



IAEA

*Atoms for Peace: The First Half Century
1957–2007*

NAHU

“The child cannot wait ...”

- Out of every ten children born in developing countries, one child will die before his or her fifth birthday.
- A large majority of child deaths in developing countries are preventable with a combination of good care, adequate nutrition and appropriate medical treatment.
- The hope that this unacceptably high childhood mortality rate can be reduced is reflected by the Millennium Development Goals which call for efforts “to reduce by two thirds the mortality rate among children under five years of age between 1990 and 2015”.





IAEA

*Atoms for Peace: The First Half Century
1957–2007*

NAHU

Combating malnutrition during early life

- The importance of adequate nutrition during early life cannot be underestimated as infants and young children have high energy and nutritional requirements due to rapid growth and development.
- Poor health and malnutrition often overlap in young children; the relationship between malnutrition and morbidity is complex as illness often results in malnutrition and malnutrition increases susceptibility to disease.
- Children living in resource poor settings are thus often caught in a vicious cycle of malnutrition and infectious disease.



photo credit: Stephanie Good, ETH, Zurich

Stable isotope techniques to move the nutrition agenda forward

- While stable isotope techniques have been used as research tools in nutrition for many years, the application of these techniques in programme development and evaluation is a relatively new approach with which the IAEA has a unique opportunity to assist Member States.
- The IAEA contributes to Member States' efforts to combat malnutrition by providing technical expertise in the use of stable isotope techniques in the development and evaluation of nutritional interventions.
- As only stable (non-radioactive) isotopes are used, the techniques can be safely applied in the most vulnerable population groups, i.e., infants and children.





IAEA

Atoms for Peace: The First Half Century
1957–2007

NAHU

Nutrition during early life

- Exclusive breastfeeding for 6 months, followed by the introduction of appropriate complementary foods and continued breastfeeding, as recommended by the World Health Organization, are cornerstones of infant nutrition.
- By using a stable isotope technique known as the 'deuterium-oxide turnover method' to assess human milk intake in breastfed infants, practical problems associated with the conventional technique of weighing the baby before and after each feed can be overcome.
- The method is non-invasive as the dose of deuterium-oxide is consumed orally by the mother and only samples of urine or saliva are collected for analysis.



figure 1 credit: IAEA

Figure 1. Stable isotope technique to assess intake of human milk in breastfed infants

- 1) Mother drinks deuterium-oxide
- 2) Deuterium-oxide mixes with mother's body water, including human milk
- 3) Baby consumes deuterium-oxide in human milk
- 4) Saliva or urine will be collected from mother and baby for analysis of deuterium oxide



photo credit: WRENmedia Ltd, UK



IAEA

*Atoms for Peace: The First Half Century
1957–2007*

NAHU

Capacity building in IAEA Member States

- Capacity building efforts in making stable isotope techniques more widely available include training of staff as well as procurement of laboratory equipment.
- With support from the IAEA's Technical Cooperation Programme, stable isotope techniques have been used to develop and evaluate nutritional interventions in several Member States.
- For example, results from Brazil and Ghana demonstrated that by providing counselling and education to lactating mothers about the benefits of exclusive breastfeeding, the introduction of other foods and fluids into the diet of infants before 6 months of age can be delayed and/or the amounts can be minimized.



photo credit: Stephanie Good, ETH, Zurich



IAEA

*Atoms for Peace: The First Half Century
1957–2007*

NAHU

Hidden hunger

- Combating the 'hidden hunger' of micronutrient deficiencies is a priority for the IAEA in nutrition, particularly in infants and young children, as these deficiencies during early life can have negative and lasting health consequences.
- For example, the potential to increase iron absorption 2-3 fold in infants by adding vitamin C to homemade complementary foods was recently demonstrated by an IAEA supported research project in Pakistan.
- These results demonstrate the usefulness of stable isotope techniques to identify simple dietary modifications to improve the nutritional value of homemade complementary foods.



photo credit: Lena Davidsson, IAEA



IAEA

Atoms for Peace: The First Half Century
1957–2007

NAHU

“The child cannot wait ...”

- The urgent need for effective nutritional interventions to combat malnutrition during early life cannot be more elegantly - or more forcefully - summarized than by the Nobel Prize laureate, Gabriela Mistral:
- *“Many things we need can wait, the child cannot. Now is the time his bones are being formed. His blood is being made, his mind is being developed. To him we cannot say tomorrow. His name is today”.*

For more information, please contact **Lena Davidsson,**
l.davidsson@iaea.org



photo credit: Marjorie Haskell, UC Davis, Davis, CA