



IAEA

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Nutritional & Health-Related Environmental Studies Newsletter

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To Our Readers

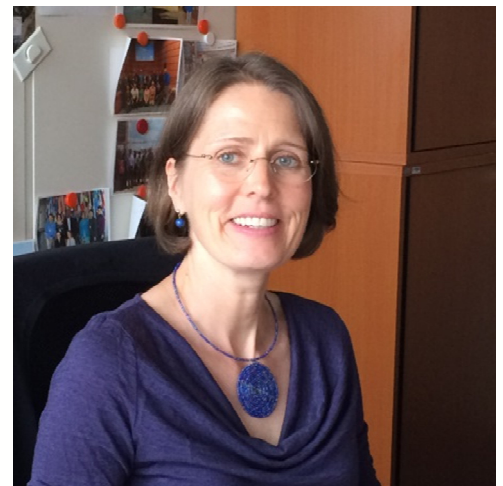
Here we are with our second edition of the NAHRES E-Newsletter! We hope you will enjoy our update – since our first edition we have been busy with a number of interesting meetings, new research projects, eLearning modules and the preparation of a technical meeting for October 2015 on how living in unsanitary conditions affects intestinal integrity and nutrient absorption.

Two interlaboratory studies are currently being conducted by NAHRES – one on analysis of deuterium enrichment and the other one on the analysis of doubly labelled water. Do not miss this opportunity if you want to check your analytical performance, or share the information in your professional networks! Please also note the opportunities for working for the IAEA on page 6 – as nutrition specialist or short-term expert!

It is my pleasure to welcome our new staff member, Victor Owino, who joined us in May 2015 from the Technical University of Kenya. With his background in food science and nutrition he is a great addition to the team. It is also my special honour to address these words to you as the new Section Head, officially appointed since 1 June 2015. I look forward to communicating and collaborating with many of you!

Sunny greetings from Vienna!

Cornelia



*Cornelia Loechl
NAHRES, Section Head*

Meetings

Consultant's Meeting on Measuring Body Composition in Low Resource Settings

Experts from Australia, South Africa and the United States of America met at the IAEA Headquarters in Vienna, 2-4 June 2015, to explore recent technological advances in the field of body composition that could be suitable for use in low resource settings across the life-course. There is a need for more information on body fat distribution, rather than total body fat, as adipose tissue and triglyceride stores are not evenly distributed in the body, and disease risk varies with body fat distribution. The widespread availability of smart phones and recent developments in camera technology and computer modelling have contributed to the emergence of potential field technologies based on optical scanning, which would complement anthropometric measurements, but need validation against reference methods (dual energy X ray absorptiometry (DXA) and isotope dilution). Emerging technologies include 2D or 3D optical scanning and radiofrequency resonance. Optical anthropometry has become fairly standardized for the clothing industry. More than 450 measures can be taken from a single optical scan, including circumferences, heights, lengths, volumes and surface areas. Sophisticated modelling techniques and body shape as a risk factor for metabolic diseases are an active area of research. These technologies possess untapped potential for use in low resource settings.



*Relaxing by the Alte Donau, Vienna
(Photo courtesy of C. Slater)*

FANUS 2015

IAEA supported a session within the 3rd Conference of the Federation of African Nutrition Societies (FANUS 2015) 25-29 May 2015. Approximately 280 delegates and experts from over 26 countries with interest in nutrition met in Arusha, Tanzania for the 3rd Conference of the Federation of African Nutrition Societies under the umbrella theme “Nutrition in Africa at Crossroads”. The FANUS Conference, which takes place every four years, focused on evaluating the current status of Africa’s achievements regarding the Millennium Development Goals as well as setting goals for the next round of Sustainable Development Goals. The IAEA organised a two hour session on “Using isotopes in research on breastfeeding”, featuring presentations from three countries (Burkina Faso, Morocco and South Africa) participating in IAEA supported technical cooperation and coordinated research projects (CRPs). The session was introduced by Cornelia Loechl, Section Head of NAHRES, who spoke about the IAEA’s work in nutrition and by Grace Munthali, an IAEA expert from Zambia, who explained how to measure human milk intake using the deuterium oxide dose-to-mother technique. The conference concluded that for Africa to reach its nutrition challenges and national goals the following steps are required: empowerment of all stakeholders, nutrition governance, systematic capacity building, as well as harmonization of nutrition activities and training.



*IAEA session participants
(Photo courtesy of C. Loechl)*

Final RCM of CRP on the Influence of *Helicobacter pylori* Infection on Micronutrient Absorption

The final Research Coordination Meeting (RCM) on “Stable isotope techniques to design effective food fortification strategies in settings with high *Helicobacter pylori* infection” took place in Vienna from 18-21 May 2015. It brought together researchers from Argentina, Bangladesh, Chile, Cuba, India, Morocco, Tanzania, and the United Kingdom. The CRP started in 2010 with the aim of evaluating the effect of *H. pylori* infection on gastric acid secretion and the absorption of iron from different food fortification compounds. *H. pylori* is the most common bacterial infection in humans in developing countries (80-90% among adults) and is associated with factors such as low socio economic status, low education level, poor sanitation and rural residence. Although most individuals do not show symptoms, infection with *H. pylori* can lead to reduced absorption of micronutrients, as well as limited absorption of non-water-soluble compounds of iron and zinc which might compromise the effectiveness of food fortification and supplementation programmes. One of the specific objectives of this project was to explore a non-invasive test to measure gastric acid secretion, using stable isotopes. A calcium carbonate breath test has potential and is being validated as part of this CRP. Currently, gastric acid secretion can only be measured by an invasive intubation method, therefore development of a non-invasive method is high priority.



CRP research contract and agreement holders
(Photo courtesy of C. Loechl)

Regional Training Course on Data Management for Assessment of Human Milk Intake

Sixteen nutritionists and health professionals from 10 Member States participating in IAEA Asian regional technical cooperation project RAS6073 “Using Stable Isotope Techniques to Monitor Situations and Interventions for Promoting Infant and Young Child Nutrition” attended a regional training course on data management and interpretation hosted by the National Nuclear Energy Agency (BATAN) in Jakarta, Indonesia, 13-17 April 2015. The training included a review of the project protocols and procedures, with an emphasis on the deuterium oxide dose-to-mother technique for assessing human milk intake in breastfed infants, lectures on data management and practical sessions on using the IAEA spreadsheet to calculate the volume of human milk consumed by breastfed infants, and the baby’s intake of water from sources other than its mothers milk, lectures on basic statistics, and development of a project database, and statistical analysis plan. The facilitators were Tinku Thomas from the IAEA Collaborating Centre for Nuclear Techniques in Nutrition, St. John’s Research Institute, Bangalore, India, and Thushari Bandara from the University of Ruhuna, Sri Lanka.



Practical session during the training course
(Photo courtesy of S. T. Thomas)

Regional Training Course on Assessment of Body Composition

A regional training course on assessment of body composition was hosted by the Food and Nutrition Research Institute, Manila, Philippines from 20-24 April 2015. Twenty nutritionists and health professionals from 12 Member States participating in IAEA Asian regional technical cooperation project RAS6080 “Preventing Overweight and Obesity, and Promoting Physical Activity among Children and Adolescents” attended the course, which provided practical training in assessment of body composition by deuterium dilution, bioelectrical impedance analysis and anthropometric methods, with a focus on quality assurance. Participants measured their own body composition using various methods, and the data collected were used on an exercise on data evaluation, and to discuss the advantages and disadvantages of each method. The facilitators were Paul Deurenberg and Jyh Elin Wong from Malaysia, and Masaharu Kagawa from Japan.



*Measuring the height of a participant
(Photo courtesy of A. Mallillin)*

Regional Training Course on Assessing Vitamin A Status

IAEA facilitated a Regional Training Course on Field Implementation of Assessing Vitamin A Status using the Stable Isotope Dilution Technique and on Measurement of Inflammation Markers from 4-8 May 2015. The course was hosted by the Centre for Research in Food and Nutrition, Yaoundé, Cameroon. Eleven nutritionists and health professionals from 11 Member States participating in the IAEA African regional technical cooperation project RAF6047 “Using Stable Isotope Techniques to Monitor and Assess the Vitamin A Status of Children Susceptible to Infection” attended the course. During this training course, experts gave presentations on the principles and laboratory procedures for measurement of labelled vitamin A enrichment using the isotope dilution technique with deuterated retinol, preparation of doses for the isotope dilution technique, and calculation of results. The training also included laboratory exercises on measuring the inflammation marker, C-reactive protein, serum retinol concentrations, and serum carotenoids, and discussions on study designs and protocols. The facilitators were Sherry Tanumihardjo and Michael Grahn from the University of Wisconsin-Madison, USA, and Guangwen Tang formerly of Tufts University, USA.



*Training course participants
(Photo courtesy of G. Medoua)*

News

New CRP on protein bioavailability

A large proportion of the population in low and middle income countries rely on plant based diets to meet their protein requirements, but there is very little data on bio-availability of proteins from meals as they are traditionally prepared. During times of rapid growth, such as pregnancy and the first two years of life, if the foetus or young child does not receive the right combination of nutrients in their diet, they become stunted or too short for their age. Stunted children are less likely to do well at school and this has lifelong consequences on their ability to earn a living later in life. This new CRP will develop and validate novel, minimally invasive techniques to assess protein digestibility and utilization from plant based diets, as they are prepared and consumed by vulnerable populations, in regions habitually relying on plant based diets. Intrinsically labelled local varieties of grain legumes will be grown in collaboration with local agriculture colleges/institutes.

For more information see

<http://www-naweb.iaea.org/nahu/NAHRES/crp.html>

or contact Christine Slater (C.Slater@iaea.org)

Technical Meeting on Environmental Enteric Dysfunction

Environmental sanitation and hygiene are important determinants of child growth and health. Poor sanitation and hygiene and lack of access to clean water are linked to stunted growth among infants and young children in developing countries. The mechanism by which a dirty environment impacts on child growth is via adverse modification of intestinal integrity with the result that nutrients may not be optimally absorbed and utilised for growth and other functions. This disturbance to the intestinal surfaces tasked with nutrient absorption is referred to as environmental enteric dysfunction (EED) and is linked to the presence of abnormal gut bacteria. Since EED has a major bearing on illness and death among infants and young children living in poor water, sanitation, and hygiene (WASH) conditions, it is important to understand how EED and associated 'bad bacteria' may be cost-effectively diagnosed based on non-

invasive techniques. The ability to diagnose EED and to understand its causes may aid in designing prevention and treatment strategies.

In recognition of the serious implications of EED on child growth, the IAEA will host a technical meeting to deliberate on EED, the microbiome and undernutrition, 28-30 October 2015 at the IAEA Headquarters in Vienna, Austria. The meeting will help inform the IAEA on its role in the global efforts to address EED and undernutrition. The agenda will cover a diverse set of subject areas related to EED and participants will represent a unique combination of viewpoints and experience in infectious diseases, malabsorption, gut health/microbiome, clinical trials on EED, undernutrition, and stable isotope techniques in nutrition.



*Typical living and playing environment for infants and young children in resource constrained settings
(Photo courtesy of T.A. Owino)*

For more information contact:

Victor Owino (V.Owino@iaea.org)

Deuterium and Doubly Labelled Water (DLW) Interlaboratory Studies



*FTIR laboratory University of Sonora
(Photo courtesy of M.E. Valencia Juillerat)*

As part of its ongoing efforts to assure the quality of data produced in IAEA supported projects, NAHRES is currently facilitating two interlaboratory studies: on analysis of deuterium enrichment by Fourier transform infrared spectrometry and analysis of doubly labelled water by isotope ratio mass spectrometry. So far, samples for the deuterium study have been sent to laboratories in 33 Member States. Anyone wishing to participate in this study should contact the Deuterium Inter-Laboratory Study 2015-Contact Point DInterLab2015@iaea.org, as soon as possible.

The doubly labelled water (DLW) study will begin during the third quarter of 2015. Anyone wishing to participate in the DLW interlaboratory study should contact the IAEA Doubly Labelled Water Inter-Laboratory Study 2015-Contact Point DLWInterLab2015@iaea.org, as soon as possible. Please circulate this information to members of your professional networks, who might be interested in participating.

Working for IAEA: Current Vacancies

i. Nutrition Specialist (P4)

Location: Vienna, Austria. Fixed Term 3 years. Closing Date: 2015-09-01.

[https://iaea.taleo.net/careersection/ex/jobdetail.ftl?job=2015/0232\(013154\)](https://iaea.taleo.net/careersection/ex/jobdetail.ftl?job=2015/0232(013154))

ii. Talent Pipeline for Human Health Professionals and Experts

Location: Vienna, Austria. Closing Date: 2015-09-30. Qualified professionals and experts worldwide who are available for short-term and/or temporary assignments are encouraged to register and create their profiles.

https://iaea.taleo.net/careersection/ex/jobdetail.ftl?job=PIP-HUMAN_HEALTH-001

iii. Expert/Lecturer Technical Cooperation (TC) Programme

Location: Field (outside IAEA Vienna, Austria). Closing Date: ongoing

TC experts provide specialized on-the-job training, assist project counterparts in developing technical analyses and offer recommendations towards achieving TC project objectives. TC experts may also participate in training courses as lecturers that transfer technical knowledge and skills to training course participants, providing lectures, exercises etc. Qualified experts worldwide, who are available for short-term and/or temporary assignments, are invited to register and create their Candidate Profile.

<https://iaea.taleo.net/careersection/ex/jobdetail.ftl?job=PIP-TC20141224-001>



*Experts at an IAEA meeting
(Photo courtesy of E. Cody)*

Success Story

India Champions Exclusive Breastfeeding With the Help of Nuclear Techniques



*Indian mother drinking a dose of deuterium oxide; saliva sampling in her baby
(Photo courtesy of U. Deshmukh)*

Over the last five years, with support from IAEA coordinated research projects, India has been using stable isotope techniques, such as deuterium dilution to investigate child growth and associated body composition changes, as well as the body composition of lactating women and human milk intake in breastfed infants. Nutritional status of both mother and baby is one of the key factors that can affect a child's birth, health and lifelong development. Therefore, India has focused on crafting better, more effective programmes to improve the nutritional status of mothers and children, and to promote exclusive breastfeeding from birth to six months. According to paediatrician Urmila Deshmukh from the Government Medical College and Hospital (Akola, India) most mothers are undernourished, lacking micronutrients such as vitamins A, D, B-12, and iron, which is reflected in infants as anaemia and delayed psychomotor development. "The published data have given us the indication that the messages about infant and young child feeding practices need to be delivered to the mother and/or the caretakers of the infants at regular intervals, and not just at birth and at six months. This may help to maintain the exclusivity of breastfeeding in the first six months of life. The fear of not having enough milk is the most common reason we have come across for starting complementary food earlier than six months, and here, maternal counselling is of great importance," said Dr Deshmukh adding that "When we speak to less educated mothers in rural areas, we need to counsel more about starting

appropriate complementary feeding after six months, and with mothers in urban areas, we need to stress upon exclusivity of breast milk until the age of six months."

Education Resources

What's New on the Human Health Campus?

Carbon-13 Breath Tests

The Human Health Campus now has resources related to carbon-13 breath tests:

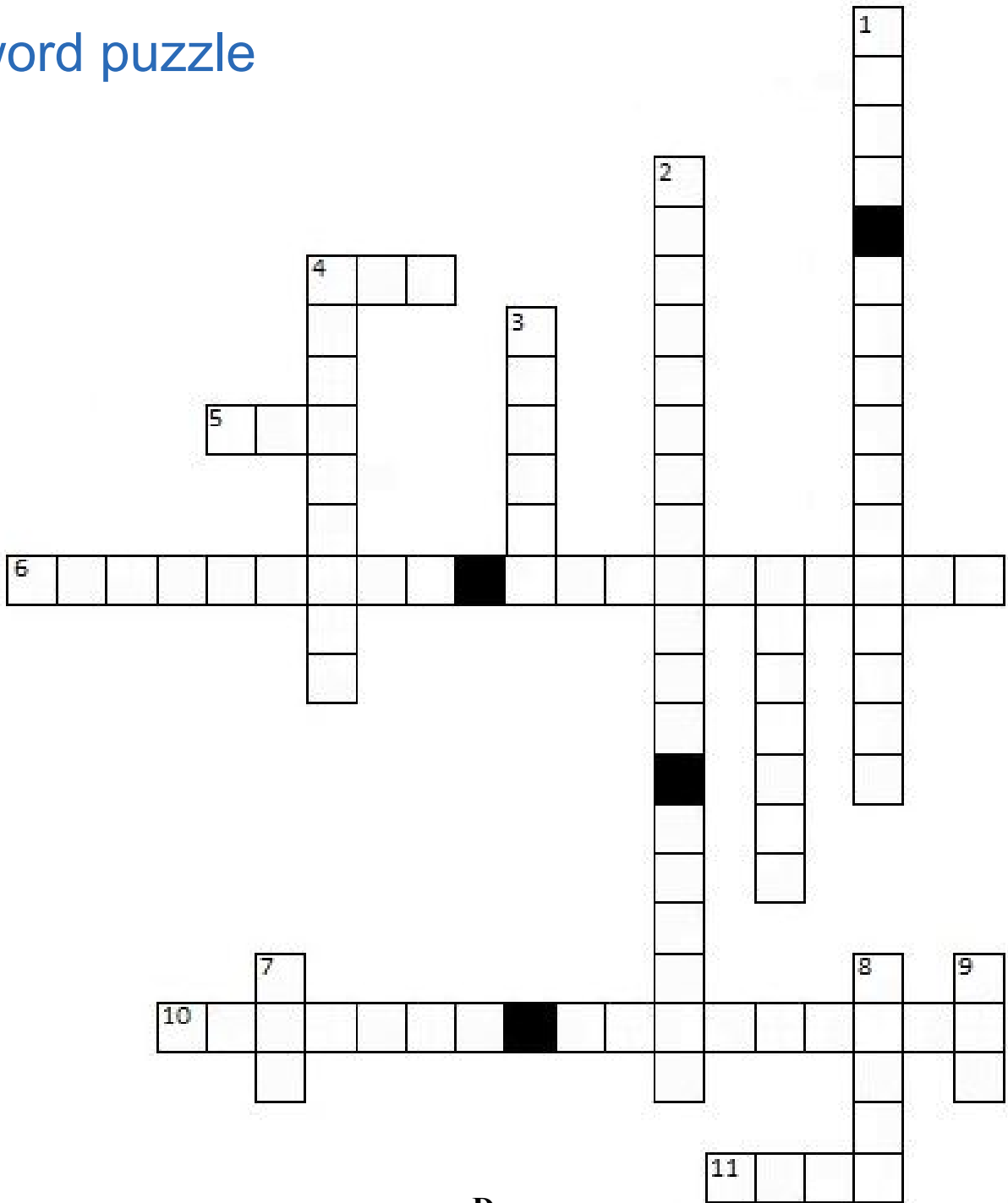
http://nucleus.iaea.org/HHW/Nutrition/Carbon-13_Breath_Tests/index.html

Carbon-13 breath tests are based on the idea that the sampling of exhaled breath can provide information about biochemical, physiological or pathological processes within the body. Organic molecules labelled with carbon-13 have been used for many years to follow metabolic pathways in the body. The final oxidation product of organic molecules is carbon dioxide, which is exhaled in the breath. Those breath tests have become useful non-invasive tools to measure gastrointestinal function and to monitor pharmacological and nutritional interventions. For instance, the urea breath test (UBT) to detect the presence of *H. pylori* in the stomach is now a well-established test for both diagnostic and research purposes. The IAEA supports the application carbon-13 breath tests to assess gastrointestinal function and its relation to absorption of nutrients from the diet.



*Sampling breath by blowing into a tube
(Photo courtesy of T. Ahmed)*

Crossword puzzle

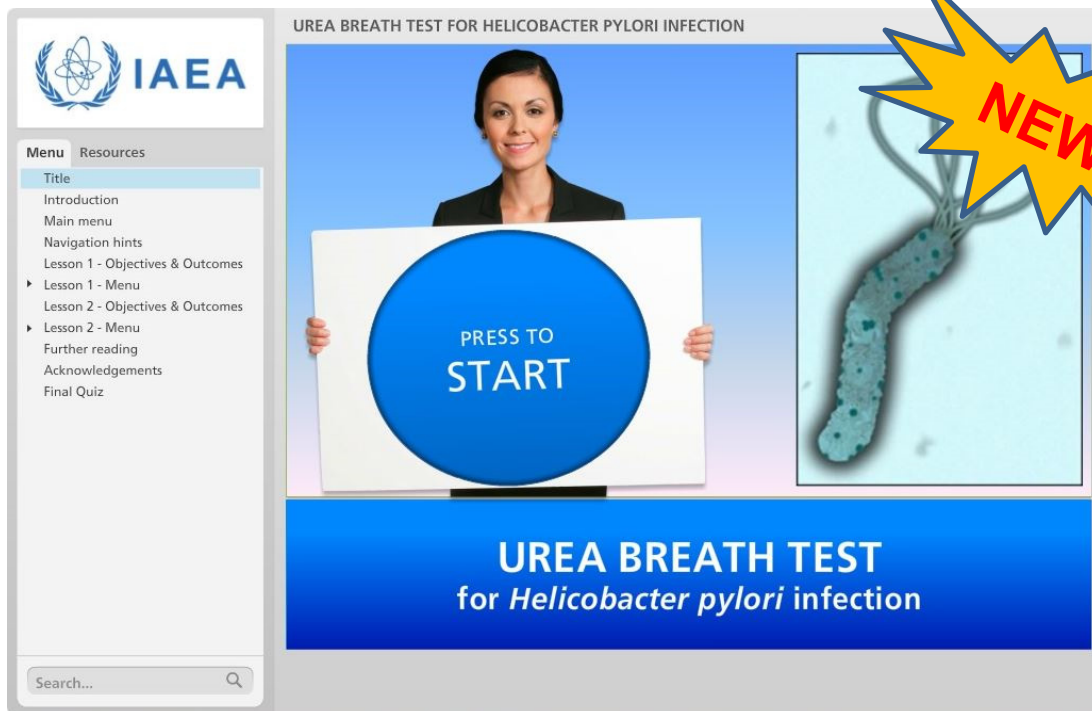


Across

4. Dual Energy X Ray Absorptiometry
5. Type of breath test to measure *H. Pylori*
6. Current job vacancy (P4)
10. A type of breath test to measure gastric acid secretion
11. Coordinated Research Projects

Down

1. Deuterium dilution, bioelectrical impedance analysis and anthropometric methods measure this
2. Most common bacterial infection in humans in developing countries
3. Nutritional and Health-Related Environmental Studies Section
4. Stable isotope of hydrogen
7. Doubly labelled water
8. Federation of African Nutrition Societies
9. Environmental Enteric Dysfunction



The latest in our series of eLearning modules, on the ‘Urea Breath Test for *Helicobacter pylori*’ is now available on the Human Health Campus:

<http://www-naweb.iaea.org/elearning/NAHRES/urea-breath-test-for-helicobacter-pylori-infection/story.html>

The supplement of the **Food and Nutrition Bulletin** with the proceedings of the 2014 IAEA International Symposium on “Understanding Moderate Malnutrition in Children for Effective Interventions” is now available for download on the IAEA’s Human Health Campus!

<http://nucleus.iaea.org/HHW/Nutrition/Symposium2014/index.html>

The NAHRES Team

We appreciate your feedback! If you have any questions or comments, please send them to nahres@iaea.org

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Impressum

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