

ORIGINAL RESEARCH

Development of Environmental Health Indicators for the Child Population: Report on a Brazilian Experience

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Abstract

BACKGROUND This report presents the Brazilian experience on the elaboration of a matrix of children's environmental health indicators to the Brazilian Health Surveillance System. This experience was part of a project with the financial support of the Ministry of Health of Brazil to develop appropriate indicators for identification, measuring, and monitoring of the environmental risk factors to the children's health.

METHODS The methodology adopted for the development of the matrix of indicators of children's environmental health to Brazil comprised 3 steps. In the first step, the main causes of morbidity and mortality in the Brazilian population, aged 0-14 years, were identified, according to the data available from the Ministry of Health. The second step consisted of the identification of the Brazilian public-access information systems, with available official data regarding environmental, health, and socioeconomic conditions. In the third step, a preliminary matrix was elaborated. Correlation analyses were done to determine the indicators that would constitute the final matrix.

FINDINGS The selected indicators allowed the identification and surveillance of cancer, injuries, adverse birth outcomes, diarrheic and respiratory diseases, associated with environmental risk factors, in the Brazilian child population. The existing Brazilian official information systems provided data with the necessary quality for the construction of children's environmental health indicators. Nevertheless, some official systems on health information presented limitations related to the data availability over the course of time and timeliness of data capture. Concerning the environmental information, the major limitation was accessibility.

CONCLUSIONS A matrix of indicators of children's environmental health to Brazil can come to contribute to the implementation of a surveillance system of children's exposure to environmental contaminants in Brazil.

KEY WORDS children's health, environmental health, indicators, environmental pollutants, information systems

INTRODUCTION

According to the World Health Organization (WHO), environmental conditions are responsible

for the deaths of approximately 3 million children aged ≤ 5 years worldwide per year. Respiratory infections and diarrheic diseases are the main causes of this high number of deaths and, respectively,

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correlated with environmental problems in 60% and 90% of the cases. Furthermore, the child survivors continue to be exposed to adverse environmental conditions, which may result in developmental problems that could lead to current and future diseases.^{1,2}

The Pan-American Health Organization has estimated that approximately 100,000 children younger than age 5 years die each year as a result of environmental hazards in the region of Latin America and the Caribbean. Additionally, about 30% of the proportionate mortality of children younger than age 14 years, from respiratory and diarrheal diseases, could also be related to poor environmental conditions.^{3,4}

Suk *et al.*⁵ report the preoccupation of members of the WHO Collaborating Centres for Children's Environmental Health about the threat of environmental pollutants to children's health. The authors emphasize the need for much more attention to environmental pollution as a risk factor for disease, mainly in low- and middle-income countries.

This situation of socioenvironmental vulnerability highlights the need for continual monitoring of these conditions. The elaboration of indicators constructed using reliable, up-to-date data could help managers to implement specific actions for each intervention required. These indicators should follow certain defined criteria, particularly regarding their scientific validity and reliability. An indicators system will be more reliable if it is more representative of the regional characteristics and the environmental and social determinants of each territory.

The harmful exposures considered more relevant to the children's development arise from the places where they spend most their time, such as their homes, schools, and neighborhoods. In addition, the biological characteristics of this age group and the social conditions where they live have a fundamental role in the impact of environmental pollutants on children's health.³

The establishment of information systems is strategic for monitoring the progress of environmental, health, economic and social conditions.⁶ Suitable information leads to the formulation of public policy or specific programs, that should be based on the available tools and possible actions in each territory.¹ The organization of an indicators system that identifies the relationship between the children's health and the exposure to environmental pollutants is fundamental to the achievement of these health surveillance actions.⁷

This article presents the experience that has been undertaken in Brazil of the development of a matrix of environmental health indicators for the child population. It has the objective to contribute to the organization and implementation of an inter-institutional network for the development of health surveillance actions related to children's exposure to environmental pollutants.

DEVELOPMENT OF ENVIRONMENTAL HEALTH INDICATORS FOR THE CHILD POPULATION

The International Scenario. Many debates have been occurring in the global scenario about the fundamentals that should be considered for the development of children's environmental health indicators. These indicators should be based on information that describes the children's health condition related to environmental determinants. In 2002 a global initiative on children's environmental health indicators was launched at the World Summit on Sustainable Development, with participation of government, nongovernment, and intergovernmental organizations, with support from the World Health Organization and the United States Environmental Protection Agency. In 2003, Briggs,⁷ on behalf of the World Health Organization, published a list of indicators grouped according to specific morbidities, with a description of the models applied to their definition, and of the environmental factors relevant to the children's health.

In 2004 the Pan-American Health Organization (PAHO) proposed a preliminary list of children's environmental health indicators during a meeting carried out with countries of the region of Latin America and the Caribbean.⁸ PAHO also published a catalog of indicators linked to the air and water quality and chemical exposure, in association with the Commission for Environmental Cooperation of North America, in 2006.⁹

In 2009 the World Health Organization organized a summary of the processes, outcomes, and key findings of the children's health indicator projects performed as part of the global initiative on Children's Environmental Health Indicators.¹⁰ Countries and projects from Africa, Americas, European, and East Mediterranean regions contributed to this WHO initiative.

In 2011 a pilot study was performed in 6 countries of the region of the Americas examining the sources and criteria of capture and analysis of the

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