ORIGINAL ARTICLE

# The Current Status of the Evidence of Malignant Tumours of the Eye and its Adnexa (dg. C69) in the Slovak Republic and in the Czech Republic

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## SUMMARY

**The Current Status of the Evidence of Malignant Tumours of the Eye and its Adnexa (dg. C69) in the Slovak Republic and in the Czech Republic**

The area of ophthalmooncology includes not only intraocular tumors but also adnexal and extraocular tumors, relatively rare malignancies. To get valid data and to study the incidence, diagnosis and treatment is extremely difficult. The most frequently occurring intraocular tumor in adults is malignant melanoma, in children it is retinoblastoma.

We present the results of the nationwide group of patients based on the diagnosis report C69 – Tumors of the eye and adnexa according to data of the National Cancer Registry in Slovak Republic. We monitor the incidence, distribution by age group, survival and staging. In the second part of the thesis analyzed data are compared with the data from Cancer Registry in the Czech Republic.

After analyzing the data, we found that the incidence of intraocular tumors have been reported to be comparable with neighbouring countries. The classification of the disease in different stages due to TNM classifying in the report is below 50 % in Slovakia. The incidence observed in each year ranges from 0.6 to 1.0 per 100 000 inhabitants. Survival of patients with dg. C69 is comparable with other countries. The proportion of clinically defined stages of the disease is in the database of Slovakia lower than in the Czech Republic. The delay of inserting data of patients in the National Cancer Registry in Slovakia and the availability of data for analysis is currently unsatisfactory. In Slovakia are available data only up to year 2003, in Czech Republic up to year 2009.

**Key words: malignant eye tumors, tumors of the eye and adnexa, incidence, cancer registry**

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## INTRODUCTION

The seriousness of resolving the problem of intraocular tumours requires a complex approach on the part of ophthalmologists, oncologists, pathologists, epidemiologists, radiotherapists and the co-operation of several branches of medicine. The incidence of intraocular tumours is approximately 1.0 in 100 000 persons. The most frequently occurring intraocular tumour in adults is malignant melanoma, in childhood the most frequent is retinoblastoma.

The national oncological register (NOR) of the Slovak Republic of the National Health Information Centre (NHIC) is intended to be a professional and methodical centre for the registration and processing of reports of the occurrence of oncological disorders in the Slovak Republic. In close co-operation with the chief expert of the Ministry of Health of the Slovak Republic, the register should ensure and guarantee the completeness and quality of information about the occurrence of malignant tumours in the Slovak Republic for oncology and by means of regional experts for clinical oncology. All the information is stored in internationally unified form in the database of the oncological registers. The data forms the basis for statistical processing and analyses of the development of the onco-epidemiological situation within the framework of the given country, as well as on a European and global scale, in co-operation with international organisations (e.g. the International Agency for Research on Cancer – IARC, European Network of Cancer Registries – ENCR).

The task of the NOR SR, NHIC is to keep a lifelong, long-term record of oncological patients from the Slovak Republic, to supplement information about patients and the disorders they suffer from, whilst respecting the internationally accepted classification systems and upon strict adherence to the Personal Data Protection Act. The conditions of the method of selection and processing of data about patients with oncological disorders (diagnoses C00-D48 according to ICD-10) are specified by Act no. 576/2004 Coll., on healthcare and on the amendment and supplement to certain acts as amended by amendment no. 350/2005 Coll., and the Methodical Instruction of the Ministry of Health of the Slovak Republic "Mandatory Reporting of Malignant Tumours in the Slovak Republic", published in the Bulletin of the Ministry of Health of the Slovak Republic 2000 parts 10-12.

For greater reliability and quality, the data processed and published by NOR SR in the past appeared in all international periodical publications, overviews and databases of the World Health Organization (WHO) and formed a component of international projects focusing on the study of the epidemiology of tumours. At present they

are unfortunately no longer available for the professional public.

The main aim of the project entitled "National Portal of Epidemiology of Malignant Tumours in the Slovak Republic" (hereinafter referred to as the "web portal of NOR SR") was to develop an information system which supports scientific analyses form the data on the nations registered in NOR SR, NHIC. The system was prepared for aggregate data, analyses and presentations of epidemiological, clinical and demographic data from NOR SR, NHIC, which have to date been published in professional monographs and other scientific articles. The web portal of NOR SR worked primarily with epidemiological data about patients registered in the database of NOR SR. Anonymous epidemiological data from the register was available for the period from the year 1978. At present the web portal in the Slovak Republic is not available. In the Czech Republic the Oncological Register is currently available also for the professional public within the framework of the project for the creation of a web portal on the epidemiology of tumours in the Czech Republic entitled SVOD. Epidemiological trends cannot be processed without the relevant demographic data on the examined population. The creation of the web portal of NOR SR came about primarily due to an endeavour to make this representative and highly valuable data available in a suitable form to a wide spectrum of users and interested parties. It ensued from the presumption that general information on the epidemiology of tumours and the connected population risks should be freely available to all citizens of the Slovak Republic. The user thus obtains a direct and unique approach to complex information from the available sources, which he/she may use for further analyses and interpretations.

The disorders stated in the following overview are subject to oncological reporting. Histologically or cytologically unverified cases are also reported, determined only by a clinical examination or display methods, also cases of illness determined upon death (this represents DCO cases = death certificate only), as well as cases of malignant tumour determined during autopsy.

An overview of disorders subject to oncological reporting according to the International Classification of Diseases (ICD-10) (table 1).

According to ICD-10 the following anatomical localisation of diagnosis no. C69 (malignant tumours of eye and its adnexa) applies (table 2).

The data from the oncological register provides necessary information not only about the fundamental parameters of the disease, but also on survival and quality of life. Five-year survival is a useful indicator for evaluation of the quality of treatment and overall care of the patient. The presented data from the registers are very important in determining the strategy of monitoring of the oncological disorder and in the decision-making of competent agents and political circles, as well as for effective resolution of problems in connection therewith. The national oncological register is a foundation for four supporting pillars, which comprise the following fundamental areas – prevention, patient care (not only healthcare but also social care), research and information, and observation of comparable data in the results attained in Europe.

## AIM

To analyse a group of patients with dg. C69 from the National Oncological Register (NOR) according to data from the National Health Information Centre (NHIC) available for the professional public in the Slovak Republic and to compare it with the data from the Oncological Register in the Czech Republic; to compare the data on the occurrence of oncological disorders in the area of the eye.

## GROUP OF PATIENTS AND METHOD

From the available data we have obtained data on reported cases of patients with dg. C69, according to data from NOR SR and the Oncological Register of the Czech Republic since 1978. Description of reported 1191 cases of dg. 69 in the period 1978-2003 in the Slovak Republic, description of reported 2967 cases of dg. 69 in the Czech Republic according to time of occurrence, geographical occurrence, classification into clinical stages and age groups. Trends of incidence according to time of occurrence, regional overview according to conversion to "world standard" (ASR-W) for the period 1996-2003 in the Slovak Republic and up to 2009 in the Czech Republic. Trends of incidence, age composition, time development of incidence and mortality, comparison of Slovak Republic with data in Czech Republic.

## RESULTS

Reports of dg. C69 in Slovak Republic

In the observed period 1978-2003, data was analysed about 1191 patients with dg. C69. Upon observation of the occurrence of dg. C69 in the Slovak Republic according to the outputs from NOR, incidence was within the range of 0.4 to 1.0 in the observed period. Upon a comparison of the occurrence of dg. C69 in the Slovak Republic in the individual years from 1978 to 2003, we did not determine a significant increase. In the observed period of 1978-2003, data was analysed from 134 patients, who died as a result of the stated diagnosis. Mortality was within the range of 0.5 to 0.3 per 100 000 persons (fig. 1). Within the framework of the individual regions of the Slovak Republic, the values of the incidence of dg. C69 in the regional overview and in the conversion to the world standard for the period of 1996-2003 were within the range of 0.66-0.70 to 0.81-0.85. Upon a comparison of the occurrence of the observed diagnosis in the individual regions of the Slovak Re-

**Table 1**

| Disorder according to group of diagnoses: | Code according to ICD-10 | Code according to ICD-9 |
|---|---|---|
| a) Malignant tumours | C 00 - C 97 | (160-208) |
| b) Disease evaluated as carcinomas in situ | D 00 - D 09 | (230-234) |
| c) Carcinomas of unclear or unknown origin | D 37 - D 48 | (235-239) |
| d) Certain diseases affecting the lymphoreticular tissue and reticulohistiocyte system | D 76.0 | |

**Table 2**

| | |
|---|---|
| C69.0 | Conjunctiva |
| C69.1 | Cornea |
| C69.2 | Retina |
| C69.3 | Choroid |
| C69.4 | Ciliary muscle – corpus ciliare |
| C69.5 | Tear gland and nasolacrimal duct |
| C69.6 | Orbit |
| C69.7 | Overlapping lesion of eye and adnexa |

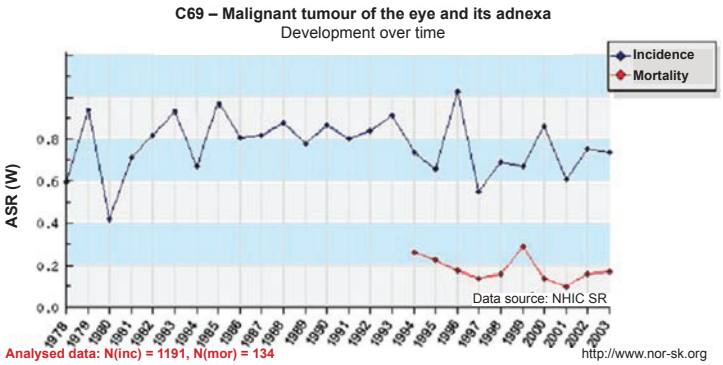


**Fig. 1** Malignant tumour of the eye and its adnexa in the Slovak Republic – development over the period 1978-2003

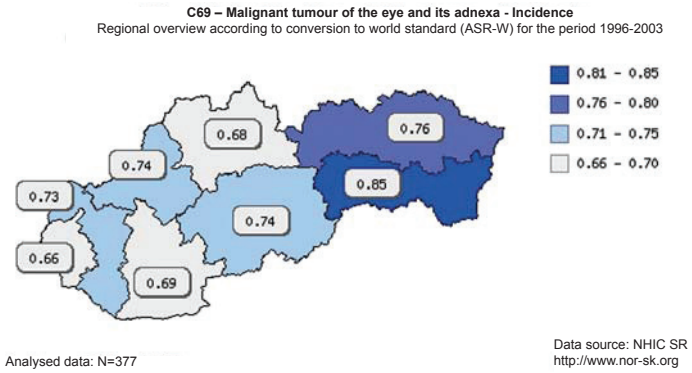


**Fig. 2** Malignant tumour of the eye and its adnexa in the Slovak Republic – incidence in the period 1978-2003 (occurrence per 100 000 persons)

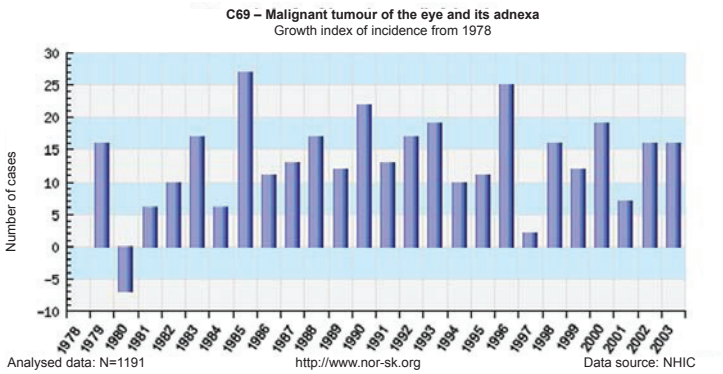


**Fig. 3** Malignant tumour of the eye and its adnexa in the Slovak Republic – growth index of incidence from 1978 (rate of occurrence per 100 000 persons)

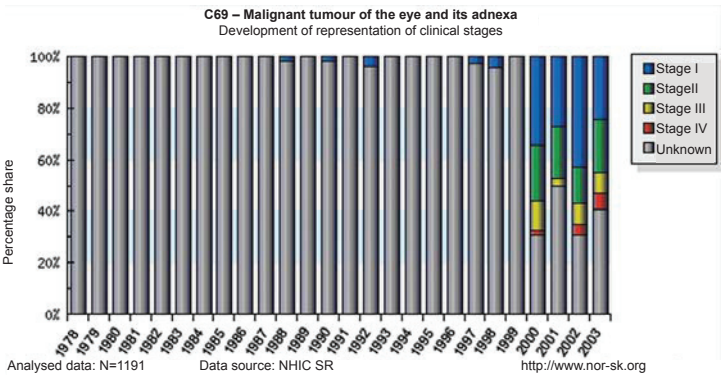


**Fig 4** Malignant tumour of the eye and its adnexa in the Slovak Republic – development of representation of clinical stages in the period 1978-2003

public and the conversion to the world standard we recorded the highest occurrence in the regions of East Slovakia (or the southern part of the East Slovakian region), where the incidence was on average up to 0.85, whereas in the Bratislava region it was only 0.66 (fig. 2).

Upon observation of the number of reports each year and upon a comparison with the initial year of 1978, increased values, or more reports of the observed diagnosis, were recorded each year. Below we present the growth index of the incidence from 1978, i.e. the year in which the data was entered and recorded in NOR for the first time in the Slovak Republic, and from this year onwards we have a record and the possibility of obtaining data (fig. 3).

In the period 1978-2003 the growth index of incidence in each individual year recorded increased values, the sole exception was 1980, when the values were negative. The values of the growth index of incidence as against 1978 were within the range of 2.0 in 1997 to 27.0 in 1985. The values from 1980 are increased in each observed year, but do not show a continual increase in the interval. The dispersal interval is very wide.

Upon an analysis of the development of the representation of clinical stages, we can state that there was a proportional representation from 2000, in which more than 40% or up to 50% of reports respectively did not have a precisely defined stage of the disorder. Disorders in the first and second stages predominated, though reports of a newly-discovered disorder in the fourth stages also appeared. The number of reports or percentage of reports which did not have a defined stage of the disorder from 2000 also exceeds ¼ of the total number of reports (fig. 4).

In the representation of clinical stages in percentages, more than 89% of reports had no specified stage of the disorder, i.e. were assessed as “unknown”. In the observed period from 1978-2003, as many as 89% of oncological reports contained no basic data – classification of disorder into stage. Of a total number of 1191 reports, only 11% had classification of the disorder according to stage (fig. 5). From 2000 onwards the development of the representation of clinical stages changes and almost one half of oncological reports with dg. C69 now contained data on the stage of the disorder within the framework of the TNM classification. Even so, the values in the individual years were at around 50% of reports which were correctly recorded and the individual disorders correctly classified into stage (fig. 6).

Upon determination of the age structure of the population of patients, the highest occurrence was recorded in the age category of 60-64 years. The second highest occurrence was recorded in the age category of 55-59 years and in the age category of 70-74 years. In the age category of 0-4 years this concerns an occurrence of retinoblastoma, in higher age categories it concerns malignant melanoma (fig. 7).
The analysis of development over time in the period of 1996 to 2003 did not provide sufficient data with regard to the generally low prevalence and incidence and relatively rare occurrence of the disease. In the observed period from 1996 to 2003 neither the minimum nor maximum values of incidence indicated a declining or rising trend (fig. 8)

**Reports of dg. C69 in the Czech Republic**

In the period of 1977-2009 data was analysed on 2967 patients with dg. C69 in the Czech Republic.
In an analysis of mortality from the observed diagnosis in the period 1977-2005, data was analysed from 1121 patients. Upon a comparison of the data from NOR SR with the data in NOR in the Czech Republic, approximately equal values of incidence and mortality were determined per 100 000 persons. The occurrence in individual years was within the range of 0.4 to 0.8, with mortality within the range of 0.1 to 0.3. We do not observe a rising trend of the occurrence or a rising trend in mortality in recent years (fig. 9).
Viewed according to region – the regional overview according to conversion to the world standard in the observed period – the differences in the regions were fairly pronounced. In the individual regions the differences are from 0.73 to 1.10, upon conversion to the world standard the lowest values were in the area of Prague (0.73). The highest values (1.10) were recorded in the Jihlava region (fig. 10).
The incidence growth index recorded large differences in the individual observed years. Upon a comparison of the incidence growth index in the individual years up to 2005, neither an increasing nor declining long-term trend was recorded – dispersion from minus 29 to plus 19 (fig. 11).
The development of representation according to the clinical stages has a pronounced improving tendency of classification of the disorder into individual stages – in recent years since 1995 this has been at around 50%. For example, in 1978 more than 95% of disorders were non-classified, whilst in 1998 this had been reduced to around 40% (fig. 12)

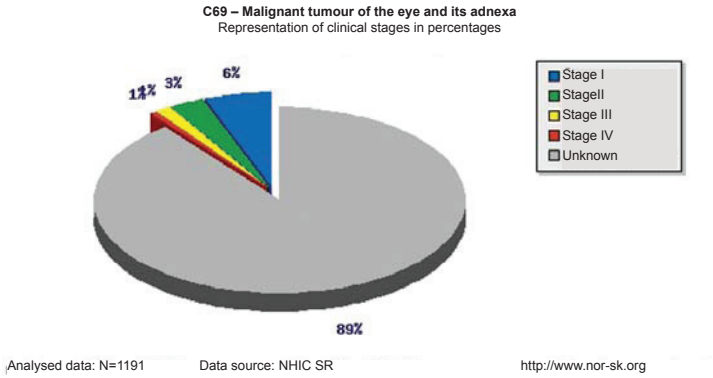


**Fig 5** Malignant tumour of the eye and its adnexa in the Slovak Republic – representation of clinical stages in percentages in the period 1978-2003

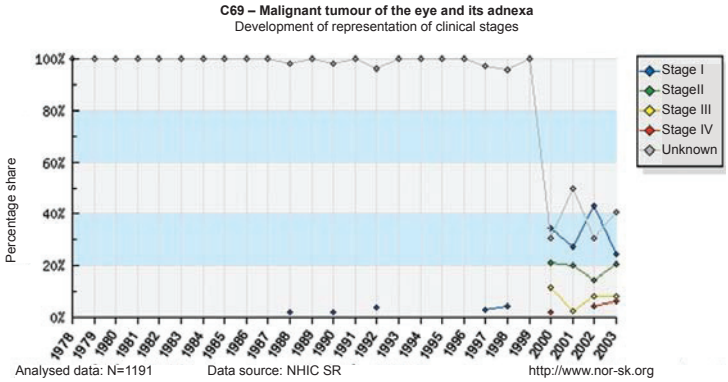


**Fig 6** Malignant tumour of the eye and its adnexa in the Slovak Republic – development of representation of clinical stages – percentage share in the period 1978-2003

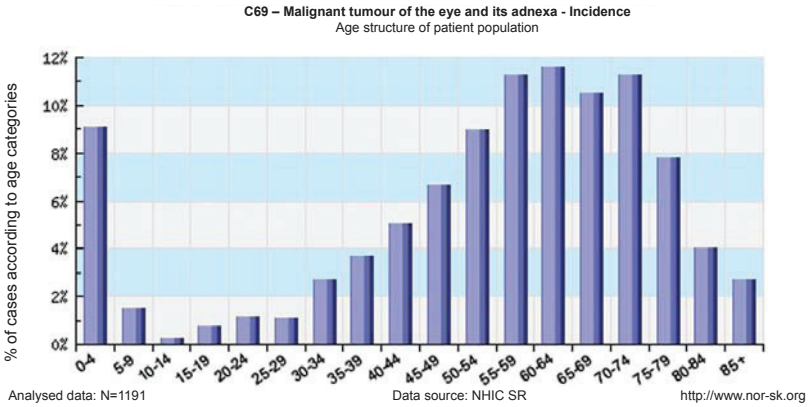


**Fig 7** Malignant tumour of the eye and its adnexa in the Slovak Republic – age structure of patient population in the period 1978-2003

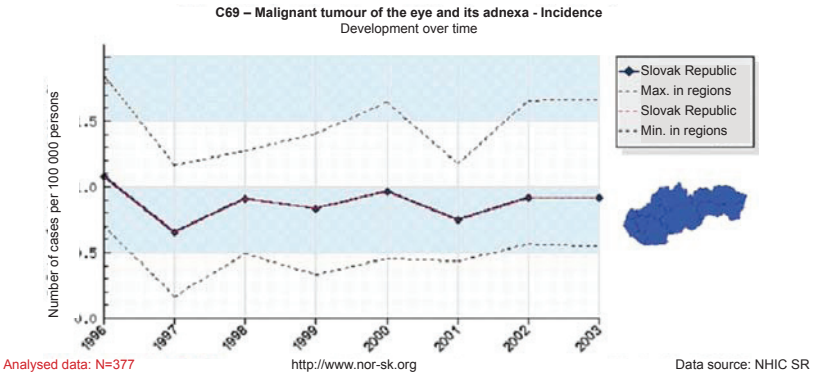


**Fig 8** Malignant tumour of the eye and its adnexa in the Slovak Republic – development over time in the period 1996-2003 (occurrence per 100 000 persons)

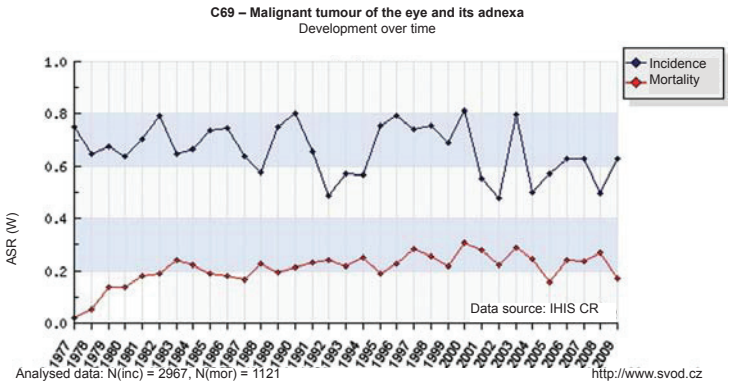


**Fig. 9** Malignant tumour of the eye and its adnexa in the Czech Republic – incidence, mortality in the period 1977-2009 (occurrence, mortality per 100 000 persons)

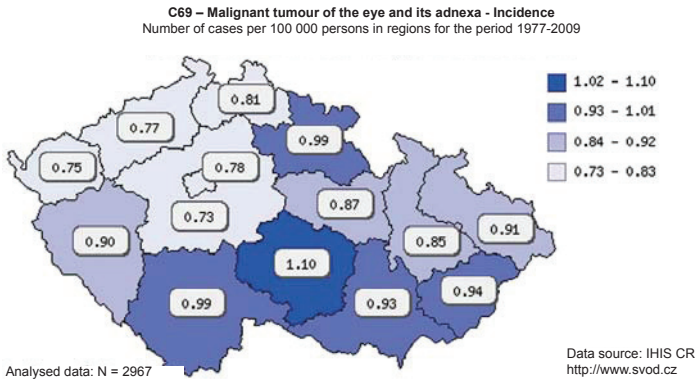


**Fig. 10** Malignant tumour of the eye and its adnexa in the Czech Republic – regional overview 1977-2009 (occurrence in regions per 100 000 persons)

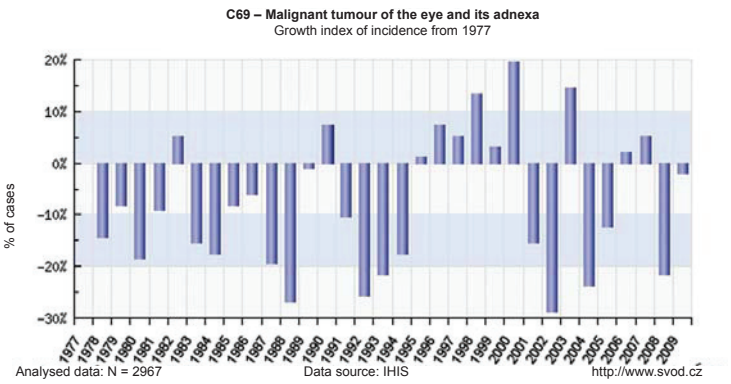


**Fig. 11** Malignant tumour of the eye and its adnexa in the Czech Republic – growth index of incidence from 1977 (rate of occurrence per 100 000 persons in comparison with 1977)

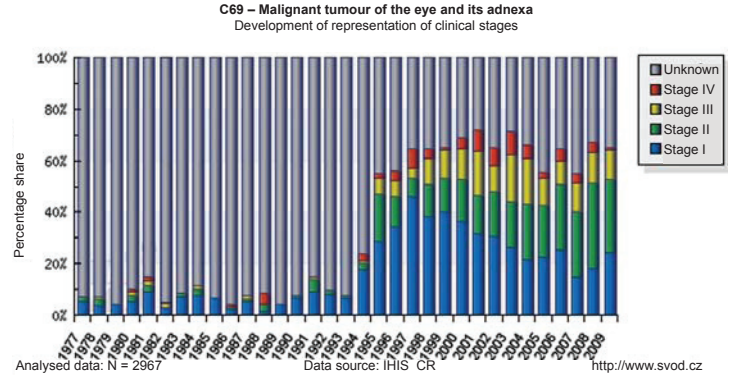


**Fig 12** Malignant tumour of the eye and its adnexa in the Czech Republic – development of representation according to clinical stages in the period 1977-2009

From the total number of 2967 analysed reports of dg. C69 in the Czech Republic in the observed period, an average of 65% of disorders were not classified into the relevant classification – i.e. stage of the disorder. Of the classified disorders, the highest percentage was in the first stage – 17%, with 10% in the second stage, 6% in the third stage and 2% of the total number of reported disorders in the fourth stage (fig. 13).

The development of the representation of the clinical stages has a markedly decreasing trend of unclassified disorders from 1993 onwards, which means that in recent years a higher percentage of disorders were classified into individual stages upon primary oncological reporting (fig. 14).

The lowest value of "unclassified disorder according to stage" was recorded in 2003 (up to 25%), whilst in the next two years it recorded a slight growth. The highest occurrence of dg. C69 was recorded in the age category of 65-69 years, which was 13% of cases according to all age categories. The second highest occurrence was recorded in the category of 60-64 years. In childhood the highest occurrence was from 0 to 4 years (fig. 15).

Upon an analysis of the data on 2967 patients in the observed period of 1977-2009, the average values of the number of cases per 100 000 persons was within the range of approximately 0.8 to 1.1. The maximum values in the individual regions reached the value of up to 2.5 and the minimum values were at around 0.5 (fig. 16).

From the data from NOR in the Slovak Republic it ensues that the trend of standardised incidence of malignant tumours of the eye (dg. C69) did not record greater fluctuations in the period 1978-2003. The incidence growth index recorded increased values in each observed year with the exception of 1980.

According to the geographical distribution of occurrence of dg. C69, the greatest standardised incidence was determined in the regions of Košice (0.85), Prešov (0.76) and the lowest in Bratislava – 0.66 per 100 000 persons.

The standardised mortality for dg. C69 is observed from 1994 onwards. We did not determine any marked changes in the trend.

We determined that 89% of reports of dg. C69 had no specific stage of the disorder or were reported as unknown, and that 6% were reported in the first, 3% in the second, 1% in the third and 1% in the fourth stage of the disorder in the period 1978-2003.

The highest occurrence of dg. C69 was determined in the age category

of 60-64 years and 70-74 years.
We did not determine a difference in the occurrence of dg. C69 or in data on mortality upon a comparison of the Slovak Republic with the Czech Republic. It is however necessary to emphasise that mortality in the Czech Republic was observed from 1977 onwards.
We determined considerably worse results in the classification of dg. C69 according to clinical stages in the Slovak Republic in comparison with the data in the Czech Republic. In the entire database of the observed diagnosis in the Slovak Republic, as many as 89% of disorders are not classified into stages, as opposed to only 65% in the Czech Republic, thus in the Czech Republic there is a substantially higher proportion of clinically and histopathically defined stages of observed diagnosis according to the reported data (1, 2 , 6, 7).

## DISCUSSION

In 1985 the problem of oncological disorders became a priority of the healthcare policy of the EU through the declaration of the Europe Against Cancer programme. In September 2009 the president of the European Commission José Manuel Barroso announced the European Partnership programme in an action plan against cancer, the aim of which is for all those involved in any capacity in the battle against this disease to join forces in order to help reduce the mortality rate from cancer by 15% by the year 2020. The incidence of oncological disorders in Slovakia for example has now exceeded the number of 26 000 new cases per year. Although ophthalmo-oncological disorders constitute a relatively small percentage of the total number of cancers, the consequences for the patient after treatment of a tumour in the region of the eye are very severe in a high percentage of cases. Unfortunately long term monitoring is greatly underestimated. Despite the seriousness of oncological disorders as a not only health but also a social and economic burden for the entire society, it is necessary to state that there is a large asymmetry between the need for covering treatment and the finances earmarked for treatment and the availability of treatment.
Within the field of ophthalmology, constant observation of patients with dg. C69 is important; long term monitoring is necessary for each patient for over 5 years, because there are described cases of recurrence of the primary illness and distant metastases after more than 15 years (3).

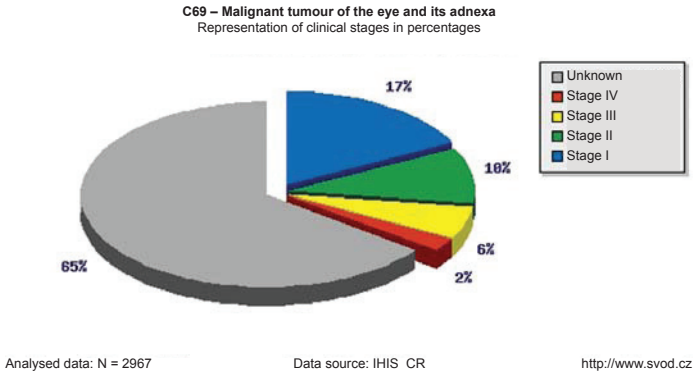


**Fig 13** Malignant tumour of the eye and its adnexa in the Czech Republic – representation of clinical stages in percentages in the period 1977-2009

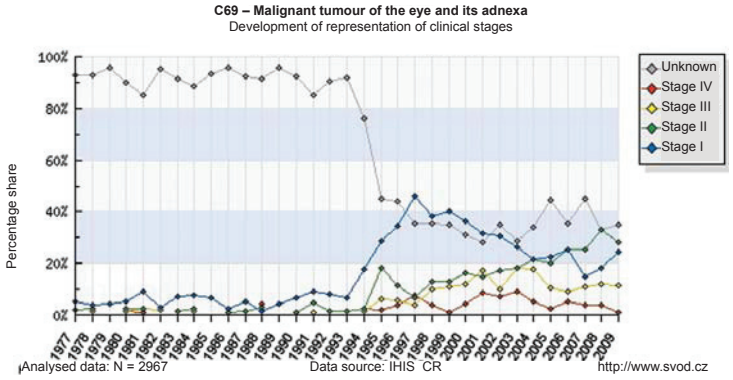


**Fig 14** Malignant tumour of the eye and its adnexa in the Czech Republic – development of representation of clinical stages in the period 1977-2009

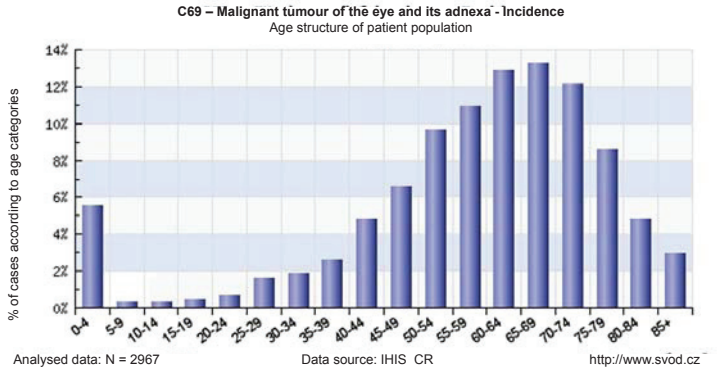


**Fig 15** Malignant tumour of the eye and its adnexa in the Czech Republic – age structure of patient population in the period 1977-2009

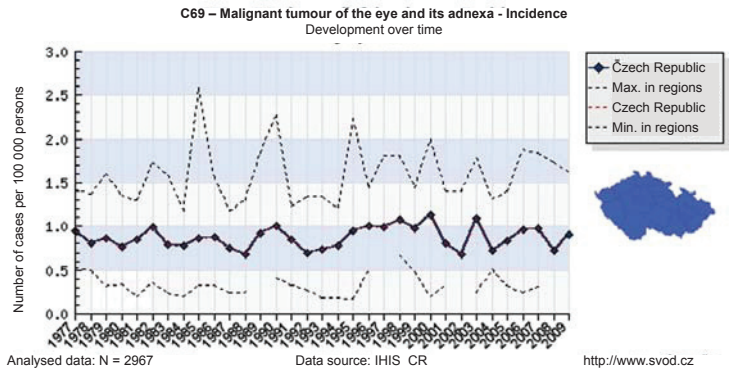


**Fig 16** Malignant tumour of the eye and its adnexa in the Czech Republic – incidence – development over time in the period 1977-2009 (occurrence per 100 000 persons)

From the analysis of the reports of dg. C69 from NOR SR it emerges that it is important to monitor the fulfilment of the obligation to report on the level of individual hospital facilities in order for the data to correspond to the reality of occurrence of the disorder. The currently available data only for the year 2003 in the Slovak Republic is practically unusable for scientific work. In the Czech Republic the availability of data is substantially better, with breadth of processing within the framework of reporting is better formulated and in comparison with the Slovak Republic the available data is more current by as much as 6 years.

Due to the small number, it is not possible to assess the mortality rate from intraocular tumours in such a small area as the Slovak Republic. In the current situation of the small number of autopsies conducted in Slovakia, the possibility of verification of hepatic metastases in direct connection with the finding of a malignant tumour in the eye for example is practically unrealistic.

With regard to the relatively small size of the Slovak Republic, reporting of small numbers of newly-determined cases of intraocular tumours are also on the level of only a few dozen cases per year. Reporting of each individual data entered in the records of each specific patient is very important. Such a small number can lead to an incorrect interpretation of data upon analysis, and as a result special procedures must be used in analysis and statistical processing of small collections of data (4, 5).

A comparison of the data on incidence and mortality in Europe has contributed to a division of Europe into western and eastern regions, to the detriment of the eastern part. Even if Slovakia is not amongst those countries with insufficient technical and methodical equipment of oncological facilities, there are still many areas which are not resolved and their insufficient financing is leading to stagnation and an obstacle to further development of the monitoring of oncological disorders. The causes of these deficiencies are frequently known, but it seems that a lack of interest on the part of the competent agencies is preventing the necessary change in strategy for the monitoring of cancer in Slovakia from being implemented.

The implementation of this strategy requires the creation and implementation of a National Oncological Plan, and the monitoring of the functioning thereof. There is no doubt that the creation of this plan would require a well organised and functional National Oncological Register. Its recognised standing within Europe-wide society is currently in jeopardy in Slovakia as a consequence of underestimation of its significance by incompetent agencies making poor decisions. Our results in Slovakia from the field of determination of tumours in the area of the eye also provide evidence of this, and at present there is in fact no data available for the professional community in Slovakia in 2012 whatsoever.

At present there is a lack of a complex view of ophthalmological patients in Slovakia, for whom a large number of further factors play a significant role in the process of treatment, in determining the quality of life of the afflicted individuals and their families. This applies not only to patients following radical surgical procedures, but also to patients who have undergone "conservative therapy" – or brachytherapy, treatment by Leksell gamma knife, after treatment with stereotactic radiosurgery or combined procedures. Emphasis should be placed on a new approach in the form of integrated oncology, which addresses patients' quality of life and their psychological and social problems in a complex manner. The fundamental requirement is to equip oncological institutions with psychological services, which are enormously important for rectifying deficiencies in doctor – patient communication and in resolving the overall number of serious problems which can also have a negative impact on the course of the treatment process.

In the case of ophthalmo-oncological patients with an intraocular tumour, loss of function of the visual organ occurs in a large percentage, especially in advanced stages of the disorder. In certain cases, the treatment procedure (exenteration of the orbit) leads to mutilating cosmetic defects with which the patient has to become accustomed. The source materials for observation are in the databases of the oncological registers, which do not provide data for the professional public in Slovakia at this time.

## CONCLUSION

The present status of recording and the status of reporting data to NOR in the Slovak Republic does not correspond with the trends worldwide or even in the neighbouring countries. We have insufficiently valid data; in our opinion the discipline of compilation of a Report by the attending physician and sending of this Report by the healthcare facility to NOR in Slovakia is insufficient in the ~~field of ophthalmo-oncology. In the available~~ databases in the Slovak Republic ~~there is a high percentage of unclas-~~sified stages of the disorder, i.e. more than 89%, which at present does not correspond with trends of oncological registers worldwide. The time lag of statistically processed data in the Slovak Republic as against the Czech Republic is as much as 6 years. Data about patients in the Slovak Republic at present is unfortunately not available for the professional public. In the Czech Republic data from the databases of the Oncological Register is currently available for the professional public and statistically processed up to 2009.

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