 (isolates)	

Number and Proportion of Isolates of Pathogens from Patients with HAI

Indicator	Isolate number	Part, %
Gram-positive cocci	10	41.7%
ENTEROCOCCUS SPECIES	2	8.3%
STAPHYLOCOCCUS AUREUS	3	12.5%
COAG.-NEG. STAPHYLOCOCCI	3	12.5%
STREPTOCOCCUS SPECIES	2	8.3%
Enterobacteria	7	29.2%
CITROBACTER SPECIES	1	4.2%
ENTEROBACTER SPECIES	2	8.3%
ESCHERICHIA COLI	2	8.3%
KLEBSIELLA SPECIES	2	8.3%
Gram-negative (not including Enterobacteriaceae)	6	25.0%
ACINETOBACTER SPECIES	1	4.2%
PSEUDOMONAS AERUGINOSA	5	20.8%
Fungus	1	4.2%

Resistance of HAI Pathogens to Specific Groups of Antibiotics

Microorganism	Isolate number	Number of resistant microorganisms	% of resistant microorganisms
Enterobacter spp., 3GC-NS	1	1	100
Enterobacteriaceae, CAR-NS	5	4	100
Escherichia coli , CAR-NS	1	1	100
Klebsiella spp., CAR-NS	2	1	100
Enterobacter spp., CAR-NS	1	1	100
Enterobacteriaceae, 3GC-NS	4	3	75
Pseudomonas aeruginosa, CAR-NS	5	3	60
Staphylococcus aureus, GLY-R	2	1	50
Enterococci, GLY-R (VRE)	2	1	50
Enterococcus faecalis	2	1	50
Escherichia coli, 3GC-NS	2	1	50
Staphylococcus aureus (MRSA), OXA-R	3	1	33
Enterococcus faecium	0	0	0
Klebsiella spp., 3GC-NS	0	0	0
Acinetobacter baumannii, CAR-NS	1	0	0

3.3. Main Results: Prevalence of Antimicrobial Use

Indicator	Value
AM prevalence, %	46.6%
95% confidence interval	(44.2)–(49.0)
Number of patients who received antimicrobials	779
Number of antimicrobials	1072
Number of antimicrobials per patient	1.4

World Health
Organization

Routes of Administration and Frequency of AM Replacement

Description	Part, %
Route of administration	
Parenteral	93
Peroral	6.4
Other (inhalation/rectal)	0.6
Rationale for the appointment in the medical records	39.7
Changes in antimicrobial therapy	
Without replacement	92.5
Escalation (switching to a stronger AM)	5.9
De-escalation (switching to a narrower-spectrum AM)	0.3
Dosage recorded	99.2

Health
vation

Prevalence of Antimicrobial Use by Specialty

Specialty	%
ICU	70.6
Surgery	62.5
Obstetrics & Gynaecology	46
Therapy	28
Pediatrics	23.1
Rehabilitation	0

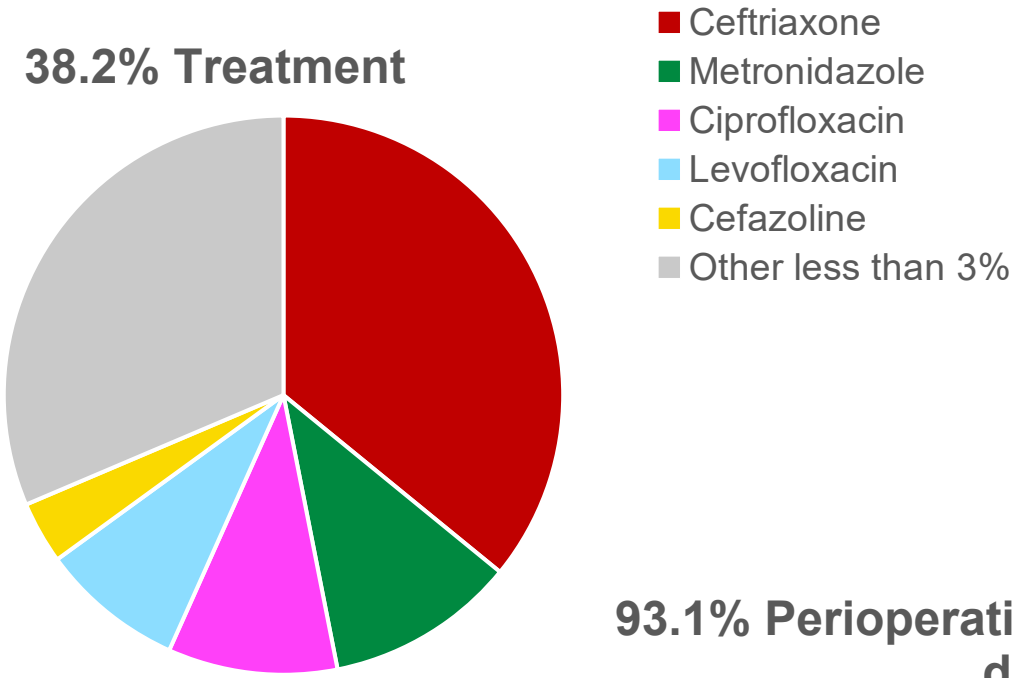


Indications for Antimicrobials Use

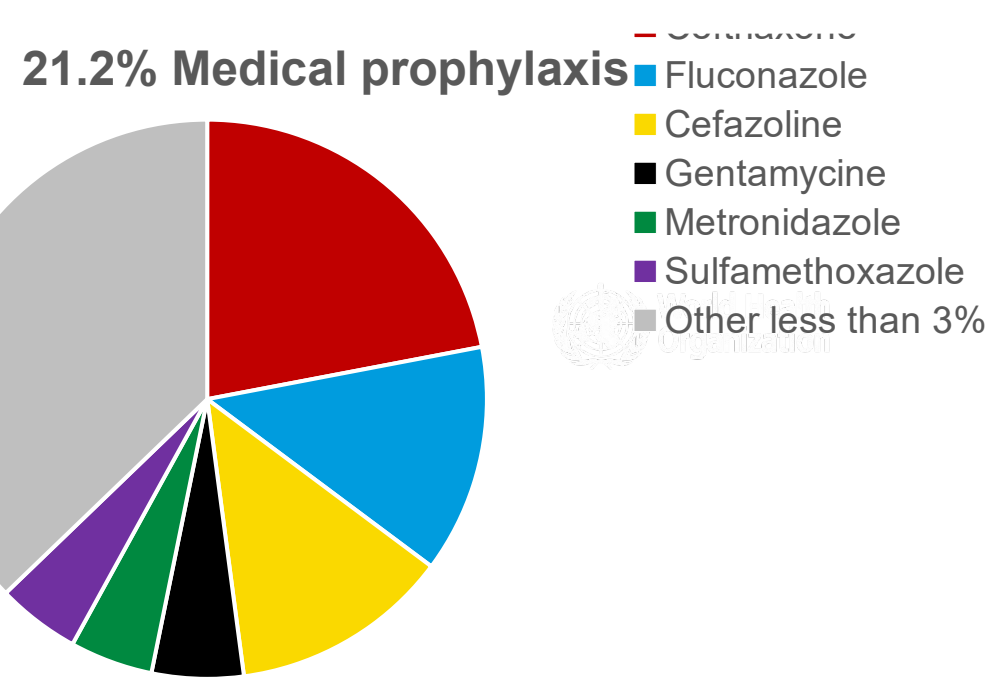
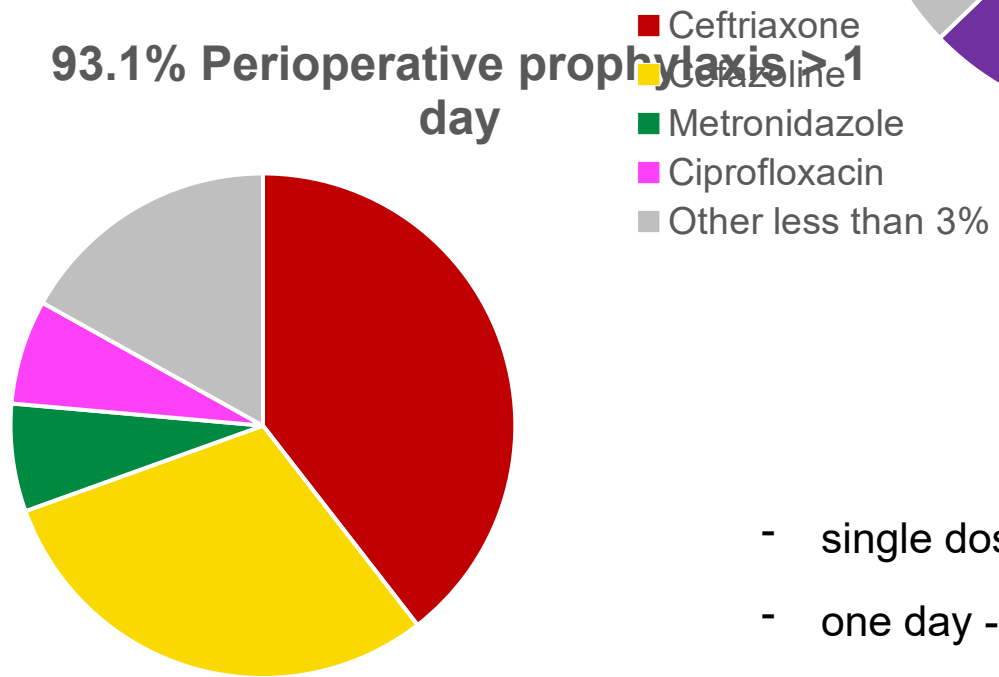
Reason of prescription		Part (%)
Treatment		38.2
CI	Treatment of non-hospital infectious diseases	80
HI	HAI treatment	20
Medical prophylaxis		21.2
MP	Any prophylactic prescription of AM, except perioperative	21.2
Perioperative prophylaxis		37.6
SP1	Perioperative prophylaxis - administration of a single dose	4.7
SP2	Perioperative prophylaxis for a day	2.2
SP3	Perioperative prophylaxis for more than one day	93.1
Other		3
UI	Unknown indications	3
In totality		100

Health
ation

Percentage of Antimicrobial Prescriptions:



93.1% Perioperative prophylaxis > 1 day



- single dose - Cefazolin - 52.6%;
- one day - Cefazolin - 55.5%;



Main recommendations

1. Review and approval of the criteria for determining a HAI case. Improvement of the active HAI surveillance system at the national level.
2. Organization of a nationwide PPS involving a representative number of hospitals, following the ECDC Protocol.
3. Strengthening the capacity of microbiological laboratories to improve diagnostic testing of HAI. Implementation of the EUCAST standard for clinical microbiology.
4. Optimizing the use of antimicrobials.
5. Development of education and training of medical specialists in the field of IPC at the national level.





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