THE IAEA-UNICEF-WHO SYMPOSIUM
Symposium Report
August 2019


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BACKGROUND

The double burden of malnutrition (DBM) affects many countries worldwide, with low- and middle-income countries bearing the greatest burden due to lack of capacity to tackle the problem. The DBM\(^1\) is the coexistence of undernutrition along with overweight, obesity or diet-related noncommunicable diseases (NCDs), within individuals, households and populations, and across the life-course.

In response to this rising double burden, as a follow-up of the Second International Conference on Nutrition (ICN2), in April 2016, the United Nations (UN) General Assembly proclaimed the UN Decade of Action on Nutrition 2016–2025. The Nutrition Decade aims to trigger intensified action to end hunger and eradicate malnutrition in all its forms worldwide and ensure universal access to healthier and more sustainable diets — for all people, whoever they are and wherever they live. The Nutrition Decade provides a unique opportunity for stakeholders to strengthen joint efforts towards achieving the global nutrition targets and the diet-related NCDs targets within the 2030 Agenda for Sustainable Development. To support and catalyse the Nutrition Decade, the International Atomic Energy Agency (IAEA) held, jointly with the World Health Organization (WHO) and UN Children’s Fund (UNICEF), a workshop in Vienna, Austria, from 3 to 5 October 2017, on analysing biological pathways to better understand the DBM and to inform evidence-based action planning.

In 2018, and as a follow up to the workshop, the IAEA, UNICEF and WHO jointly organized an international symposium with the aim of strengthening actions to tackle the DBM. More than 460 representatives from 91 countries and 21 organizations met in Vienna from 10-13 December to attend the symposium on ‘Understanding the Double Burden of Malnutrition for Effective Interventions’. In addition, a large number of enthusiasts followed the event via livestream.

PURPOSE AND OBJECTIVE

The symposium focused on how the wealth of scientific knowledge on biology and assessment methods can inform effective interventions and policies. Participants had the opportunity to learn about and discuss the latest developments taking a life-course approach, considering the different underlying causes of malnutrition in various settings and country realities and participate in interactive educational activities where new technology was demonstrated.

This symposium served as a platform for Member States to share experiences and learn about new assessment tools to measure malnutrition in all its forms and how to assess the impact of interventions with tools such as stable isotopes. The event created a timely opportunity to discuss and identify concrete actions for the achievement of nutrition commitments within the context of the UN Decade of Action on Nutrition. Researchers shared their own project results through oral abstract presentations and posters.

The symposium served as venue for a launch event of the Global Nutrition Report. In addition, a new IAEA Doubly Labelled Database containing human energy expenditure measurements was launched. Over the course of the week, several key outcomes were identified by participants including building partnerships across disciplines and stakeholder levels, demystifying nutrition for the public and other non-nutrition sectors and engaging with youth to boost awareness.

The symposium covered five thematic areas:

- **Epidemiology** - Prevalence, causes and consequences of the DBM.
- **Biology** - Biological mechanisms contributing to the DBM.
- **Assessment** - How to assess the DBM in individuals and populations.
- **Interventions** - Interventions targeting the DBM.
- **Policy implications** - Policies addressing the DBM.

This report provides a general snapshot of each session based on the speakers’ presentations and the Q&A sessions. Readers are encouraged to consult the website with the recorded livestream and speakers’ presentations.

For more photos from the Symposium, click here:
Key messages from the opening ceremony

For the first time, the three UN agencies - IAEA, UNICEF and WHO – joined forces for a major multi-stakeholder event on tackling the DBM. All stakeholders recognised the threat that the DBM poses to the achievement of the Sustainable Development Goals (SDGs) if not tackled timely and appropriately.

Mr Aldo Malavasi, out-going Deputy Director General of the Nuclear Applications Department, IAEA highlighted in his welcoming address that the IAEA ‘plays an active part in helping the international community to achieve the 17 SDGs’ and that ‘this tri-agency partnership shows the commitment of UN agencies towards Member States to the UN Decade of Action on Nutrition’.

Mr Francesco Branca, WHO’s Director of the Nutrition for Health and Development Department explained that ‘nearly 1 in 3 persons globally suffer from at least one form of malnutrition and the coexistence of the different forms of malnutrition is the new normal and has a serious and lasting impact on people and puts a heavy weight on national economies’, ‘we must improve diets to end all forms of malnutrition’ and that ‘interventions are needed across the entire food system’. He highlighted that ‘the Nutrition Decade is our unprecedented opportunity to support the adaptation and tailoring of global solutions into context specific actions and investments’.

Mr Victor Aguayo, UNICEF’s Associate Director, Programme Division and Chief of Nutrition said that ‘the current reality of child malnutrition worldwide has three main features: the number of stunted children in the world is decreasing in all regions except in Africa, the number of overweight children increasing in all regions, including Africa, and the DBM is increasingly concentrated in poorer countries and poorer households. He also added that ‘the main driver of the DBM is the poor quality of children’s diets, from infancy and early childhood, through middle-childhood and adolescence’ and that ‘it is accurate to say that food systems are failing to provide millions of children with the diets they need to grow and develop to their full potential’.

Mr Clemens Auer from the Austrian Federal Ministry of Labour, Social Affairs, Health and Consumer Protection emphasized that ‘next to climate change, the food crisis is the largest humanitarian crisis we have’ and that ‘it is up to us to represent the interests of the people and tackle this food crisis and understand better the fragmentation of political responsibility and accountability’.

Ms May Abdel Wahab, Director of the IAEA’s Division of Human Health expressed the hope that the symposium ‘will enhance collaboration and increase synergies between WHO, UNICEF and IAEA nutrition activities in Member States’. ‘From IAEA’s perspective, this can be done through strengthening the use of isotope techniques for monitoring and evaluation of interventions.

Ms Cornelia Loechl, Head of the IAEA’s Nutrition and Health-Related Environmental Studies Section said that ‘isotope techniques are crucial in the assessment of the DBM by providing accurate objective data on body composition (fat and fat-free mass), breastfeeding patterns and energy expenditure amongst others’ and ‘that isotope techniques are a great step towards the practical assessment of the DBM’.
Motivation
To build a common understanding of the magnitude and drivers of the DBM, and to present different perspectives on what it takes to overcome it.

Key messages from the plenary
- Malnutrition in all its forms is the most important cause of disability adjusted life years (DALYs) lost globally and in every single country in the world. The risk of malnutrition increases with low socio-development index.

- The analysis of the drivers of this problem needs to take a broad and system-based approach. The food system is efficient in supplying people with food, but two dysfunctional feedback loops are at the root of many of the nutrition and health problems we face. First, the food system contributes to health problems i.e. undernutrition and obesity but these negative effects do not feed back into the food system. The other broken feedback loop relates to the damage the food system causes to the environment. It can be described as a synergy of epidemics that co-exist and influence one another. There is very little evidence on the costs of the DBM which are driven by increased risk of disease, lower educational attainment, reduced lifetime earnings (i.e. the costs of undernutrition) and by higher medical costs and productivity losses (overweight and obesity).

- There is currently a lack of evidence on what works, i.e. the effectiveness of interventions tackling the DBM. This makes conducting cost-effectiveness studies impossible hindered by the lack of harmonised methodology used to assess outcomes.

- There is evidence that some social safety net programs originally designed to tackle food insecurity and undernutrition have done (or are doing) harm by increasing the risk of overweight and obesity in the targeted individuals or in other, non-targeted household members. Programs and policies, therefore, need to be re-designed

- To ensure that they do no harm in the short term (i.e. by having unintended negative effects on targeted or non-targeted individuals) and in the long term (i.e. causing rapid weight gain in early life, which can increase future risks of overweight and obesity at adulthood). The potential of negative impacts from programs or policies targeting food insecurity or undernutrition is particularly severe in countries that are undergoing rapid urbanization and rises in income, and changes in diets characteristic of a nutrition transition.

- Double duty actions (i.e. actions that simultaneously address the problems of undernutrition and overweight/obesity and diet-related NCDs) and triple duty actions (which additionally include the objective of reducing environmental impact) are urgently needed.

- Possible platforms for designing and delivering double duty actions include social safety net programs, educational institutions, health services, and agricultural development programs and policies.

- Required actions to tackle the multiple burdens of malnutrition include reducing poverty, joining up the silos of undernutrition, obesity and NCDs, strengthening governance and international actions and coordination, increasing funding for nutrition, and creating new business models for the 21st century.
Motivation

To acknowledge the preconception period, particularly adolescent girls as a special entry point for interventions to prevent the DBM.

Key messages from the session

- The adolescent period presents a window of opportunity within the 1000+ days (peri- and pre-conceptional periods) to prevent the DBM. It is a key period to change behaviour.

- Addressing adolescent nutrition is key to a healthy reproductive life as nutrition pre-conceptionally affects foetal growth development and trajectories, metabolic dysregulation (lipid and glucose metabolism) and risk of developing NCDs later in life.

- Addressing youth as a key priority is reflected in many global strategies and recommended actions/guidance like the Global Strategy for Women’s, Children’s and Adolescents’ Health (2016-2030).

- Diet quality is not reflected in the SDGs. The Minimum Dietary Diversity Score for Women (MDD-W) represents a promising indicator to assess the impact of interventions. It is important to continue validating its use across diverse settings globally as an in-depth knowledge of local foods consumed is needed. The indicator has already been integrated in 10 national surveys and 21 impact assessments in different countries. And 30 additional countries plan to use it in the short term.

- Better evidence from implementation science is needed. It is important to understand where and how to reach adolescents and to implement healthy lifestyle behaviour change interventions pertinent to the neurological and social development of adolescents. Timing of interventions is also critical as well as understanding their dietary patterns i.e. spending less time eating with family, skipping breakfast or having low or inconsistent meal frequency etc.

- Multi-sectorial strategies including health system strengthening, community outreach programmes and modified school curricula are needed and offer opportunities for double-duty strategies. Many challenges remain and there is a need to identify entry points of opportunities to deliver sound nutrition interventions.

- Interventions to foster early-childhood development e.g. breastfeeding is equally important to reduce stunting and micronutrient deficiencies offer opportunities for triple-duty actions. Need to consider the 8,000 days concept (1,000 days + 7,000 days including childhood and adolescence) as part of interventions starting early in life, before conception and continuing until conception.
GAIN’s Executive Director and 2018 World Food Prize Laurate, Mr Lawrence Haddad gave a lecture on ‘Businesses: How to make them a smaller part of the nutrition problem and a bigger part of the solution’.

Businesses are big players in nutrition, and they are everywhere in the food system (production, quality, access, promotion)

Are businesses influenceable?

- Work with business outside the food system
- Support businesses involved in the food chain
- Influence the big food and beverage companies

We cannot address all forms of malnutrition without engaging businesses: new ways of working needed, new allies, and a new display of courage
Motivation
To discuss the implications of maternal nutrition for offspring's health and how antenatal interventions can make a difference.

Key messages from the session

- Maternal undernutrition impacts multiple pathways of children’s development, health and human capital, the latter starting early in life and translating into an average loss of adult income of 26% in their offspring. However, not only women are responsible for care but also families and government are equal partners in ensuring that human capital is fostered from young age.

- Body composition in pregnancy can predict increased risk of adverse outcomes. Future research is needed to understand better the predictors of body composition changes.

- Many methods are available (anthropometry and skinfold techniques, bio-electrical impedance, imaging and stable isotope techniques) but each have advantages and disadvantages. Validation of non-invasive field methods is required in all life stages. The week of gestation must be considered for the use of the stable isotope technique.

- Total Body Potassium is a nuclear technique with great potential to assess body composition in pregnancy and all life stages. Dietary potassium does not affect Total Body Potassium and the method has been validated against a 4-compartment model.

- When it comes to maternal interventions, the following 3 key areas are important:
  - Strengthening health systems: effective delivery, coverage and quality of nutrition interventions is essential to address both ends of the maternal nutritional spectrum - under and over nutrition.
  - Strengthening multisectoral coordination: policy coherence of different sectors to ensure synergistic actions towards multiple maternal nutrition challenges.
  - Strengthening community structures: community-based strategies to empower women, families and communities for optimal care during pregnancy.
Motivation
To review the benefits of breastfeeding, the assessment and actions promoting and supporting breastfeeding and to discuss the benefits of exclusive breastfeeding.

Key messages from the session

- Breastfeeding is considered an exquisitely personalised medicine at a critical moment. Widely cited knowledge of the benefits to infant (e.g. higher fat-free mass and protection against overweight and diabetes) and to mother (e.g. reduced risk of breast cancer and increased birth spacing) exist.

- The deuterium oxide dose-to-mother technique can be used to measure the amount of human milk consumed by breastfed infants and provides an estimate of water intake from sources other than human milk, and hence whether the infant is exclusively breastfed. Applications of the include: assessment of the quantity of human milk consumed and intake of nutrients or potentially toxic environmental contaminants during breastfeeding, and validation of exclusive breastfeeding (EBF) data collected from maternal recall.

- Breastfeeding is the single most effective intervention for reducing child mortality, but we fail to invest in it and measure it adequately. Limited data of EBF is available from high income countries because it is not measured, or not in a standard manner. There is also a failure to create a supportive environment for breastfeeding women and to protect science and policy.

- Collective responsibility is key to breastfeeding. Women need support from the government, workplace, community, family and the health system. Combined delivery platforms and interventions (e.g. health systems + community) work best for improving breastfeeding practices.

- The Baby-friendly Hospital Initiative (BFHI); BFHI – Ten Steps Updated (2018) has a large and positive impact on breastfeeding rates.

- The Global Breastfeeding Collective led by UNICEF and WHO advocates for smart investments in breastfeeding programmes and policies, and galvanizes support to increase breastfeeding rates.
Motivation

To review the influence of complementary feeding on long-term health, how healthy complementary feeding practices can be supported.

Key messages from the session

• Timeliness, quality, consistency and quantity of complementary foods are critical to the success of complementary feeding and to the prevention of the DBM.

• The evaluation of complementary feeding programmes needs improvement on both delivering interventions in the most effective way to promote complementary feeding and measuring the outcome of interventions e.g. to consider alternatives to using “stunting” as primary outcome.

• Bottleneck analysis is important in understanding underlying challenges to complementary feeding and is part of a process where solutions and strategies are identified to address the bottlenecks. The approach does not require huge investments – just the right stakeholders to engage in the analysis and to make recommendations. A bottleneck analysis in Ethiopia looking at the enabling environment and the supply and demand components indicated that food taboos, limited involvement of the fathers, limited availability of fruits & vegetables, poor knowledge and weak multi-sectoral engagements were some of the bottlenecks for a minimum dietary diversity in different settings. The results of the analysis helped to acknowledge that there is a problem, build consensus on the problems and solutions that were felt to be manageable by the stakeholders and inform the way forward in Ethiopia.

• How children are fed is just as important as what they are fed. Responsive care and care giving skills can positively influence early feeding experiences that shape future dietary habits. Intervention studies suggest that when responsive feeding is part of a complementary feeding package, improvements in dietary or nutrient intake are observed and, improvements in cognitive development are observed when combined with other interventions. There is a need for more evidence on the effect of responsive feeding and a standardised tool to measure responsive feeding.

• Food-assisted maternal and child health and nutrition programmes typically target food insecure households with children with linear growth retardation. The design and targeting of programs must embrace the problem of overweight/obesity and should include of all family members. Results from Guatemala indicate decreased stunting rates and simultaneously increased maternal body mass index. The use of micronutrient supplements during pregnancy instead of food rations in food secure areas, behavioural change communication to promote health micronutrient-dense diets, and cash should instead of food rations can be considered as alternative approaches in these types of programs.
HIGHLIGHTS: LEARNING LABS

5 daily learning labs gave participants the opportunity to try new technology and interact with the developers. Participants had also the chance to ask questions and get some hands-on experience with several assessment techniques and applications.

INDDEX 24
Presenting a new technology platform for improved dietary assessment in low- and middle-income countries https://inddex.nutrition.tufts.edu/.

AGILENT
Demonstrating how to measure deuterium enrichment in saliva using a portable Fourier Transform Infrared Spectrometer (FTIR 4500).

BODY SURFACE TRANSLATIONS
Presenting a device using 3D imaging technology to measure e.g. infant length and other anthropometrical measurements.

COSMED
Demonstrating how air displacement plethysmography works to measure body volume and estimate body composition using the BODPOD.

SELECT RESEARCH
Using 3D imaging technology to estimate body composition using the Body Volume Indicator (BVI) App for smartphones.

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2 See also disclaimer in the acknowledgements part of the report (p. 30)
Motivation

To summarize current understanding of the associations between undernutrition in early life and risk of overweight, obesity or NCDs in later life.

Key messages from the session

• The ‘metabolic capacity–load’ model is a conceptual approach to improve understanding of the aetiology of nutrition-related diseases, and their association with ecological and societal risk factors. Undernutrition in early life is associated with adult disease when overweight subsequently emerges. Severe undernutrition (stunting and wasting) in early childhood may constrain metabolic capacity and confer elevated susceptibility to NCDs in the long term when exposed to metabolic load (diet, physical inactivity, body weight). Low metabolic capacity combined with high metabolic load is associated with higher risk of NCDs.

• Nutritional programming means that maternal nutrition and metabolism can permanently alter the structure and function in a developing embryo, with metabolic consequences throughout life. C Yajnik presented data from a transgenerational prospective cohort study where historic cyclical undernutrition was linked to insulin secretion and sensitivity in next generations. It was concluded that undernutrition imprinted fat deposition when food became available. Such inter-generational mechanisms call for long term approaches to tackle the DBM. The study also showed that short and undernourished mothers gave birth to small and thin-fat babies. These babies are at high risk of diabetes and cardiovascular disease, especially if they experience a rapid growth during childhood and adolescence.

• Wasting and stunting are usually addressed as separate issues in research, policy and practice. However, wasted children who are also stunted have particularly high mortality risk. The presenter recommended that research studies and surveys should include concurrent wasting and stunting as a category of analysis (prevalence, risk factors, mortality). It was proposed that a combination of low weight-for-age z score (WAZ) and low mid-upper arm circumference (MUAC) could be considered as a tool to identify high risk children in nutrition programmes.

• Poor nutrition is most often a consequence of stresses imposed by the environment either directly (e.g. infections) or indirectly (e.g. social structures). Evidence indicates that a fully engaged public health system is the most cost-effective way to achieve greater population health. The use of data to establish the underlying principles that determine the relationships and how they might vary from one context to another is fundamental. Only when these basic structures are understood and acknowledged can the organization of the health system securely address the DBM at a manageable cost.

• Treatment of acute malnutrition should aim at making children survive and thrive. Two examples on short-term effects of acute malnutrition were presented, one from inpatient management of severe acute malnutrition (SAM) and one from outpatient management of moderate acute malnutrition (MAM).
• In a study in Uganda, it was local practice to give rice porridge to children with diarrhoea as part of inpatient management of SAM. However, an observational study revealed that although the diarrhoea might have improved, children who had received rice porridge had an increased risk of dying. Also, low serum concentration of phosphate was associated with mortality. Insufficient phosphorus content of the rice porridge, particularly if provided in the first few days of hospitalisation and refeeding was considered a possible explanation for the increased mortality.

• In a study on treatment of MAM in young children in Burkina Faso, body composition changes were assessed after 3 months treatment with different nutritional supplements. The supplements were either corn-soy-blends (CSB) or lipid-based nutrient supplements (LNS) with different levels of milk and soy protein. The study showed that the weight gain in young children treated for MAM consisted mainly of fat-free mass, and even more so in the LNS than the CSB. This study did not confirm short-term excessive fat accumulation during treatment of MAM, even with a high fat supplement. However, long-term effects were not observed.

• The focus of World Food Programme (WFP) is on adequate and healthy diets that meet nutrient needs with actions on reducing acute and chronic malnutrition and not only to avoid harm, but also reduce risk of overnutrition. WFP aims at doing double duty by applying four principles: Robust situation analysis, Focus on targeting, Diverse response options and Optimal use of Specialized Nutritious Foods.

• The session Chair concluded that
  – The capacity load model provides a novel framework to understand the relationship between early development and later NCD risk.
  – The burden of acute malnutrition remains dangerously high, our global nutrition community must be bold and innovative to address the persistent problem while also preparing children and communities to tackle emerging nutritional challenges.
On day 2 of the symposium, the IAEA launched the first comprehensive IAEA Doubly Labelled Database aiming at helping countries devise better health policies to combat a growing obesity epidemic worldwide. The DLW database contains human energy expenditure measurements from the last three decades collected using a stable isotope technique and it will help researchers look at the impact of growing sedentary lifestyles on energy needs, how energy demands change over the lifetime of a person, how these demands differ between sexes and ethnic backgrounds, and whether energy expenditure has declined over the time course of the obesity epidemic. Researchers and policy makers can access over 6,600 measurements from 23 countries collected using the DLW method between 1981 and 2017. The database currently contains measurements mostly from high-income countries, but is open for contributions from all countries that have collected DLW data. This nuclear technique uses water with the added stable isotopes deuterium and oxygen-18 to measure a person’s energy expenditure. After a person drinks a dose of DLW, he or she goes back to regular activities. Most commonly, urine samples are taken over a 10-14 day period and analyzed using IRMS. Through this, the rate of the isotopes which leave the body can be estimated. The elimination rates of these isotopes is used to calculate carbon dioxide production, which is related to energy expenditure.

For the presentation on the launch, click here: https://humanhealth.iaea.org/HHW/Nutrition/Symposium2018/presentations/speakman.pdf
DAY 3 – WEDNESDAY 12 DECEMBER
PLENARY SESSIONS

SESSION 9 OBESITY

JONATHAN WELLS, UCL Institute of Child Health
INGE HUYBRECHTS, IARC
STEWART TROST, Queensland University of Technology
JOHN SPEAKMAN, Chinese Academy of Sciences
PEGGY KONIZ-BOOHER, JSI
ANTONIOS PROESTAKIS, European Commission
YANNIS MANIOS, Harokopio University

Motivation
To present and discuss evidence on the effect of diet and physical (in)activity on growth and body composition and how to establish healthy sustainable activity habits in children.

Key messages from the session

- There are many markers to assess metabolic health – capacity and load which are both important to DBM can both be measured. Linear growth is associated with organ growth, and adult height is associated with organ size. Organ size and height are both measures of metabolic capacity. Body mass index (BMI) is useful to assess patterns of growth in early life but not ideal to measure the DBM as it provides no information on tissue masses or distribution. The deuterium dilution and various other techniques can be used to determine body composition, i.e. to divide body weight into fat mass (metabolic load) and fat free mass (metabolic capacity). Another limitation of the BMI is that the relationship between BMI and health risk differs between populations.

- Important factors to consider when assessing the magnitude of the DBM in individuals or tracking trends include height-adjusted body composition indices, central adiposity, organ phenotype, and functional markers such as grip strength. Integrating measures to build composite scores of metabolic loads (fat mass, central fat, physical inactivity, smoking, unhealthy diet) and metabolic capacity (birth weight, leg length, height, grip strength) should be considered.

- We need to accurately measure diet at the individual level to understand metabolic health, but it is challenging in both high- and low-income settings. Diet research needs an integrated approach that combines several methods as a way forward to leverage the advantages and eliminate the disadvantages of traditional methods e.g. records (diary), recall (24-hour recall, FFQ) and innovative methods e.g. wearable cameras. Factors to consider when choosing dietary exposure methods include: timeframe, age, budget, and main exposure variables.

- Indicators of physical activity (PA) are biomechanical (velocity, acceleration, force), physiological (heart rate) and behavioural (type, context and domain). PA categories are then linked to energy expenditure units. When measuring PA, context, variation, frequency, duration and type need to be considered.
Sedentary time has increased during the last 50-100 years. Technology and working conditions have resulted in a largely inactive daily life. Exercise reduces all-cause mortality, probably leads to increased longevity, and in addition, being sedentary has an independent negative impact on health biomarkers. Total energy expenditure can be measured in free-living individuals using the doubly labelled water (DLW) method. IAEA is hosting a database on data from published DLW studies to expand the use of these data. Total daily energy expenditure is a result of resting energy expenditure, dietary energy expenditure (thermic effect of food), and physical activity energy expenditure. Thus, care must be taken to apply adequate adjustments when total energy expenditure is compared over time and across studies.

To effectively tackle the DBM, nutrition counselling should be client focused, action orientated and change attitude or behaviour. Nutritional counsellors usually do not have adequate training and may not have access to resources despite having a high responsibility and their roles and responsibilities are often misunderstood. Investing in nutrition counsellors is necessary.

Two European Commission led network interventions for changing PA using social incentives show positive effects on obesity prevention via the notions of:

- ‘my behaviour affects others’ welfare while yours affect my welfare’
- ‘the more we bike together, the more points we get’

The ToyBox-study for preschool children (kindergarten-based, family-involved) and Feel4Diabetes-study (school-based, community-involved) are successful examples of health promotion and obesity prevention interventions in Europe. They showed that interventions led to significant positive changes on children’s screen time and PA level, consumption of water, fruits and vegetables, sweets and salty snacks and on parental behaviour including increases in physical activity and decreases in screen time and BMI. The influence of parents and siblings and even grandparents as role models of positive behaviours were of great significance! The ToyBox-study is scaling up in 2 countries in Americas, 1 in Africa, 2 in Asia, 4 in Europe and 1 in Oceania.
Motivation
To discuss the role of food systems to respond to the DBM, and to present examples of how the DBM can be effectively addressed through a systemic approach.

Key messages from the session

- Household food insecurity (HFI) touches all countries all over the world and is a risk factor for the DBM. HFI is associated to many poor health and wellbeing outcomes (including delayed early childhood development, stunting, overweight and obesity, NCDs, mental health, poor sleep) and it is associated with a significantly higher percentage of diabetes particularly among women. Longitudinal studies are urgently needed to assess the relation between HFI and health and investigate the multiple pathways (e.g., dietary and sleep behaviours, stress and depression) that explain causal relationships. In addition, studies looking into the relation between HFI and sedentary behaviour are needed.

- Food systems and sustainability are key to providing healthy diets and to addressing the DBM. Globally the issues are i) diets are not necessarily healthy (we are eating too much of the bad stuff and we are also not getting enough of the good stuff) ii) diets are not sustainable and iii) diets are transforming in inequitable ways from traditional rural diets to affluent Western diets).

- The presenter stated that ‘shifting diets at the national or global scale requires a constellation of different approaches and strategies, operating across scales and supply chains, and targeted at different people and organizations. Key actions that can make positive changes on the food system include: caring, committing to the SDGs (even though there is no specific diet indicator), institute policies with food system entry points, maximizing entry points and minimizing exit points for nutrition, consider options for keeping the food system within environmental limits/planetary constraints.

- Food systems need to focus on children’s diets and prioritise their needs. UNICEF jointly with GAIN and the Government of Netherlands launched a consultation on Food Systems for Children and Adolescents. The presentation focused on ‘Why are children 0-4 years not receiving the diets they need for optimal growth and development?’. Social norms, taboos and traditional practices, knowledge, experiences, convenience and time constraints of caregivers, and physical-environmental as well as commercial factors do not always align with behaviours that support healthy diets for children.

- In preparation of the consultation, ‘the food systems framework for children’ was developed with the main aim of ‘placing the children at the heart of a systematic dialogue on food systems’. The outcome of the consultation will be published soon.
SESSION 11 FOOD SYSTEMS – CONT.

• New-born Health and the DBM: health facilities are new-born infants’ first encounter with the “food system”. The Philippines’ “Unang Yakep” (First Embrace) is a unique country.

• Experience that started from evidence to policy and then to practice. The four core steps of the “Unang Yakep” (First Embrace): Immediate and thorough drying, early skin to skin contact, properly-timed cord clamping and non-separation of the new-born from the mother for early breastfeeding. Guidelines refer to the first 90 hours after birth up to hospital discharge. Scale up actions included building capacity of health workers which focused on behaviour change, and support from national insurance companies.

• Another example of a social protection scheme is the Chilean Law No. 20,606 on nutrition and composition of food and its advertising presented as an effective approach to deal with the issue of the DBM. The law focuses on advertising and was built on the model that the breastfed child is the gold standard. It aims to protect children from the influence of the advertising effect of harmful foods. Food manufacturers must declare fats, saturated fats, added sugar and salt/sodium. Educational establishments are required to include in their curriculum teaching on healthy eating and the school environment is required to promote health e.g. vendors are not allowed to sell unhealthy foods.

• Mexico has a high burden of NCDs and has highest mortality rate from diabetes – the annual estimated cost of the DBM in Mexico is around 29 million US dollars, the government only spends 21 million US dollars (2018) due to lack of resources. The ‘soda tax’ is a successful example: reduction of 7.6% in consumption of sugar sweetened beverages (5.1L/capita/year) from 2014-2015. More work is needed though in the school environment and in marketing/advertising especially as this occurs more so in low-income areas via gifts, incentives, discounts, cartoon and images i.e. aggressive marketing.

• Assessing food environments to monitor policy implementation: The International Network for Food and Obesity/NCD Research Monitoring and Action Support (INFORMAS) has a module structure which includes upstream focused monitoring tools to assess food environments and monitor progress in countries. 30 countries have utilised INFORMAS modules to date – a strong INFORMAS network exists internationally and more modules are low cost. One module example is the Healthy Food Environment Policy Index (Food-EPI) used to assess progress made by governments towards good practice. Following a scorecard assessment, data is fed into an expert consultation to create a set of priorities (reflecting international benchmarks/best practise examples) for the government. Processes are as important as outcome.

• City Mayors are aware that they can contribute to sustainable urban food systems as emphasized in Milan Urban Food Policy Pact and reflected in many networks e.g., C40cities and Global Parliament of Mayors. Based on the ‘Food Systems for An Urbanizing World’, 5 mandatory concepts were identified by City Mayors: (1) The local administrative bodies must assume ownership for the agri-food policies; (2) Re-think and boost the urban-rural relationship; (3) City councils must encourage and promote the creation of common spaces in which all stakeholders are able to interact; (4) Permanent campaigns must be developed to raise awareness amongst citizens about nutrition; (5) Big changes come from the bottom up. This requires a new concept of identity based on conscious nutrition that also means holistic, participative and healthy system of life.

• The Chair commented that the Chilean Law and the Mexican Soda Tax are powerful examples of how we can keep things simple and simplify the messages despite the complexity of the food systems and that governments across the different levels of authority could play an important role. An important role also has the civil society platform.
Iron deficiency is common in overweight (OW)/obesity (OB) partly explained by the diet.

The ongoing obesity epidemic may impair efforts to control iron deficiency, especially in developing and transition countries.

Stable isotope studies showed that OW/OB can worsen iron deficiency through an impairment of iron absorption, and greater catabolic losses of the nutrient, which can deplete iron concentrations.

Understanding epigenetics is crucial in preventing and managing malnutrition and diseases related to poor nutritional status.

Diet can alter epigenetic patterns e.g. through maternal nutrition (mother to foetus/infant) and dietary supplements.

Epigenetic biomarkers and better understanding of epigenetic processes related may contribute to personalised nutrition advice for prevention and management of malnutrition.

When undernourished, the microbiome is disrupted which leads to an impaired mucosal immune system and later, negatively effects the entire body, muscles and bone growth. An impaired microbiome results in dysbiosis, which also exists in an overweight person.

Altered gut microbiota in infant can also increase the risk of overweight. Several factors can alter the gut microbiota such as maternal health and microbiota, birth mode, antibiotic exposure, breast milk intake, probiotics and prebiotics.

Microbiome research (of the mother and the child) is important for the field of nutrition and malnutrition. Bacteria can save children’s lives.

IRON METABOLISM DEFINED USING STABLE ISOTOPES IN OBESITY

EPGENETICS

CHILD’S MICROBIOME
Exposure to food contaminants has profound public health implications in terms of adverse effects related to stunted growth, risk of overweight and obesity and cancers. Food contaminants occur in main staple foods such as maize, peanuts and lead to agricultural, economic loss.

Current methods to measure exposure are limited and existing biomarkers may not be readily measured in all settings. Due to heterogeneous distribution of the toxicants in food matrices, it is not easy to quantify so assessment is based on biomarkers such as aflatoxin albumin adducts.

Food-based interventions and a strong regulatory framework to ensure food safety, especially in smallholder farming settings may help in mitigating.

Contaminants co-occur but their synergistic or antagonistic effects on health indicators are yet to be fully understood.

Exposure to food contaminants is an important field for future research in the DBM.

Interventions only lead to 30% reduction in stunting. Compromised gut function related to living in poor sanitary conditions in resource limited settings presenting as environmental enteric dysfunction (EED) may partly explain why interventions are unexpectedly ineffective.

The presented study will investigate the occurrence of stunting and the relationship with EED in a rural Kenyan setting.

The novel stable isotope-based breath test 13C-Sucrose Breath Test will be used in diagnosing and classifying EED and relating it to linear growth trajectory.

Exposure to endocrine disrupting chemicals (EDCs) from food and environment can have health implications for child and mother.

A study with an in vitro model containing placenta cells exposed to some EDCs showed altered levels of hormones.

Some chemicals like (ZEN) and p,p’-DDT are found to increase the expression of the gene PHLDA2, which has been found to be associated with low birth weight and intrauterine growth restrictions.

More research is needed to better understand the link with the DBM.
Motivation
To discuss how to improve the translation of biological evidence into effective interventions and how to ensure programme relevance of new scientific evidence for maximized impact.

Key messages from the session
- Dialogue. Bridging biological evidence to effective programmes depends on a continuous two-way dialogue between science and implementation. Outcomes need to be defined in a way that makes sense to policy makers. The nutrition community cannot insist on other sectors buying into nutrition outcomes but should bridge by listening and defining sector relevant outcomes, e.g. poverty reduction for social protection sector, and access to healthy diets for agricultural sector.

- Action-inaction balance. Although we should not roll out large-scale programmes without adequate evidence for potential benefit, we cannot wait until we have the perfect evidence. Malnutrition will not wait, so inaction is unacceptable, and programmes must be initiated based on the best available evidence. We know a lot about what should work! At the same time, it is important not to forget what we don’t know and ignore the complexity in the name of moving forward.

- Many programmes fail because of poor implementation and low coverage. This calls for programme evaluation and implementation research. It calls for a higher awareness of the importance of context, food environment and a continuous monitoring of implementation failure and unintended effects while implementing.

- Tanzania experience from biology to implementation:
  - Moving nutrition from the Ministry of Health to a multiple sector action plan.
  - 12 sectors in Tanzania came together to define a common plan of action – were convinced by the evidence – speaking the language of the different sectors.
  - The case was made that inaction would have long term economic consequences – political leaders were convinced about potential financial savings of acting on nutrition.

- Implementation aspects needed to translate from biology to practice improving effectiveness of programmes:
  - Gathering evidence of biology through literature review (enough evidence already), gather information on global evidence of successful implementation of double duty actions (not so much available) and contextualize
  - Work multidimensional with local stakeholders, industry as well as local governments.
  - Try to understand the views of the beneficiaries on the DBM.
**IAEA Technical Cooperation (TC) Programme:** In the past 10 years, TC supported 30 national, 3 regional, and 1 interregional projects. Among these studies on vitamin A status in 10 countries and body composition in acute malnutrition in 6 countries.

**Epidemiology and landscape**
- Lowering of communicable diseases is giving way to increase in NCDs. Adolescent pregnancy, low birth weight, stunting (despite decrease in rates in many countries) are some of the concerns.
- NCDs have become a great concern with type 2 diabetes projected to be in Africa the largest, as opposed to other continents, in the next decade. Despite current lower rates of type 2 diabetes, surprisingly mortality due to diabetes in Africa is currently higher than in developed countries.
- Key underlying causes/drivers of DBM may differ by region but include inexpensive convenience foods, added sugars to diet and rapid demographic and nutrition transition.

**Programmatic experiences**
- Policies and measures to address the DBM are currently focussing on low impact interventions such as nutrition counselling.
- Lessons from two case studies in Kenya and South Africa: government leadership is key to promote and support implementation of high impact interventions such as the enforcement of the international code of marketing of breastmilk substitutes and the sugar tax.
- Universities and other partners such as NGOs and UN bodies should support governments with technical and legal expertise in building the evidence base and helping to translate it into policy, and in monitoring the interventions.
- Creating an enabling environment to making healthy choices.

**Recommendations and conclusions**
- Experience from South Africa shows that it is important not to wait for obesity and NCDs to become a full-blown crisis before taking action. We need to strengthen the evidence to support policy and programmes which includes better use of monitoring and evaluation data to inform programming.
- Relevant interventions for stunting reduction that can serve the double duty of preventing obesity should be leveraged; for example, universal access to clean drinking water would reduce consumption of sweetened beverages and breastfeeding prevents diarrhoea-related undernutrition as well as obesity.
- Shift very quickly towards a focus on high impact interventions such as regulations of food marketing and reformulation.
- WHO AFRO is developing a regional strategy to address the DBM and will facilitate the creation of a network of universities and researchers as an institutional resource to support sound nutrition policies in Africa.
Asia/Western Pacific: Maternal and child nutrition

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IAEA Technical Cooperation (TC) Programme: National TC projects in 6 countries and 2 regional projects on maternal and child health.

Epidemiology and landscape

- In the South-East Asia Region, maternal underweight and stunting is decreasing, but overweight is increasing. Programmes implemented in the region show some successes. However, health system gaps impede scale up and quality challenges remain.
- Trends in DBM among women in Western Pacific (18+ years): undernutrition is decreasing and overweight increasing rapidly. Almost all countries off track in meeting global goals with regards to addressing overweight/obesity and anaemia in pregnant women.
- Triple burden of malnutrition persists among pregnant and lactating women in the Philippines as per the national presenter.

Programmatic experiences

- Nutrition interventions are most often delivered through reproductive, maternal and child health programmes, but at national level, nutrition only remains vertically guided by WHO recommendations on antenatal care for a positive pregnancy experience.
- In most Western Pacific countries, interventions focus on children and women. Service delivery platforms include primary health care system & antenatal care, community-based programs. Lack of coordination, resources, access and inadequate monitoring remain challenges.
- Case study Philippines: interventions in the form of policies, plans, strategies and programs are in place, including the Philippine Plan of Action for Nutrition, 2017-2022. Existing policies and interventions need to be reviewed under an obesity lens to reduce potential negative impact.

Recommendations and conclusions

- Health system strengthening is essential to deliver double duty actions to improve nutrition. Countries need to systematically assess their health system delivery programmes for nutrition and align multiple system building blocks to address maternal malnutrition. Strengthening maternal nutrition data for policy and program is similarly important.
- Addressing the nutrition needs of adolescents could be an important step towards breaking the vicious cycle of intergenerational malnutrition.
- Strengthened monitoring and the use of the data for policy actions on maternal nutrition. Research and policy must learn from each other, and rich data sets are available which need to be utilised cross sectoral.
- Designing double duty actions for maternal nutrition and points of action at programmes level with a focus on how to implement programmes with quality.
- Developing protocols/guidance on managing excessive weight gain and weight gain range in Asian/Pacific countries.
Europe, Central Asia and the Eastern Mediterranean: Unhealthy diets and obesity

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IAEA Technical Cooperation (TC) Programme: First regional TC nutrition project including 10 active Member States.

Epidemiology and landscape
- Almost all countries in the region experience rising numbers of childhood and adult obesity.
- Central Asia is two-fold challenged, by high numbers of stunted children and at the same time rising numbers of overweight. Anemia is also still highly prevalent.
- In Norway, marketing of energy dense, highly processed foods and beverages to children is of major concern.

Programmatic experiences
- The Food and nutrition action plan (FNAP 2015-2020)/WHO EURO provides a policy framework to tackle unhealthy diets and prevent obesity.
- The Regional Framework on Obesity Prevention in the Eastern Mediterranean Region (EMRO) another regional tool in place to tackle the double burden.
- The Norwegian example of tackling marketing of unhealthy foods to children under 13 with a voluntary self-regulatory scheme shows the opportunities, but also some weaknesses. Learnings: there is not enough public awareness, no strong voices, future campaigns to have a confidential pre-judgment.
- The 'Regional Nutrition Capacity Development and Partnership Platform - Central Asia and Caucasus' another regional tool in place to tackle the DBM.

Recommendations and conclusions
- It is important to analyse the situation we want to change, to define indicators and set goals.
- Engagement with the private sector needs transparent rules on how collaboration is organised.
- Fortification of certain foods can help to reduce micronutrient deficiencies.
- Cross-sectorial and cross-border collaboration is vital to tackle factors like marketing of unhealthy foods to children successfully and to ensure a healthy diet for all.
IAEA Technical Cooperation (TC) Programme: Since 2007, 4 regional projects were supported, and currently national projects include Jamaica, Haiti, Guatemala and Dominican Republic.

Epidemiology and landscape
- Stunting, wasting, anaemia, overweight, obesity and NCDs are a current challenge, especially in women. Consumption of ultra-processed food is considered one of the main drivers. There is an increase in dietary energy availability in the Americas region and shift from undernutrition to overnutrition.
- The problem is not the lack of (healthy) available food but rather harmful trade and fiscal policies, and lack of appropriate distribution.
- Interventions addressing the first 1000 days are lagging.

Programmatic experiences
- A 5 year plan of action was put in place by PAHO in 2014 to halt the rise of the rapidly growing obesity epidemic in children and adolescents.
- The region’s strongest achievements are regarding school feeding programmes and initiatives creating family farming programmes.
- The Caribbean Public Health Agency, the Caribbean Region’s collective response to strengthening and reorienting health system approach provides policy packages and supports school-based behavioural interventions.
- Social protection schemes such as ‘Crece Contigo’ in Chile and ‘Bolsa Familia’ in Brazil have facilitated reductions in the DBM.
- Brazil is a protagonist in meeting the commitments of the UN Decade of Action on Nutrition (2016-2025); examples of this effort are the action networks in the Americas such as the Network on Food-Based Dietary Guidelines, based on the processing of foods and the Network on Reducing CVD through Dietary Salt Reduction in the Americas and Caribbean.
Recommendations and conclusions

- National surveillance is key, and IAEA could make a substantial contribution in supporting programme impact evaluation. PAHO’s coordination is critical.

- Many countries of the region, due to their small size with open economies, non-health promoting international trade policies, adverse impact of multi-national companies and hostile and highly vulnerable climatic conditions, are particularly at risk for developing the DBM. It was recognised that the DBM needs to be addressed through enactment of enabling policies and legislation for people who have been informed and empowered, and this is of particular relevance in improving coherence across food production, supply and consumption.

- Regional institutions, civil society and academic institutions are increasingly addressing the double burden but there is need for greater interagency and institutional collaboration, and greater application of a “Whole of society” in health to combat NCDs.

- Political will and leadership are required, encouraged by strong advocacy efforts, while mechanisms need to be found for motivating the food and beverage industry to contribute to what has been recognised as an issue of total societal concern requiring action by all.
Workshop 1: Developing a multi-dimensional index to monitor child growth, organised by the IUNS Task Force

**Aim:** To develop a strategy on how to move from the conceptual phase of a capability approach to child growth to an index that will be applicable in the evaluation of interventions targeted to combatting the DBM.

**Progress and challenges:** In the past five years, the International Union of Nutritional Sciences (IUNS) Task Force "Towards a multi-dimensional index of child growth" has developed a conceptual framework for a capability approach to child growth. Ethnographic research has given insight into parental and child capabilities of child growth in Tanzania and Bangladesh. Empirical analysis of a large database from India has been carried out to better understand the analytic challenges of applying the approach to population data. To move the work to the next level, it is essential to apply appropriate quantitative modelling techniques.

At the working group session, Professor Paul Anand described quantitative applications of the capability approach in studies of (child) wellbeing, and how these techniques extended to a capability approach to child growth.

Themes in the fruitful discussion following Professor Anand’s presentation included:

- The importance of obtaining data to examine the complex issue why people act differently in apparently similar circumstances.
- Guidelines to assist decisions concerning “the right strategy” and “the right intervention”.
- Directing special attention to the most vulnerable by addressing issues of empowerment and disempowerment.
- The essential importance of the views/perspectives of the people who are experiencing the situation.
- The value of the capability approach for assessing progress and barriers to progress on common national indicators.
- Providing a tool to help address the fundamental challenge of the “do no harm principle”.
- Concerning the utility of a multidimensional set of indicators, the working group's discussion stressed that it will have utility at local and regional levels as well as at the national level. Also, while the set of indicators is intended to be globally applicable, it will be necessary to choose from the set based on the local setting and the purpose.

**Future activities:**

- A publication plan includes the writing of a white paper to be posted on the IUNS website, as well as the preparation of other manuscripts, which will include (as appropriate to the topic) members of the Task Force and the working group participants.
- Empirical analysis of an existing "rich" dataset in order to derive easily understood charts and graphs that help to reveal barriers that constrain people from choosing growth promoting choices.
- Testing of the multi-dimensional index in several settings.
Workshop 2: Integrating stable isotope derived biomarkers into national surveillance systems to strengthen policy formulation and programming, organised by the IAEA

Context: Stable isotope techniques have been used over the past 5 decades, contributing to accurate measurement of nutritional indicators such as breast milk intake and exclusive breastfeeding, body composition, total energy expenditure, bioavailability and absorption of essential minerals (iron, zinc), and vitamin A body pool size as a measure of vitamin A status. The IAEA’s sub-programme on nutrition enhances Member State capacity to use stable isotope techniques to develop and evaluate nutrition actions to combat all forms of malnutrition.

Information generated using these techniques has been used by policy makers in a number of countries to design and evaluate national programmes on prevention and control of obesity (e.g. Seychelles, Chile), food fortification (e.g. Botswana, Haiti, Thailand, Morocco) and infant and young child feeding practices (e.g. Guatemala). Demographic and Health Surveys (DHS) are nationally-representative household surveys that provide data for a wide range of indicators in the areas of demographics, health, and nutrition. The STEPWise approach to Surveillance (STEPS) introduced by the WHO, is an ideal tool to assess the country-level prevalence of NCDs and risk factors. Micronutrient Surveys are a third example of a nutrition survey.

Opportunities: Potential stable isotope technique-derived indicators include body composition, breast milk intake, exclusive breastfeeding and vitamin A body pool size. Integration of such indicators in national surveys could provide accurate situation assessments on the DBM by measuring adiposity (body fat) and lean mass simultaneously, breastfeeding practices, and vitamin A status.

This understanding can inform better planning and design of preventive and mitigating interventions and support monitoring and evaluation of interventions, programs and policy changes to combat all forms of malnutrition. Studies involving stable isotopes follow the same procedural steps involved in national surveys with due consideration for ethical practice.

Objective: This Working Group kickstarted discussions among a diverse group of stakeholders on how stable isotope derived biomarkers may be integrated into national surveillance systems for enhanced strategic programming, planning and policy making, and strengthening country capacity to meet international commitments in the framework of the SDGs.

Way forward:

- The first step will be to use stable isotopes to validate tools with potential for wide scale up in population surveys. e.g. deuterium dilution can be used to validate bioelectrical impedance (BIA) for body composition in a DHS sub-sample; the validated BIA is then scaled-up in subsequent surveys.

- One key area to pay attention to is on the rigour of training needed to do relatively larger sample sizes than what stable isotope studies usually involve.

- Immediate opportunities for testing this approach will be Tanzania and Lesotho which have DHSs coming in 2020. Argentina is also currently running a survey and is keen to do a pilot in subsequent surveys.

- Another potential opportunity is to validate a short breast milk intake protocol based on deuterium-dose to the mother method (DTM) under development with the standard 14-day DTM protocol currently used by many IAEA member states.

- Key stakeholders will include the local bureau of statistics and others.
Workshop 3: Harnessing public and private sector engagement for improved nutrition (in all forms), organised by Sight and Life

Progress: There is a growing recognition that complex and multi-dimensional issues such as the DBM need cross-sectoral and holistic approaches, pooling together the resources, knowledge and expertise of different stakeholders. Private-sector engagement (PPE) is increasingly viewed as essential to creating change in the food supply or the global food environment and international agencies have repeatedly called for increased engagement with the private sector to address the DBM in LMIC. In fact, SDG17, encourages “the global partnership for sustainable development, complemented by the use of multi-stakeholder partnerships” as a means of implementation of the 2030 Agenda. It also invites states and other stakeholders to “encourage and promote effective public, public-private and civil society partnerships” that “mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the SDGs in all countries, in particular developing countries”.

Challenges: Yet, PPE remains difficult due to a lack of trust between both government and other stakeholders and the private sector, potential conflicts of interest, possible conflicts of interest, different goals, objectives, working culture, and timeline expectations. Further investigation shows that there are very few independent rigorous assessments of the impact of private-sector engagement on improved nutritional status. There is an urgent need for improved dialogue between government and the private sector including an approach for the prevention and management of conflicts of interest, as PPE has the potential to include multiple perspectives and resources to address complex food and nutrition issues such as the double burden of malnutrition. The question remains, how do we harness public-private partnerships to improve nutrition outcomes?

Way Forward:

We need a framework for how PPEs work that could include the following elements:

- An online register of PPEs to enhance the transparency and knowledge sharing. It is important to note that simple registration will have limited value added without clear guidance on the adequate level of information to be reported. Partnerships should disclose appropriate information on goals and commitments, members and their contributions, and financial arrangements.

- A curated online hub that would look to (1) increase the impact of PPEs through effective monitoring, evaluation and experience sharing and (2) integrate the different forms of knowledge and explore further areas of research on PPEs to finance and improve PPEs. At present, it is difficult to find detailed and publicly available information on existing PPEs. A great part of the available data is self-reported with no guarantee of independent verification. We need to better understand and share knowledge on current partnerships and alliances that exist. What are the success factors and what are the challenges and learnings to support further effective partnering for nutrition? This knowledge should be shared and curated with the aim of establishing a research agenda that will enable us to measure the impact of these alliances and partnerships on nutrition outcomes.

- Further research could use the readily available criteria on what makes PPEs work, to develop innovative methodologies and metrics to assess the short- and long-term impacts of PPEs on food security and nutrition. For instance, the Committee on World Food Security (CFS) Multi-stakeholder Partnerships report could be used as a framework for data collection on PPEs and to develop metrics around transparency, accountability, trust, the partnering process and on when and how to engage, etc.

A blog from the session will be prepared to disseminate more detailed working group outcomes and stimulate discussions.
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Disclaimer: The contributions have been used to support the IAEA’s International Symposium on Understanding the Double Burden of Malnutrition for Effective Interventions to assist participants with low financial resources to attend the symposium. Contributions were also used to fund invited speakers and hospitality. The fact that the IAEA has provided facilities for commercial entities to exhibit their products and services on the margins of the Symposium did not imply any formal association between the exhibitors and IAEA or UNICEF or WHO nor did it in any way represent an endorsement of the products and services of such exhibitors.
ANNEX 1: SYMPOSIUM STATISTICS

- 15 sessions
- 15 learning labs
- 40 oral abstract presentations
- 65 speakers
- 164 posters
- 70 presentations

- 89 member states, 2 non-member states
- 463 Participants and Observers
- 21 Organisations

- 63% female, 37% male
ANNEX 2. FURTHER INFORMATION

Symposium

- Programme
- Book of abstracts
- Homepage
- Video streams, photos and presentations

The symposium proceedings will be published under the ‘Symposium Materials’ section. More information on the nuclear techniques in nutrition can be found at the Human Health Campus webpage.