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Ukrainian Strategy and Action Plan for the Prevention of Healthcare Association Infections (HAIs) and Antimicrobial Resistance

Summary

The Ukrainian Strategy and Action Plan for the Prevention of Healthcare Association Infections (HAIs) and Antimicrobial Resistance defines the purpose, principles and main directions of the improvement of the National system for control and prevention of HAI and AMR pathogens of these infections, mechanisms of its functioning, as well as expected socio-economic impact.

Action plan underscores the need for an effective «One Health» approach involving coordination among numerous international sectors and actors, including human and veterinary medicine, agriculture, environment, and well-informed consumers. The Action Plan recognizes and addresses both the variable resources nations have to combat antimicrobial resistance.

The main objectives of the Ukrainian Action Plan is to improve the regulatory, legal and methodological support system of prevention of Healthcare-associated Infections (HAI), laboratory diagnosis and monitoring of AMR pathogens infections, training system for medical personnel in these fields. We are talking about the introduction of modern approaches and optimization of controls and prevention of HAI, preventing of transmission of multi resistance pathogens in healthcare institutions, improving the effectiveness of disinfection and sterilization measures.

It is planned to create a unified system of laws and regulations that will ensure effective control and prevention of HAI and AMR, and investigation of outbreaks when they occur and ensuring of adequate compensation to victims; to prepare a standard on infection control with the compliance of mandatory requirements aimed at preventing HAI and AMR in healthcare institutions based on their profile; to create in healthcare institutions the methods of epidemiological diagnostic, based on standard criteria for determining of nosocomial infection cases by anatomic localization of infection.

In addition, it is necessary to optimize the list of indications for microbiological and clinical research material and objects of hospital environment, rules of sampling and shipping of samples of biological material in the laboratory. And to develop target prevention programs for HAI and AMR at the national (country), regional and municipal levels. To implement modern technologies on infection control and monitoring of AMR in health care institutions.

As a result of the Ukrainian Action Plan is expected to reduce the number of infections caused by resistant strains of microorganism's mortality, disability and complications from infections associated with medical care, increase the employment potential of the nation by reducing temporary and permanent loss of working ability as a result of population diseases. Also, it is necessary to increase safety of patients and staff while providing medical care.

Key words: Action Plan, Healthcare-associated Infections, Antimicrobial Resistance, National Surveillance Networks, Microbiological monitoring, European Committee on Antimicrobial Susceptibility Testing, European Union, World Health Organization, WHONET, CAESAR, Education and Training.

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INTRODUCTION

Despite the advances of science and medicine, in-depth study of the nature, development and introduction of new technologies for diagnosis and treatment, using of the latest antimicrobial medicines, of modern disinfectants and antiseptics, the Healthcare-associated Infections (HAI) caused by resistant pathogens in Ukraine over the past decades continue to occupy a leading position in infectious pathology of human and acquired scale medical and social problems, getting more and more medical and social importance.

This is primarily due to their wide distribution, which is second only to cardiovascular disease and cancer, high level of morbidity, disability and mortality with a tendency to grow a variety of clinical manifestations, often severe course and propensity for complications and chronic process, and also not rational usage of antibiotics, insufficient level specialized knowledge due to lack of educational programs on these issues, imperfect regulatory framework for control and prevention of HAI and Antimicrobial Resistance (AMR).

The main causes of problems of HAI and AMR in Ukraine are:

1. Lack of recognition from both the state and society of the fact that HAI and AMR in the country have become signs of uncontrolled epidemic.
2. Absence of any state policy on preventing mass outbreaks IAMC and other infections caused by multi resistant pathogens.
3. The discrepancy of the legal framework which regulates measures to ensure the safety of the patient and medical personnel of health care institutions, the issue of disinfection and sterilization of medical devices and equipment international standards (ISO, EN), WHO recommendations.
4. Imperfection of the regulatory framework that regulates accounting and reporting HAI and AMR, that making it impossible to implement of adequate on time and volume preventive measures.
5. Lack of national standards for control and prevention of HAI and AMR.
6. Lack of a development strategy and the principles of rational use of antibiotics.

7. Lack at the national and regional levels of resistance monitoring from pathogens to antibiotics and biocides.
8. Health care institutions use extremely limited range of disinfectants, whose effectiveness is not confirmed by microbiological research.
9. Inadequate safety measures for staff while performing of sterilization and disinfection.
10. Insufficiency of staffing on infection control issues of healthcare institutions.
11. Low level of awareness among medical staff of health care institutions in the prevention issues of HAI and transmission multi resistant pathogens, AMR, sterilization, disinfection methods and quality control.
12. Lack of funding and low material and technical base of microbiological laboratories.
13. Low awareness among the population on risk factors while visiting institutions of health care, low responsibility of health professionals for the safety of manipulation carried out and the possibility of preventing nosocomial infection.

Growing incidence of patients in healthcare institutions due to the increased frequency of invasive procedures, spread of AMR of pathogens of infections associated with HAI. From year to year a problem HAI of different containment and AMR pathogens of these infections has become increasingly important issue for public health. This especially concerns of clinicians who work in the offices of surgical and intensive care, whom daily have to deal with the problem of treatment of infections and especially HAI in patients with severe concomitant pathology when timely diagnosis and adequate empirical antibiotic therapy have a crucial role to save the patient's life.

Unsatisfactory results of treatment and prevention of HAI primarily related to AMR their pathogens. In economic terms, AMR leads to a significant increase in terms of hospitalization and costs of their treatment.

Considering global spread of socio-economic and medical significance of the problem, AMR referred to national security issues around the world. Despite the relevance and clinical importance, the issue HAI and AMR pathogens in Ukraine is insufficiently developed both in scientific and organizational areas.

Today in Ukraine there is no reliable information on the number of patients HAI and AMR pathogens in

healthcare institutions. Data of etiological structure of these infections and their AMR shown only rare original research.

Today in Ukraine there are no state level programs that would include precise criteria and approaches of control and preventing of spread of HAI and AMR pathogens of these infections in the healthcare institutions. At the same time, much attention is paid to the investigation of numerous surgical hospital environments, the results of which are not amenable to the epidemiological interpretation and have led to considerable material damage.

Healthcare-associated Infections (HAI) that arise in patients due to diagnostic and therapeutic procedures are different in anatomic localization and nature of the flow. Local inflammatory lesions can lead to the generalization of the pathological process.

Considering periodic change of the dominant pathogens of HAI, their biological properties, in particular AMR, the ability of these pathogens to survive long in the environment (environmental) of healthcare institutions, there is the need to improve the system of epidemiological surveillance of these infections in modern conditions. It is required scientific substantiation of the approaches in relation of control and prevention of HAI and AMR pathogens of these infections.

Experience of many countries shows that the solution of the problem of antimicrobial resistance and HAI not possible without the development and implementation of science-based prevention and control system based on the principles of evidence-based medicine.

WHO developed recommendations for prevention and control of AMR, which have been used successfully in the European Union, the United States and other developed countries. The key point in the fight against HAI have to be the arranging of monitoring of AMR pathogens at the level of country and regions, as even modern and reliable data in the literature, not able to replace equivalently local research.

The fact that the European Region focuses on the problem of bacterial resistance to antibiotics, is fully justified given the rapid spread of this phenomenon with a very small number of items of reserve antibiotics for the treatment of life threatening infections in medical facilities.

This creates a situation that could soon lead to the development of potentially incurable infections.

At the summit of the Regional Committee of the World Health Organization (WHO), held in Baku, Azerbaijan, 12-15 September 2011, the European strategic action plan on antibiotic resistance, it was emphasized that the use of antimicrobial agents, especially the excessive and wrong, often leads to adaptation of microorganisms by genetic mutation, recombination and selection, resulting resistant strains of antimicrobial agents may become dominant in hospitals and/or in the environment.

Thus, an important issue today is development of modern evidence-based Action Plan for Ukraine on prevention HAI and AMR, the implementation of that will assess the epidemic situation in the country and will develop and implement effective measures to prevent and finally – to reduce the incidence HAI and AMR pathogens of infectious diseases. The solution of these problems is devoted Action Plan.

UKRAINIAN ACTION PLAN

The main objectives of the Ukrainian Action Plan is to improve the regulatory, legal and methodological support system of prevention of Healthcare-associated Infections (HAI), laboratory diagnosis and monitoring of AMR pathogens infections, training system for medical personnel in these fields. We are talking about the introduction of modern approaches and optimization of controls and prevention of HAI, preventing of transmission of multi resistance pathogens in healthcare institutions, improving the effectiveness of disinfection and sterilization measures.

It is planned to create a unified system of laws and regulations that will ensure effective control and prevention of HAI and AMR, and investigation of outbreaks when they occur and ensuring of adequate compensation to victims; to prepare a standard on infection control with the compliance of mandatory requirements aimed at preventing HAI and AMR in healthcare institutions based on their profile; to create in healthcare institutions the methods of epidemiological diagnostic, based on standard criteria for determining of nosocomial infection cases by anatomic localization of infection.

In addition, it is necessary to optimize the list of indications for microbiological and clinical research material and objects of hospital environment, rules of sampling and shipping of samples of biological material in the laboratory. And to develop target

prevention programs for HAI and AMR at the national (country), regional and municipal levels. To implement modern technologies on infection control and monitoring of AMR in health care institutions.

As a result of the Action Plan is expected to reduce the number of infections caused by resistant strains of microorganism's mortality, disability and complications from infections associated with medical care, increase the employment potential of the nation by reducing temporary and permanent loss of working ability as a result of population diseases. Also, it is necessary to increase of patient safety and staff while providing medical care.

1. General provisions

The Ukrainian Action Plan on HAI and AMR (hereinafter – the Action Plan) developed by the Ukrainian Association Infection Control and Antimicrobial Resistance in conjunction with the Shupyk National Medical Academy of Postgraduate Education. The strategic plan defines the purpose, principles and main directions of the improvement of the National system for control and prevention of HAI and AMR pathogens of these infections, mechanisms of its functioning, as well as expected socio-economic impact.

The strategic objective of health care is to provide quality medical care and a safe habitat for patients and staff in health care institutions that engaged in medical activities. HAI and AMR are important components of public health problems due to their wide distribution, negative consequences for the health of patients, staff and the state economy.

The general criterion for belonging of infections cases to HAI is a direct relationship they occur with medical care (treatment, diagnostic tests, immunizations and so on). That is why HAI cases of infections are not only those that acceded to the underlying diseases in hospitalized patients, but also related to the provision of any types of care (in outpatient clinics, education, and health care institutions, social security institutions when providing emergency medical aid, at home and so on) and cases of infection of medical professionals as a result of their professional activities.

The term «infection that is associated with medical care» (Healthcare-associated infection (HAI)), at present used as in the scientific literature and in the publications of the World Health Organization (WHO), and the regulations of the European Union (EU), and the most in developed countries.

According to WHO data, infections associated with medical care, affect approximately 10% of patients exposed therapeutic or diagnostic procedures, and occupy tenth place among the causes of mortality.

In Ukraine, according to the official statistics, annually registered about 5 – 7 thousand cases of infections associated with medical care, however, experts believe that their numbers varies from 800 thousand to 1 million people. The frequency of incidence of HAI changes depending on the action of various risk factors. Some patient groups are especially vulnerable: infants, the elderly, patients with severe course of the basic disease and numerous co morbidities, patients undergoing aggressive intervention of invasive medical procedures, and organ transplants and so on. In these groups the incidence HAI, caused by resistant pathogens are much higher.

Patients with HAI, caused by resistant pathogens are in the hospital 2-3 times longer than similar patients without signs of this infection. On average, their discharge from the hospital are delayed for 10 days, and 3-4 times is increased the cost of treatment and 5-7 times the risk of mortality. The economic damage caused by HAI and resistant pathogens are impressive: in Ukraine these figures by the most conservative estimates may reach 1 billion HRV per year (for comparison – the annual economic costs of HAI and AMR in Europe is approximately 7 billion Euros in US – 6.5 billion dollars). Infections associated with medical care significantly decrease quality of life, lead to loss of reputation by the health care institutions, and bear significant social and economic losses to the state.

Intensive development of high-tech, invasive methods of diagnosis and treatment, combined with the widespread microorganisms, and multidrug resistance, determines the need for continuous improvement of supervision and control.

Today in our country at the state level the main directions of control and prevention of AMR and HAI not formulated in any policy document that would define the strategy of research, the task of developing regulatory, legal support, the introduction of advanced methods of prevention into practice.

The necessity of such a document as the Action Plan dictated, first of all, the reform of the health system of Ukraine, which provides optimization of health care institutions that implement state policy in the field of public health; accumulated new scientific and practical data; the implementation of many

of the provisions defined in the legislation and the need to harmonize regulations with the EU, WHO and other international requirements.

2. Goals and objectives

The main purpose of the Action Plan is to define the priority directions of prevention of HAI and AMR to reduce the incidence of patients and medical staff and to improve the quality of medical services provided to the population, and to reduce socio-economic losses by implementing of effective organizational, preventive and therapeutic and diagnostic measures.

The following general objectives of the Action Plan it was proposed:

- To reduce morbidity, mortality and related direct and indirect costs associated with antibiotic-resistant bacteria;
- To promote implementation of the Action Plan based on the coordination and development, which are based on inter-sectorial experience to work on prevent, combat and curb the growth of AMR;
- To promote rational use of antibiotics and systematic implementation of infection control measures for the prevention of HAI in health care;
- To promote a need of consideration of issues regarding the existing relationship between bacterial resistance and antibiotic use in humans and animals, including the aspect of the food chain;
- To carried out further work on the review and implementation of effective policy learning rational use of antibiotics in medical, veterinary and biological secondary and higher education;
- To increase overall awareness of the emergence and spread of antibiotic resistance, as well as the lack of effective antibiotics to treat life threatening infections;
- To consider a need of creation of innovative financing mechanisms and marketing to develop new drugs against bacterial and other infections are of paramount importance;
- To promote a involvement of groups to ensure patient safety and other partners to act at all levels that can prevent infection and reduce the need for antibiotics.

According to WHO recommendations have been formulated following seven strategic objectives to guide the Government of Ukraine to consider complex factors related to bacterial resistance and causes that contribute to its occurrence – the use of antibiotics (especially their excessive or improper use).

These objectives take into account the technical, financial, governing, educational and behavioral aspects that must be considered in a comprehensive national action plans.

The Strategic Objectives of the Regional Action Plan are the following:

1. To strength National Coordination by organizing Inter-Agency Committee to curb antibiotic resistance.
2. To strength surveillance for resistance to antibiotics.
3. To ensure comprehensive promote the development and implementation of National and Regional Strategies for Rational Use of Antibiotics and strengthen supervision over their use in health care institutions.
4. To increase infection control and monitoring of AMR in terms of health care.
5. To prevent of resistance to antibiotics used in veterinary medicine and agriculture through inter-agency coordination committee, joint meetings, seminars and training courses on rational use of antibiotics.
6. To promote the implementation of innovative technologies.
7. To enhance awareness, to improve patient safety and to develop partnerships.

The main tasks of the Strategic Action Plan are:

1. Improvement of a regulatory, legal and methodological support of HAI and AMR prevention, harmonization with EU requirements, the WHO recommendations and international standards.
2. Improvement of a system of epidemiological surveillance and control of the implementation of control measures and prevention HAI and AMR.
3. Improvement of an epidemiological surveillance HAI and AMR and its software.
4. Improvement of a laboratory diagnosis and monitoring of HAI pathogens and AMR.

5. Development of a target prevention program for HAI and AMR.
6. Improvement of a staff structure and staffing of epidemiology activity in health care organizations.
7. Implementation of modern approaches and optimization of sanitary prevention of HAI and AMR in health care institutions.
8. Improvement of a training system for medical personnel regarding the control and prevention of HAI and AMR.
9. Optimization of an HAI control and prevention guidelines caused by resistant pathogens among medical personnel.
10. Improvement of an effectiveness of control measures and prevention of HAI and AMR.
11. Improvement of an effectiveness of disinfection and sterilization measures.
12. Evaluation of an effectiveness of measures complex for control and prevention of HAI and AMR.
13. The development of scientific research in the field of control and prevention of HAI and AMR.

3. The ways of improvement of epidemiological surveillance and prevention of infections associated with medical care

Unified state system of epidemiological surveillance and prevention HAI and AMR is a combination of information technology, laboratory diagnostic, research and training facilities, which provide a set of organizational, preventive, anti-epidemic and medical diagnostic measures to reduce the morbidity and mortality of patients.

3.1. Improvement of regulatory, legal and methodological Support of Control and Prevention of HAI and AMR

International scientific and professional medical societies, associations and organizations (WHO) recommend practice in the development and implementation in health care institutions of the principles of evidence-based medicine focused on providing patients with medicines, safe medical technologies (diagnostic, therapeutic, prophylactic), whose effectiveness have been proved and confirmed by randomized clinical trials and practice.

The conducted over the past decade studies allowed to obtain scientific data on clinical, epidemiological, social and economic performance of specific controls and prevention of HAI and AMR, which must serve as the basis for a regulatory, legal and methodological documents which regulate conduct in health care institutions preventive measures with proven effectiveness.

Improvement of the National regulatory, legal and methodological support measures to ensure the biological safety of patients and medical staff in the provision of care involves the use of common principles of obtaining and presenting compelling evidence supporting the proposed guidelines and requirements.

To work on normative, juristic and methodological documents should be involved researchers, experienced clinicians, microbiologists, hospital/clinical epidemiologists, experts in infection control, clinical pharmacologists, and representatives of professional medical associations and societies with the possibility of a broad discussion of draft documents.

Improvement of the regulatory and legal framework documents that regulate the activities of prevention HAI and AMR includes:

- Creation of a unified system of normative and legal acts, including legislation of Ukraine, regulations of ministries, agencies and organizations that provide effective prevention HAI, and also localization, effective treatment HAI, caused by resistant pathogens if they occur and adequate compensation to victims;
- Systematically updating the regulatory, legal and methodological documents of the main directions of the Strategic Plan;
- Expanding of the regulatory and legal framework for the prevention HAI and AMR in non-surgical profile health care institutions (infectious, pediatrics, physical), intensive care and resuscitation, clinical diagnostic, outpatient facilities;
- Create documents that reflect legal aspects of the HAI and AMR problem, patient safety and protection of medical personnel and patients;
- Development, approval and implementation of national standards for the prevention of HAI and AMR.

The development and approval of national standards for the prevention of AMR and HAI that in-

cludes standard definition of HAI case various nosological forms, introduction of infection, intrauterine infection, the standard definition of hospital strain standards of epidemiological surveillance, prophylactic and anti-epidemic measures and others.

Standard definition (definitions) the case if the infection is the foundation on which is based the whole system of epidemiological surveillance, including the identification and registration of cases of nosocomial infections, epidemiological diagnosis, and differential diagnosis with other clinical conditions of patients.

It is expedient to harmonize a standard definition of HAI and AMR cases to the standards of the patient examination.

3.2. Improvement of state surveillance and monitoring over the implementation of measures on prevention HAI and AMR

Epidemiological surveillance and monitoring of AMR and HAI is a form of government regulation in areas which differ special state social, economic importance.

In the field of public administration activities aimed at preventing AMR and HAI should be ensured the development of an exhaustive list of mandatory requirements for organizations and individuals responsible for the implementation of preventive and anti-epidemic and other measures for establishing sufficient authority for the authorities, that authorized carry out state supervision and control, the formation of social, economic and health protection of persons affected by the HAI, caused by multidrug pathogens.

The implementation of measures aimed at improving epidemiological surveillance and control in the area of the prevention HAI and AMR provides:

1. Formation harmonized with EU requirements and other international regulations of the list of mandatory requirements, compliance with which ensures effective prevention HAI and AMR in health care institutions;
2. Preparation of a national standard for verification of compliance with mandatory requirements aimed at preventing HAI and AMR in health care institutions depending on their profile;
3. Improvement of administrative legislation and legislation in the area of rights protection of medical services consumers.

3.3. Improvement of epidemiological surveillance for HAI and AMR and its hardware and software

Epidemiological surveillance for AMR and HAI is a system of continuous monitoring of the incidence of patients and medical staff of health care institutions, causes and risk factors, AMR pathogens of these infections to carry out epidemiological diagnostics with a goal to make informed management decisions regarding the prevention of HAI and AMR.

Epidemiological surveillance of AMR and HAI must be implemented at the national, regional, municipal and local/hospital level.

Carry out of Epidemiological Surveillance of HAI and AMR provides:

- Ensuring active detection, recording and registration of HAI and AMR;
- Identifying risk factors of HAI and AMR occurrence in certain categories of patients in various types of medical health care institutions;
- Epidemiological analysis of the incidence of patients with the detection of the leading causes and risk factors that contribute to the emergence and spread of HAI and AMR;
- Epidemiological analysis of the incidence of medical personnel with the identification of the leading causes and risk factors that contribute to the emergence and spread of HAI and AMR;
- Implementation of microbiological monitoring of AMR pathogens HAI in hospitals of different profiles;
- The definition of the spectrum of sensitivity of pathogens HAI to antimicrobial agents (antibiotics, antiseptics, disinfectants, etc.). To develop rational strategies and tactics they use;
- Epidemiological evaluation of diagnostic and treatment process;
- Epidemiological and hygienic assessment of risk factors of hospital environment, of the hospitals conditions for patients and medical professionals;
- Evaluation of the effectiveness conducted HAI preventive measures and preventing transmission of multi resistant pathogens infections;
- Forecasting epidemic situation in health care institutions.

Improvement of epidemiological surveillance of HAI and AMR includes the development of the following areas:

- Methodology epidemiological surveillance of HAI and AMR;
- Information support on the basis of standardized criteria for defining cases of HAI and optimization of the list of nosological forms of HAI, to be recorded;
- Principles of microbiological monitoring AMR with the development of standards in hospitals of different profile;
- Approaches to assessing risk and spread of AMR and HAI in hospitals of various profiles;
- Methods of epidemiological diagnosis;
- Hardware and Software.

Modern computer technology provide significant practical assistance in implementation of the HAI and AMR epidemiological surveillance, increasing its efficiency, quality of epidemiological diagnosis, providing adequate timely decision-making and implementation of preventive and anti-epidemic measures.

Software ensuring of epidemiological surveillance system for HAI and AMR provides:

- The use of computer equipment, network equipment, application software product for epidemiological surveillance of AMR and HAI;
- Creation and maintenance of databases on disease cases and adverse results in HAI patients and medical personnel;
- Creation and maintenance of databases of HAI pathogens and AMR (WHONET);
- Creation and maintenance of databases on state of sanitary-hygienic and microbiological environment of hospitals;
- Creation and maintenance of databases on personnel, financial, technical, organizational support and intensity of treatment and diagnostic units in medical establishments of public health;
- Creation and maintenance of databases on the movement of patients in health care institutions in various fields;
- Creation and maintenance of register on infection control measures implementation in health care institutions;

- Conduct statistical analysis of received information.
- Improvement of information and software systems for epidemiological surveillance HAI and AMR provides:
- Creation and renewal of computer equipment, network equipment;
- Creation of computerized surveillance systems of AMR and HAI based on Internet technology for health care of regional and national levels authorities that carried out-of-state sanitary and epidemiological supervision;
- Development and implementation of unified software for accounting, formation of databases and statistical analysis of the received information;
- Development and implementation of software for computer-workstation hospital/clinical epidemiologist, a clinical microbiologist, clinical pharmacologist of health care institutions;
- Creation and maintenance of health care institutions sanitary hygiene electronic passports and register of accidents in health care institutions.

3.4. Improvement of laboratory diagnostics of HAI pathogens and monitoring of AMR

Laboratory diagnosis and monitoring of HAI pathogens and AMR are the most important components of epidemiological surveillance systems in hospitals.

Microbiological monitoring of HAI pathogens and AMR provides:

- Obligatory microbiological support system of HAI and AMR epidemiological surveillance;
- Analysis of the etiologic pathogen HAI structures, isolated from patients and medical personnel, species identification (typing) HAI pathogens and antibiotic susceptibility testing;
- Microbiological monitoring of epidemic hospital environment important objects is carried out to control the spread of antibiotic resistant strains of microorganisms which include at least: *S. aureus*, *Streptococcus spp.* (including *S.pneumoniae* *S. pyogenes*), *E. faecalis*, *E. faecium*, *E. coli*, *Proteus vulgaris*, *P.mirabilis*, *Klebsiella spp.* (Including *K. pneumoniae*), *Enterobacter spp.*, *Citrobacter spp.*, *P. aeruginosa*, *Acenotobacter spp.* (Including *A. baumannii* and *A.lwoffii*);

- Determination of the sensitivity HAI pathogens to antimicrobial agents, selected from patients and epidemiological important objects of hospital environment is carried out according to the methodology of the European Committee on Antimicrobial Susceptibility Testing (EUCAST);
- Creation and maintenance of database on HAI pathogens and AMR carried out taking into account WHO recommendations (WHONET, CAESAR) and the European Centre for Disease Prevention and Control (ECDC);
- In the study of AMR to ensure systematic monitoring of the major pathogens HAI, including *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Enterococcus faecalis*, *E. faecium*, *Escherichia coli*, *Klebsiella pneumoniae*, *Enterobacter spp.*, *Pseudomonas aeruginosa*, *Acinetobacter spp.* selected from biological material (blood, cerebrospinal fluid, pus from surgical wounds);
- Effective quality control of microbiological tests in health care institutions;
- Statistical analysis of research results.

The scope and level of microbiological tests have to meet the conditions and profiles of hospitals, to ensure the effectiveness of epidemiological surveillance.

Improvement of laboratory diagnosis and monitoring of HAI pathogens and AMR provides:

- Optimization of the indications list for microbiological tests of clinical material and epidemiologically important hospital environment objects;
- Inclusion of microbiological diagnostics methods into the standards of medical care;
- Development a network of microbiological laboratories of health care institutions;
- Providing clinical laboratories involved in the HAI pathogens identification and AMR monitoring, advanced laboratory equipment, diagnostic systems;
- Optimization the system for sampling and transport of biological material samples to the laboratory for research;
- Improvement and standardization of selection and identification methods of HAI pathogens and AMR testing;

- Development and implementation of express – methods of microbiological diagnostics and testing HAI and AMR;
- Creation of the reference laboratories which provide methodological and consultancy advice to laboratories of health care institutions, control of research quality that carry out in health care institutions, conducting of the technically complex studies, including molecular – genetic typing.

3.5. Create applications control and prevention of HAI and AMR

Control and prevention HAI and AMR requires concentration and coordination of efforts and participation of a wide range of health care organizations public and private ownership, legislative and executive authorities in order to ensure safe patient medical care and create safe working conditions for medical staff.

An important condition for the implementation of the Strategic Plan is to develop programs control and prevention HAI and AMR for national, regional and municipal levels of implementation as an integral part of the development and modernization of public health approved in accordance with legislation. When developing prevention programs HAI and the AMR should be considered the level of health development, financial and material resources of the region. The appropriate action Plan for Program implementation should be developed in each health institution.

Programs on control and prevention of HAI and AMR for health care institutions should be formed on the basis of their structure, of profile units (branches), of the specific characteristics of patient population and medical diagnostic process.

Program on control and prevention of HAI and AMR includes a list of specific measures, indicators health (epidemiology, clinical), social and economic performance, funding and decision-makers.

In health care institutions the programs on control and prevention HAI and AMR should be developed by members of the committee for the prevention of HAI and AMR, whose powers extend to all departments and hospital services.

For an effective and successful activity the Committee on Prevention of HAI and AMR should:

- Coordinates development programs and plans for Control and Prevention HAI and AMR in

health care and approve them for further approval of the chief doctor;

- Considers an issue of necessity and feasibility of financing and resourcing of individual activities on the control and prevention of HAI and AMR;
- Systematically evaluates an effectiveness of programs for control and prevention HAI and AMR and makes the appropriate adjustments;
- Coordinates of control measures prevention HAI and AMR subdivisions and services in health institution.

The decisive role in the creation and implementation of programs for control and prevention HAI and AMR in health facilities owned hospital/clinical epidemiology/specialist infection control, which has had special training in this area.

The main task of hospital/clinical specialist on epidemiologist/infection control health institution is the foundation and organization of controls and prevention of disease HAI and AMR on the basis of epidemiological diagnosis. To address these challenges a hospital/clinical epidemiologist in health institutions creates a system of epidemiological surveillance AMR and HAI and manages its operation.

To ensure the implementation of activities under the program of control and prevention of AMR and HAI in all subdivisions of agencies of health care institutions have to be defined by administration the responsible persons.

3.6. Improvement of staff structure of staffing of epidemiological activities in health care institutions

Epidemiological activity is an integral part of public health and aims to create a safe environment of hospitalization and prevention infecting patients and medical staff in the process of care.

Epidemiological activities in health care institutions is carried out by hospital/clinical epidemiologists and other specialists in infection control, and at the regional and national levels – by public health specialists of Ministry of Health, which carry out surveillance on HAI and AMR.

Epidemiological activity in health care institutions includes:

- Organization and implementation of epidemiological surveillance HAI and AMR;
- Conducting of epidemiological diagnosis;

- Development a set of diagnostic, preventive and anti-epidemic measures to prevent HAI and transmission of resistant strains of pathogens infections;
- Standardization of measures to protect patients and medical staff from infection pathogens in various medical technologies;
- Participation in the examination of projects, reconstruction and overhaul of the current health care;
- Assessment of the need and feasibility of health care organizations epidemiological, economic effectiveness of various antimicrobial and immunological products, disinfectants, methods and means of protection of patients and medical staff, epidemiological degree of safety equipment and devices, new medical technologies;
- Training of various categories of health personnel in areas of prevention HAI and AMR;
- Epidemiological assessment and cost-effectiveness of preventive and anti-epidemic measures.

Improving staff structure and staffing of epidemiology in health care includes:

- Expansion of personnel capacity and staffing of health care institutions by specialists of preventive-medical profile (hospital / clinical epidemiologists and other professionals of infection control), the introduction of the post of Deputy chief physician at the epidemiological issues and the establishment of epidemiological departments in health care facilities at high risk of HAI patients and medical staff;
- Optimization of a functional responsibilities of hospital/clinical epidemiologists or other specialists on infection of the control health institution with an emphasis on organizational, methodological, diagnostic and expert activities;
- Creation at the national, regional levels of the departments of epidemiological profile (in the administration of public health and in health care committee for prevention HAI and AMR).

3.7. Introduction of modern approaches and optimization of hygienic measures to prevent HAI and AMR

The need for the implementation of this direction is determined by the importance of sanitation measures for prevention HAI and AMR. The aim of this

direction is to create optimal conditions for being patient and professional work of medical staff in healthcare organizations aimed at preserving their health and the prevention of nosocomial infection.

A rational hygienic measure is the base for HAI prevention among patients and staff, as well as transfer multi resistant pathogens. The quality of adequate hygienic measures depends largely on the success of treatment and productivity, comfort and safety of staff professional health organizations. Given the diversity of problems sanitary nature, they solved by a wide range of activities.

Implementation of the basic principles of hygiene in health care organizations includes:

- Ensuring optimum hygienic conditions for therapeutic and diagnostic process, accommodation and meals patients;
- Providing optimum hygiene and safe working conditions of medical staff of health care institutions;
- Prevention an emergence of group and flare incidence of HAI and preventing the transmission of multidrug-resistant strains in health care facilities;
- Prevention a spread of resistant pathogens HAI outside the institution health and safety of the population living adjacent to the health organization of the territory.

Implementation of this area provides a wide range of measures that need further improvement, both in terms of enforcement of already developed measures and the creation and implementation of new technologies:

- Use of modern architectural and planning solutions in the construction and reconstruction of buildings of public health institutions that meet sanitary and hygienic requirements;
- Rational distribution of functional units on the floors and buildings with the requirements of anti-epidemic regime;
- Meet the requirements and recommendations of the construction of infectious disease wards, operating units, delivery rooms and so on. Particular attention should be given to outpatient institutions and separate offices;
- Compliance with sanitary norms and guidelines, equipment and operating rooms with the principle of functional zoning;

- Ensuring water supply, ventilation, heating and lighting of health facilities according to hygiene standards and regulations;
- Ensure that the class of clean rooms in the health facility to the manufacturing processes carried out in them;
- Improvement of the insulating-restrictive measures;
- Optimization of flow separation with varying degrees of danger of the epidemic in the organization of personnel, food, clothes, tools, waste, etc.;
- Providing conditions necessary to comply with the requirements in processing the hands of medical personnel, operating and injection fields, sanitary treatment of the skin of patients, organization of current and final disinfection, cleaning and sterilization of medical products;
- Introduction of modern cleaning technologies;
- Compliance with the requirements of preventive and health standards for the collection, temporary storage, disinfection (disposal) and removal of medical waste;
- Introduction of modern technologies of preparation, transportation and distribution of food;
- Personal hygiene and health standards nursing;
- Compliance with bed rest, increased use of disposable underwear, clothing for medical staff and textiles used for patient care;
- Adherence to the linen mode, wider application of disposable linen, clothing for medical staff and textile products used for patient care;
- Ensuring proper sanitary conditions at the workplace of medical staff;
- Optimization of methods of health education among patients of health care.

3.8. Improvement of system training of medical personnel on prevention HAI and AMR

Currently has developed certain methodological approaches to the training of medical health personnel on the prevention of HAI and AMR. However, the apparent failure of existing measures for qualitative preparation of specialists of different profile. The complexity of the tasks of prevention HAI and AMR, the involvement of all personnel health institution

in their decision, diversity of functions of individual experts determine the need for the development and implementation of training on prevention HAI and AMR in health care institutions.

The main components and principles of personnel training system health organizations in the prevention HAI and AMR:

- A modular, focused on different categories of staff, character education;
- Differentiation, given the nature of their functions;
- Availability of educational departments of post-graduation education, training and methodological centres to ensure comprehensiveness, accessibility and regularity of training;
- Use of various forms of postgraduate education: full-time, distance, distance, etc.;
- Improving information and methodological support staff of health facilities (directories, databases, thematic magazines, fact sheets, computer software);
- Increasing the motivation of medical personnel to create safe conditions in health care facilities;
- Quality control of training and certification.

Staff of health facilities regardless of specialization and qualifications should have theoretical and practical training on prevention AMR and HAI and constantly improve their qualification. Obligatory employee training of health care institutions on the prevention AMR and HAI should implement immediately after placement (in specially created training programs) and subsequently at regular intervals.

With this aim, healthcare organizations need to have at their disposal the necessary forces and means for organizing the training of staff in modern pedagogical and methodological rules on HAI and prevention of AMR in the institution, and on the basis of institutions of secondary, higher medical and secondary vocational education.

For healthcare institutions should be developed differentiated educational programs for training specialists in different fields on issues of prevention HAI, taking into account the specific characteristics of the institution (department). Training appropriate to accompany the input and final test examinations, tests, to use in teaching interactive forms – seminars, work in small groups, role-playing, etc. At the regional/national level it is advisable to establish education

Centers for the prevention HAI and AMR. The main objective of the Centers is to develop and implement differentiated educational programs for specialists of different profile and different categories, carrying out of elective courses for employees of medical institutions on various issues of prevention HAI and AMR, preparation of teaching and visual aids.

Joint discussion and training of different specialists to help you better understand the problems facing the institutions, and to develop tactics system approach to organization of prevention and control of AMR and HAI. At postgraduate level of training of workers of health institutions should implement multi-disciplinary training on cycles of thematic improvement on the problems of prevention HAI and AMR with the involvement of various professionals: hospital/clinical epidemiologists, specialists in infection control, Disinfectology, professionals from the hospital hygiene, clinicians, clinical microbiologists, clinical pharmacologists, and organizers/managers public health.

3.9. Optimization of the principles of prevention of HAI and AMR among medical staff

The incidence of infectious diseases of professionals of health care institutions is much higher than in many industries and is largely determined by the specific professional activity.

It is connected with presence in health care institutions a large number of sources of infectious agents (patients and carriers of the diseases among patients), the need for many invasive diagnostic and therapeutic procedures, specific microbial landscape, the specificity of transmission of infectious agents.

Matters widespread use in healthcare institutions of antimicrobial agents (antibiotics, disinfectants, antiseptics), cytostatics, changing the biocenosis of the mucous membranes and skin of the staff and opening the "input gate" for microbes. Infection of medical workers by various microorganisms, including multidrug resistant strains, can be a cause of illness and disability.

Optimization HAI principles of prevention and medical staff AMR provides:

- Organization of medical examinations for employment and periodic reviews of health personnel;

- Identification and registration of cases of infectious disease, of carrier status, of intoxication, of sensitization of the body, of injury (micro traumas), of accidents of exposure to blood and body fluids to the skin and mucous membranes, organization of follow-up, including native markers hemocontact infections;
- Availability of sanitary facilities, catering staff;
- Organization of emergency and planned specific and nonspecific prevention of infectious diseases among medical personnel;
- Compliance with hygiene requirements (EN 1500) in the treatment arms;
- Provision according to estimated needs personal protection when caring for patients and training for their use;
- Development and application of epidemiologically safe technologies perform therapeutic and diagnostic procedures;
- Training health professionals on epidemiology and prevention HAI and AMR in different types of health care organizations.

Implementation of this direction of activities includes:

- Improvement of approaches to assessing the negative influence of factors of hospital environment on health the medical staff;
- Development of methodologies for assessing the health losses medical personnel in connection with professional activities;
- Development of programs of medical examination of medical staff, and program of measures;
- Improving prevention HAI medical personnel;
- Development of programs of treatment and rehabilitation, social protection of medical staff offices with high risk;
- Improving the legal framework of occupational infection of health professionals;
- Improving the professional legal support cases infected health care workers;
- Development of training programs for medical personnel on biosafety issues in different types of health facilities.

3.10. Improving of the effectiveness of preventive measures

Scientific studies in recent decades, based on the principles of evidence, convincingly demonstrated

that the most important epidemiological principles of prevention, which should be implemented in health care institutions, are:

- Minimizing patient lengths of stay in hospital;
- Reducing aggression medical technologies;
- Limiting the use of highly invasive procedures;
- Ensuring the safe use of epidemiologically medical technology, which provides:
- Development and implementation of algorithms epidemiologically sound performance of medical procedures, including detailed prevention HAI and AMR;
- Reduce risk factors contamination of materials, solutions and tools by eliminating intermediate points materials processing;
- Ensuring the principle duplication barrier protection from potential sources of contamination of materials and tools;
- Enforcement of safety rules while working staff with biological materials and complex emergency prevention measures in emergency situations with the risk of infection of medical personnel;
- Separation streams with varying degrees of danger epidemic at all stages of treatment and diagnostic process;
- Implementation of the principle of individual isolation (including implementation of patient manipulation of complications using individual);
- Systematic measures aimed at limiting antibiotic resistance breeding of microorganisms through rational use of antimicrobial agents, including based on the results of monitoring antibiotic resistance microflora in health care;
- Effective adequate insulating-restrictive measures;
- Maintaining the optimal level of microbiological purity hospital environment through the implementation of modern cleaning and disinfection of medical waste;
- Protecting the patient from secondary endogenous infection, including the rehabilitation of chronic foci of infection; prophylactic use of antibiotics; use the testimony of immune stimulatory therapy; prophylactic use of probiotics, bacteriophage, providing quality surgical equipment operations, procedures and operations and conduct of childbirth.

A prerequisite for effective prevention of HAI and AMR is to optimize the use of antibiotics and other antimicrobial drugs in health care institutions, which should be implemented with close collaboration of hospital/clinical epidemiologist or other specialist in infection control, clinical pharmacist, clinical microbiologist and doctors according to the clinical profile.

The optimizing the use of antibiotics includes:

- Introduction to the work health organization principles on the use of antibiotics on the basis of international and national guidelines on antimicrobial chemotherapy;
- Development of tactics antibiotics taking into account existing guidelines, information on global and regional spread of resistant infectious agents, multicenter study data on the results of monitoring and antimicrobial resistance of microorganisms in health care institutions;
- Optimizing perioperative antibiotic prophylaxis in each therapeutic and prophylactic institution;
- Development of scientifically grounded approach to the compiling forms of antibiotics and chemotherapy of system analysis and evaluation costly-effective significance of selected antibiotics;
- Development and implementation strategies of teaching materials on the use of antibiotics for treatment and prevention HAI and AMR.

An optimization measure to combat and prevent HAI and AMR with different transmission paths includes:

- Carry out major preventive and anti-epidemic measures in different groups of infections in health care organizations in various fields;
- Rationalization of methods and schemes emergency prevention, including the use of bacteriophages and immune modulators for both patients and health professionals;
- Improving measures to control and prevent HAI and prevent transmission of multi resistant pathogens diseases;
- Definition tactics immunization of medical personnel (in special cases – patients);
- Implementation of current measures to protect medical staff from infection;

- Development of recommendations on the calculation of the required number of personal protective medical staff;
- Development of strategies and tactics measures in identifying among health professionals carriers of resistant strains of pathogens HAI;
- Preparation of regulations and guidance documents on prevention HAI and transmission of resistant strains of pathogens insulating-restrictive measures and other infections with different transmission paths in terms of health care, guidance on rules for the use of personal protective medical personnel.

3.11. Improvement of the effectiveness of disinfection and sterilization measures

Improving the efficiency of disinfection and sterilization measures provide for improved means and methods for disinfection, cleaning and sterilization, the development and introduction of new, more efficient and secure technologies, organizational forms of implementation of disinfection and sterilization activities, taking into account the peculiarities of functioning of health care organizations in various fields.

In recent years, in Ukraine there are the registration and introduction in practice of work of healthcare institutions ineffective disinfectants, disinfection and sterilization of equipment due to lack of qualified expert assessment.

According to the important areas are:

- A system of accreditation of research laboratories (centers) that carried out research pre-sterilization and new disinfectants, including for use in health care facilities;
- Improving the system of accreditation of testing laboratories, which carried out the work of conformity assessment disinfectants, including recommended for use in schools of health;
- Organization of quality control of supply and means used for disinfection, cleaning and sterilization with further information about unscrupulous manufacturers;
- Achieving quality standard sterilization of materials and medical devices, eliminating the possibility of more than one million non-sterile products in sterilized;
- Maximum use of replacing reusable products used in health care products for single use;

- Protection against re-contamination of sterile materials;
 - Creation, production and implementation in practice of domestic detergent-disinfectant machines for processing (disinfection, pre-sterilization cleaning) medical devices, including endoscopes;
 - Introduction in the health care institutions of modern sterilization equipment based on new sterilizing agents, priority requirements which are effective sterilization of packed medical products and the ability to control sterilization;
 - Introduction in a health care institutions a science-based mode of sterilization of medical products according to the international standards (ISO, EN);
 - Implementation in health care institutions of means which contain enzymes for pre-sterilizing cleaning of medical products- Implementation in health care institutions of modern methods and materials for packaging medical devices that meet international standards (ISO, EN) and the use of materials and medical devices to be sterilized;
 - A qualified expert assessment of foreign disinfection and sterilization equipment, auxiliary materials (packaging, chemical and biological indicators, etc.) and operational documentation on them; if necessary – preparing of full training instructions in the national language;
 - Further harmonization of adopted in Ukraine and the European Union approaches in the field of study, evaluating the effectiveness and application of disinfection, cleaning and sterilization, preserving provisions justified by national research;
 - Improvement the means and methods for monitoring sterilization, disinfection efficiency and quality;
 - Implementation in health care institutions new high and low-toxic means of disinfection, sterilization, disinfection and disinfestation;
 - Development of new tools and methods for rapid control of working solutions of disinfectants;
 - Improvement of methods for determining the microorganisms' sensitivity to disinfectants according to the international standards (ISO, EN);
 - Development and implementation in health care institutions of activities aimed at preventing the appearance and spread of strains resistant to disinfectants;
 - Systematic implementation of measures aimed at curb the breeding of microorganisms resistant to disinfectants, skin antiseptics including by improving the quality of disinfection, disinfection measures improvement tactics based on the results of monitoring of resistance to disinfectants;
 - Development an optimal schemes rotation of disinfectants on the basis of monitoring resistance of hospital strains microorganisms with the taking into account a specific functioning of health care organizations, and types of pathogens and characteristics of disinfectants;
 - Introduction of new effective and low-toxic, easy to use skin antiseptics to disinfect hands of medical professionals and skin of patients;
 - Introduction of modern methods of treatment arms, the whole arsenal of new technologies in antiseptic;
 - Introduction in health care institutions new high and low-toxic means of disinfection, sterilization, disinfection and disinfestations for use in health care organizations;
 - Development and implementation in practice of health care institutions of new, effective and safe for patients and medical staff facilities means and equipment to cleaning and disinfection of indoor air of health facilities;
 - The creation and implementation in health care organizations of modern economic tools and new equipment to disinfect medical waste, preferring natural methods (or a combination of them with chemical).
- Improvement of disinfection and sterilization effectiveness measures includes:
- Organization in health care institutions of central sterilization departments (CSD), which meet the requirements of international standards (ISO, EN) and provision of sterile materials and medical products (including industrial) in the required amount;
 - Permanent improvement of regulatory and methodological framework that governs the use of modern means of disinfection and sterilization pre-sterilization cleaning, disinfection and

sterilization equipment, methods of monitoring their effectiveness;

- Development of scientific basis of determining needs, planning and monitoring of the rational use of disinfecting (including sterilized) materials and tools, taking into account their intended effectiveness and safety for medical staff and patients;
- Development of strategies and tactics of informed choice and application of disinfectants in health care institutions, taking into account the type and structure, goals and objectives disinfection, epidemiological situation, risk factors and effectiveness to multi resistant of HAI pathogens;
- Creation of reserves disinfectants from different chemical groups in health care with the need and possible rotation of purpose, antimicrobial resistance of HAI pathogens;
- Systematic training of specialists of testing laboratories and test centers in laboratory testing activity and safety of disinfectants, precluding unwarranted advice on their application modes;
- Improvement of testing methodology for disinfectants during pre-registration testing; Introduction of improved quality evaluation for exhibited materials on the efficacy and safety of disinfectants by the introduction of parallel testing in two laboratory centers;
- Development of guidelines for the organization of activities aimed at preventing of microorganisms formation resistant to disinfectants;
- Systematic providing of preventive disinfection and disinfestations by effective and low-toxic agents which recommended for use in health care organizations.

3.12. The development of research in the field of prevention of HAI and AMR

The problem of prevention HAI and AMR – interdisciplinary scientific field that investigates the causes and risk factors of various forms of HAI and occur AMR and transmission of drug-resistant pathogens in health care institutions of different types, features of the etiology and biological properties, including antimicrobial resistance of pathogens which cause infections in patients and medical personnel, conditions and factors (medical-biological, hygienic, organizational, medical-diagnostic etc.) that promote or prevent the emergence and spread of HAI and AMR

in health care institutions. Moreover, research area simultaneously is area of practice, which is aimed at the development and introduction of new technologies of infection control aimed to ensure patient safety and safe working conditions health professionals in health care institutions.

The development of scientific research in the main areas of the Strategic Action Plan of includes:

- Development of target program of scientific research on the prevention and control HAI and AMR;
- Consolidation and concentration of resources on promising areas of science and technology based on the extension of the mechanisms of public-private partnerships, including innovation active enterprises, scientific & research and research & design work;
- Ensuring the involvement of young professionals in the field of research and development, the development of leading scientific schools;
- Development of research in higher education, including postgraduate education;
- Development of a scientific laboratory and material-technical base of competitive scientific organizations, universities with leading research problems;
- Development of effective infrastructure innovation system.
- Study of features of HAI and AMR in health care institutions of different profiles in modern conditions;
- Development of epidemiological classification HAI and AMR;
- Study of the mechanisms of AMR, risk factors and conditions of the various forms of lymphoma HAI and AMR pathogens at this stage;
- Study of the structure and dynamic changes in populations of bacterial, viral and parasitic pathogens agents in health care organizations in various fields;
- Improvement methodologies, technologies of epidemiological surveillance and control HAI and AMR in health care institutions in various fields;
- Improvement the approaches and methods to ensure biological safety in health care organizations, health preservation medical staff;

- Development of tools and methods for diagnosis HAI and AMR;
- Improvement the approaches and methods of control and prevention of HAI and AMR;
- Development and improvement of means and methods of sterilization, disinfection, disinfections and deratizations in the prevention HAI and the emergence of AMR;
- Improvement treatments HAI, caused by resistant pathogens;
- Development criteria for cases of occupational infection personnel;
- Development of standard criteria for definition identifying cases of nosocomial infection anatomic localization of infection, the need for epidemiological supervision HAI;
- Development of criteria for biological safety in health care.

3.13. Evaluating the effectiveness of prevention measures

In the system of protection of public health and patient safety, and medical staff is important to assess the epidemiological, social and economic efficiency of preventive measures, the aim of which is to achieve a maximum preventive effect against the minimum acceptable cost for the organization and carrying out of complex of preventive measures.

An epidemiological effectiveness of the control and prevention defined in terms of reducing morbidity patients and medical staff on the basis of the forecast and epidemiological trends.

A social efficiency of measures for control and prevention estimated the level of reduction of the overall damage caused by HAI and AMR to the health of the patients based on their severity, duration of flow, frequency of adverse outcomes (death, disability) and their devastating impact on the various forms of life and human activities.

An economic efficiency of measures is determined by the reduction of direct and indirect harm to the health of patients HAI and AMR, limiting workforce.

Conflict of interests

Conflict of interest is absent. The author did not receive any financial assistance when developing the Action Plan. All research was carried out by the own financial means of the author of the Action Plan.

The evaluation of an economic efficiency of activities to prevent HAI and AMR provides:

- Calculation of economic damage to one case of lymphoma in various forms HAI, caused by resistant strains of bacteria;
- Calculation of costs and implementation of measures to prevent AMR and HAI and components epidemiological surveillance;
- Determining the economic efficiency of activities to prevent AMR and HAI and components epidemiological surveillance;
- Analysis of the cost/benefit;
- Analysis of the cost/effectiveness;
- Analysis of the cost/benefit.

4. The expected social and economic impact of the Strategic Action Plan

The expected socio-economic impact of implementing the Plan includes:

- HAI reducing, morbidity, mortality and disability from complications HAI, caused by pathogens resistant to antimicrobial agents;
- Reducing the additional costs for the treatment and diagnosis of diseases, costs associated with the low efficiency of medical care due to lack of necessary information;
- Increasing the employment potential of the nation by reducing temporary and permanent disability population as a result of diseases;
- Reducing health care costs by reducing the number of additional laboratory tests;
- Improving the safety of patients and staff in the provision of medical care through the introduction of epidemiologically safe medical technology for infection control.

5. Financial support of the Ukrainian Action Plan

Funding of the Action Plan have to be implemented by the State budget, private organizations and individuals, as well as other sources not prohibited by law.

СТРАТЕГІЯ ТА ПЛАН ДІЙ УКРАЇНИ З ПРОФІЛАКТИКИ ІНФЕКЦІЙ, ПОВ'ЯЗАНИХ З НАДАННЯМ МЕДИЧНОЇ ДОПОМОГИ ТА ПРОТИМІКРОБНОЇ РЕЗИСТЕНТНОСТІ

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Резюме

Стратегія та План дій України з профілактики інфекцій, пов'язаних з наданням медичної допомоги та антимікробної резистентності визначає ціль, принципи, основні напрямки вдосконалення національної системи контролю та профілактики інфекцій, пов'язаних з наданням медичної допомоги (ІПМД), та антимікробної резистентності (АМР) патогенів цих інфекцій, механізми забезпечення її функціонування, а також очікуваний соціально-економічний ефект. План дій наголошує на необхідності впровадження ефективного підходу «Єдине здоров'я» (принцип, згідно з яким здоров'я людей, тварин та навколишніх екосистем взаємопов'язане), що передбачає координацію між різними секторами та суб'єктами, зокрема спеціалістами з медицини, ветеринарії, сільського господарства, екології та добре поінформованими споживачами. План дій визнає та враховує різноманітні ресурси, доступні для протидії резистентності до антибактеріальних препаратів.

Мета цього Плану дій – забезпечення якомога тривалішої безперервності успішного лікування та профілактики інфекційних захворювань завдяки ефективним та безпечним препаратам, які проходять контроль якості, застосовуються відповідально й доступні для всіх, хто їх потребує. Основні завдання Плану дій України: а) удосконалити нормативне, правове та методичне забезпечення системи профілактики ІПМД, лабораторну діагностику й моніторинг АМР, б) покращити обізнаність і розуміння резистентності до антимікробних препаратів через ефективну комунікацію, просвітницькі заходи та навчання, в) зміцнити знання та доказову базу шляхом епідеміологічного дослідження та дослідження, г) зменшити поширеність інфекцій завдяки ефективним санітарно-гігієнічним заходам профілактики інфекцій, д) оптимізувати застосування антимікробних препаратів у медицині та ветеринарії.

У результаті реалізації Плану дій очікується зниження кількості інфекцій, спричинених резистентними штамми мікроорганізмів, смертності, інвалідності та ускладнень від ІПМД, унаслідок чого збільшиться трудовий потенціал нації за рахунок зниження тимчасової і постійної втрати працездатності населення в результаті захворювань, підвищиться безпека пацієнтів і персоналу в процесі надання медичної допомоги.

Ключові слова: План дій, медицина, ветеринарія, сільське господарство, інфекції, антимікробна резистентність, антибіотики, мікробіологічний моніторинг, Європейський Союз, Всесвітня організація охорони здоров'я, WHONET, CAESAR, освіта, навчання.

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