THE PROJECTION OF MALIGNANT DISEASES DISTRIBUTION IN YUGOSLAVIA WITH A SPECIAL REGARD TO BELGRADE UP TO THE YEAR 2020

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ABSTRACT

The paper presents data based on a 30-year period of descriptive and analytic studies conducted in Yugoslavia. It includes geographical distribution of malignant diseases and assessment of their frequency according to gender and age and the projection up to the year 2020.

Key words: malignant diseases, distribution, frequency assessment

METHODOLOGY:

A) Descriptive epidemiology

- Mortality statistics is based on the counting of the number of deaths. It could be used in cancers with short survival period (Republic Institute for Statistics).
- Morbidity statistics is based on registration of all cases of malignant diseases in the period of one year. The frequency of the new cases is compared to all existing cases – frequency of the existing patients. (Source of data are vital statistics, population cancer registries, hospital cancer registries, and the annual reports of clinics and hospitals).

B) Analytic epidemiology

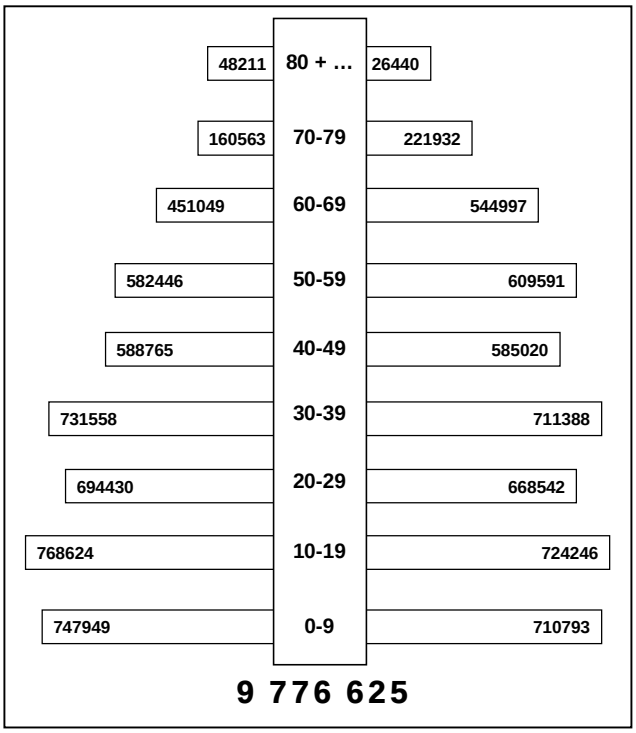
- The results of the anamnestic studies (case-control studies), conducted in hospitals for leading malignant diseases are also used for this paper.

At the end of this millenium we experienced the fast technological development of computers, which have become an integral part of the work in health centers. They presented a solution to many problems. With some imagination we try to present ourselves a new era in history of medical science with computers in its way which enables creating a new method of medical thinking. The computers started to change mentality and psychology of people. This is the reason of changing the way of thinking and also the generation gap. The

process of computerization has started and it couldn't be stopped. The perspectives are unclear. At the crossroad of two millenia, the population of Serbia experienced the greatest crisis. These are the reasons for summing up 30 years of our work.

RESULTS

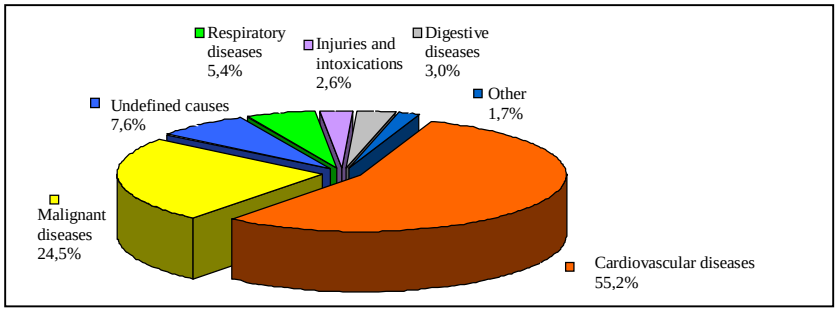
The results of our studies (of the last decades of this century) are shown on tables, histograms, and graphs.



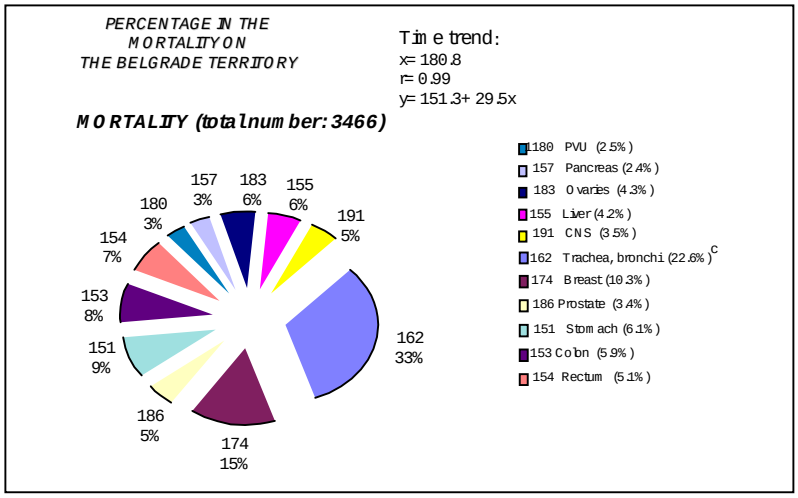
Up to the census from 1991, 9,776,625 people have been registered to live in Serbia; 16,4% people live in the capitol city - Belgrade. There are small differences in the age distribution

in Europe: a smaller number of youngsters (age 0-19) and higher number of the older population (more than 60).
The pyramid below shows the number of people in certain age groups. The pyramid shows women on the left, and men on the left.
The natality rate is decreasing in most Serbian regions for a long time. Exception are the southern regions, where this rate showed enormous increase until 1995.
The following is some mortality statistics data.

Percentage of leading causes of death in Serbia:



The mortality rates are: cardiovascular diseases 528.2; malignant diseases 198.7; undefined causes of death 72.6; respiratory diseases 52.7; injuries and intoxication 50.0; digestive diseases 28.7; other 16.1. Until 1995, a number of 29,000 to 31,000 new patients were registered annually. The total number of malignant patients is 140,000-145,000 and 19,000-21,000 deaths are registered.
In Belgrade (with 16.4% of people in Serbia), there are 7,500-8,000 new diagnosed patients annually, with a total number of malignant diseases of 35,000-40,000, and 3,500-4,000 of deaths.
Malignant diseases mortality rates have an increasing time trend (y=118.7+6.7x). The average standardized mortality rates of Serbian regions show geographical variations due to way of life, culture, diet…
The graph below shows the epidemiological situation in Belgrade



Malignant diseases in Belgrade are presented with 20%; all other diseases with 80%. The number of patients with malignancy and deaths had increased for 40% in the last ten years on the territory of Belgrade.
The next two tables show the ten leading malignancies in Serbia for men and women:

MEN

Cancer	Mt (1:100.000)	Trend (y)
Lungs	41.9	25.1+ 3.4x
Stomach	16.5	13.7+ 0.6x
Prostate	10.4	11.93-0.3x
Liver	8.8	7.6+ 0.3x
Colon	7.6	4.3+ 0.6x
Larynx	6.1	2.6+ 0.2x
Nervous sy.	5.2	4.7+ 0.1x
Bladder	4.7	3.2+ 0.3x
Pancreas	4.1	2.7+ 0.4x
Hodgkin	3.5	6.3+ 0.6x

WOMEN

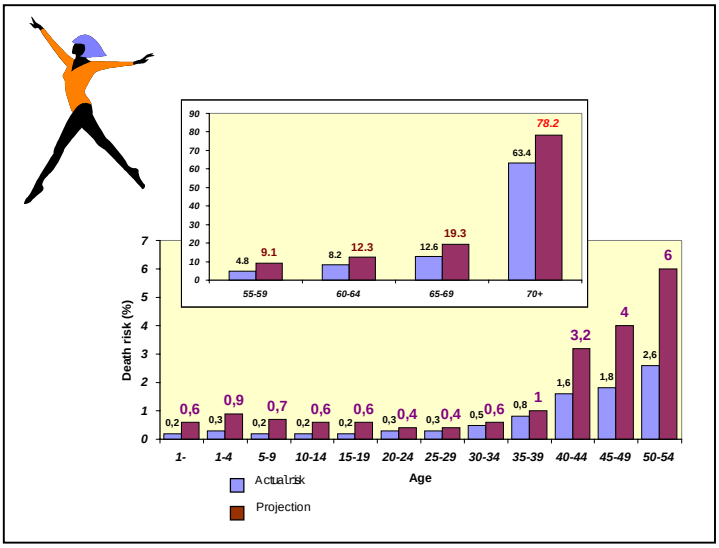
Cancer	Mt (1:100.000)	Trend (y)
Breast	29.4	10.3+ 1.6x
Lungs	9.6	6.8+ 0.6x
Cervix	7.4	9.1+ 0.1x
Colon	6.3	3.7+ 0.5x
Pancreas	6.3	3.8+ 0.5x
Liver	6.3	5.8+ 0.1x
Ovaries	5.0	2.9+ 0.4x
Corpus uteri	3.9	2.3+ 0.1x
Nervous sy.	3.7	1.3+ 0.1x
Hodgkin	2.4	1.3+ 0.1x

So, these are the numbers, but what about ”reality”?
People live in their environment. Many factors, the egsogenous ones, have their effects with appropriate consequences. These are chemical, physical and biological factors that exist for ages. But, there are also new ones, the effects of which are, frequently, unpredictable. Sometimes the effect is visible at that moment. But, in most cases, the effect may be seen many years later (the latent period).
But, Serbia and Belgrade have survived many things. The truth is that this is not a nation very much concerned about its environment. Also, we have such a geographical position, that many nuclear plants are located in our surroundings. One more thing. A few months ago, tones of bombs have fallen over us.

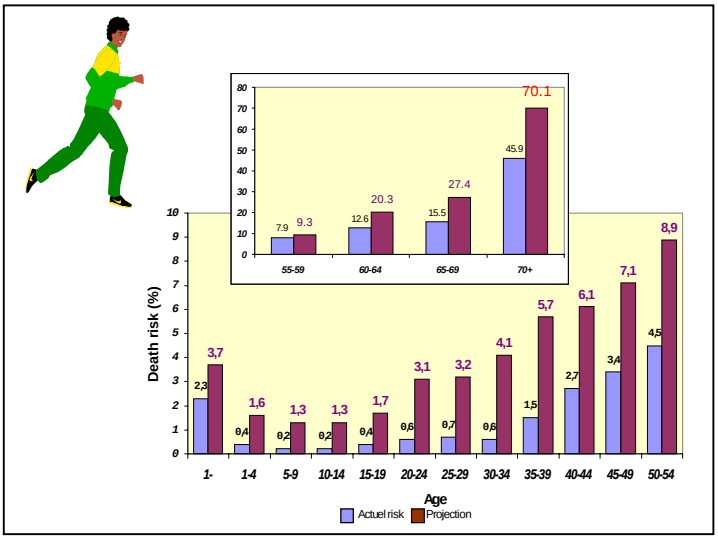


One may say that the situation is quite complicated now. People are exposed to exogenous factors (both old and new) and to endogenous factors, such as psycho-stress, immunity decrease, hormonal disorders, metabolic disorders. What are the consequences? Probably, the most obvious consequences would be: rapid aging process, increase of mass chronic diseases incidence (cardiovascular diseases, malignant diseases) and increase of the total number of deaths in the population.

We have calculated the following figures on the basis of the age pyramid of mortality statistics. In statistics, aging statistically presents an increased risk of dying during the period of one year. In the following graphs, the death risk is shown depending of the age of a person, in the present situation, and in the year 2020.

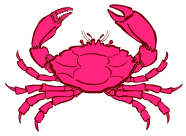


And for men:



We have noted one more thing. There are some mutual risk factors for cardiovascular and malignant diseases.
Here they are, together with relative risk and odds ratio.

		RR	OR
1.	Age	-	
2.	Smoking	7.3	(5.0-8.0)
3.	Exogenous factors	-	
4.	Alcohol	2.9	(1.9-5.0)
5.	Diet (fat)	6.2	(4.0-7.0)
6.	Hormones	5.3	(3.0-7.0)
7.	Infection (viruses)	3.1	
8.	Immunology	2.9	(0.8-4.2)
9.	Drugs	3.1	(2.0-9.0)
10.	Inheritance	3.6	(1.9-6.0)
11.	Stress	1.9	(0.8-6.0)
12.	Constitution	2.8	(1.4-5.2)
13.	Decreased physical activity	3.1	(1.6-4.8)
14.	Radiation	5.6	(4.0-11.0)



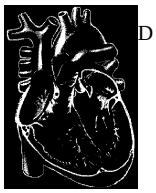
Standardized mortality rate of malignant diseases, 1996 (1:100.000)

210.1

AND INCREASING

Standardized mortality rate of cardiovascular diseases, 1996 (1:100.000)

593.2



D INCREASING

The most usual malignant diseases considering age and gender are:

	Male	Female
Age 0-29	Hodgkin disease	CNS
	CNS	Hodgkin disease
	ALL	ALL
Age 30-49	Lungs	Breast
	CNS	Lungs
	Hodgkin disease	PVU
	Stomach	
Age over 50	Lungs	Breast
	Stomach	Lungs
	Liver	PVU

The five-year survival of the most frequent malignancies in Serbia and USA:

Localization of malignancy	*Serbia*	*USA*
Lungs	6 %	13 %
Breast	60 %	74 %
Colon	22 %	52 %
Pancreas	1 %	3 %
Prostate	47 %	70 %
Testis	40 %	89 %
Ovaries	30 %	38 %
Corpus uteri	64 %	83 %
Cervix	50 %	66 %
Bladder	60 %	75 %
Melanoma	51 %	80 %
Leukemia	19 %	33 %

Comment is not neccesary.

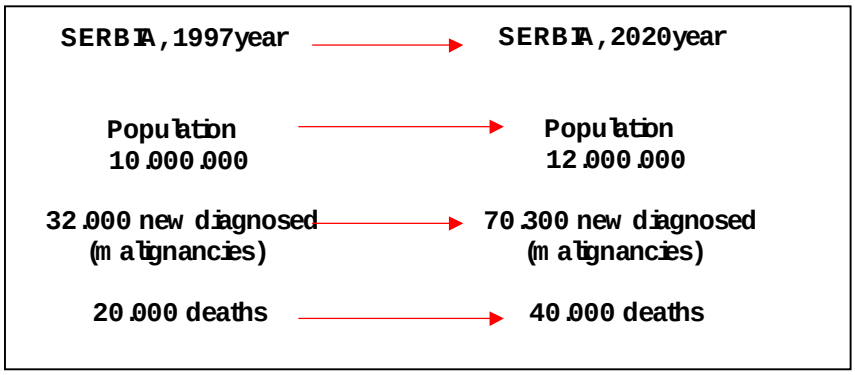
Results of other studies show that there are many more possibilities for decreasing number of lungs, liver and stomach cancer on the level of prevention. The number of breast, cervix and colon cancers could decrease with better methods of screening. And the number of Hodgkin disease, testis cancer and leukemia could be decreased with satisfactory therapy methods.

Smoking, infection and diet are risk factors for some ”usual” malignancies. We have calculated that 388 people (from 1945) would not get bladder, pancreas or kidney cancer if they stopped smoking. This is decrease of 20%. If they have quit smoking, 5,664 people (from total 7,080) would not get lung, larynx or oropharynx cancer. The decrease is much greater - 80%. Is it worth it?

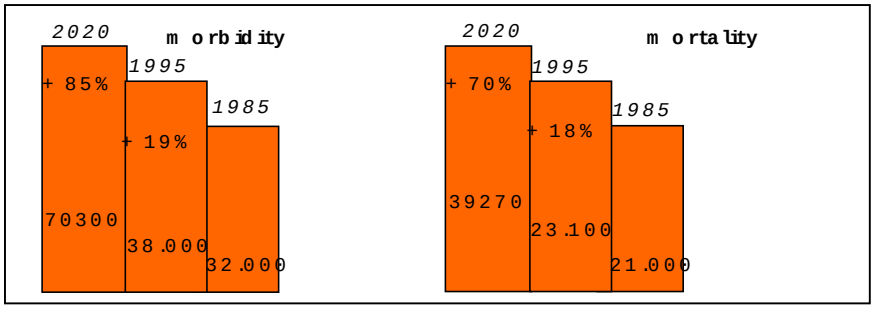
Well, take a glance. What could infection prevention and appropriate diet do?

Cancer	*Number of cases (morbidity statistics)*	*Good prevention and infection therapy*	*Decrease*
Bladder cancer	730	146 would stay healthy	20%
Stomach Cervix Non Hodgkin Liver	5400	4320 would stay healthy	80%
Cancer	***Number of cases (morbidity statistics)***	***Appropriate diet and cancer number decrease***	***Decrease***
Liver Prostate Orofarynx	2820	705 people would stay healthy with dietary intervention	25%
Stomach Colon Breast Esophagus	7210	5407 people would stay healthy with dietary intervention	75%

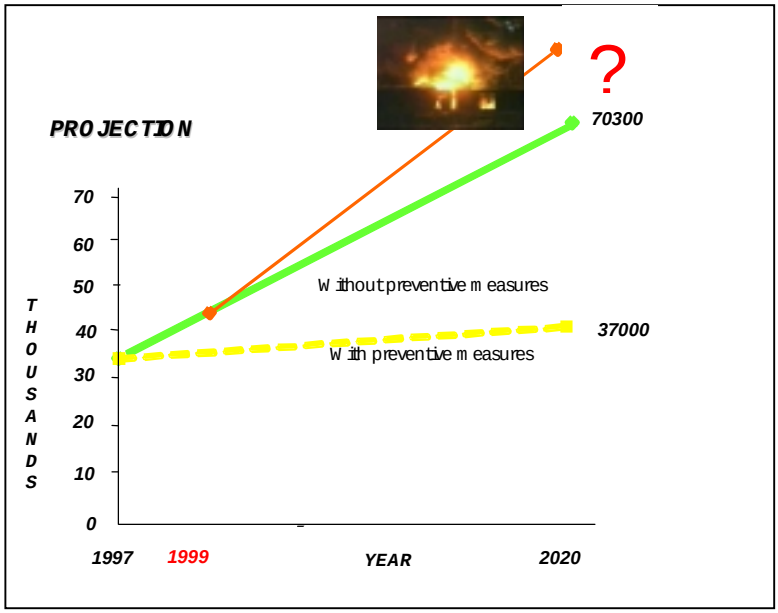
The projection of malignant diseases for 2020:



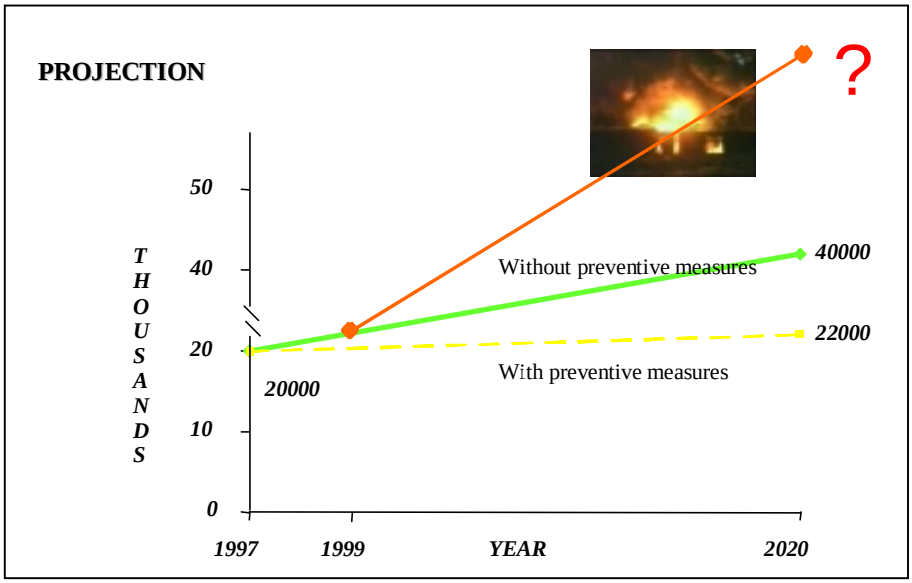
So, the trend is an increasing one.



Possible gain as a result of applied preventive measures against cancer in Serbia up to 2020 (incidence rate - new diagnosed)



Possible gain as a result of applied preventive measures against cancer in Serbia up to 2020 (mortality)



DISCUSSION

As of the etiology of malignant diseases, the causes are considered to be multifactorial. They could be egsogenous and endogenous. The egsogenous factors are cancerogens (chemical elements, compounds), physical agents (radiation), biological agents (viruses), and their combinations. These agents were in our environment (in higher or lower dose) until 1999 (March 24), when the bombing of Yugoslavia had started. This altered the abiotic factors of our environment.

The destruction of petrochemical and fertilizer factories, refineries and electroenergetic systems released cancerogens in the air: sulfur dioxide, nitrogen hydroxide, hydrocarbons, pyralene, vinyl-chloride-monomer, lead and other. Many cancerogens have polluted water flows. Radiation is present - uranium oxide from impoverished uranium. Great number of supersonic plane flights were the reason for creating a depletion of the ozone layer. It is hard to predict what kind of chemical reactions would take place in the air, soil or water. Long term effects would be seen in 5 to 15 years. The epidemiologists' task is to warn on consequences in the future.

The increase of lung cancer in men, but also in women is expected in the next 10 years. The same situation is with colon, breast, prostate, liver, CNS, bladder, pancreas, uterine body, ovary cancer and also with leukemia. The increased trend of malignant diseases would be much greater than was expected in 1998 (the projection up to 2020).

On the other hand, biotic factors disorders are expected: relation disorders between individuals, relations between species.

Endogenous factors, psychostress in the first place, endanger physiological individual balance through nervous system, endocrine system, causes numerous metabolic disorders. Individual reaction on changes is different. Small number of people would have optimum

of life. The most of people would find themselves in the pesimum of living. They are candidates for mass chronic diseases - they get sick more easilzy, they get older faster, and the death risk for them would be greater.
Regarding these facts, here is the quotation of the UN - Committee for human environment and development from 1988:

> *"Humanity would survive the next century only if laws intended to people change, so only if human activities pair up with nature laws."*

Considering that almost nothing has been done to protect the natural Earth systems, which are already globally endangered (the ozone layer, the air, forests, soil, water), onco-epidemiologists are correct to expect an enormous increase of malignant diseases until 2020. Serbia is only a part of this planet.

> *"If we wish to understand the present laws and state of the nature mega- and micro-systems on the Earth and to be successful in planning and accomplishing the future of the mankind on this planet, we should learn more about the laws controlling the development and offering of all existing systems, and even more of the relationship in the given time."*

CONCLUSION

The presented epidemiology data regarding malignant diseases and their projection until 2020 demands new algorithms for cancer prevention and screening. The plans for some malignancy algorithms are near the end, but it is needed for them to become part of whole community, governments, and not only the part of health services.
The contribution of The Scientific Research Center at the "Bezanijska kosa" Medical Center to the project of breast cancer prevention and screening, which is one of the leading malignancies on Yugoslav territory.
Oncoepidemiologists who made the projection for the XXI century will skip this epidemic, because they will not be here.

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