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## EARLY DETECTION AND SCREENING AS THE MAIN COMPONENTS OF THE CANCER PREVENTION STRATEGY

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**Purpose:** to analyze current incidence and mortality rates of cancer; a role of early detection or screening in reducing high cancer mortality; and approaches of screening in the world and Ukraine, particularly.

**Materials and Methods.** A bibliosemantic, structural-logical, and comparative analysis and analytical method were used in the research.

**Results and Discussion.** The incidence and mortality from cancer are increasing rapidly worldwide. The causes are complex, but reflect aging and population growth, as well as changes in the prevalence and distribution of major cancer risk factors, some of which are related to socio-economic development. The problem of high mortality from oncological diseases is very acute for all countries of the world, including economically developed ones. Between 30 % and 60 % of patients are died from cancer because of the late diagnosis. The analysis showed that the strategies for cancer control based on the WHO Resolution on Cancer in Great Britain, France, Poland, and the United States of America include prevention, diagnosis, and screening. It was possible to reduce mortality rate from cancer due to the wide use of the cancer screening system in routine medical practice. There are three mandatory screening tests for breast, cervix, and prostate cancer in Ukraine. However, these screening programs for cancer are currently ineffective. In fact, early diagnosis of cancer still comes from the patient's alertness to changes in health and self-examination for cancer.

**Conclusions.** According to research released by WHO, millions of deaths due to different types of cancer have been recorded worldwide annually. However, it has been proven that early diagnosis and rational treatment of cancer can reduce incidence or mortality rates. The experience of Western Europe countries and the United States shows that the systematic work in early detection and screening allows reducing cancer incidence and mortality. In Ukraine, there are mandatory screening tests for breast, cervix, and prostate cancer but they have still related to non-systematic and, as a result, are ineffective.

KEY WORDS: **early detection; screening; cancer; oncological diseases; incidence; mortality.**

**Introduction.** Over the years, cancer has been one of the main reasons of disability and mortality in the world, leading to significant losses in the work and life potential of the global community. According to a study published by the International Agency for Research on Cancer (IARC), 7 million fatal cancer cases are detected every year around the world. It is estimated that 20 million new cases of cancer will have been detected annually by 2020, and cancer mortality will have increased by 45 % by 2030 compared to 2007. According to World Health Organization (WHO), almost 40 % of all cancers can be prevented through timely screening, medical examinations, and lifestyle changes [26, 27].

The increase in the incidence of cancer in recent decades sharply raises the problem of early diagnosis and rational treatment of oncological diseases.

It is noted by WHO that Ukraine is the ninth largest country in the world of spreading cancer, and epidemiological situation in Ukraine is characterized by a high morbidity that is steadily increasing [27]. Besides, levels of quality and accessibility of medical service in Ukraine do not meet needs of patients with cancer. Therefore, it is extremely important to improve three main areas of medical care with

proven effectiveness: early detection, screening, and rational prevention.

**Purpose:** to analyze current incidence and mortality rates of cancer; a role of early detection or screening in reducing high cancer mortality; and approaches of screening in the world and Ukraine, particularly.

**Materials and Methods.** It was used the statistical materials of the State Statistics Service of Ukraine, the Health Statistics Center of the Ministry of Health of Ukraine, the specified data of the National Cancer Registry of Ukraine and GLOBOCAN database, and the results of sampling studies of the incidence and prevalence of cancer among the world and Ukrainian population. Also it was analyzed official information about early detection and screening of cancer from the Department of Health and Social Care of the United Kingdom, the Ministry of Health of the Republic of Poland, the United States Department of Health and Human Services, and the Ministry of Social Affairs and Health of the French Republic. A bibliosemantic, structural-logical, and comparative analysis and analytical method were used in the research.

**Results and Discussion.** Non-communicable diseases are now the cause of most deaths in the

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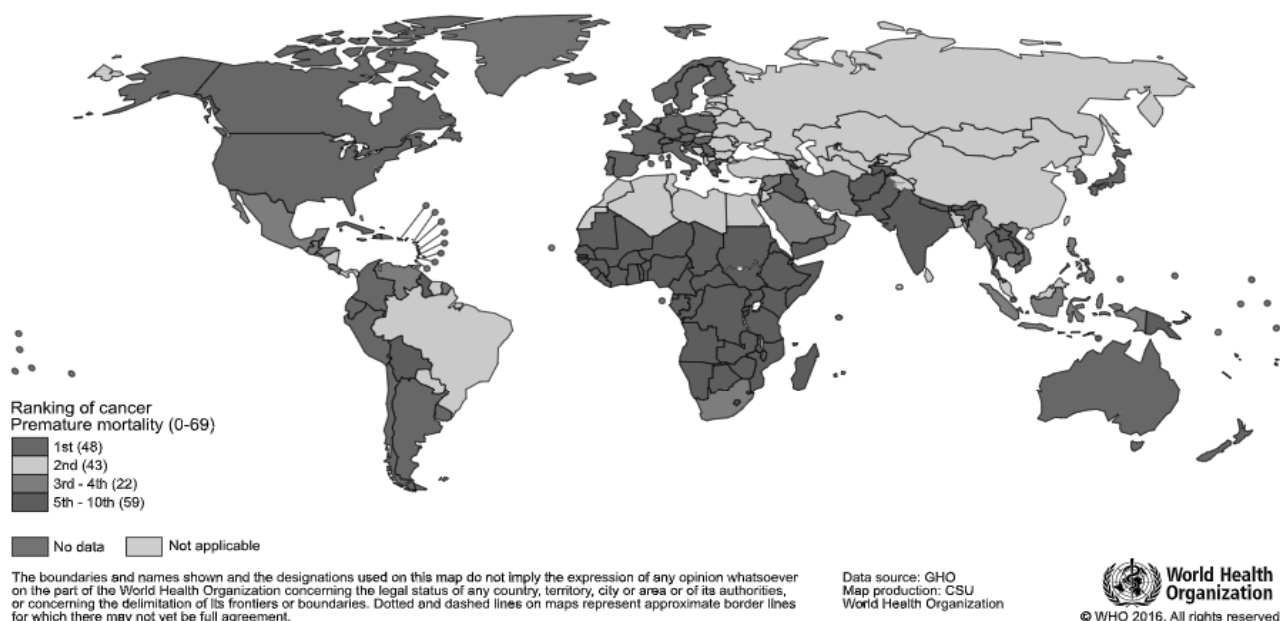


Fig. 1. A global map that presents the rank of cancer as a cause of mortality in the age under 70 in the world in 2015. Source: World Health Organization

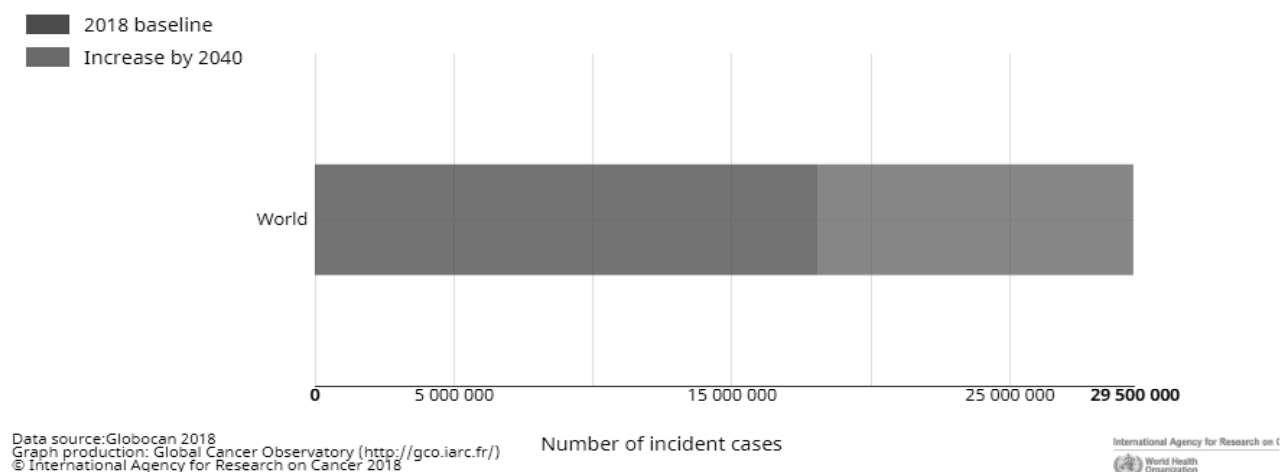


Fig. 2. Estimated number of incident cases from 2018 to 2040, all cancers, both sexes, all ages. Source: World Health Organization, GLOBOCAN database.

world. Cancer is expected to be the leading cause of death and a major barrier to increasing life expectancy in every country in the 21st century. According to World Health Organization (WHO), it is estimated that cancer was the first or the second cause of mortality in the age under 70 in 91 out of 172 countries in the world in 2015 (Fig. 1) [26].

According to World Health Organization, it is estimated that over 29 million new cases of cancer will have been detected by 2040 globally (Fig. 2) [27].

According to GLOBOCAN data, incidence cancer rates were rather high in 2018 in the world: from 7 to 41 incidence cases of different cancer types per 100,000 (Fig.3) [27]. Ovarian cancer had the lowest incidence (7 cases per 100,000), and breast cancer had the highest incidence (41 cases per 100,000). It is also mentioned that prostate, lung, and colorectal

cancers had also the leading position in estimating new cancer cases (29, 25, 19 cases per 100,000, respectively).

In Ukraine, it is almost the same situation with incidence rates in 2018 (Fig.4). It is characterized from 8 to 44 incidence cases of different cancer types per 100,000 for Ukraine population annually [27]. Breast cancer had the highest incidence (44 cases per 100,000), and thyroid cancer had the lowest incidence (8 cases per 100,000). Prostate and colorectal cancers also characterized with high incidence in Ukraine in 2018 as well as in the world (34 and 26 cases per 100,000, respectively).

The National Cancer Registry of Ukraine presented that 137,266 new cases of cancer were registered in 2017, and the total gross incidence of cancer was 381.4 per 100,000, including 392.5 in males and

Estimated age-standardized incidence and mortality rates (World) in 2018, worldwide, both sexes, all ages

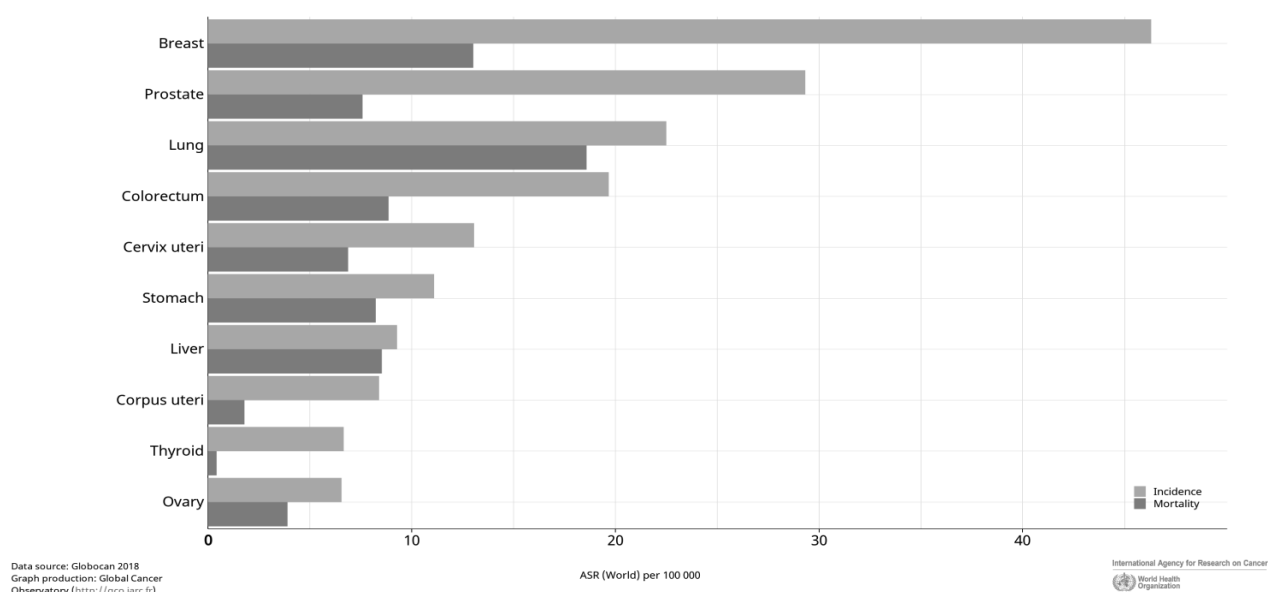


Fig. 3. Estimated age-standardized incidence and mortality rates in 2018, world, both sexes, all ages. Source: World Health Organization, GLOBOCAN database

Estimated age-standardized incidence and mortality rates (World) in 2018, Ukraine, both sexes, all ages

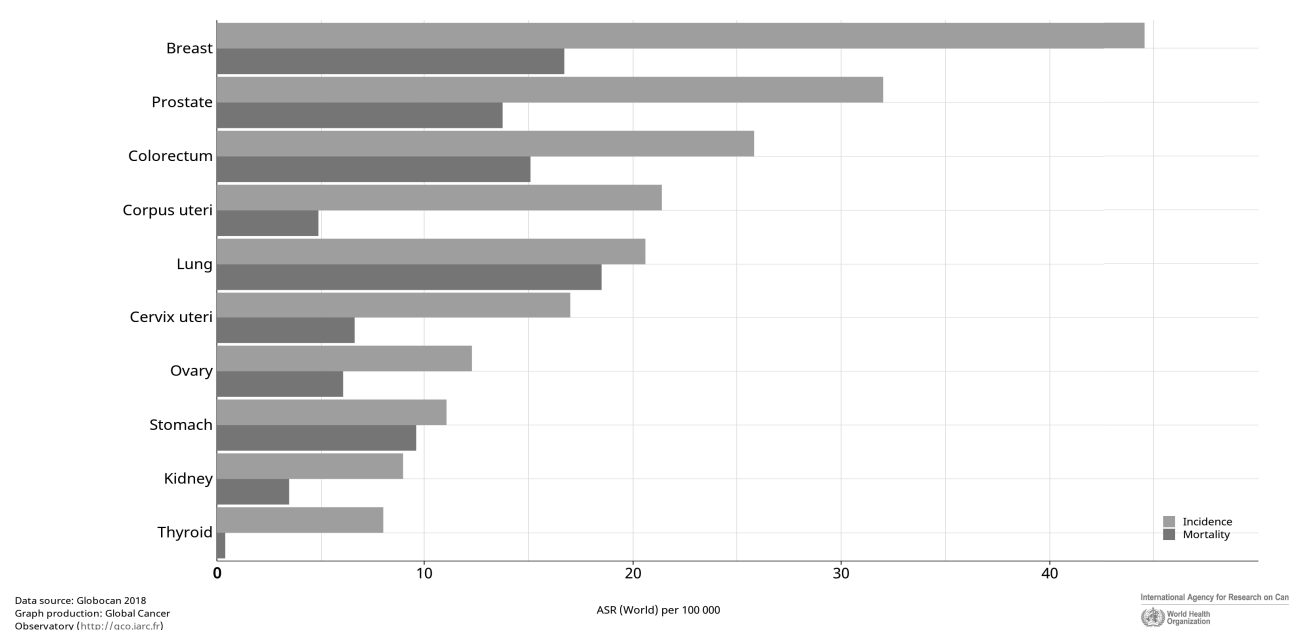


Fig. 4. Estimated age-standardized incidence and mortality rates in 2018, Ukraine, both sexes, all ages. Source: World Health Organization, GLOBOCAN database

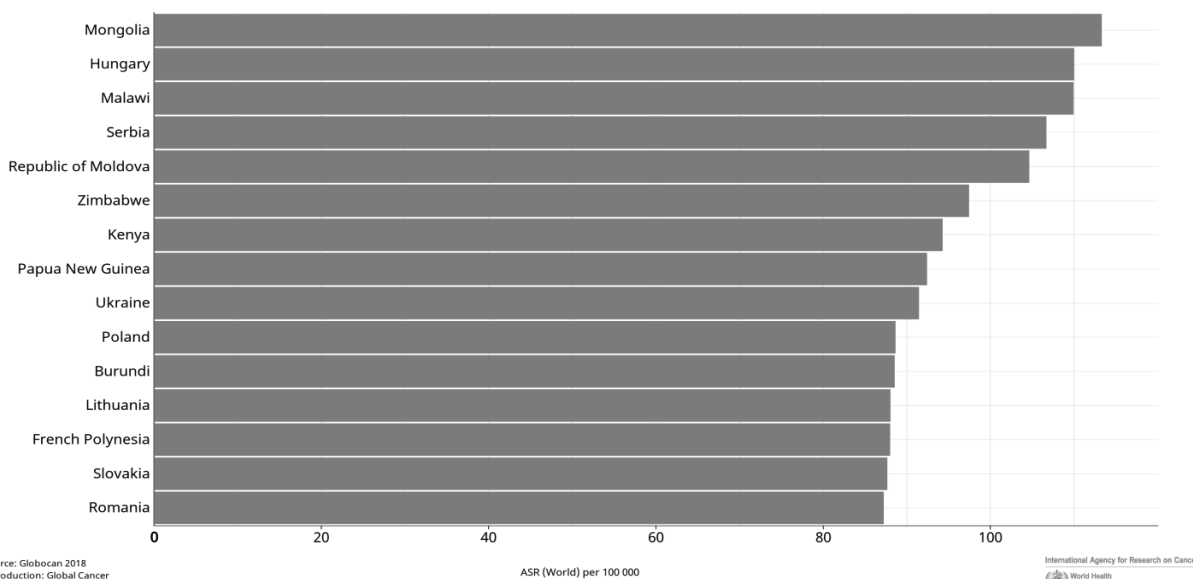
371.7 in females. Compared to 2016, the overall incidence of cancer increased to 349.5 per 100,000, according to a standardized indicator (Ukrainian population standard). The highest incidence in males was observed in the Zaporizhzhia, Kirovohrad, Mykolaiv, Sumy, and Kherson regions (461.4–516.9 per 100,000). In the female population, the highest incidence were reported in Kyiv, Kirovohrad, Mykolaiv, Kherson regions, and Kyiv city (328.4–389.0 per 100,000) [5].

Cancer mortality rates are increasing every year. For example, according to WHO, cancer mortality rates in 2018 at the age under 70 ranged from 86 to 113 deaths per 100,000 (Fig. 5) [27].

Mortality rates in Ukraine are rather high; thus, Ukraine is the ninth country in the world by the number of death in 2018 [26].

Mortality from cancer in 2017 in Ukraine was 64,860, with a gross mortality rate of 180.2 per 100,000. Standardized mortality rates were highest

Estimated age-standardized mortality rates (World) in 2018, all cancers, both sexes, ages 0-69



Data source: Globocan 2018  
Graph production: Global Cancer  
Observatory (<http://gco.iarc.fr>)

International Agency for Research on Cancer  
World Health  
Organization

Fig. 5. Representation of cancer mortality rates at the age under 70 in 2018, world, both sexes. Source: World Health Organization

in males from Dnipropetrovsk, Kirovohrad, Rivne, Kherson, and Khmelnytskyi regions (175.1–185.5 per 100,000). In females, mortality rates were 124.4–139.3 per 100,000 from Dnipropetrovsk, Kirovohrad, Sumy, Kharkiv, and Kyiv regions [5]. So, mortality rates are possibly increasing in Ukraine annually.

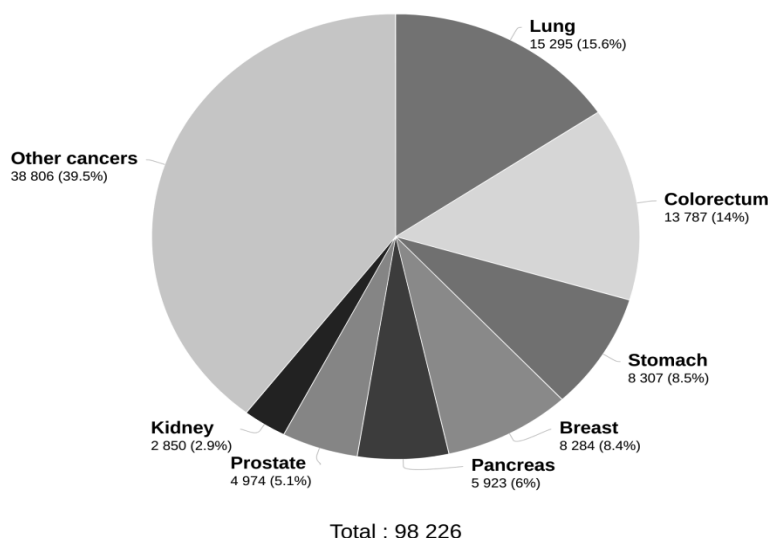
Also, it was analyzed the top 7 most frequent cancers in 2018 by WHO. Lung (15.295 deaths), colorectal (13.787 deaths), stomach (8.307 deaths), breast (8.284 deaths), pancreatic (5.923 deaths), prostate (4.974 deaths), and kidney (2.850 deaths) cancers

are the most frequent in Ukrainian population and are characterized by the highest mortality (Fig. 6) [26, 27].

According to GLOBOCAN database, the total number of deaths from all cancers was 98,226 in Ukraine in 2018. Table 1 shows the number of deaths from all cancers that are prevalent in Ukrainian population in 2018 [27].

According to the National Cancer Registry of Ukraine, lung, prostate, skin, stomach, and colorectal cancers (57.0 % from all cancers) had the largest

Estimated number of deaths in 2018, Ukraine, all cancers, both sexes, all ages



Data source: Globocan 2018  
Graph production: Global Cancer  
Observatory (<http://gco.iarc.fr>)

International Agency for Research on Cancer  
World Health  
Organization

Fig. 6. Estimated number of deaths from top 7 most frequent cancers in Ukraine in 2018, both sexes, all ages. Source: World Health Organization, GLOBOCAN database.

Table 1. Estimated number of deaths in 2018, Ukraine, both sexes, all ages.  
Source: World Health Organization

ICD	Cancer	Number	Uncertainty interval
C00-97	All cancers	98 226	[97478.5-98979.2]
C33-34	Lung	15 295	[14895.5-15705.2]
C18-21	Colorectum	13 787	Not available
C16	Stomach	8 307	[8015.9-8608.7]
C50	Breast	8 284	[7874.9-8714.3]
C25	Pancreas	5 923	[5677.8-6178.8]
C61	Prostate	4 974	[4751.5-5207.0]
C64-65	Kidney	2 850	[2686.7-3023.2]
C56	Ovary	2 681	[2526.4-2845.0]
C91-95	Leukaemia	2 585	[2399.3-2785.0]
C67	Bladder	2 515	[2357.2-2683.4]
C54	Corpus uteri	2 495	[2340.5-2659.7]
C53	Cervix uteri	2 475	[2314.7-2646.4]
C70-72	Brain, central nervous system	2 356	[2217.1-2503.6]
C22	Liver	2 256	[2102.7-2420.5]
C00-06	Lip, oral cavity	2 107	[1926.8-2304.0]
C15	Oesophagus	2 020	[1865.8-2186.9]
C82-86, C96	Non-Hodgkin lymphoma	1 596	[1461.5-1742.8]
C43	Melanoma of skin	1 389	[1269.6-1519.6]
C12-13	Hypopharynx	1 026	[903.1-1165.6]
C09-10	Oropharynx	1 022	[900.4-1160.0]
C23-24	Gallbladder	913	[804.1-1036.7]
C88+C90	Multiple myeloma	793	[703.9-893.4]
C51	Vulva	393	[333.9-462.6]
C73	Thyroid	352	[287.7-430.6]
C81	Hodgkin lymphoma	326	[267.1-397.8]
C07-08	Salivary glands	302	[239.1-381.4]
C45	Mesothelioma	188	[142.8-247.5]
C11	Nasopharynx	172	[140.5-210.5]
C62	Testis	137	[106.0-177.1]
C60	Penis	96	[69.5-132.6]
C52	Vagina	82	[54.5-123.4]
C46	Kaposi sarcoma	10	[6.6-15.2]

share in the structure of incidence in males in Ukraine in 2017. In females, breast, skin, body, cervical, and colorectal cancers (59.5 % from all cancers) had the leading incidence role. In the structure of mortality from cancer of the male population, the first five ranked places in 2017 were occupied by lung, stomach, prostate, colorectal cancers (54.1 %); in female population – breast, stomach, colorectal, and ovarian cancers (49.4%) [5].

The incidence and mortality from cancer are increasing rapidly worldwide. The causes are complex, but reflect both aging and population growth, as well as changes in the prevalence and distribution of major cancer risk factors, some of which are related to socio-economic development. With the rapid growth and aging of the worldwide population, stroke and coronary heart disease mortality is decreasing comparing to cancer mortality in many countries around the world [14, 15, 20].

The problem of high mortality from oncological diseases is very acute for all countries of the world, including economically developed ones. However, in economically developed countries, the population of older age groups (65 years and above) is the most affected by cancer. In the younger age groups in these countries, some progress has been recently made in reducing mortality from virtually all types of oncological diseases, especially breast cancer [7].

As it was noted by WHO that between 30 % and 60 % of patients are died from different types of cancer because of the late diagnosis [26], current scientific studies have focused on prevention, early detection, and screening of this pathology, as cancer is being treated in early stages nowadays.

The direct link is proven: the earlier man is diagnosed, the better treatment is, and the better cancer prognosis is. Thus, the survival in the case of early detection and screening at the first clinical

stage of the disease is 92 %, II – 88 %, III – 42 %, IV – 13 % [1]. Unfortunately, it is noted that in Ukraine, about 29.7 % of cancer patients (from 23.9 % in Odesa to 39.6 % in Chernivtsi regions) died within 1 year of being diagnosed (perhaps of late diagnosis). In developed countries, 1-year mortality does not exceed 25–30 %. Particular attention is paid to the discrepancy between the death number by the 1-year from diagnosis and the neglect (detection in III or IV stages) case number, the difference ratio of which in the Dnipropetrovsk, Sumy, Kharkiv, Khmelnytskyi regions and Kyiv city is in 1.0–1.3 times, which indicates the probable artificially lowering of the level of neglect as a rating [5].

Early detection and screening in 2018 in Ukraine revealed 27.0 % of cancer patients (from 5.1 % in Odesa region to 56.6 % in Kyiv city). The level of detection of visual localization tumors on preventive examinations remains as unsatisfactory. In particular, breast cancer was actively detected in 48.2 % of patients. Cytological screening deficiencies resulted in a low level of active detection of cervical cancer – 47.9 %, including the Dnipropetrovsk – 32.0 %, Ivano-Frankivsk – 16.8 %, Odesa – 12.3 %, Chernihiv regions – 25.7 %. Lung detection was low – 15.1 % in Ukraine, while in Vinnytsia, Volyn, Zakarpattia, Ivano-Frankivsk, Odesa, Chernivtsi regions and Kyiv city the value was 1.3–7.5 %, which indicates the poor performance of the fluorographic service. Special attention is paid to the diagnosis of prostate cancer disease, the active detection rate of which does not exceed 21.1 % in Ukraine, and in the Dnipropetrovsk, Zakarpattia, Odesa, Chernivtsi regions it does not reach 5 %, which indicates deficiencies in the urological service [5].

The increase in the prevalence of cancer leads to finding ways to improve the early diagnosis and treatment, the identification of new cancer markers, drug development, etc [2]. Nevertheless, effective organization of cancer care and early diagnosis of cancer are considered to be important components of the cancer control strategies. Prevention and early detection of cancer, which is a system of measures aimed at identifying early stage tumors, is a major challenge for health care implementation. Prevention is conducted in three stages: preventive examination

and timely screening, timely treatment of precancerous conditions and early treatment of cancer [3].

As international experience shows, the burden of cancer can be reduced by implementing prevention strategies and innovative treatments. International cancer prevention and prevention activities under WHO auspice include advocacy and political commitment to measures which reduce the risk of cancer, build up and disseminate knowledge to promote evidence-based anti-cancer approaches.

We have worked out the experience of the practice of early diagnosis of oncological diseases in the United Kingdom, France, Poland and the United States, based on the World Health Organization Resolution on Cancer (2005). The strategy for cancer control consists of four major components: prevention and diagnostics, screening and treatment, care and palliative care, and other organizational activities.

Due to the widespread use of basic methods of early detection of cancer in routine medical practice in many countries of the world, it was achieved stabilization and reduction of mortality from breast, cervix, prostate, intestines, and lung cancer.

There are two areas for the implementation of screening programs in the international medical community: 1) organized or systematic – directed to the entire population of the country or in the region with the highest rates of morbidity and mortality from a particular form of cancer (the risk zone); 2) unorganized or non-systematic – for those sectors of the population who have applied to the treatment-and-prophylactic institution for any reason. Organized screening is the most effective, precisely because of the ability to reach more populations. Organized cancer screening programs in different countries are based on their relevance to those forms of cancer that are an important health problem in the country or region according to morbidity and mortality.

In the UK, there are currently national screening programs for breast, cervix, and bowel cancers (Table 2). However, these programs are only offered to patients with declarations with a primary care physician and are at risk, otherwise, the cancer screening service is a fee or partial reimbursement [8, 9, 10-12].

There are national programs in the United States for the early detection of breast, cervical, lung, and

Table 2. Application of screening programs in some countries of the world

Country	Cancer					
	Breast	Cervix	Lung	Colorectal	Bowel	Prostate
UK	+	+			+	
France	+	+			+	+
USA	+	+	+	+		
Poland	+	+		(implementation is planned for the second half of 2019)		
Ukraine	+	+				+

colorectal cancers that are recommended by the US Working Group on Preventive Services and covered by health insurance for target groups (Table 2) [21–25].

In France, routine screening campaigns are conducted for the four most common types of cancer: the breast, prostate, cervix and bowel (Table 2), which are offered free of charge for specific age groups or groups at increased risk. If patients fall outside the target group of screening data, they pay for them individually or require reimbursement through insurance companies [13].

In Poland, there are two compulsory systematic screening programs for breast and cervical cancers (Table 2). The program of breast cancer screening among the female population has brought positive results – it has been able to significantly reduce mortality from this cancer. While the screening program for cervical cancer did not meet expectations because of its economic inefficiency. It is also planned to implement a state-wide colon cancer screening program for colonoscopy in Poland in 2019–2024 [16–19].

In Ukraine, according to the statistics on the spread of cancer pathology, it is advisable to introduce routine screening of lung, breast, stomach, colon, and cervix cancer. It should be noted that the mandatory screening tests for breast, cervix, and prostate cancer have already been introduced; thus, the patient can undergo free of charge (at the expense of the state budget) at the level of primary health care (Table 2) [4]. However, government screening programs for cancer in Ukraine have still related to non-systematic and, in fact, they are currently ineffective for some reasons.

Early diagnosis of cancer is still coming primarily from the patients' alertness to changes in their own health, with the practice of so-called self-examination for certain types of cancer. Despite the current awareness of the population of Ukraine about the widespread oncological diseases, most of them show complete indifference to their own health. The results of the 2010 nationwide Campaign for Early Diagnosis of Breast Cancer showed that even when experiencing specific symptoms (pain, tactile sensitivity, palpation, etc.), women did not turn to a specialist for fear of being diagnosed, indifferent to their health, the desire to avoid the appointment of treatment in connection with the fear of hormonal and cost therapy [6].

Therefore, the analysis showed that each country chooses its way of implementing screening programs recommended by WHO, depending on the epidemiological situation and the economic situation. Nevertheless, cancer early detection is based on standardized and simple clinical, instrumental (ultrasound, computed tomography, etc.) and pathomorphological (thin needle aspiration biopsy, trepan biopsy, open biopsy) methods. In each country, the choice of the priorities of medical measures should be made by taking into account the socio-economic, political, environmental, and epidemiological aspects. A persistent anti-cancer national program is the most important in this process. At the same time, it is necessary to take into account the availability of conditions that allow them to be realized, as shown by the experience of Poland. In Ukraine, it is necessary to take the best international management experience of early detection and screening of cancer relying into socio-economic and epidemiological conditions.

**Conclusions.** Cancer has been a major reason of non-communicable incidence, disability, and mortality in the world for many years. According to research released by WHO, millions of deaths due to different types of cancer have been recorded worldwide annually. However, it has been proven that early diagnosis and rational treatment of cancer can reduce incidence or mortality rates. Nowadays, the whole world is working on programs on early cancer detection and screening. The management experience of the countries of Western Europe and the United States shows that the systematic work in the field of early detection and screening actually allows solving a problem of late cancer diagnosis and high mortality. In Ukraine, there are mandatory screening tests for breast, cervix, and prostate cancer but they have still related to non-systematic and, as a result, are ineffective.

**Prospects for further research.** The prospect of the study is to continuously study and analyze the health indicators and risk factors that affect its condition, as well as to justify, formulate, and implement public health strategies. The further research is planned to investigate the root causes of low early diagnosis and high cancer mortality in Ukraine. Systematic questionnaire is planned for patients, general physicians, oncologists, and health care experts to understand actual problems of different levels of medicine.

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## РАННЯ ДІАГНОСТИКА ТА СКРИНІНГ ЯК ОСНОВНІ СКЛАДОВІ СТРАТЕГІЇ ПРОТИДІЇ ОНКОЛОГІЧНИМ ЗАХВОРЮВАННЯМ

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**Мета:** проаналізувати сучасні показники захворюваності та смертності від онкологічних захворювань, роль ранньої діагностики та скринінгу в зниженні показників високої смертності від раку та підходи до скринінгу онкопатологій у світі та Україні.

**Матеріали і методи.** У дослідженні використано бібліосемантичний, структурно-логічний та порівняльний аналізи, а також аналітичний метод.

**Результати.** Захворюваність та смертність від онкологічних захворювань зростають дуже швидко в усьому світі. Причини високої захворюваності – складні. Деякі з них пов'язані з соціально-економічним розвитком. Проблема високої смертності від онкологічних захворювань дуже гостра для всіх країн світу, включаючи економічно розвинені. Від 30 до 60 % пацієнтів померли від раку через пізнє діагностування онкопатології. Аналіз показав, що стратегії боротьби з раком у Великій Британії, Франції, Польщі та Сполучених Штатах Америки ґрунтуються на Резолюції Всесвітньої організації охорони здоров'я щодо профілактики та контролю онкологічних захворювань (2005) і включають профілактику, діагностику та скринінг. Завдяки впровадженню скринінгових програм у рутинну медичну практику країн ЄС та Сполучених Штатів Америки, вдалося знизити рівень смертності від раку. В Україні є три обов'язкові скринінг-тести на рак молочної залози, шийки матки та передміхурової залози. Однак програми скринінгу на ці види раку наразі малоєфективні. Насправді, рання діагностика раку все ще ґрунтується на самообстеженні та усвідомленні змін у власному здоров'ї потенційного пацієнта, що призводить до пізньої діагностики та тяжкого перебігу захворювання.

**Висновки.** Згідно з дослідженнями, опублікованими ВООЗ, реєструють мільйони смертей від різних видів раку щорічно у всьому світі. Однак було доведено, що рання діагностика, скринінг та раціональне лікування раку можуть знизити рівні захворюваності та смертності. Досвід країн Західної Європи та США показує, що систематична робота з ранньої діагностики та скринінгу дозволяє зменшити захворюваність та смертність від раку. В Україні існують обов'язкові скринінгові тести на рак молочної залози, шийки матки та передміхурової залози, але вони все ще є несистематичними та, як наслідок, неефективними.

**КЛЮЧОВІ СЛОВА:** рання діагностика; скринінг; рак; онкологічні захворювання; захворюваність; смертність.

## РАННЯ ДІАГНОСТИКА И СКРИНИНГ КАК ОСНОВНЫЕ СОСТАВЛЯЮЩИЕ СТРАТЕГИИ ПРОТИВОДЕЙСТВИЯ ОНКОЛОГИЧЕСКИМ ЗАБОЛЕВАНИЯМ

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**Цель:** проанализировать современные показатели заболеваемости и смертности от онкологических заболеваний, роль ранней диагностики и скрининга в снижении показателей высокой смертности от рака и подходы к скринингу онкопатологий в мире и Украине.

**Материалы и методы.** В исследовании использовали библиосемантический, структурно-логический и сравнительный анализы, а также аналитический метод.

**Результаты.** Заболеваемость и смертность от онкологических заболеваний растут очень быстро во всем мире. Причины высокой заболеваемости – сложные. Некоторые из них связаны с социально-экономическим развитием. Проблема высокой смертности от онкологических заболеваний очень острая для всех стран мира, включая экономически развитые. От 30 до 60 % пациентов умерли от рака из-за позднего диагностирования онкопатологии. Анализ показал, что стратегии борьбы с раком в Великобритании, Франции, Польши и Соединенных Штатах Америки основаны на резолюции Всемирной организации здравоохранения по профилактике и контролю онкологических заболеваний (2005) и включают профилактику, диагностику и скрининг. Благодаря внедрению скрининговых программ в рутинную медицинскую практику стран ЕС и Соединенных Штатов Америки, удалось снизить уровень смертности от рака. В Украине есть три обязательных скрининг-тесты на рак молочной железы, шейки матки и предстательной железы. Однако программы скрининга на эти виды рака пока малоэффективны. На самом деле, ранняя диагностика рака все еще основывается на самообследовании и осознании изменений в собственном здоровье потенциального пациента, что приводит к поздней диагностике и тяжелому течению заболевания.

**Выводы.** Согласно исследованиям, опубликованным ВОЗ, регистрируют миллионы смертей от различных видов рака ежегодно во всем мире. Однако было доказано, что ранняя диагностика, скрининг и рациональное лечение рака могут снизить уровень заболеваемости и смертности. Опыт стран Западной Европы и США показывает, что систематическая работа по ранней диагностике и скринингу позволяет уменьшить заболеваемость и смертность от рака. В Украине существуют обязательные скрининговые тесты на рак молочной железы, шейки матки и предстательной железы, но они все еще несистематические и, как следствие, неэффективные.

**КЛЮЧЕВЫЕ СЛОВА:** ранняя диагностика; скрининг; рак; онкологические заболевания; заболеваемость; смертность.

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