Contribution of animal-source foods to healthy diets for improved nutrition

Addressing undernutrition through nutrient dense meat and other animal-source foods

16 NOVEMBER 2021

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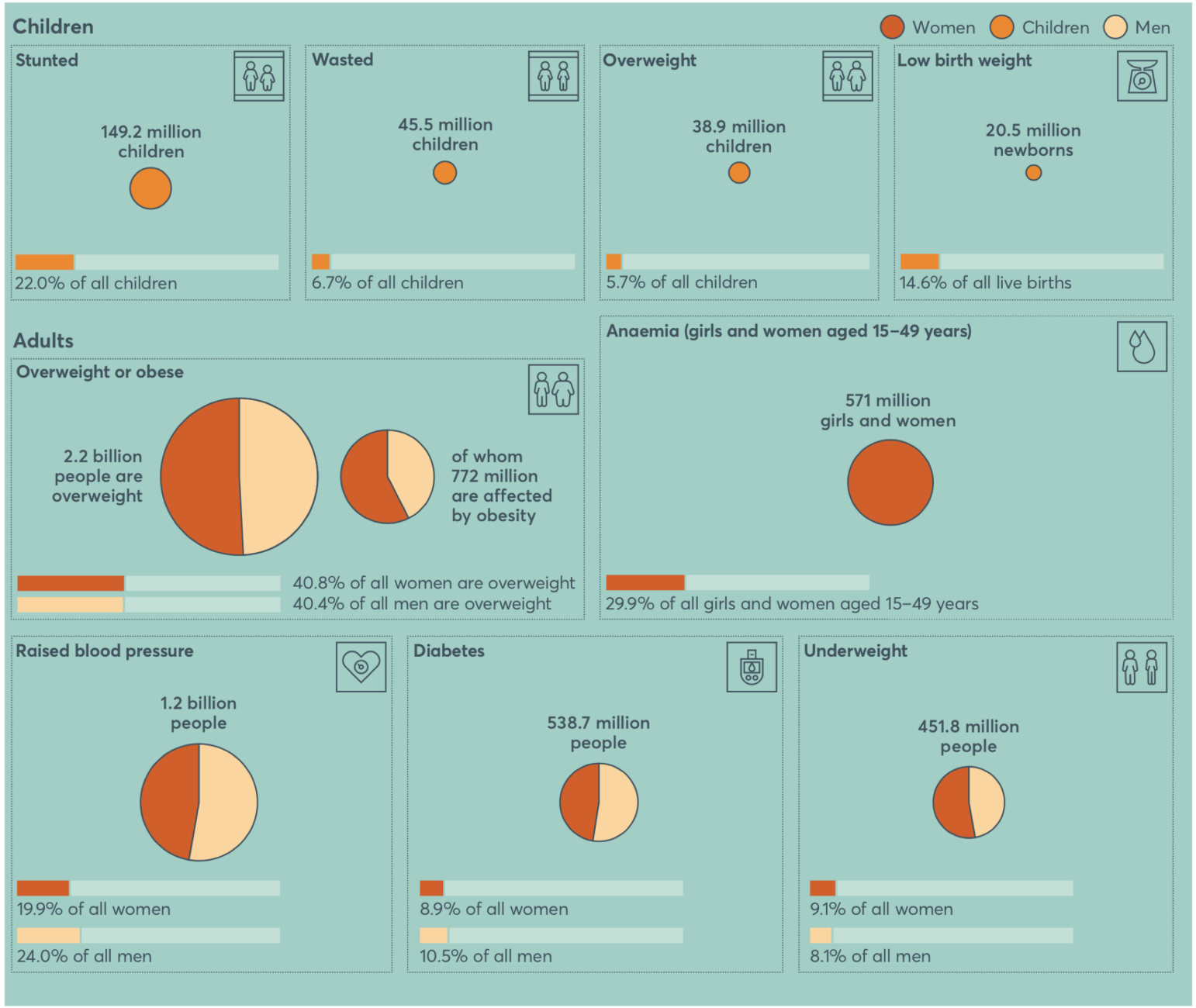
Disclosures

Nothing to disclose

Outline

- Global burden of malnutrition
- Dietary inadequacies
- Nutritional contribution of meat and other animal-source foods
- Role in child growth and development
- Role in longevity
- Conclusions

Too many people worldwide are malnourished



Global Nutrition Report 2021

1 billion

people do not consume enough protein

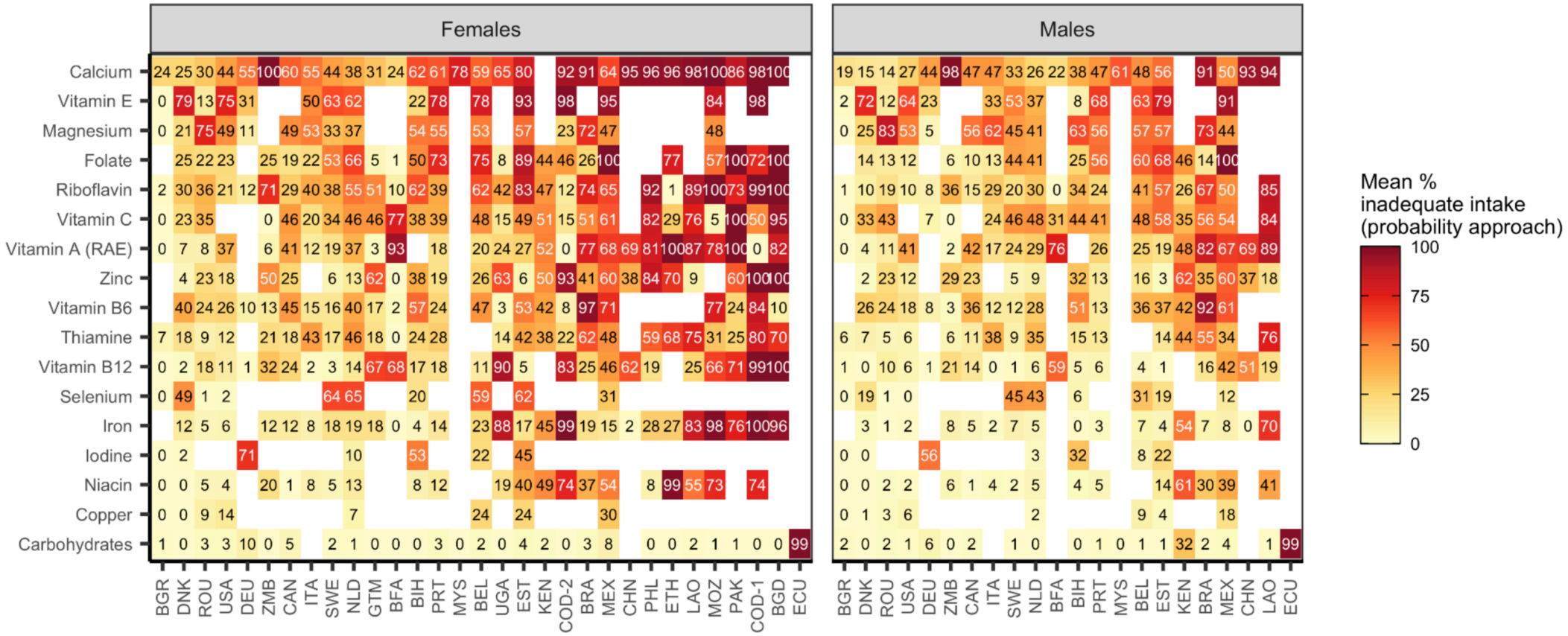
1.6 billion

pre-school aged children and women of reproductive age are deficient in one or more vitamins and minerals

Wu et al. (2014). Production and supply of high-quality food protein for human consumption: sustainability, challenges, and innovations. Annals of the New York Academy of Sciences 1321(1), 1-19.

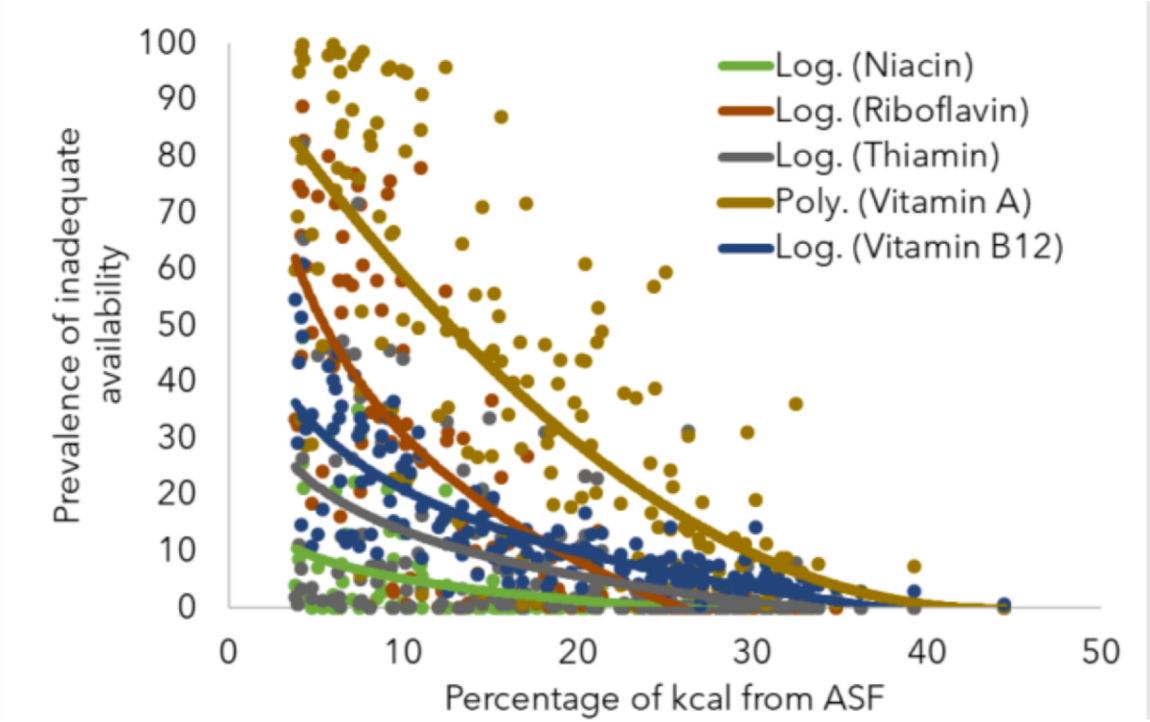
Stevens et al. (under development). Global and regional prevalence of one or more micronutrient deficiencies in non-pregnant women of reproductive age and pre-school aged children.

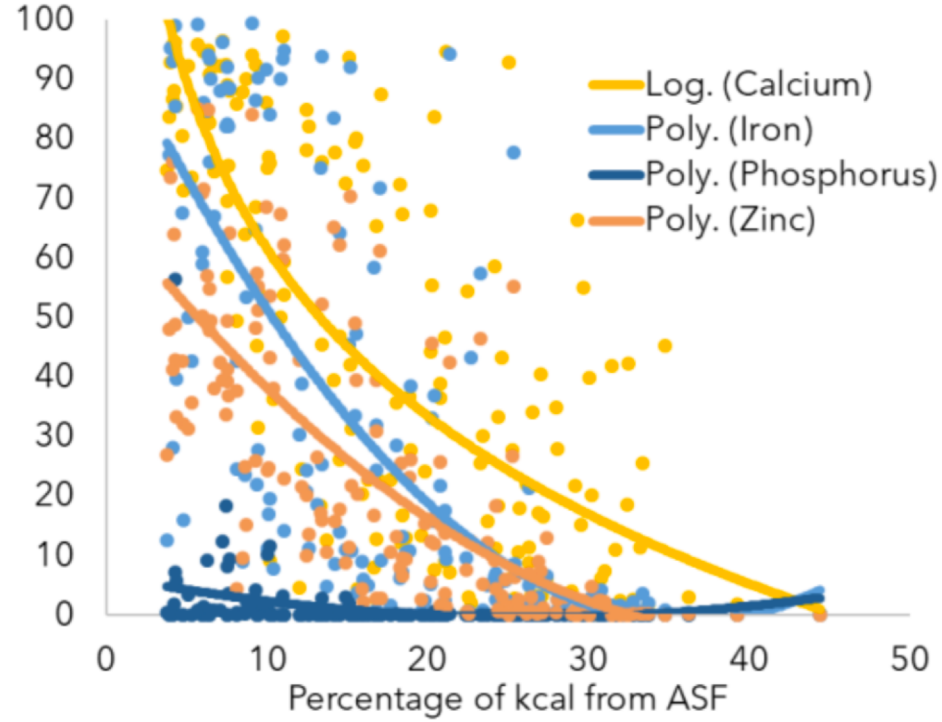
Vitamin and mineral inadequacies are widespread globally



Passarelli et al. (under development). Estimating national and sub-national usual nutrient intake distributions of global diets.

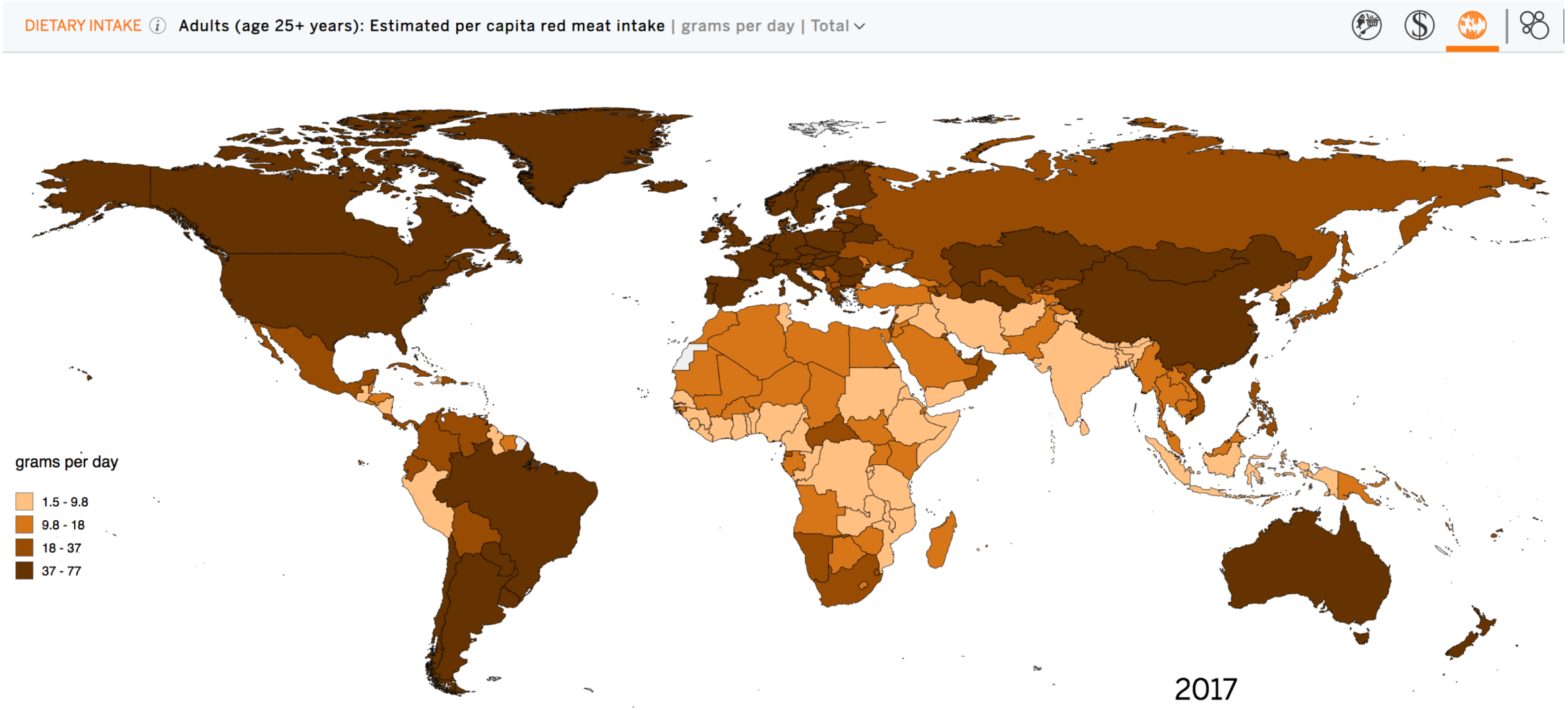
Average national diets low in animal-source foods do not meet needs for essential micronutrients





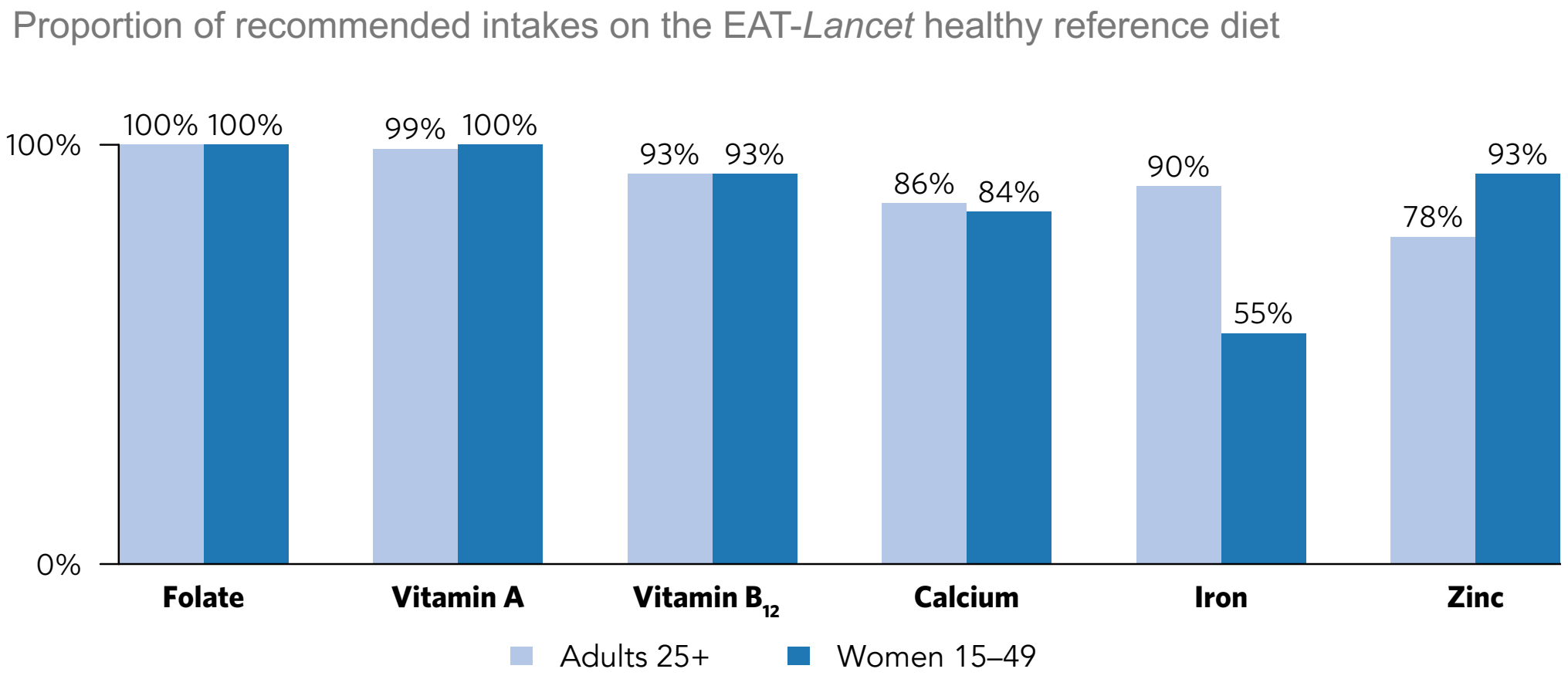
Nordhagen et al. (2020). The role of animal-source foods in healthy, sustainable, and equitable food systems.

Meat intake is very low in low/middle-income countries



www.foodsystemsdashboard.org

A Planetary Health Diet may not provide adequate micronutrients



Beal et al. (Under consideration). Uncertainties in the micronutrient adequacy of the EAT-Lancet Planetary Health Diet.

Meeting nutrient needs requires more animal-source foods

- Increasing animal-source foods from 14% of total calories to 27%
- Fish and shellfish (+105 calories)
- Eggs (+60 calories)
- Beef (+45 calories)
- Chicken and other poultry (+30 calories)
- Pork (+15 calories)
- Organ meats (+8 calories)

Beal et al. (Under consideration). Uncertainties in the micronutrient adequacy of the EAT-Lancet Planetary Health Diet.

Animal-source foods contain unique nutrients

- Only dietary source of retinol, heme iron, vitamin B_{12}, and vitamin D
- Highly bioavailable zinc
- Complete amino acid profile and bioavailable protein
- Only source of DHA and EPA, except sea vegetables
- Unique potentially beneficial compounds including creatine, anserine, taurine, cysteamine, 4-hydroxyproline, carnosine, CLA, and bioactive peptides
- Grass-fed meat and milk contain meaningful amounts of phytonutrients like terpenoids, phenols, carotenoids, and anti-oxidants

Nordhagen et al. (2020). The role of animal-source foods in healthy, sustainable, and equitable food systems.
Leroy et al. (2022). Animal source foods in healthy, sustainable, and ethical diets – an argument against drastic limitation of livestock in the food system.

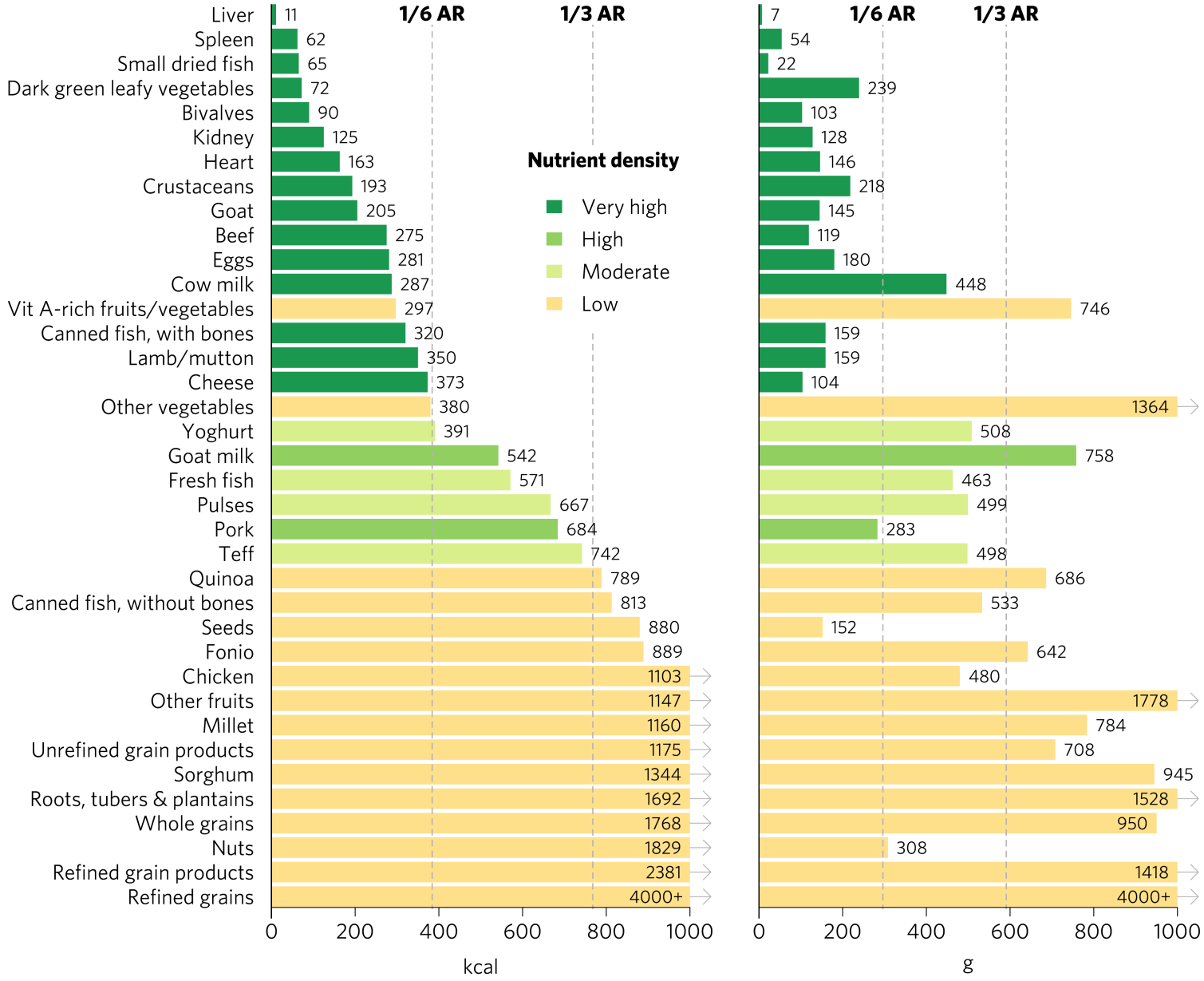
Animal-source foods are evolutionarily appropriate for humans

- Their abundant consumption over 2.5 million years has resulted in an adapted human anatomy, metabolism, and cognitive capacity that is divergent from other apes
- Hunter-gatherer populations consumed on average half of calories from animal-source foods, but this varied widely by population
- Chronic disease was rare in ancestral communities, and contemporary cultures that have maintained traditional diets and lifestyles typically have low burdens of chronic disease

Pontzer and Wood (2021). Effects of Evolution, Ecology, and Economy on Human Diet: Insights from Hunter-Gatherers and Other Small-Scale Societies.
Leroy et al. (in press). Animal source foods in healthy, sustainable, and ethical diets – an argument against drastic limitation of livestock in the food system.

Meat and other animal-source foods are top sources of commonly lacking nutrients

Calories and grams needed to provide an average of one-third of recommended intakes of vitamin A, folate, vitamin B_{12}, calcium, iron, and zinc for women 15–49



Beal and Ortenzi. (Under review). Priority micronutrient density in foods.

Meat and other animal-source foods are top sources of commonly lacking nutrients

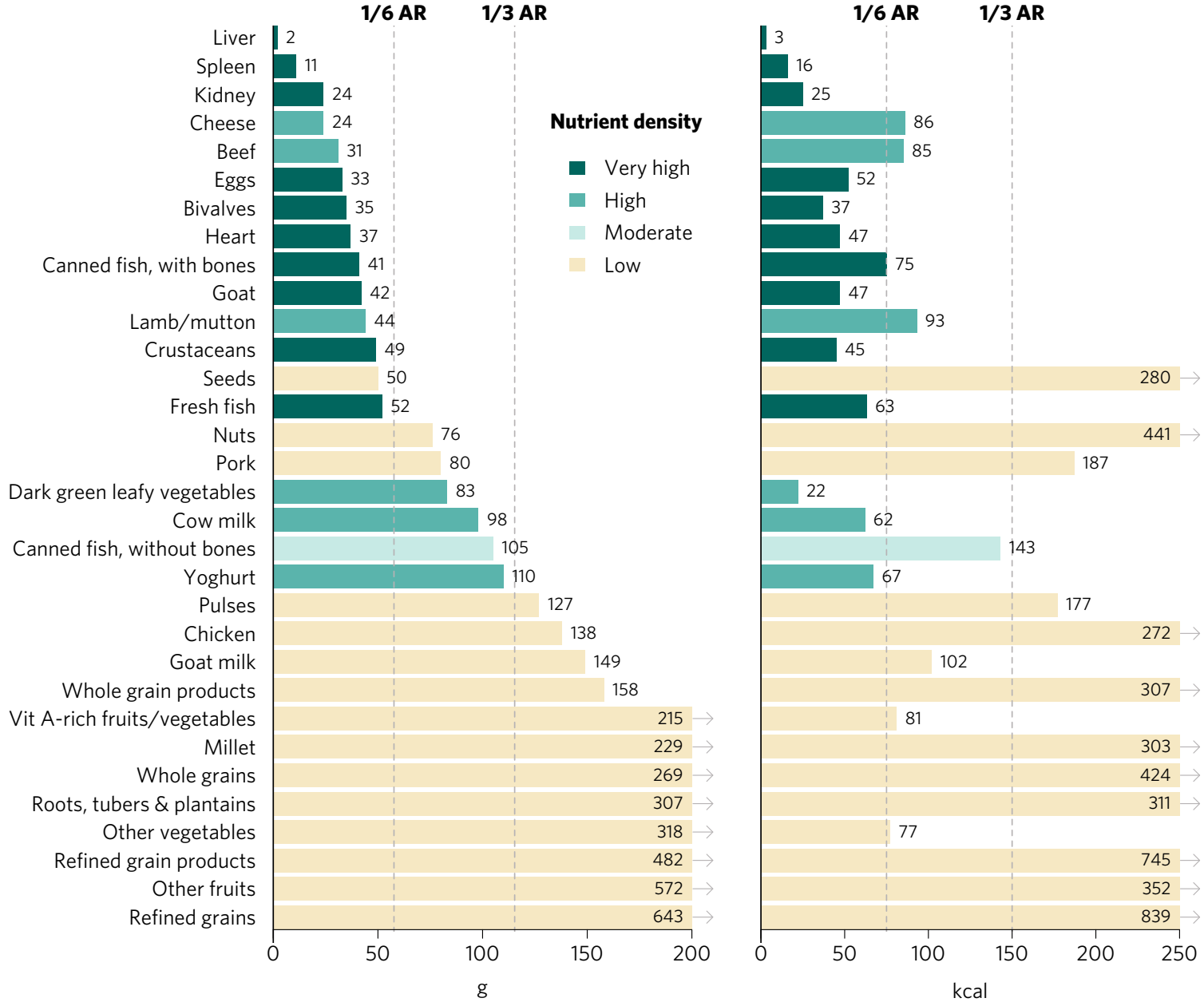
Aggregate and individual micronutrient density scores for women 15–49

	2+ nutrients	Iron	Zinc	Vitamin A	Calcium	Folate	Vitamin B_{12}
Liver	Very high	Very high	Very high	Very high	Low	Very high	Very high
Spleen	Very high	Very high	Very high	Low	Low	Low	Very high
Small dried fish	Very high	Very high	Very high	Very high	Very high	Low	Very high
Dark leafy greens	Very high	High	Low	Very high	Very high	Very high	Low
Bivalves	Very high	Very high	Very high	Very high	Very high	Moderate	Very high
Kidney	Very high	Very high	Very high	High	Low	High	Very high
Heart	Very high	Very high	Very high	Low	Low	Moderate	Very high
Crustaceans	Very high	Moderate	Very high	Low	Moderate	Low	Very high
Goat	Very high	Very high	Very high	Low	Low	Low	Very high
Beef	Very high	High	Very high	Low	Low	Low	Very high
Eggs	Very high	Moderate	Very high	Very high	Low	Very high	Very high
Cow milk	Very high	Low	High	Very high	Very high	Low	Very high
Canned fish w/ bones	Very high	Moderate	Very high	Low	Very high	Low	Very high
Lamb/mutton	Very high	High	Very high	Low	Low	Low	Very high
Cheese	Very high	Low	Very high	Very high	Very high	Low	Very high
Goat milk	High	Low	Moderate	High	Very high	Low	Low
Pork	High	Low	Very high	Low	Low	Low	Very high
Yoghurt	Moderate	Low	Low	Low	Very high	Low	Very high
Fresh fish	Moderate	Low	Moderate	Low	Low	Low	Very high
Pulses	Moderate	Moderate	Moderate	Low	Low	Very high	Low
Teff	Moderate	Very high	Moderate	Low	Low	High	Low
Vit A-rich fruit/veg	Low	Low	Low	Very high	Low	High	Low
Other vegetables	Low	Low	Low	Low	Low	Low	Low
Quinoa	Low	Moderate	Moderate	Low	Low	Very high	Low
Canned fish w/o bones	Low	Low	Moderate	Low	Low	Low	Very high
Seeds	Low	Low	High	Low	High	High	Low
Fonio	Low	Moderate	Moderate	Low	Low	Moderate	Low
Chicken	Low	Low	High	Low	Low	Low	High
Other fruits	Low	Low	Low	Low	Low	High	Low
Millet	Low	Moderate	Moderate	Low	Low	Moderate	Low
Unrefined grain prod	Low	Low	Moderate	Low	Low	Moderate	Low
Sorghum	Low	Moderate	Low	Low	Low	Low	Low
Roots/tubers/plantains	Low	Low	Low	Low	Low	Low	Low
Whole grains	Low	Low	Moderate	Low	Low	Low	Low
Nuts	Low	Low	Low	Low	Low	Low	Low
Refined grain products	Low	Low	Low	Low	Low	Low	Low
Refined grains	Low	Low	Moderate	Low	Low	Low	Low

Beal and Ortenzi. (Under review). Priority micronutrient density in foods.

Meat and other animal-source foods are top sources of commonly lacking nutrients

Calories and grams needed to provide an average of one-third of recommended intakes of vitamin A, folate, vitamin B_{12}, calcium, iron, and zinc for **children 6–23 months** in South and Southeast Asia



Ortenzi and Beal. (2021). Priority Micronutrient Density of Foods for Complementary Feeding of Young Children (6–23 Months) in South and Southeast Asia.

Growing evidence on importance of animal-source foods for child growth and development

- **De Beer (2012):** Meta analysis - 245 mL milk/day → 0.4 cm ↑ height
- **Ianotti et al. 2017: Lulun I:** 1 egg/day ↓ stunting by 47% and ↑ linear growth (183 infants; **Lulun II**: Effects not evident 2 yr later)
- **Stewart et al 2020; Mazira project:** (660 infants). 1 egg/day ≠ linear growth but ↑ head circumference in Malawi. (Background fish consumption; low stunting).
- **Baleghn et al., 2019:** ASF ↑ **31** cognitive function variables in 10 studies
- **Nutrition Innovation Lab studies:** ASF associated with ↑ linear growth and ↓ stunting (6377 infants across Uganda, Nepal Bangladesh;
- **Headey et al. (2018):** Strong associations between ASF consumption and ↓ stunting
- **Pimpin et al., (2019):** Meta analysis: ASF consumption ↓ stunting and ↑ birth and child weights.
- **Miller et al. (2017);** Consuming more types of ASF associated with ↑ head circumference

Presentation by Adesogan, A. (2020). Role of animal-source foods in meeting micronutrient requirements.

Growing evidence on importance of animal-source foods for child growth and development

The Journal of Nutrition
Symposium: Food-Based Approaches to Combating Micronutrient Deficiencies in Children of Developing Countries

Meat Supplementation Improves Growth, Cognitive, and Behavioral Outcomes in Kenyan Children[1,2]

Charlotte G. Neumann,[3]* Suzanne P. Murphy,[4] Connie Gewa,[5] Monika Grillenberger,[6] and Nimrod O. Bwibo[7]

Growing evidence on importance of animal-source foods for child growth and development

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REVIEW ARTICLE

Maternal & Child Nutrition WILEY

Animal source foods, rich in essential amino acids, are important for linear growth and development of young children in low- and middle-income countries

Panam Parikh[1] | Richard Semba[2] | Mark Manary[3] | Sumathi Swaminathan[4] | Emorn Udomkesmalee[5] | Rolf Bos[1] | Bee Koon Poh[6] | Nipa Rojroongwasinkul[5] | Jan Geurts[1] | Rini Sekartini[7] | Tran Thuy Nga[8]

Vegan diets are problematic for vulnerable groups like young children

Article

SOURCE DATA | TRANSPARENT PROCESS | OPEN ACCESS

EMBO Molecular Medicine

Vegan diet in young children remodels metabolism and challenges the statuses of essential nutrients

Topi Hovinen[1,†], Liisa Korkalo[2,†], Riitta Freese[2], Essi Skaffari[2], Pirjo Isohanni[1,3], Mikko Niemi[4,5], Jaakko Nevalainen[6], Helena Gylling[7], Nicola Zamboni[8], Maijaliisa Erkkola[2] & Anu Suomalainen[1,5,9,*]

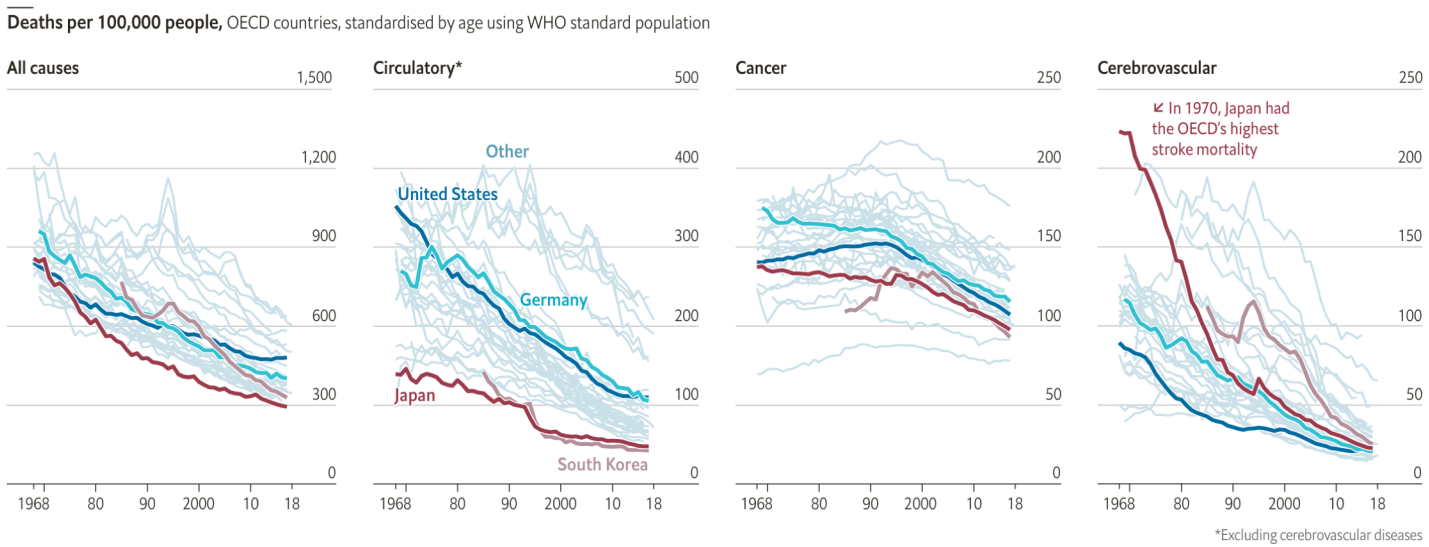
Consuming too little animal source foods may not be optimal for longevity

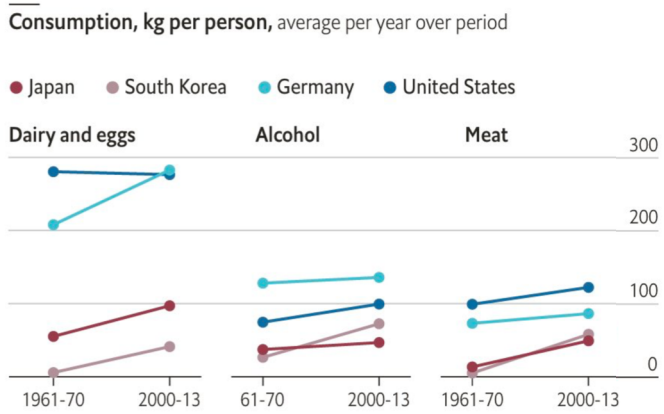
The meat spot

Japanese people may have gained longevity by balancing their diets

Japan's rate of strokes fell during a period when it began eating a bit of meat

JAN 16TH 2021





https://www.economist.com/graphic-detail/2021/01/16/japanese-people-may-have-gained-longevity-by-balancing-their-diets

Tsugane. (2020). Why has Japan become the world's most long-lived country: Insights from a food and nutrition perspective.

Consuming too little animal source foods may not be optimal for longevity

THE GERONTOLOGICAL SOCIETY OF AMERICA®

Journals of Gerontology: Medical Sciences
cite as: *J Gerontol A Biol Sci Med Sci*, 2022, Vol. XX, No. XX, 1–7
https://doi.org/10.1093/gerona/glab334
Advance Access publication November 27, 2021

OXFORD

Research Report

Animal Protein Intake Is Inversely Associated With Mortality in Older Adults: The InCHIANTI Study

Tomás Meroño, PhD,[1,2] Raúl Zamora-Ros, PhD,[1,3,*] Nicole Hidalgo-Liberona, PhD,[1,2] Montserrat Rabassa, PhD,[1] Stefania Bandinelli, MD,[4] Luigi Ferrucci, MD, PhD,[5] Massimiliano Fedecostante, MD,[6] Antonio Cherubini, MD, PhD,[6,†] and Cristina Andres-Lacueva, PhD[1,2,†]

Meat and animal-source foods are compatible with sustainable diets

- Prioritize production of foods that are suitable to local ecosystems
- Shift towards regenerative and sustainable production for all foods, using diverse agroecosystems that integrate crops and livestock
- Moderate intake of foods with the largest environmental impacts (which will vary depending on the production method and local context)
- Strengthen fortification policies and programs and use appropriate supplementation
- Build bridges with stakeholders with different perspectives, seeking to find common ground whenever possible towards achieving healthy and sustainable diets

Conclusions

- Billions of people are malnourished worldwide
- Meat intake is very low in low/middle income countries
- Low consumption of meat and other animal-source foods increases risk of undernutrition
- A Planetary Health Diet may not be nutrient adequate without additional meat and other animal-source foods
- Animal-source foods contain unique nutrients and are evolutionarily appropriate for humans
- Meat and other animal-source foods are among the top sources of nutrients commonly lacking, especially among vulnerable groups like young children
- Too little animal-source foods may hinder child growth and development and may not be optimal for longevity
- Meat and animal-source foods are important for healthy diets and are compatible with sustainable diets when produced appropriately

Key messages

- Diets are generally inadequate in nutrients, causing nutrient deficiencies and poor health outcomes worldwide, especially in lower income contexts
- Meat, eggs, and dairy provide unique essential nutrients important for healthy diets
- Consuming too little animal-source foods worsens diet quality, increasing risk of nutrient deficiencies and ill health

Thank you!

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