

Nazarbayev University School of Medicine
Master of Public Health Program

**Compliance of antibiotic prophylaxis
therapy with clinical protocols at the
National Research Center of
Oncology and Transplantology in
Astana: retrospective cohort study**

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Antibiotic prophylaxis therapy

Antibiotic prophylaxis therapy – a crucial procedure before undergoing any surgical interventions that is used to decrease the occurrence of surgical site infections and, thus, minimize postoperative morbidity, mortality and reduce hospitalization time.

- Key components of Antibiotic prophylaxis therapy
 - Appropriate antibiotic drug
 - Correctly defined time and dosages of antibiotic therapy
 - Preoperative and postoperative antibiotic administration

(Page, 1993)

Consequences of inappropriate antibiotic prophylaxis therapy

- Inappropriate use of antibiotics before surgery might lead to:
 - **development of surgical site infections**
 - **occurrence of medication errors.** *(Bratzler et al., 2005)*
- Surgical site infection accounts for **22%** of hospital-acquired infections in USA that is associated with **increased morbidity, mortality, readmissions, and prolonged hospital stay** *(Jonge et al., 2017)*.
- Each year at least **1.3 million** people have postoperative complications due to medication errors in USA *(WHO, 2017)*.

Intervention

- Republican center for Health development (*RCHD, 2016*)
 - develop clinical protocols with detailed instructions for antibiotic use in various diseases based on best world practices
- World Health Organization (*WHO, 2007*)
 - evidence-based guidelines of safe antibiotic administration for patients that need surgical interventions
 - surgical safety checklist

Key criteria to assess compliance of Antibiotic prophylaxis therapy

(1) Antibiotic introduction to patient prior to and after surgical intervention

(2) Correct antibiotic dosage for first dose

(3) Time of administration of the first dose (between 30 and 60 minutes before surgery)

(4) Correct antibiotic dosage for second dose

(5) Time of administration of the second dose (between 8 and 24 hours after surgery)

(WHO, 2007)

Importance of the study

- Occurrence of **surgical site infections** due to incorrect antibiotic therapy is high (*Jonge et al., 2017*).
- Reported number of **verbally given prescriptions** of antibiotic to nurses and number of **undocumented antibiotic administration** among health professionals (*Committee on Patient Safety and Quality Improvement, 2010*)
- **Limited studies** on the problem of compliance of antibiotic prophylaxis therapy with clinical protocols
 - No similar studies published in Kazakhstan

Study objectives

1. To identify the **level of compliance of antibiotic prophylaxis** with clinical protocols and guidelines in National Research Center of Oncology and Transplantology within 2015-2017
2. To highlight **the role of the clinical protocols** in providing correct antibiotic prophylaxis

Methods (1)

Study Design

- Retrospective cohort study (January 2015 – December 2017)
- Approved by the **research ethical committee of Nazarbayev University School of Medicine** and **ethical committee of University Medical Center**.

Study population

- Inclusion criteria: patients elder than 18 years old receiving antibiotics before and after surgery between 2015 and 2017 in the Department of orthopedics
- Exclusion criteria: incomplete medical records

Sample Size Data Collection

- 180 medical records were analyzed
- Examining doctor's prescriptions, drugs/procedures appointment sheet, surgical and anesthesiology records and preoperative checklist

Methods (2)

Study Instrument

- Key criteria of compliance of Antibiotic prophylaxis therapy with clinical protocols:
 - Antibiotic introduction **prior to** and **after** the surgery
 - Correct **time** and **dose** of antibiotic **prior to** and **after** the surgery

Independent Variables Outcome Variable

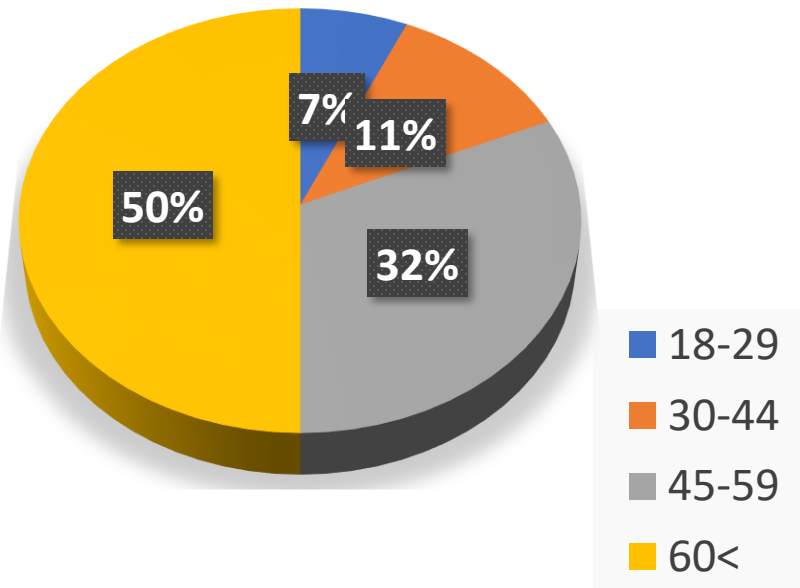
- Age, gender, type, dose and time of antibiotics
- The level of compliance of Antibiotic prophylaxis therapy with clinical protocols and WHO guidelines

Statistical Analysis

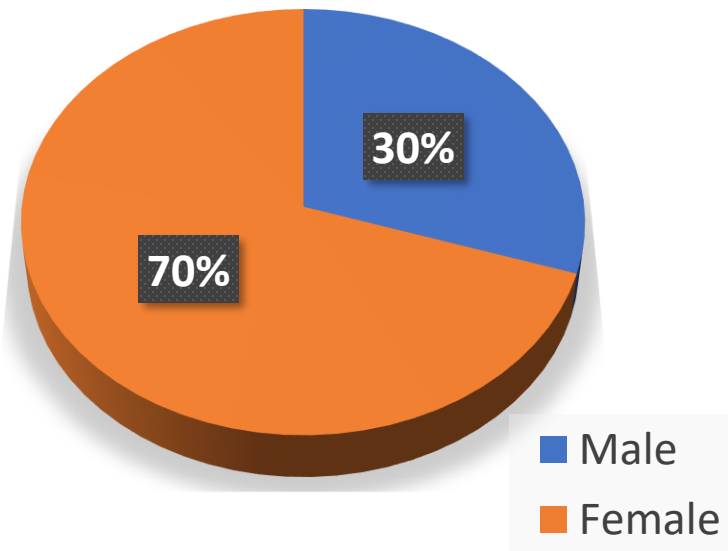
- Univariate, Bivariate (Chi-square test)
- Statistical significance p-value <0.05
- Stata software (*StataCorp, 2013*)

Results: Socio-demographic characteristics

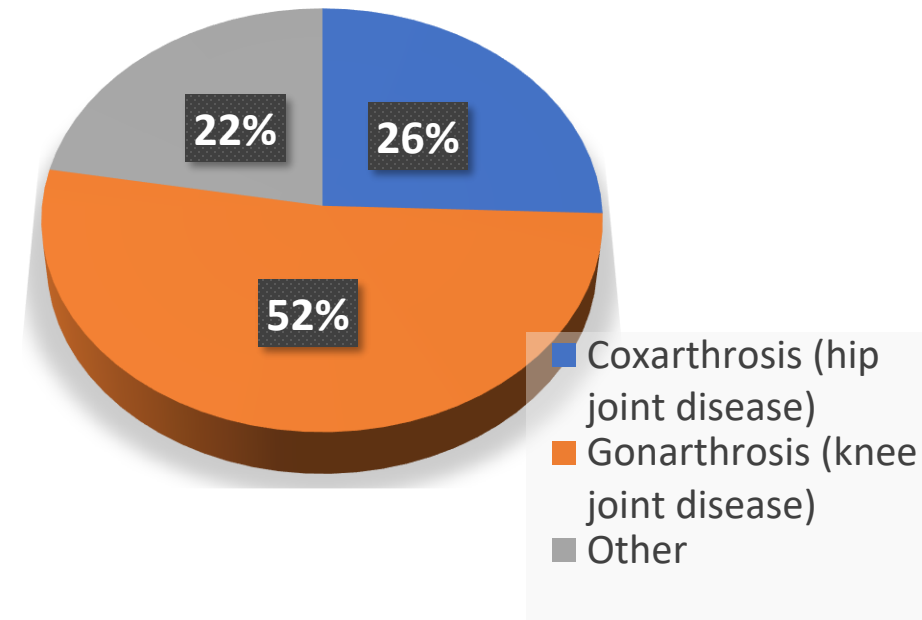
Age



Gender



Disease



Compliance of Antibiotic prophylaxis therapy with Clinical protocols and guidelines

Criterion	No. available	Compliance		
		No. of compliant medical records	%	95% CI
1. Compliance of chosen antibiotic	180	153	85.0	82.9-95.9
2. Correct time of administration of the first dose	180	76	42.2	34.9-49.5
3. Correct antibiotic dosage for the first dose	180	152	84.4	79.1-89.8
4. Correct time of administration of the second dose	180	142	78.9	72.9-84.9
5. Correct antibiotic dosage for the second dose	180	163	90.6	86.2-94.9
Total duration of antibiotic prophylaxis ≤ 24 hours	180	170	94.4	91.1-97.8
Full compliance *	180	58	32.2	25.3-39.1

Compliance of Antibiotic prophylaxis therapy with Clinical protocols and guidelines in 2015-2017

Actions		2015 (n = 60)			2016 (n = 60)			2017 (n = 60)		
		C	NC	p	C	NC	p	C	NC	P
Antibiotic	Cefazolin	15	36	0.294	15	30	0.024	25	25	0.014
	Ceftriaxone	1	2		2	1		0	0	
	Lincomycin	0	0		0	0		0	1	
	No antibiotic agent	0	6		0	12		0	9	
First dose	Intraoperative administration	0	2	< 0.001	0	5	< 0.001	0	6	< 0.001
	Preoperative administration, < 30 min	0	5		0	9		0	10	
	Preoperative administration, 30-60 min	16	3		17	9		25	5	
	Preoperative administration, > 60 min	0	26		0	0		0	0	
	No antibiotic prophylaxis	0	8		0	20		0	14	
Second dose	Postoperative administration, < 8 h	0	5	0.578	0	0	0.002	0	0	0.417
	Postoperative administration, 8-24 h	16	34		17	25		25	25	
	Postoperative administration, > 24 h	0	0		0	0		0	2	
	No antibiotic prophylaxis	0	5		0	18		0	8	

* C – compliant, NC – not compliant

Full compliance of Antibiotic prophylaxis therapy with clinical protocols and guidelines by year

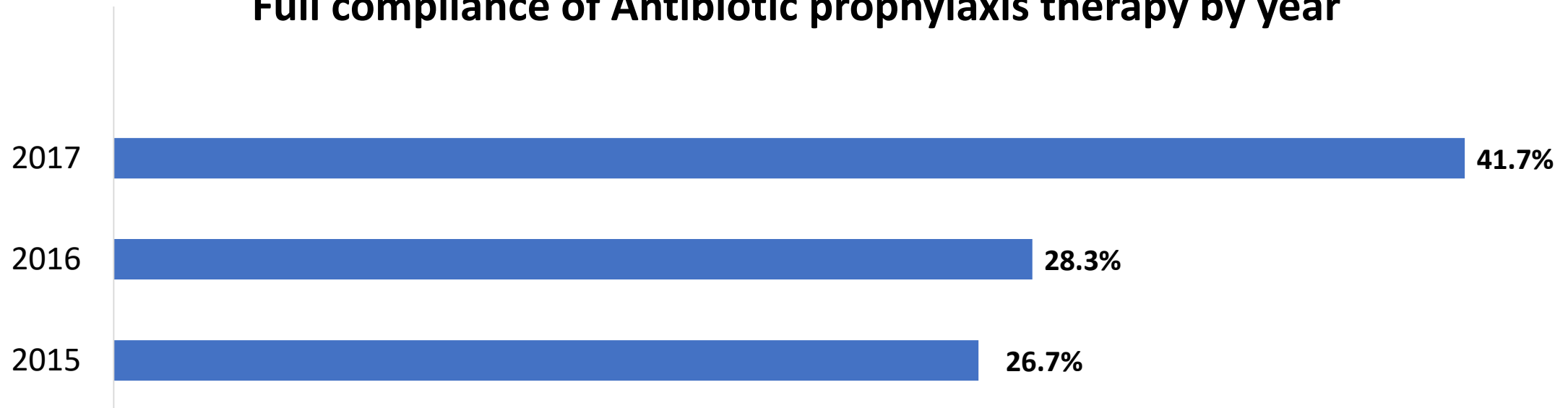
Full compliance	No. available	% of compliant medical records	95% CI	P
By year				0.156
2015	60	26.67 (16)	0.151-0.382	
2016	60	28.33 (17)	0.166-0.401	
2017	60	41.67 (25)	0.288-0.545	

Discussion

- Most compliant criteria – **“Dosages of preoperative and postoperative antibiotic administration”**
- Least compliant criterion – **“Time of preoperative antibiotic administration”**
 - Preoperative antibiotic prophylaxis therapy **improves patient`s condition** (*Vries et al., 2010*)
 - Preoperative antibiotic prophylaxis therapy has **significant effect** on reducing Surgical site infections (*Giusti et al., 2016*)

Discussion

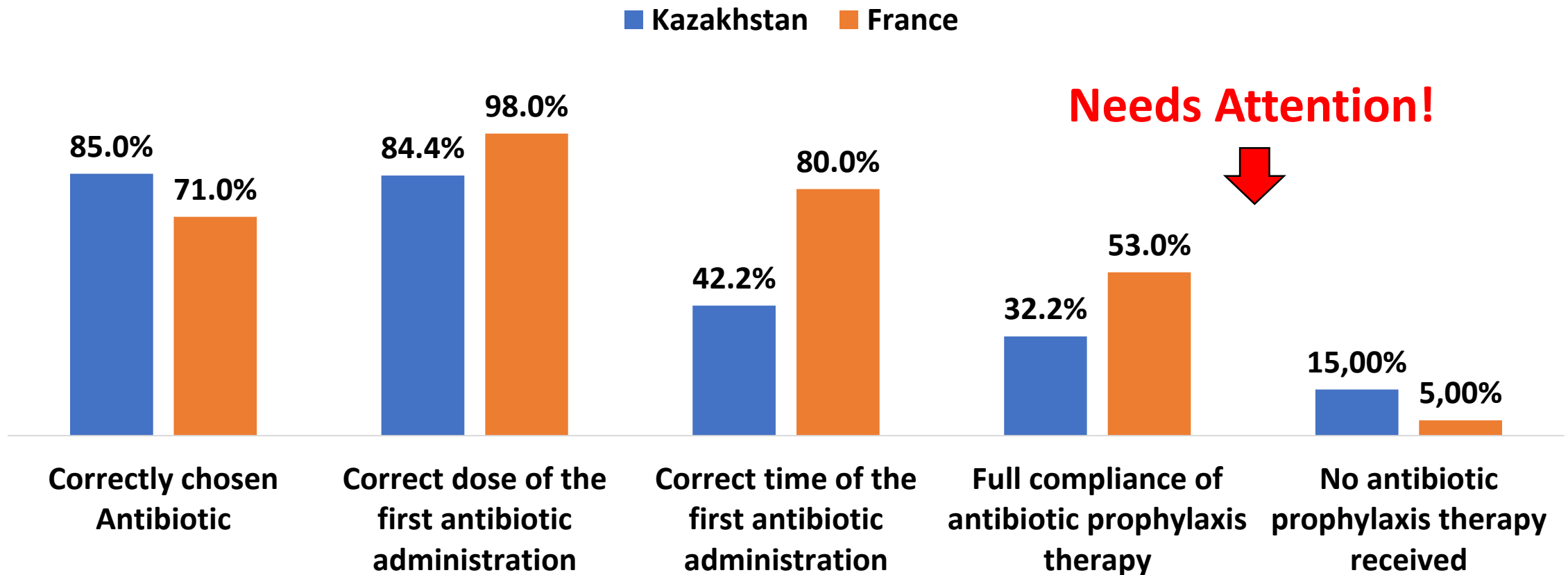
Full compliance of Antibiotic prophylaxis therapy by year



- Introduction of updated surgical checklist in November, 2016 at the National Research Center of Oncology and Transplantology based on physician feedback, occurrence of patient readmission and updated clinical protocols.

Discussion

Level of Compliance of Antibiotic Prophylaxis Therapy with Clinical protocols: Kazakhstan vs France



(Bedouch et al., 2004)

Discussion: Strengths

- Study findings allow us:
 - to see the situation in hospitals
 - to increase the awareness of anesthesiologists on Antibiotic prophylaxis therapy compliance
 - to improve adherence to safety guidelines which is required by many accreditation services
 - to monitor the compliance of Antibiotic prophylaxis therapy procedures with WHO guidelines and Clinical protocols

Discussion: Weaknesses

- Quality of dataset
 - unclear handwritten documentation about antibiotic use
- Small sample size
 - 180 medical records were analyzed instead of expected 300 medical records
- Data is limited to only one hospital

Discussion: Recommendations

- The study can be **expanded to all departments** of the center to compare the level of compliance with Clinical protocols among National Research Center of Oncology and Transplantology departments.
- **Mixed method study** can be conducted which will include **qualitative interviews** of anesthesiologists, surgeons and nurses and **quantitative analysis** of medical records of patients.

Школа Медицины Назарбаев Университета
Программа Общественного Здравоохранения

**Соблюдение антибиотикопрофилактики
согласно клиническим протоколам в
Национальном научном центре онкологии
и трансплантологии в г. Астана:
ретроспективное когортное исследование**

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Введение

Антибиотикопрофилактика – процедура, используемая перед каким-либо хирургическим вмешательством для уменьшения числа хирургических инфекций, сокращения послеоперационной заболеваемости, смертности и времени госпитализации. *(Page, 1993)*

- Клинические протоколы и методические рекомендации на основе лучших мировых практик с подробным описанием по применению антибиотиков при различных заболеваниях помогают снизить риск распространения хирургических инфекций *(RCHD, 2016; WHO, 2007)*

Ключевые критерии для оценки соответствия антибиотикопрофилактики клиническим протоколам

(1) Введение антибиотика пациенту до и после хирургического вмешательства

(2) Правильная дозировка антибиотиков до операции

(3) Правильное время введения антибиотиков до операции (в период между 30-60 мин до операции)

(4) Правильная дозировка антибиотиков после операции

(5) Правильное время введения антибиотиков после операции (в период между 8-24 ч после операции)

Цели исследования

1. Определить **уровень соответствия антибиотикопрофилактики** клиническим протоколам и методическим рекомендациям в Национальном научном центре онкологии и трансплантологии в 2015-2017 гг.
2. Определить **роль клинических протоколов** в обеспечении правильной антибиотикопрофилактики

Методы

- Ретроспективное когортное исследование (Январь, 2015 – Декабрь, 2017)
- **Образец исследования** – 180 медицинских карт:
 - Критерии включения: пациенты старше 18 лет, получающие антибиотики до и после операции в период между 2015 и 2017 годами в Отделе Ортопедии
 - Критерии исключения: неполные медицинские записи
- **Независимые переменные:** вид, доза, время введения антибиотика
- **Зависимая переменная:** Уровень соответствия антибиотикопрофилактики клиническим протоколам и рекомендациям ВОЗ

Результаты исследования

- Более соблюдаемый критерий – **«Дозировка предоперационного и послеоперационного введения антибиотиков»**
- Менее соблюдаемый критерий – **«Время предоперационного введения антибиотиков»**
- **Полное соблюдение** антибиотикопрофилактики согласно клиническим протоколам и рекомендациям ВОЗ – **32,2%**
- **Рост** полного соблюдения антибиотикопрофилактики в 2015-2017 годах – с **26,7% до 41,7%**

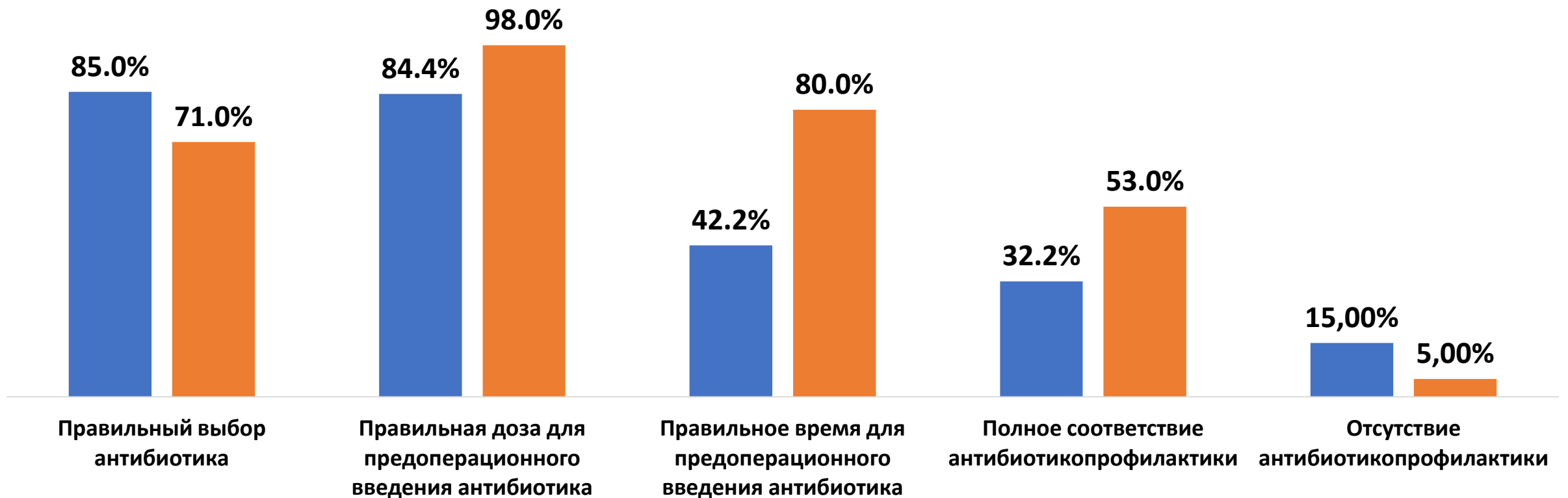
Обсуждение

- Важность предоперационной антибиотикопрофилактики:
 - Улучшает состояние пациента (*Vries et al., 2010*)
 - Оказывает существенное влияние на снижение хирургических инфекций (*Giusti et al., 2016*)

Обсуждение

Уровень соблюдения антибиотикопрофилактики согласно клиническим протоколам: Казахстан и Франция

■ Казахстан ■ Франция



(Bedouch et al., 2004)

Рекомендации

- Проведение исследования во всех отделениях Национального научного центра онкологии и трансплантологии, чтобы сравнить уровень соблюдения клинических протоколов.
- Проведение смешанного метода исследования, который будет включать качественные интервью анестезиологов, хирургов и медсестер и количественный анализ медицинских записей пациентов.



**THANK YOU FOR YOUR ATTENTION.
YOU MAY APPLAUD NOW.**

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