



IAEA

International Atomic Energy Agency

# Nutritional & Health-Related Environmental Studies Newsletter

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## Contents

To our readers	1	Publications	5	Puzzle corner	10
Meetings	2	Success stories	6	Contact	10
News	4	NAHRES Special	7		



## To our readers

### Summer greetings from Vienna!

I hope that you are all managing to cope with the ongoing COVID-19 challenges. Here in Vienna, we are back in our offices, albeit with measured caution, after a long period of working from home.

In the past six months, we have initiated new research projects, discussed research ideas in virtual meetings and participated in virtual conferences with IAEA-organized sessions. The report of our meeting last year on diet quality in the context of changing food systems is now available. Check out our new online data entry tool and body composition calculator and don't miss the opportunity to provide feedback on the newsletter and our Human Health Campus in our mini survey (page 5). Also note the groundbreaking paper that was just published in *Science*, changing our understanding of metabolism, based on energy expenditure data from the IAEA DLW database! Fantastic to see that it was picked up by NYT, BBC, Good Morning America and others.

The preparations for a new Technical Cooperation Programme (2024-2025) will start soon and it is the perfect moment to think about new project ideas. You can also find information on the pre-summit of the UN Food Systems Summit and the international collaboration on nutrition and cancer. Many thanks to the UN Nutrition Secretariat and ICONIC for these contributions. In addition, we would like to welcome Arthur as our new Health Education Officer. Find out what he is bringing to the team.

And finally, be prepared for a change – this will be the last newsletter in this format. Our next one in January will be an e-newsletter (see mock-up)!

Best wishes for good health,  
Cornelia



## To our new readers

The International Atomic Energy Agency (IAEA), an organization within the United Nations (UN) system, is the world's central intergovernmental forum for scientific and technical cooperation in the nuclear field. The Nutritional and Health-related Environmental Studies (NAHRES) Section, part of the Division of Human Health (NAHU), enhances countries' capabilities to combat malnutrition for better health throughout life. It complements the work of other UN agencies, non-governmental organizations and interested stakeholders in the field of nutrition and health by encouraging the use of accurate nuclear techniques to design and evaluate interventions aimed at addressing malnutrition in all its forms. For example, NAHRES supports the application of stable isotopes to measure micronutrient bioavailability and vitamin A status, changes in body composition and physical activity, and infant feeding practices. The support mechanisms of the IAEA

include Coordinated Research Activities (CRA) and the Technical Cooperation (TC) Programme. Check out this [guide](#) to learn how these mechanisms work. To read more about our work, visit the [Human Health Campus](#) website, where you will find information about stable isotope techniques, our projects, guidance documents and learning materials such as eLearning modules, fact sheets and other publications.



Chilean children doing physical activity at school. (Photo courtesy of S. Gorisek)

## Meetings

### Establishing iron requirements with stable isotopes

A new method to study iron requirements and evaluate the impact of iron interventions on iron absorption and losses was discussed virtually among a group of experts from 29 June – 1 July. The stable iron isotopes dilution technique labels the total body stores of iron. Once equilibration is reached (after 9-12 months), long-term dietary iron absorption and iron loss can be quantified from changes in the isotopic profile. Experts from ETH Zurich (Switzerland), St John's Research Institute (India), University of East Anglia (UK), Columbia University (USA) and Bill & Melinda Gates Foundation (USA) with expertise in iron metabolism proposed the most relevant research questions for this new method and identified method optimization needs. This will form the basis of a new Coordinated Research Project (CRP) to be launched in 2022.



Enough iron? (Photo by Eric Vö on Unsplash)

### Assessing Vitamin A status from deficiency to excess

Experts on the retinol isotope dilution (RID) method to assess vitamin A body stores met virtually from 16-18 March to discuss barriers for the RID to be used at larger scale to assess vitamin A status in national surveys. The RID is currently the only method that can reliably assess vitamin A status in individuals with high vitamin A intakes. However, the method was mainly developed as a research tool, and some adaptations and streamlining are needed before it can reach its full potential at larger scale. These will be addressed in a [new CRP](#).

New CRP: Optimising Nuclear Techniques to Assess Vitamin A Status in Population Surveys – From Deficiency to Excess (Phase II – E43035)

New Coordinated Research Project

Ferrelle Kaestel, IAEA Department of Nuclear Sciences and Applications

JUL  
12  
2021



#### Related Stories

[An Isotopic Technique to Get Vitamin A Programmes Right](#)

[Nuclear-Derived Techniques for a Quality Diet: IAEA Commemorates 11th Africa Day for Food and Nutrition Security](#)

#### Related Resources

[% Diet quality](#)

## Meetings

### Optimising nuclear techniques to assess accurate quantitative biomarkers of added sugar intake in adults

The first Research Coordination Meeting (RCM) of the Coordinated Research Project (CRP) ‘Optimising nuclear techniques to assess accurate quantitative biomarkers of added sugar intake in adults’ (E4.30.34) took place in a virtual format from 21-24 June 2021. Research teams from Argentina, Australia, China, India, Lebanon, Mexico and South Africa as well as experts from the India, UK and the USA participated.

The CRP aims to test the utility of the natural abundance Carbon Isotope Ratio (CIR) and the CIR of alanine (CIR-ala) as biomarkers of added sugar intake in adult populations with different dietary background, including those who eat corn, millet or sorghum as a staple, by comparing the biomarker with accurate measurements of daily sugar intake. There has been no careful and systematic study of CIR in the blood of adults from different parts of the world, with varying dietary carbohydrate intakes and a careful discrimination of the sources of carbohydrates that are eaten.

This is relevant in terms of the emerging evidence for the role of carbohydrate and free sugar intake in chronic disease, and the guidance by the World Health Organization (WHO) which recommends restricting free sugar in the diet to less than 10%, or even 5% of total energy intake for additional health benefits. The discussions at the first meeting focused on critical study design and protocol issues, aspects on the collection of biological specimens (blood, urine), storage and shipment, the DLW protocol and the possible addition of breath tests.



Consumption of sweets by a girl. (Photo by Santhosh Varghese on Shutterstock)

## Conferences

### Virtual annual meeting of the American Society for Nutrition (ASN)

NAHRES was invited to organize a 90-minute session on the value of isotope techniques in nutrition research at the virtual annual meeting of the American Society for Nutrition (ASN), Nutrition Live Online 2021, in June 2021. A separate 1-hour live discussion and Q&A was held. The five presentations from NAHRES and IAEA experts from the France, UK and the USA focused on the added value of the use of stable isotope techniques and emphasized the importance of assessing body composition and energy metabolism across the lifespan, the need to evaluate the effectiveness and safety of vitamin A programmes at large scale and the opportunities of stable isotope-based methods to provide reference values for protein and amino acid requirements in different populations, to study the risk of zinc deficiency and to inform zinc requirements.

### Beyond Body Mass Index; the body composition story from ECO

The 28th European Congress on Obesity (ECO 2021) was held virtually from 10-13 May 2021. NAHRES organized a 1-hour parallel [symposium](#) on Tuesday, 11 May 2021, titled 'Beyond Body Mass Index: positioning body composition in the nutrition assessment menu'.

The symposium highlighted the central role body composition plays in understanding the dynamics of the double burden of malnutrition and mitigating interventions. Discussion focused on the relevance of body composition in both clinical and public health practice, how it can be measured and how the IAEA has supported countries to develop capacity in the use of nuclear techniques to assess body composition.

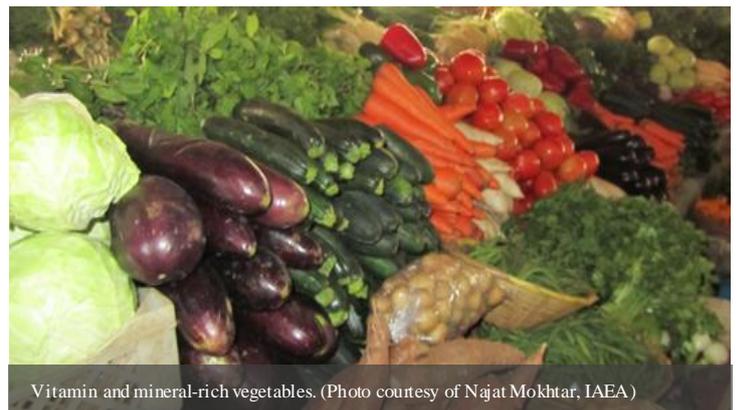
# News

## Assessing diet quality in a changing food systems landscape

A virtual Technical Meeting organized by the IAEA from 19-21 October 2020 focused on understanding the effectiveness of food-based approaches to improve diet quality in the face of rapidly changing food systems driven by adverse events such as climate change and the COVID-19 pandemic. While the exact influence of climate change on food systems is yet to be fully understood, some of the immediate impacts are on crop yield, and food nutrient composition and bioavailability. Measuring all these becomes a challenge. Combinations of various stable isotope techniques can be used to simultaneously decipher changes in soil fertility and water use efficiency and nutrient density and bioavailability, and to assess functional health and nutrition outcomes including body composition and energy expenditure, and correlate these to disease conditions.

For example, existing stable isotope techniques can be used to assess protein digestion, amino acid

absorption, and iron and zinc bioavailability; such data can be included in food quality databases and food composition tables. Further, the evidence base can inform the design of programmes to increase food nutrient density and bioavailability such as biofortification and food fortification. The outcomes of the meeting will inform a new CRP in this area to be launched in 2022. The [report](#) with more details on this meeting is now available.



Vitamin and mineral-rich vegetables. (Photo courtesy of Najat Mokhtar, IAEA)

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## Online data entry tool for body composition projects



From paper to digital. (Photo by Surface on Unsplash)

Did you ever get lost in a myriad of Excel files for your body composition study? Hopefully, this will soon be history. An IAEA hosted online data entry tool and body composition calculator is being pilot tested in one regional TC project and one CRP. The aim is that every project on body composition can have its own questionnaires in a project specific data entry space with integrated body composition calculations and a user-friendly interface.

The system can work across multiple browsers and devices including mobile phones and tablets. All data including body composition will be available as one project specific Excel file. Data will be safely stored on a server in Vienna and be accessible to project members via a user login and password. Ask your technical/project officer at the IAEA how you can get your own project specific data entry space.

# News

## NEW Technical Cooperation Cycle



The Technical Cooperation (TC) programme is the IAEA’s primary mechanism for transferring nuclear technology to Member States, helping to address key development priorities in areas such as health and nutrition.

We are starting the preparations for a new TC Programme for the cycle 2024-2025 and maybe your team can apply. To discuss potential project ideas and the application procedure, please contact your IAEA National Liaison Officer (NLO) in the country, or NAHRES ([nahres@iaea.org](mailto:nahres@iaea.org)) in case you don’t know who your NLO is.

More information on the use of stable isotopes in nutrition programmes and concrete steps to request project support can be found [here](#).

## NAHRES User Survey Now Available



NAHRES has just launched an anonymous online survey to get your feedback concerning your views and use of the NAHRES newsletters and the nutrition-related content available in our Human Health Campus. The survey takes only 2 to 3 minutes to complete.

The survey results will inform NAHRES on respondents’ satisfaction concerning the newsletter and the Human Health Campus.

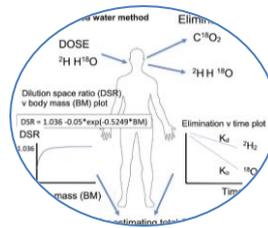
[Answer the survey now](#)

# Publications



*Science, Aug 2021!!!*

Daily energy expenditure through the human life course



*Cell Reports Medicine, Feb 2021*

A standard calculation methodology for human doubly labeled water studies



*Clinical Nutrition ESPEN, Aug 2021*

New bioelectrical impedance analysis equations for children and adolescents based on the deuterium dilution technique



*The Journal of Nutrition, May 2021*

Tea Consumption Reduces Iron Bioavailability from NaFeEDTA in Nonanemic Women and Women with Iron Deficiency Anemia: Stable Iron Isotope Studies in Morocco

## Success stories

### Sensitising agriculture for nutrition: What can body composition tell us?

Nutrition-sensitive agricultural policies and interventions that enhance the availability and accessibility of nutrient-rich foods and capacity for income generation at the household, community and national levels can be a gateway to addressing malnutrition in all its forms. A diverse diet anchored on the consumption of traditional and local foods may not only guarantee adequate nutrient intake and safeguard biodiversity but can also protect against unintended adverse health consequences of dietary transition. However, evidence on the nutritional impact of nutrition-sensitive agricultural interventions is inadequate. Between 2013 and 2017, researchers from countries spread across Africa, Asia, Latin America, Europe and North America participating in an IAEA CRP (E4.30.29) investigated the contribution of various nutrition-sensitive agri-food systems on health and nutrition in Bangladesh, Cuba, Haiti, Myanmar, Peru, Senegal and the United Republic of Tanzania. Body composition was the primary indicator of nutritional status and was assessed using the deuterium dilution technique.

No significant differences in nutritional status and body composition were observed between mothers and children receiving interventions versus the comparison. However, the CRP generated body composition data that can be included in databases to allow validation of new methods for assessing body composition and dietary diversity. More information can be found [here](#).



Nutrient rich fruits and vegetables. (Photo courtesy of V. Owino/IAEA)

### Global studies using deuterium to determine human milk volume ISRHML European Webinar Series 2021

At the invitation of The International Society for Research in Human Milk and Lactation (ISRHML), NAHRES held a webinar on global studies using deuterium to determine human milk volume. IAEA's work in supporting the use of the deuterium oxide dose-to-mother technique to quantify human milk intake was presented. In addition, examples of human milk intake from different regions, infant's intake of nutrients and contaminants, and exclusive breastfeeding rates assessed by the isotope technique in comparison to maternal recall were presented. The recording is available [here](#).

## GLOBAL STUDIES USING DEUTERIUM TO DETERMINE HUMAN MILK VOLUME

JUNE

1

**EUROPEAN REGION**

12:00 PM EDT (JUNE 1)

6:00 PM CEST (JUNE 1)

12:00 AM AWST (JUNE 2)

**Speaker: Dr. Cornelia Loechl**

Nutritional Specialist, International Atomic Energy Agency (IAEA)

Visit <http://isrhml.com/> for more information

Follow us at [@ISRHML](#) for updates

## NAHRES Special

### Addressing childhood obesity in Seychelles: national training course on body composition, total energy expenditure and physical activity assessment

*With special thanks to Stephanie Desnousse, Principal Nutritionist, Ministry of Health Seychelles*

Since 2014, Seychelles, with support from the IAEA has built capacity in using stable isotopes to assess risk factors of childhood obesity with a focus on body composition (by deuterium dilution) and total energy expenditure (by doubly labelled water). In a new phase of the collaboration, the support by the IAEA is channelled through a national TC project (SEY/6/005) which aims to evaluate an intervention programme on obesity and obesity related risk factors in children aged 8 to 10 years in response to the current high prevalence of childhood obesity in Seychelles.

As part of the capacity building activities, a total of 18 staff and students from the Nutrition Unit and the Public Health Laboratory in Seychelles attended a virtual National Training Course (NTC) organized by the IAEA from 19 - 23 April 2021. The NTC focused on the principles of assessment of body composition by deuterium dilution and total energy expenditure using doubly labelled water (DLW). The training itself was facilitated by two experts, Khalid El Kari and Hasnae Benkirane from the AFRA Regional Designated Centre for Stable Isotopes in Nutrition in Morocco.

On the first day of training, participants discussed the new project protocol as well as how it links with the previous project which was completed in 2018. The following days focused on body composition assessment, the use of accelerometers for measuring physical activity, the use of the FTIR and the theory and application of the DLW technique. Through this virtual training participants were able to improve their knowledge on the various topics presented.



Participants follow a training via livestream. (Photo courtesy of S. Desnousse)

### New Associate Health Education Officer in NAHRES: What does it enable us to do?

In February, in the middle of a COVID-19 lockdown in Vienna, I gladly joined the NAHRES team as its new Associate Health Education Officer. This recently created position came during a time when the work world had been pushed to adapt to new educational and training (ET) circumstances, shifting from exclusively in-person ET activities to either fully virtual or hybrid practices.

In this role, I expect to effectively address the learning needs of our target audiences and thus ultimately contribute to the fulfilment of NAHRES' goal to support Member States in enhancing their capability to improve nutrition for better human health.

Below are some educational and training activities you can expect to hear more about during the next few years:

- Review and update of the e-learning modules currently in our Human Health Campus
- Development of new web-based educational resources (including e-learning courses)
- Conception of an ET programme on nuclear techniques in nutrition assessment
- Adoption of emerging technologies for educational purposes

Overall, I look forward to contributing to NAHRES' ET activities and addressing our audiences' learning needs.

# NAHRES Special

## Putting nutrition at the centre of food systems transformation

With special thanks to A. Mora and S. Oenema, UN Nutrition Secretariat

The [Pre-Summit of the UN Food Systems Summit](#) took place from 26 to 28 July 2021. More than 500 in-person delegates and over 20 000 virtual delegates discussed how to build more sustainable, equitable, resilient and nutritious food systems as a means to achieve the Agenda 2030.

On 27 July, UN Nutrition organized a session on [Putting nutrition at the centre of food systems transformation](#). The event aimed at planting the seeds for building coalitions for nutrition across the Food Systems Summit Action Tracks and Action Areas, and show how UN leadership is rallying forces for nutrition, leaving no one behind, to ensure food systems transformation.

The UN Nutrition Chair, **Naoko Yamamoto**, opened the event stressing the importance of having nutrition cutting across all Action Tracks, followed by **Henrietta H. Fore**, UNICEF Executive Director, who urged food systems actors to put the interests of children and the planet first to identify solutions that can deliver progress at scale. A rich panel of experts, including the Minister of Health of Guyana, the UN Resident Coordinator in Nigeria, the World Food Prize laureate for 2021, and a youth leader from Malawi, discussed how to achieve food systems transformation for better nutrition.

**H.R.H Princess Sarah Zeid of Jordan**, WFP Special Advisor on Mother and Child Health and Nutrition, closed the event with a powerful intervention on the centrality of nutrition and human rights for food systems transformation. *“The mere fact that we are having a session that is called ‘Putting nutrition at the centre of food systems transformation’ is disheartening because it means it is not already there, and we all know nutrition is the bedrock of all interventions”* said the Princess.

Nutrition and One Health were not clearly addressed in the Pre-Summit, which focused more on climate and sustainability issues. Nutrition is part of the solution to fix broken food systems and addressing all forms of malnutrition is a strong lever in transforming towards more sustainable and equitable food systems.



## IAEA & European Association for the Study of Obesity



The European Association for the Study of Obesity has included links to three IAEA education resources on body composition, energy expenditure and dual energy X ray absorptiometry on their website ([Education section](#)) in order to enhance the outreach and widen the support to nutrition researchers and other stakeholders. A [blog post](#) about the IAEA and its education resources was also published.

# NAHRES Special

## Advancing collaborative engagement in nutrition, physical activity and cancer as a defined activity within the international agenda

*With special thanks to Rachel Marklew, ICONIC*

Cancer represents a major cause of mortality globally. Over the last thirty years, there has been increasing recognition of the need to better understand how lifestyle - including factors related to diet, nutrition and physical activity - can influence the risk of cancer, its treatment and survival. Although there has been more and more research in this area, those in the cancer world are not necessarily familiar with the role of nutrition in the care of cancer patients, and those in the nutrition world have often not been involved in the prevention and management of cancer.

The last three years have seen the formation of a new task force, specifically set up to address this lack of synergy and bring more coordinated action across all areas of research, education and practice. Established as a Task Force of the [International Union of Nutritional Sciences \(IUNS\)](#), the [International Collaboration on Nutrition in relation to Cancer \(ICONIC\)](#) seeks to build capacity through supporting practitioners in their training and practice, facilitate research leading to public policy focused on impactful interventions, and promote improved care and outcomes for those affected by cancer. ICONIC has ongoing collaboration with IAEA and receives support from other organizations including the [World Cancer Research Fund \(WCRF\)](#), [Union for International Cancer Control \(UICC\)](#) and [International Agency for Research on Cancer \(IARC\)](#). The Task Force has also drawn heavily on the experience of the [Cancer and Nutrition Collaboration](#) of the National Institute of Health Research in the UK.

With many activities now underway, one specific objective for ICONIC is to support capacity building, especially in low- and middle-income countries (LMIC) with an emphasis on the most vulnerable. Working with Wageningen University and a newly formed group of African scientists within the African Nutrition Society (ANS), the aim is to develop an online course to improve grant writing capabilities across Africa – as an imperative for the development of a high quality, relevant and context specific research programme in these countries.

Another area of particular focus for ICONIC is to help facilitate new and stronger connections between different groups interested in the area of nutrition and childhood cancers. Malnutrition poses serious challenges in the management of children throughout their cancer journey, from prior to diagnosis into long-term survivorship. ICONIC supports the development of an agreed framework that will help to share current knowledge and identify gaps and set research priorities that will enhance opportunities for improved care.

As a first step in April 2021, ICONIC hosted a [Special Focus Dialogue](#) in collaboration with UICC, bringing together experts in the field to share their experience and understanding. Looking ahead and with a series of specific questions to be addressed, ICONIC looks forward to results from the IAEA's [Coordinated Research Project](#), which looks to develop nuclear techniques for improving cancer in LMIC and with a particular emphasis on children.

Given the global context of rising cancer rates as well as rising overweight/obesity levels, the need for communication and collaboration between the cancer and nutrition communities has never been greater. ICONIC looks forward to working together with the international community to ensure that progress is accelerated and the outlook for those living with and beyond cancer is improved. Please do get in touch if you would like to find out more ([nutritionandcancer@wcrf.org](mailto:nutritionandcancer@wcrf.org)).



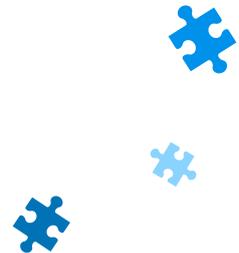
Malnutrition poses serious challenges in childhood cancer management. (Photo by A3pfamily/Shutterstock.com)

# Puzzle corner

## NAHRES Word Search



- AGRICULTURE
- BREASTFEEDING
- IRON
- OBESITY
- BIOAVAILABILITY
- DEUTERIUM
- ISOTOPE
- SUGARINTAKE
- BIOMARKER
- ICONIC
- NUTRITION
- ZINC



Do you want to know the answer? Write us an e-mail to [nahres@iaea.org](mailto:nahres@iaea.org) and we will send you the solution!

## The NAHRES Team

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Arthur Colaco Pires de Andrade	Associate Health Education Officer
Lucia Suarez-Leon	Intern

## Feedback

The NAHRES Team appreciates your feedback! If you have any questions or comments, please send them to: [nahres@iaea.org](mailto:nahres@iaea.org)

### Impressum

#### Nutritional & Health-Related Environmental Studies Newsletter No. 14, August 2021

The Nutritional & Health-Related Environmental Studies Newsletter is prepared by the Division of Human Health, Department of Nuclear Sciences and Applications

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