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Toward the Cure of All Children With Cancer Through Collaborative Efforts: Pediatric Oncology As a Global Challenge

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Abstract

Advances in the treatment of childhood cancers have resulted in part from the development of national and international collaborative initiatives that have defined biologic determinants and generated risk-adapted therapies that maximize cure while minimizing acute and long-term effects. Currently, more than 80% of children with cancer who are treated with modern multidisciplinary treatments in developed countries are cured; however, of the approximately 160,000 children and adolescents who are diagnosed with cancer every year worldwide, 80% live in low- and middle-income countries (LMICs), where access to quality care is limited and chances of cure are low. In addition, the disease burden is not fully known because of the lack of population-based cancer registries in low-resource countries. Regional and ethnic variations in the incidence of the different childhood cancers suggest unique interactions between genetic and environmental factors that could provide opportunities for etiologic research. Regional collaborative initiatives have been developed in Central and South America and the Caribbean, Africa, the Middle East, Asia, and Oceania. These initiatives integrate regional capacity building, education of health care providers, implementation of intensity-graduated treatments, and establishment of research programs that are adjusted to local capacity and local needs. Together, the existing consortia and regional networks operating in LMICs have the potential to reach out to almost 60% of all children with cancer worldwide. In summary, childhood cancer burden has been shifted toward LMICs and, for that reason, global initiatives directed at pediatric cancer care and control are needed. Regional networks aiming to build capacity while incorporating research on epidemiology, health services, and outcomes should be supported.

INTRODUCTION

Advances in clinical and biologic characterization, the development of risk-adapted therapies, and the optimization of supportive care have resulted in a dramatic increase in the cure rates of children with cancer over the last four decades.^{1,2} Collaborative work by North American and European pediatric oncology consortia have been a centerpiece in achieving these milestones. Prognostic clinical and

are moderate, and low again when development and cancer incidence are high (Fig 3). Low when cancer incidence and development are low, highest when development and cancer incidence are of this decade. Childhood cancer mortality, however, is polynomial: mortality rate estimates are cases increases. In LMICs, the expectation is that pediatric cancer cases will increase by 30% by the care systems improve and competing causes of mortality decrease, the number of childhood cancer that NLM and childhood cancer incidence are inversely correlated (Fig 3); therefore, as child health childhood health care delivery systems.¹² Merged data from the World Bank and GLOBOCAN show that age 2 years (under-2 mortality rate [NLM]) tends to be a good reflection of the strength of regional (Table 3) — but the estimation of burden is consistent. The mortality rate for children younger the reference population, incidence rates reported, and perceptive need—economic (Table 1) versus approximately 80% live in countries with limited resources (Fig 1). The crude numbers are sensitive to estimated more than 100,000 children and adolescents diagnosed with cancer every year.

Collaborative efforts are needed to address these unique national and regional circumstances. Of the the financial expenditures on cancer worldwide.⁵ Most more than two thirds of the world population and new cancer cases, they account for only 6.5% of losses, and the cost of cancer research, was estimated to be at least US\$280 billion.⁸ Although LMICs economic cost of new cancer cases in 2008, including medical and nonmedical costs, productivity LMICs, these countries have less than 2% of global resources for cancer care and control.⁵ The global worldwide. Although almost 80% of the disability-adjusted life-years lost worldwide to cancer are in However, there is a dramatic inequity in the distribution of resources for cancer care and control because of a transition in risk factors resulting from globalization of economies and behaviors.^{2,9} Proportion of this cancer burden falls on LMICs, not only because of demographic change, but also cases in all age groups will increase from 15.1 million in 2008 to 25.5 million by 2030. An increasing develop and maintain cancer programs is becoming imperative. Globally, the number of new cancer As low- and middle-income countries (LMICs) continue to improve their health status, the need to

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collaborative efforts in limited-resource settings.

differences in pediatric cancer burden, and summarize the state of regional and international activities. In this article, we define why pediatric oncology is a global health problem, describe regional consortia are an ideal platform and potential catalyst for development and coordination of these biomedical, and health services research are crucial to meeting this challenge.³ We believe that regional development of national and regional frameworks for collaboration and incorporation of clinical, achieved in higher-income settings to all children worldwide. Carefully designed initiatives? Thus, the major challenge in pediatric oncology for the next few decades will be how to translate gains oncology: the most important prognostic factor for a child with cancer is where he or she was born.³ Biology-based risk stratification algorithms. However, one indisputable truth defines pediatric biologic factors have been identified and treatments have been optimized, often through complex