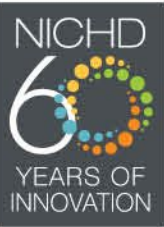




# Conference Highlights



## Double Burden of Malnutrition (DBM)

- Today our first keynote speaker, Dr. Barry Popkin, provided his classical definition of the double burden of malnutrition (DBM) — namely the linkage of stunting or low weight for age and obesity at the country level.
- In Low- and Middle-income Countries (LMIC's), undernutrition is declining while overweight is increasing much more rapidly.
- However, stunting is highly prevalent, so increases in overweight prevalence (20% or more in all countries) are leading to high DBM levels.
- Research has found that of 126 LMICs, 38% face a DBM prevalence that is described as very high or severe.
- The DBM is shifting toward countries in the poorest income quartile, i.e., in South and Southeast Asia and sub-Saharan Africa, with increased risk for noncommunicable diseases (NCDs)





## Triple Burden of Malnutrition

- We then heard our second keynote speaker, Dr. Elaine Borghi, discuss the triple burden of malnutrition which includes measures of micronutrient malnutrition.
- Dr. Borghi reported that the coexistence of multiple forms of malnutrition is the new normal, i.e., low birth weight, stunting, wasting in children, overweight in children, anemia in women of reproductive age, inadequate breastmilk
- With regard to 2030 global nutrition targets, progress has been made only for exclusive breastfeeding and child stunting
- In LMIC's, undernutrition is declining while overweight is increasing in children and adolescents and patterns vary by sex





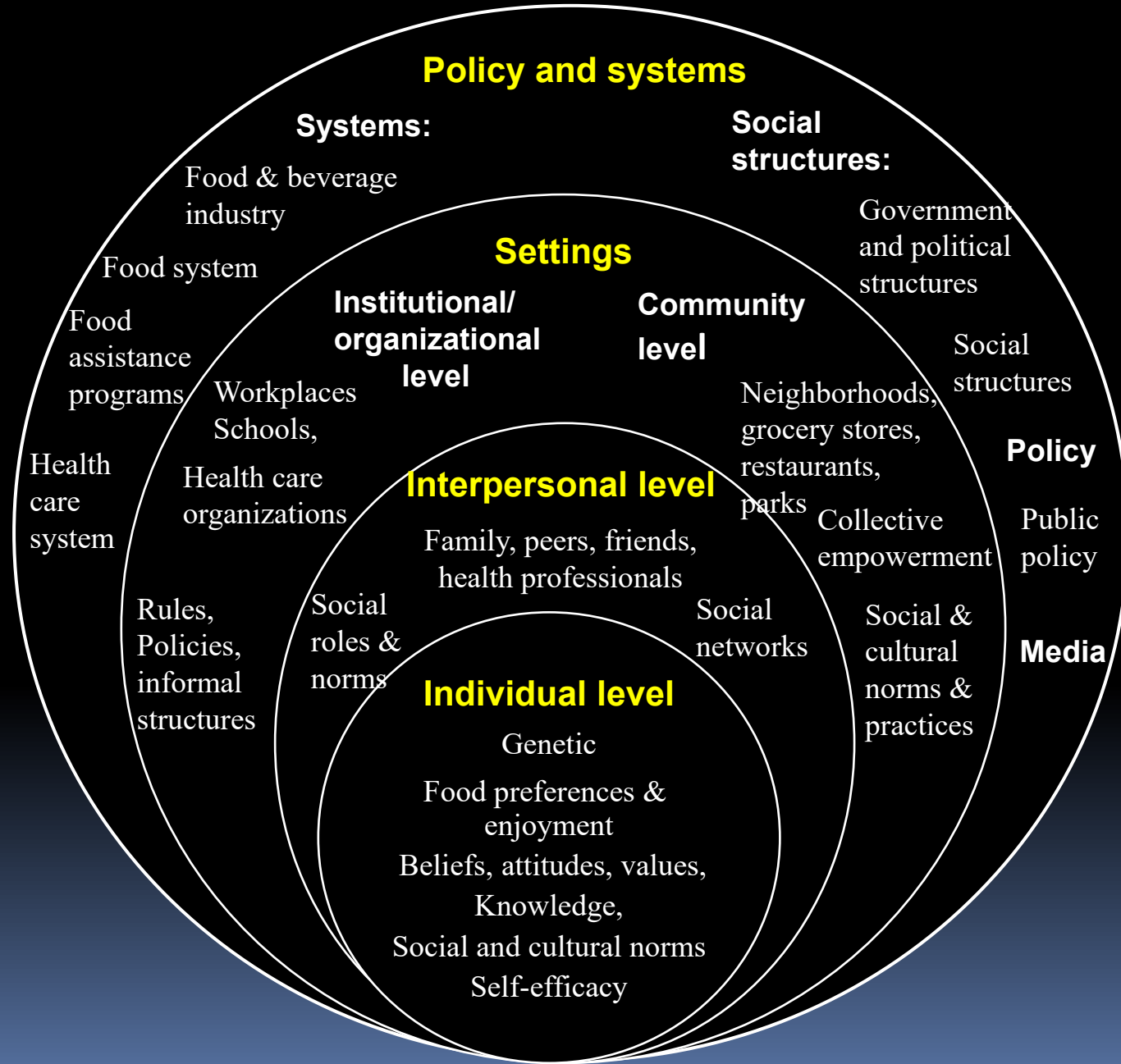
## **Socio-ecological Model and Double Burden of Malnutrition**

Dr. Trias Mahmudiono provided an overview of the Socio-ecological Model and the Double Burden of Malnutrition with a spotlight on the status of the DBM in Indonesia.

- Individual level:
  - Central adiposity and anemia
- Household level:
  - Stunted Children and Overweight Mother/SCOWT
  - Stunted Children and Overweight Mother/SCOM
  - Maternal Child Double Burden/MCDB
- Population/Country level:
  - Stunting, Underweight, Overweight and Obesity among children
  - Underweight, Overweight and Obesity among women



# Socio-Ecological Model





## Multiple Burden of Malnutrition

- Dr. Nancy Krebs referred to the Multiple Burden of Malnutrition which includes “programming” during the “First 1000 days” that sets the stage & informs the origins of risk for each life-cycle stage which gives clues to intervention points
- The NICHD Global Network – Preconception Nutrition Trial in 4 countries – at Guatemala site, pregnant women provided with lipid-based micronutrient supplement, key research findings:
  - Increases in birth length found during preconception & early prenatal period
  - Decreased stunting at birth, lower rates of LBW, lower rates of SGA
  - Adequate gestational weight gain led to higher birth length & weight
- Association of Average Daily Maximum Temps by Trimester w/ OB & Fetal Outcomes
  - Effects of heat exposure on obstetric & fetal outcomes differ by trimester
  - In India: Anemia of pregnancy directly associated with exposure to air pollution





## Multiple Burden of Malnutrition

- In line with Double Burden of Malnutrition perspective, maternal body mass index & education was found to have positive association with infant's length for age & lower stunting
- Women First Trial in 4 countries found neurodevelopment assessed at 24 months - 4 variables associated with all domains: maternal education, change in length for age 6-24 months, birth weight greater than 2500 g, and opportunities for learning.
- Next steps:
  - Invest in longitudinal cohorts in LMIC to identify critical periods and conditions that drive development of DBM
  - Apply multiple data sets to refine links of exposures & outcome
  - Think holistically & multi-sectorally: Biomedical and socioenvironmental





## Maternal Dietary Factors and Early Child Growth in Tanzania

- Dr. Isabel Madzorera reported on a study in Tanzania that examined low maternal dietary diversity and quality and found these may be modifiable risk factors related to adverse birth outcomes.
  - Maternal diet quality was found to be inversely associated with preterm birth, low birth weight (LBW), and fetal loss.
  - Dietary diversity was found to be inversely associated with small for gestational age (SGA).
  - LBW and SGA were important predictors of child anthropometric growth (stunting, wasting and underweight)
  - Micronutrient adequacy/diet quality associated with a significantly lower risk of underweight in infants
  - No significant associations between micronutrient adequacy/diet quality and stunting or wasting in infants
  - Conclude poor dietary diversity and diet quality should both be considered as important risk factors for poor birth outcomes; may be important for early child growth







## Dietary Intake and Quality for Adolescents in sub-Saharan Africa

Dr. Isabel Madzorera described her research on dietary intake and quality among adolescents in sub-Saharan Africa.

- She found evidence of poor-quality adolescent diets and gender and age differences in the consumption of healthy diets.
  - Low: Consumption of vegetables, fruit, nuts and seeds, eggs, fish and poultry
  - Higher: Consumption of refined grains
  - Adolescent boys consumed unhealthy foods less frequently but consumed fewer cruciferous vegetables and deep orange tubers.
- Factors associated with adolescent diet quality
  - maternal unemployment
  - physical activity
    - adolescents reported physical activity on 2 ( $\pm$ 2) days/week.
- Poor quality diets providing insufficient fruits, vegetables and animal source foods (ASFs) and increasing consumption of unhealthy foods may be exposing African adolescents to the double burden of malnutrition.







## Global Syndemic of Obesity, Undernutrition, and Climate Change

Dr. William Dietz described that syndemics are clusters of diseases within a population

- Includes adverse disease-promoting interactions at both biological and biosocial levels
- Large scale social forces that precipitate disease clustering in the first place, often with a disparate impact on marginalized populations
- Structural racism impacts destination accessibility, employment distribution, neighborhood design; car culture; cheap fuel supported by fossil fuel lobby and subsidies; increased exposure to pollutants in low-income communities
- Reduce poverty and inequities to reduce the impact of the Global Syndemic on the most vulnerable populations





## Double-duty Actions to Address the Double Burden of Malnutrition

Dr. Corinna Hawkes defined double-duty interventions, programs, and policies that simultaneously prevent or reduce the risk of both nutritional deficiencies leading to underweight, wasting, stunting and/or micronutrient deficiencies, and problems of obesity/diet-related non-communicable diseases

- Need for analyses of the association between consuming foods, snacks, drinks high in energy, sugars, fat, and salt and obesity and DR-NCDs and undernutrition
- Examine interventions focused on undernutrition during early life (e.g. ready-to-use therapeutic foods, follow-on formula) for longer-term effects on obesity and DR-NCD outcomes
- Analyze the role of food environments and the impact of food environment policies (typically obesity focused) on different forms of malnutrition
- Assess the feasibility, cost and staff workload of double-duty actions
- Pilot test and evaluate double duty actions





## Adolescents' Perceptions of Healthy Nutrition and Eating Habits

Dr. Namukolo Covic described nutrition research with adolescents in several African countries including Ethiopia, Ghana, and South Africa

- A consistent trend was observed that adolescents were often aware of elements of a healthy diet but despite this knowledge still chose unhealthy food options.
- In the South African study, adolescents who helped with food tasks at home were at higher risk of excess energy consumption and participating in less exercise, and consequently more likely to become affected by overweight and obesity.





## Adolescents Perceptions of Nutrition and Food Security

Dr. Rafael Pérez-Escamilla described key finds from a study of adolescents from 18 countries and 5 world regions, it was found:

- Both male and female participants understood the importance of healthy eating and nutrition for their own health
- Adolescents in several countries reported most of the foods they had consumed in the previous 24 hours were ultra-processed - especially in Australia, Guatemala, Mexico, Serbia & USA
- Sources of influence for food choices - family, social media and the internet, television and radio, friends, branding and advertising, body image, taste of foods
- Structural barriers for healthy eating - financial constraints, food environments at home, school and in the community
- Solutions proposed by adolescents - Address food insecurity, easier access to unhealthy foods and limited nutritional knowledge
- Action plans to improve their food choices by bringing their communities together, and where adolescents are key actors in designing the solutions.





## **Global School Feeding Programs**

Dr. Maureen Black reported that the UN World Food Program (WFP) was established in 1961 with the first school feeding program in Togo

- Research indicates 50% of school-age children (388 million) receive school meals daily in at least 161 countries in 2020.
- A meta-analysis of school feeding programs in LMICs in 2020 examining 57 studies, found children aged 6-15 years who participated in school feeding programs had beneficial increases in weight, height, and school attendance
- As part of a systematic review (2021) of Universal School Meals in OECD Countries with 47 studies (25 USA and 22 other OECD countries) - Positive associations were found with attendance, diet quality, food security, and academic performance
- Conclusion: Expand access to universal meals, especially for schools in vulnerable circumstances (extreme poverty, conflict areas) & align school meals with nutritional guidelines





## **School-based Nutrition Interventions for Adolescents**

Dr. Sachin Shinde discussed research findings related to important components related to effective school-based adolescent nutrition interventions:

- Not only focusing on education and skills building but investing in multifaceted and integrated interventions (e.g., Health Promoting Schools and Nutrition Friendly School Initiatives)
- Emphasizing environmental exposures and syndemic nexus of risk factors, pathways, and protective factors
- Resonating with adolescents' values and social context
- Harnessing food environments, autonomy, and peer approval and norms
- Involving family members and wider community







## **Africa Research, Implementation Science and Education (ARISE) Network**

Dr. Sachin Shinde described the ARISE Network which was launched in 2014 to advance collaborative education and research activities in Africa

- The Community-based Adolescent Health Study was conducted through the ARISE Network - A cross-sectional community-based survey of 8,075 adolescents aged 10–19 in 9 communities in 7 countries, key findings:
  - Males more likely to be underweight and stunted than females
  - Females more likely to be overweight and/or obese and anemic than males
  - Inadequate fruit and vegetable consumption
  - High consumption of whole grains and vegetable oils
  - High consumption of soft drinks and processed food items
  - Low prevalence of at least 1 hour of physical activity per day
  - Females less likely to exercise for 1 hour or more per day







## Thin - Fat Indian Concept

- Dr. Chittaranjan Yajnik describes the Thin-Fat Indian concept for which two individuals can share nearly identical body mass index (BMI), but dual X-ray absorptiometry imagery may indicate significant differences in percentage body fat.
- This is a useful reminder of the limitations of BMI as a measure of adiposity across populations. It's important to understand that the word "fat" refers to "body fat percentage" and not the conventional lay person's image of an individual large in appearance due to overweight or obesity.
- Thin-Fat' and 'Short-Fat' individuals are at higher risk of glucose intolerance. Having "thin and short" stature suggests a failure to achieve growth potential, while being 'fat' suggests an overdevelopment of adipose tissue.
- In other words, being thin or short but having high body fat percent represents a double burden of malnutrition which increases risk of diabetes.





## Pune Maternal Nutrition Study

- Dr. Chittaranjan Yajnik reported on recent research results of the Pune Maternal Nutrition Study (PMNS) which is a 25 year old longitudinal study in Pune, India which is examining the determinants of fetal growth and body composition and the life course evolution of phenotypes.
- A child's growth and development is studied beginning with the mother's preconception health prior to pregnancy, during intrauterine development, at birth, and every six months postnatally. At ages 6, 12, 18, and 24 years more detailed studies are done.
- This longitudinal preconception cohort was set up with Dr. David Barker who developed the famous "Barker Hypothesis." The PMNS study has had a remarkable 90% participation and follow up rate over 25 years.





## **Results from the Pune Maternal Nutrition Study (PMNS) include:**

- General trends show that there is a progressive reduction in underweight in the mothers and fathers over the period of 24 year follow up.
- A substantial number of children remain undernourished from birth to 18 years, but their percentage of underweight begins to drop after 18 years of age and through adulthood (i.e., individuals who were underweight as children begin to gain weight at age 18 and throughout adulthood).
- The research results found children tended to grow taller than their parents, and stunting is less likely to be experienced by the children than had been experienced by their parents.
- Both mothers and fathers in the study exhibited increasing levels of overweight and obesity beginning at middle age.
- Recent results show that children at earlier ages are exhibiting overweight and obesity at increasing levels, with a higher rate for boys than girls.





## The Chilean Food Labelling Law

- Dr. Camila Corvalán discussed how the Country of Chile implemented a set of policies to promote healthier food environments.
- The Chilean Food Labelling Law includes the use of a warning label on the packages of unhealthy foods, extended food marketing restrictions of unhealthy foods to children and the promotion of healthier school environments.
- At the dietary intake level, both school age children and adolescents were found to have a reduction in the consumption of sugars and sodium but no differences in saturated fats.





## The Chilean Food Labelling Law

- In terms of marketing, there was an important decrease in the use of marketing strategies directed to children for unhealthy foods, although it did not disappear 100%.
- In schools, the sale of unhealthy foods almost disappeared or was very infrequent.
- Chile also participated in the International Food Policy Survey which compared more than 10,000 youth from 7 countries and found that Chilean children were found to consume the least amount of unhealthy foods while having the highest consumption of fruits and vegetables.





## Trends in food systems in LMICs:

- Dr. Reardon recommends working on increasing the consumption and supply of horticultural, dairy, fish, and poultry products in LMICs.
- He reported that the consumption and supply of these types of food is rising in LMICs, with already existing markets/supply chains for these products.
- This growth is not based on NGO, donor, or direct government “interventions” but rather the rapid growth of private sector supply chains for these products (mainly based on small enterprises but not all), technology change (such as for packaging), wholesale market development, and local and very active demand for these products not just by middle class but also by lower income consumers.







## Trends in food systems in LMICs:

- Dr. Reardon recommends public investment and good policies that further the growth of healthy food products and to increase the efficiency of these mostly indigenous and local supply chains that feed low-income families including children and adolescents.
- Research evidence supports how extremely important domestic markets already are in LMICs for consumption of these products.
- This overturns the idea that there are missing markets and unstarted supply chains and a lack of sources for these products for people living in poverty. These food products just need to be further encouraged and supported by building new roads and wholesale market improvements to move the products better.







## Lack of dietary data in many countries

- Dr. Edward Frongillo reported simultaneously addressing under- and over-nutrition requires
  - In-depth understanding of children and adolescents being targeted to know root causes, needs, and what actions could work sustainably
  - Careful formative research, design, implementation, and evaluation of proposed actions
- In contrast to undernutrition, societal and policy stakeholder framing and consensus about nutrition-related noncommunicable diseases nascent in most countries
- Lack of data (and data systems) on diets (and physical activity) of school-age children and adolescents and what actions work





## Applying Implementation Science and Knowledge Brokering to Accelerate Progress

- Dr. Isabelle Michaud-Létourneau described the Implementation Science System with key take away points being:
  - It is important to mobilize existing knowledge, frameworks and tools to address implementation bottlenecks whenever possible
  - Whenever research is needed, use methods with the level of rigor, practicality and timeliness appropriate to the decision context
  - Collaboratively identify research topics based on priority implementation challenges and bottlenecks
  - Facilitate formal and informal interaction, knowledge exchange, and collaboration between researchers and program/policy actors in an ongoing manner
  - Knowledge brokering (individual or team) can facilitate all processes to strengthen implementation and lead to impact.





## Fostering information systems and networks to support LMIC decision makers

- Dr. Rebecca Heidkamp emphasized the importance of data for decision making:
  - The 2014 Global Nutrition Report highlighted, “Nutrition needs a data revolution. Of the many information gaps the ones most needed to be filled are those that constrain priority action and impede accountability.”
  - Periodic & routine data available in LMICs include population-based surveys and administrative data.
  - The limited data available on nutrition of school-age children and adolescents are neither standardized nor comparable.
  - Ongoing global metrics development underway by School Meals Coalition, WHO Life Course Quality of Care Metrics Coordination Working Group, Healthy Diets Monitoring Initiative, and WHO-UNICEF Technical Expert Advisory Group on Nutrition Monitoring.





## USAID Nutrition-related Activities

- Dr. Lindy Fenlason described USAID priorities for improving malnutrition among children and adolescents, these include:
  - Increase access to and consumption of affordable, safe, and nutritious foods, particularly in the critical first 1000 days from pregnancy through a child's second birthday, including quality nutrition counseling
  - Strengthen community and facility-level health systems to deliver high-quality nutrition services
  - Improve access to quality nutrition services in humanitarian response settings
  - Facilitate an enabling environment that supports sustainable food and health systems, such as improving access to diverse markets and strengthening capacity of health workers and systems.





## World Food Programme - School Feeding Division

- Ms. Carmen Burbano de Lara described priorities for global school feeding programs, these include:
  - Emphasized the importance of promoting health, well-being and education throughout the first 8,000 days of life.
  - In January 2020, before the COVID-19 pandemic, schools globally had an unprecedented reach of 388 million children world-wide receiving school meals
  - However, by April 2020 school closures deprived children of education and school meals, and increased the awareness of schools as a platform for health service delivery
  - School closures affected both the education and wellbeing of the learner
  - The School Meals Coalition is addressing the double burden of malnutrition within the school setting.





## New Partnership for Africa's Development - Food and Nutrition Security Division

- Ms. Boitshepo Bibi Giyose described priorities for addressing malnutrition in African countries, these include:
  - Globally, 124 countries experience high levels of at least two forms of malnutrition (i.e., overweight, anemia, stunting)
  - 30 of 41 countries that experience high levels of at least three forms of malnutrition (i.e., overweight, anemia, stunting) are found in Africa.
  - Need to invest in appropriate and context specific research that is targeted to address the local nutrition problems – e.g. the domestication and nutrient analysis of traditional, indigenous and neglected underutilized foods (in addition to exotics)





## New Partnership for Africa's Development - Food and Nutrition Security Division

- Ensure a multisectoral integrated approach and coordination from research, to pedagogy, policy, programme design and implementation
- Invest and increase national budgets in early childhood and development for better health and nutrition – from public, private and innovative financing
- Educate consumers esp. children to create a demand driven culture for nutrient dense products – plant, aqua, livestock, wild, etc. for healthier diets and obesity prevention
- Understand the links between climate change, soil health, food production, healthy diets and nutrition, using the school environments as a spring board.







## UNICEF Childhood & Adolescent Prevention & Reduction Programs in Mexico

- Mr. Mauro Brero described an UNICEF investment case that aimed to:
  - Measure the costs of childhood obesity in terms of health (DALY) and economy (health care costs, wages and productivity loss, years of life lost)
  - Measure the economic and health costs and benefits of implementing five priority interventions:
    1. Breastfeeding promotion
    2. Fiscal interventions
    3. Strengthening the restrictions on marketing unhealthy foods to children
    4. Social marketing in schools
    5. Strengthening school-based interventions





## UNICEF Childhood & Adolescent Prevention & Reduction Programs in Mexico

Key findings from the UNICEF investment case:

- The study indicates that the health and economic impacts of childhood overweight and obesity are substantial.
- The combined implementation of the five interventions analyzed would be highly cost-effective in all time horizons.
- Although several measures have already been implemented, it is necessary to strengthen their design and scale-up to increase their impact.
- This investment would constitute a solid and coherent public policy response to the national challenge posed by the increase in the rates of child and adolescent overweight in Mexico.





## UNICEF Childhood & Adolescent Prevention & Reduction Programs in Mexico

In México, the Government with Support from UN, the Academia and Civil Society has recently made important progress:

- Marketing regulations: publication of a strengthen version of the General Health Law's Marketing regulation
- School-based interventions: ongoing reform of the general education law and national guidelines on school food environments
- Social marketing in schools: Implementation of Vida Saludable
- Promotion of Breastfeeding: first 1000 days national strategy





## Nutrition Research supported by the Bill and Melinda Gates Foundation (BMGF)

Dr. Jian Yan reported on the BMGF commitment of \$922 million dollars over 5 years to advance global nutrition to help women and children.

- Cross-foundation approach to investing in nutrition:
  - Nutritious Food Systems
  - Large-Scale Food Fortification
  - Maternal, Infant, and Young Child Nutrition
  - Discovery of Nutrition, Knowledge, Products, & Interventions
- Recent expansion of nutrition research to address discovery and R&D work with focus on women of reproductive age and adolescent girls and THRIVE neurodevelopment research.





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  - Discovery of Nutrition, Knowledge, Products, & Interventions



**Thank you!**

**Now we will transition to the Question-and-Answer session with all of speakers.**

