INTRODUCTION

The importance of malignant tumour epidemiology has been rising constantly due to an increasing number of malignant neoplasms in most of the developed countries in the world. The interest of both the professional and lay public may for the most part be explained by the growing incidence of tumour diseases, representing a significant social issue which brings serious social and economic consequences. The Czech Republic is no exception. Because the Czech Republic possesses a standard national oncology register (NOR CR) which has been systematically maintained since 1976, this article summarizes epidemiological data for malignant childhood tumours reported in the CR population over the past 19 years, i.e., from 1991 until present.

In spite of the rare occurrence of tumour diseases in children, they represent approximately only 1–3% of the total number of tumours [1–3], holding second-highest position among causes of mortality in children up to 15 years of age. Tumour diseases in children are serious both in terms of the difficulty of their detection (false differential diagnosis due to their infrequent occurrence), complicated development, aggressive treatment generating serious complications and the unfavourable prognosis compared to other childhood diseases. After traumas (accidents and injuries) they are the second most frequent cause of mortality in children. Paediatric oncology is not just the oncology of adults applied to children but an entirely independent follow-up field focused on specific issues. Paediatric oncology significantly differs from adult oncology in the occurrence of individual tumours and in terms of organ localisation. In children, most tumour diseases consist of hemoblastosis and hemoblastoma – tumours of the nervous tissue, mesenchymal cells and immature cells of embryonic leaf while 80% of the tumours in adults are represented by carcinomas [1–3].

MATERIAL AND METHODS

The available data from the National Oncology Register of the Czech Republic (NOR CR) which...
have been published or are freely available at the website of the Institute of Health Information and Statistics of the Czech Republic (ÚZIS) were used as the source data.

The data on malignant tumour occurrence have high validity, since all the data are re-verified and their accuracy and completeness are checked. Data included in the National Oncology Register of the Czech Republic are also compared retrospectively with the death register. That is why the most up-to-date data is made available only after a delay of several years.

The results presented in this article come from data gathered and processed from 1991 to present [4-22]. Individual data on the incidence of the malignant tumour diseases reported were divided into four age groups (0 - 4 years, 5 - 9 years, 10 – 14 years and 15 - 19 years). The data obtained was used to prepare outputs in the form of tables and graphs expressing the temporal evolution of tumour incidence – the absolute numbers of newly reported diseases and the relative count recalculated per 100,000 men or women of the particular age group, i.e., the frequency of the newly originated diseases in the CR population in a particular calendar year in the period monitored. To depict the time trends better and to increase the layout clarity, bar graphs were selected to depict the absolute numbers of malignant neoplasm incidence (Figure 1 through 7) and line charts to depict the relative numbers of incidence in individual age groups (Figure 8 through 11).

RESULTS

The values indicated in absolute numbers serve as basic indicators for tumour disease impact on the population. These absolute numbers indicate the number of newly reported tumour diseases during the monitored period in the population studied. In this case, the absolute numbers indicate how many new malignant neoplasm diagnoses were made under the MKN-10 (dg. C00 – D09) code in children and adolescents in the Czech Republic in the particular age group per year. These characteristics are particularly suitable for designating oncology care capacity demands; they are less suitable for comparing various populations or determining the time trend development.

Figure 1 and 2 depict the temporal trend in absolute numbers of malignant neoplasm and in situ neoplasm cases (dg. C00 – C96 and D00 – D09 according to MKN-10) in the set monitored. Both graphs allow the dynamics of tumour disease incidence in children and adolescents to be followed during individual years over the period monitored. Both figures show oscillation of the absolute numbers of newly reported neoplasms during individual years. In spite of the fact that a duty to fill in a report on neoplasms is a matter of law and the Neoplasm Report form must be submitted by the medical facility diagnosing the oncological disease, active collaboration by all medical facilities and their employees is of key importance for creating valid data. It is important that
maximum support for quality and the timely nature of the data entered in the national oncology register is provided for by employees of individual medical facilities, since reporting morale may influence the individual numbers of new disease cases, as well.

Figure 2 also shows that during the 1990s, higher numbers of malignant neoplasm were reported in men. After 2001, the absolute numbers of newly reported tumours for both sexes in the same year are balanced or slightly higher in men.

Figure 3 depicts the total absolute numbers of newly reported malignant tumours in by individual age groups in the set studied. The figure shows the highest numbers of newly determined tumours in children are in the adolescent age group between 15–19. This age group in the set also has a higher risk of tumour development than children younger than 15 years, based upon the prerequisite of longer carcinogenic exposure, cell aging and the related decrease in changes (decrease in telomerase, somatic mutations, etc.).
Figure 4. Absolute numbers of newly reported malignant tumours in the 0 – 4 age group

Figure 5. Absolute numbers of newly reported malignant tumours in the 5 – 9 age group
Figure 6. Absolute numbers of newly reported malignant tumours in the 10 – 14 age group

Figure 7. Absolute numbers of newly reported malignant tumours in the 15 – 19 age group
Figure 4 to 7 show that the higher absolute numbers of newly reported malignant tumours in the 0–14 age group concern boys in contrast to the 15–19 age group where, since 2000 (with the exception of 2004 and 2008) the higher number of newly reported malignant tumours concerns girls. Closer comparison of the absolute incidence of malignant neoplasm in individual diagnoses in the 15–19 age group shows the greatest differences between sexes (if we exclude malignant neoplasm of female genitalia (dg. C51 – C58) and malignant neoplasm of male genitalia (dg. C60 – C63)) found in the diagnosis of malignant neoplasm of the thyroid gland with internal secretion (dg. C73 – C75). The most frequently represented tumour diagnosis in this age group was malignant tumour of the thyroid gland (C73), particularly in girls and women. Malignant thyroid tumours are a disease with increasing incidence in childhood and adolescence. Thyroid gland tumours are more frequent in girls and young women; in children under 10 years of age the incidence is balanced for both sexes.

The group of four graphs indicated below (Figure 8 to 11) depicts the gross malignant tumour incidence in children and adolescents in the CR defined as a share in the number of newly discovered cases of the diseases in the particular population in the particular period of time and the number of individuals in the particular population in the particular period of time. These graphs depict the relative numbers of the newly reported malignant neoplasm and in situ neoplasm (dg. C00 – C96 and D00 – D09 according to MKN-10), i.e., the numbers recalculated per 100,000 (wo)men of the particular age group.

Figure 8. Comparison of malignant tumour incidence – relative numbers (0 – 4 age group)
Figure 9. Comparison of malignant tumour incidence – relative numbers (5 – 9 age group)

Figure 10. Comparison of malignant tumour incidence – relative numbers (10 – 14 age group)
Not only do the individual gross incidence values for the CR set of persons studied depicted in graphs (Figure 8 to 11) differ within the individual age and sex groups but they also significantly oscillated during the individual years of the period of time monitored, i.e., between 1991 and 2009. Upon cross comparison of gross incidence values for both sexes in the CR population in individual age groups, different temporal incidence trends were identified.

**DISCUSSION**

The results confirm that the incidence of tumours in children and adolescents in the Czech Republic differs in various age and sex groups not only in terms of absolute numbers but also in gross incidence values. In spite of the fact that according to the total absolute incidence numbers (Figure 1 and 3) it may seem that malignant neoplasm incidence in children and adolescents has stagnated over the past ten years, over the past 19 years of the period monitored (i.e., from 1991 to 2009), according to the recalulation per 100,000 men and women in the particular age group monitored, malignant tumour incidence has increased for both sexes in the 0–19 age group in the CR and the total time trend of malignant tumour incidence in children and adolescents is instead growing. This growth trend in the incidence may be seen particularly in the 15–19 age group, where the risk for tumour development is higher than in children younger than 15 years, based upon the prerequisite of longer carcinogenic exposure, cell aging and the related decrease in change (decrease in telomerase, somatic mutations, etc.).

It is important to continue in the trend of centralizing the treatment of child oncology patients, improving diagnostics and collaboration of all employees concerned as well as using up-to-date, less invasive treatment methods. Further, it is very important that the newly obtained experience with oncological diseases brings significant benefits in tumour disease treatment in children and adolescents. That is why, to maintain this trend, further improvement is necessary for collaboration between professionals at individual institutions, along with timely recognition and diagnosis of tumour disease resulting in timely treatment in specialized oncological centres. Stabilization and further education of medical staff support for clinical studies and sufficient financial resources for anti-tumour and support treatment are also of key importance.

The standardization methods are based on existence of hypothetical, standard population which is invariable in the long term. The standards indicate composition of population within individual age groups and these are usually included in elemen-
lymphoma was also observed for paternal exposure to preconception period. Increased risk of non-Hodgkin's lymphoma and aliphatic hydrocarbons, particularly in the presence of maternal occupational exposure to aromatic and aliphatic hydrocarbons [26]. Early diagnosis of childhood cancer can be influenced by mothers' knowledge about signs and symptoms of cancer, when mothers don't underestimate and underplay the first symptoms, but on the contrary they pay attention to them [27].

CONCLUSIONS

The Czech Republic is no exception. Because the Czech Republic possesses a standard national oncology register (NOR CR) which has been systematically maintained since 1976, this article summarizes epidemiological data for malignant childhood tumours reported in the CR population over the past 19 years, i.e., from 1991 until present.

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Correspondence to:
Mgr. Vendula Ševčíková, DiS.
Javořínská 2109
688 01 Uherský Brod
Czech Republic
E-mail: sevcikova.vendula@centrum.cz