

Nutritional and Health-Related Environmental Studies (NAHRES)

Applying nuclear nutrition techniques to improve outcomes for childhood cancer in low-and middle-income countries

Background

More than 300,000 children are diagnosed with cancer each year, with the annual incidence rate of cancer being 155 per million children aged 0-19 years in 2001-2010 (1). While survival rates for some cancers have reached a 5-year net survival of around 90% in many high-income countries, 80% of young people with cancer live in low middle-income countries (LMICs) where survival rates are currently only 10-30% (2, 3). It is calculated that worldwide between 80 and 100,000 young people die unnecessarily from cancer each year in LMICs, it is concerning that the most important prognostic factor for a child with cancer is where they were born (4). Low survival rates in LMICs are due to cancer being misdiagnosed until later stages, inaccessible treatment, treatment abandonment, coexisting debilitating conditions such as malnutrition, and health professionals without specialized training (5). The global challenge in childhood cancer is to translate gains achieved in higher-income settings to all children worldwide, but it is not enough to duplicate strategies or make recommendation only on consensus, quality research is needed to identify solutions for low resource settings and provide quality evidence on the priority areas.

One of the influencing factors for lower survival rates in childhood cancer for LMICs is children having coexisting malnutrition. The prevalence of malnutrition in children with cancer is between 3-65% for undernutrition and 15-57% for obesity, dependant on cancer type, treatment stage, assessment method and whether from a high or low-income country (6). There is a paucity of evidence examining associations between malnutrition and clinical outcomes in paediatric cancer, but there is some evidence in LMIC that children who are malnourished will have a poorer clinical outcome, as represented by tolerance of chemotherapy, number of infections, abandonment of treatment, relapse of disease, late effects, quality of life and survival (7-12). The value of nutritional support in children and young adults is still an underacknowledged topic within pediatric oncology, especially in LMIC (13-14). Whereas new cancer therapies are not readily accessible and other solutions to improve survival may not be feasible in LMICs, a focus on nutritional management could serve to raise the standard of care and improve clinical outcomes with simple low-cost strategies, such as educating medical staff about the importance of nutrition, providing access to nutritious food during treatment, identifying malnutrition so it can be treated, and providing guidance on effective low-cost nutrition interventions.

Through the WHO Global Initiative for Childhood Cancer and the Society of International Paediatric Oncology there are efforts to make nutrition a key component of cancer care in LMICs. To provide LMICs cancer centers with quality evidence to improve nutritional care in their patients, more research is needed in four key areas within IAEA's focus.

- 1) Evidence is needed to understand how body composition and energy expenditure is affected by cancer type and treatment phase so nutritional support can be prioritized for the high-risk patients. The majority of studies that provide the current evidence have used simple proxies of body size to represent malnutrition. The evidence these studies provide are limited, as studies show that these simple predictors do not accurately represent the amount of fat and lean mass in the body (15-18).
- 2) Emerging research in adult oncology is proving that it is the amount of lean and fat mass in the body that influences clinical outcomes (19-22). The role that fat and lean mass has in clinical outcomes for childhood cancer is a priority area of research.
- 3) To make the assessment of nutritional status accurate, accessible, and applicable for routine clinical use in children with cancer, simple and available screening and assessment methods need to be validated against reference body composition and energy balance techniques.
- 4) To support LMICs in employing the most effective nutritional interventions and evidence-based nutrition support, quality research in LMICs is required to evaluate the impact of feasible nutrition intervention on body composition, energy expenditure and clinical outcomes.

Overall Objective

The overall objective is to generate evidence on how to improve survival in children with cancer in low middle-income countries through understanding the interlinking relationships between cancer, body composition, energy balance and clinical outcomes in childhood cancer.

Outcomes

The improved understanding of the interlinking relationships between cancer, body composition, energy balance, interventions and clinical outcomes will provide guidance to LMIC childhood cancer centres in implementing nutrition supportive care programs to prevent premature deaths from childhood cancer.

Outputs

1. New data on body composition and energy balance through the continuum of childhood cancer
2. New data on the effect of body composition on short and long term clinical outcomes for childhood cancer patients
3. New data on body composition and energy balance assessment techniques for childhood cancer
4. New data on the effect of interventions on body composition, energy balance and clinical outcomes in childhood cancer

Assumptions

The CRP application process will be open to all LMIC Member States who fulfil the following criteria:

- 1) Study design will provide data addressing at least one of the CRP Outputs
- 2) All projects will need to include the use of a nuclear nutrition technique to assess body composition and/or energy expenditure within their study design.
- 3) The study teams will need to have strong experience in childhood cancer and/or paediatric nutrition and collaborations between childhood cancer teams and nutrition research teams with nuclear nutrition techniques experience are encouraged.

Proposal submission forms

Research institutions in Member States interested in participating in this CRP are invited to submit proposals directly to the Research Contracts Administration Section (NACA) of the International Atomic Energy Agency: research.contracts@iaea.org or to Dr Alexia Alford: A.Alford@iaea.org

The forms can be downloaded from <http://cra.iaea.org/cra/forms.html>

For more information about research contracts and research agreements, please visit our web-site.

Deadline for submission of proposal

Proposals must be received **no later than 3rd May**. The CRP will be for 5 years.

For more detailed information on CRP, process and funding conditions, please contact:

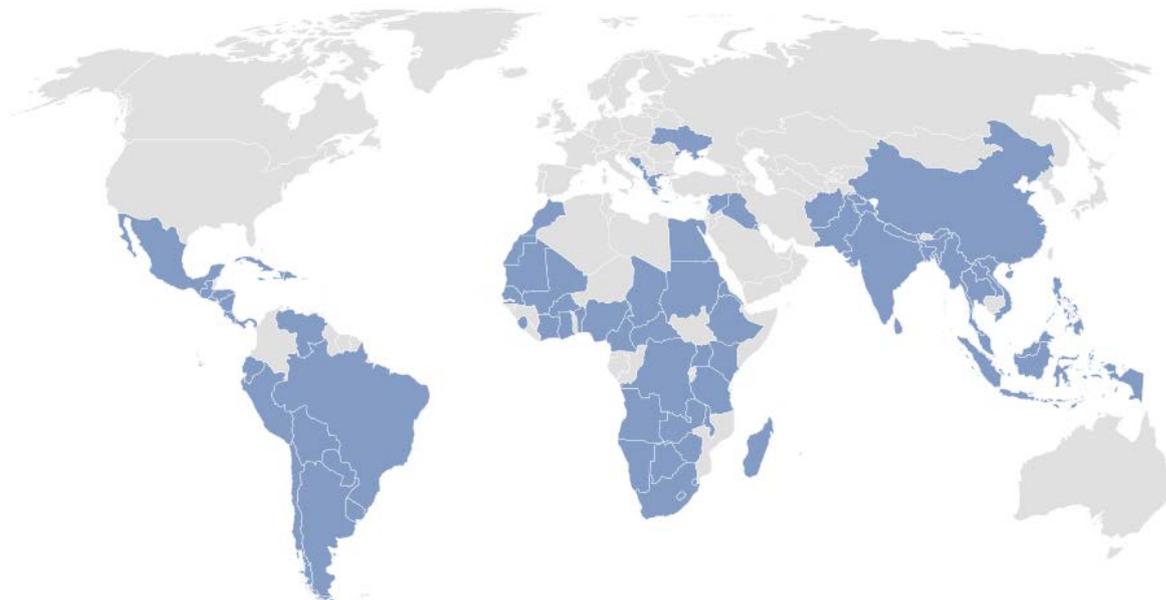
Dr Alexia Alford, Nutrition Specialist, A.Alford@iaea.org

Additional Information

Nuclear nutrition techniques

<https://nucleus.iaea.org/HHW/Nutrition/>

LMICs with isotope analytical capacity and IAEA related nutrition activities (n=75)



Selected References

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