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Childhood central nervous system tumours: Incidence and time trends in 13 Southern and Eastern European cancer registries

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Abstract *Aim:* Following completion of the first 5-year nationwide childhood (0–14 years) registration in Greece, central nervous system (CNS) tumour incidence rates are compared with those of 12 registries operating in 10 Southern–Eastern European countries.

Methods: All CNS tumours, as defined by the International Classification of Childhood Cancer (ICCC-3) and registered in any period between 1983 and 2014 were collected from the collaborating cancer registries. Data were evaluated using standard International Agency for Research on Cancer (IARC) criteria. Crude and age-adjusted incidence rates (AIR) by age/gender/diagnostic subgroup were calculated, whereas time trends were assessed through Poisson and Joinpoint regression models.

Results: 6062 CNS tumours were retrieved with non-malignant CNS tumours recorded in eight registries; therefore, the analyses were performed on 5191 malignant tumours. Proportion of death certificate only cases was low and morphologic verification overall high; yet five registries presented >10% unspecified neoplasms. The male/female ratio was 1.3 and incidence decreased gradually with age, apart from Turkey and Ukraine. Overall AIR for malignant tumours was 23/10⁶ children, with the highest rates noted in Croatia and Serbia. A statistically significant AIR increase was noted in Bulgaria, whereas significant decreases were noted in Belarus, Croatia, Cyprus and Serbia. Although astrocytomas were overall the most common subgroup (30%) followed by embryonal tumours (26%), the latter was the predominant subgroup in six registries.

Conclusion: Childhood cancer registration is expanding in Southern–Eastern Europe. The heterogeneity in registration practices and incidence patterns of CNS tumours necessitates further investigation aiming to provide clues in aetiology and direct investments into surveillance and early tumour detection.

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1. Introduction

Primary tumours of the central nervous system (CNS) are the second most common cancer in childhood (0–14 years) comprising over 20% of cases and the third most common cancer type in adolescence (~10% of cases) in Europe. The incidence rate during 1978–1997

was 30 per million children and 24 per million adolescents, with a peak of 34 per million in the age group 1–4 years [1,2]. More than 100 different histological subtypes have been described, along with a slight predominance of the male gender among all cases [3].

A sharp increase in overall incidence of childhood CNS tumours during the 1980s has been noted in several European countries and the United States (US) [4–7], coinciding with the impressive advancements in imaging technologies, notably the introduction of the Magnetic Resonance Imaging (MRI) [4]. Similar increases were not noted in countries with lower resources, where implementation of this expensive diagnostic technology was delayed [8], such as those in Sub-Saharan Africa, where CNS tumours are rarely diagnosed [9,10].

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