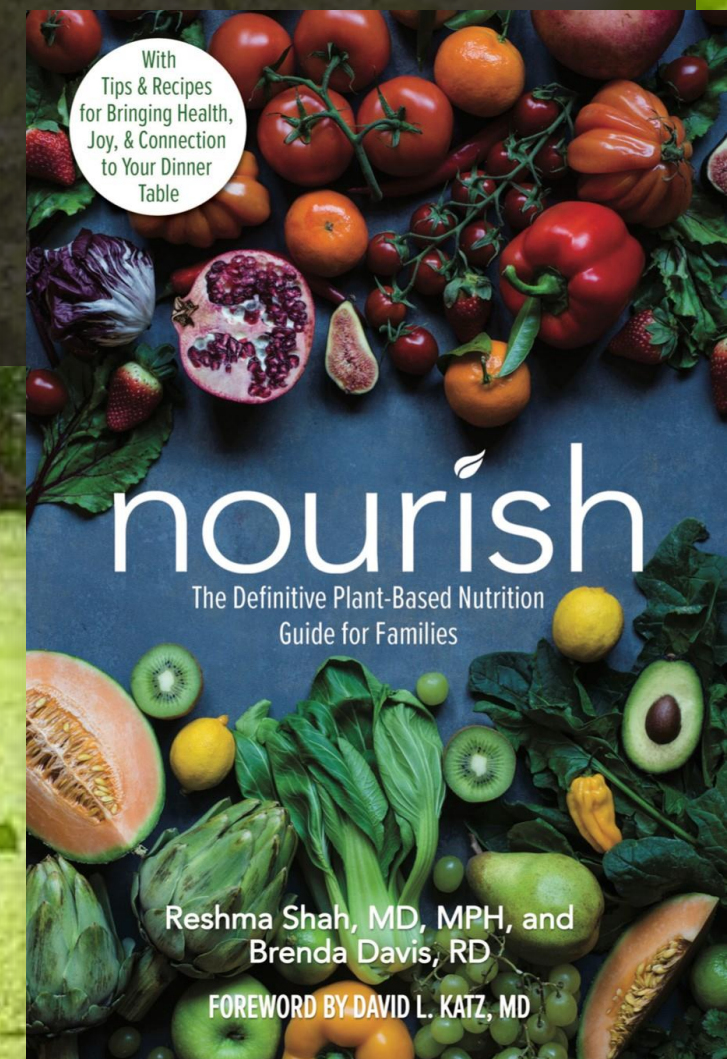


Nourishing Plant-based Children from Birth through Adolescence

THE REAL TRUTH ABOUT HEALTH -- BRENDA DAVIS, RD



OUTLINE

- ▶ **Why Plant-based?**
- ▶ **Safety and Adequacy**
- ▶ **4 Core Concepts**
- ▶ **Considerations at various stages of growth**
 - Infants (0-12 m)
 - Toddlers (1-3 y)
 - Children and teens (4-18 y)
- ▶ **Avoiding nutritional shortfalls**



Why Plant-based?



HEALTHY



SUSTAINABLE



HUMANE



HEALTHY



Nutrition and Health

- ▶ Nutrition is critical to health. It is necessary optimal growth and development of our children.
- ▶ Food is our fuel, but it is also the raw materials we need to build and repair every cell of the body.

The Link Between Diet and Disease

Poor nutrition is linked to:

- 70% of deaths globally
- 90% of type 2 diabetes
- 80% of heart disease
- 30-70% of cancers



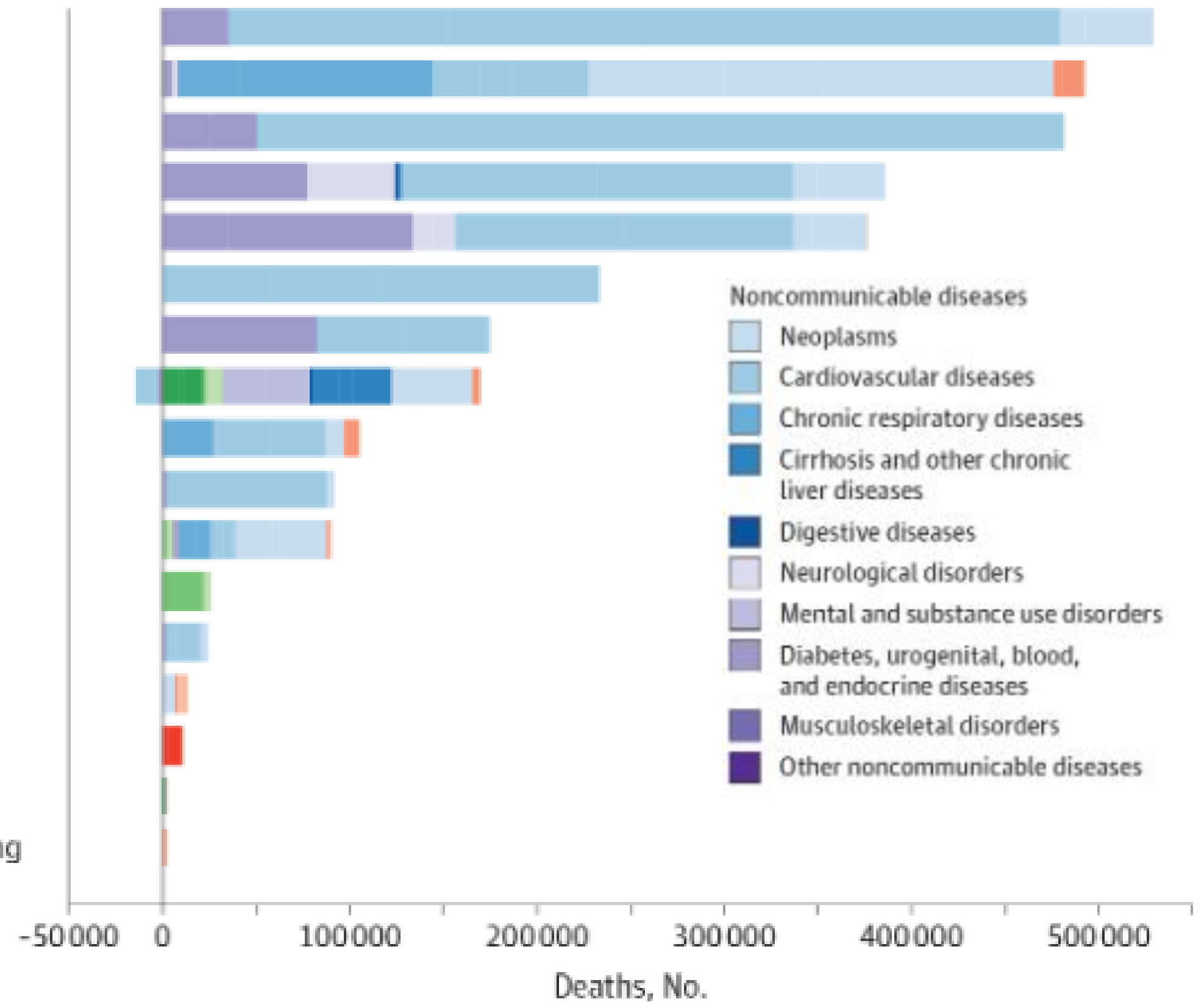
Poor Diet is the #1 Cause of Death in America and Globally

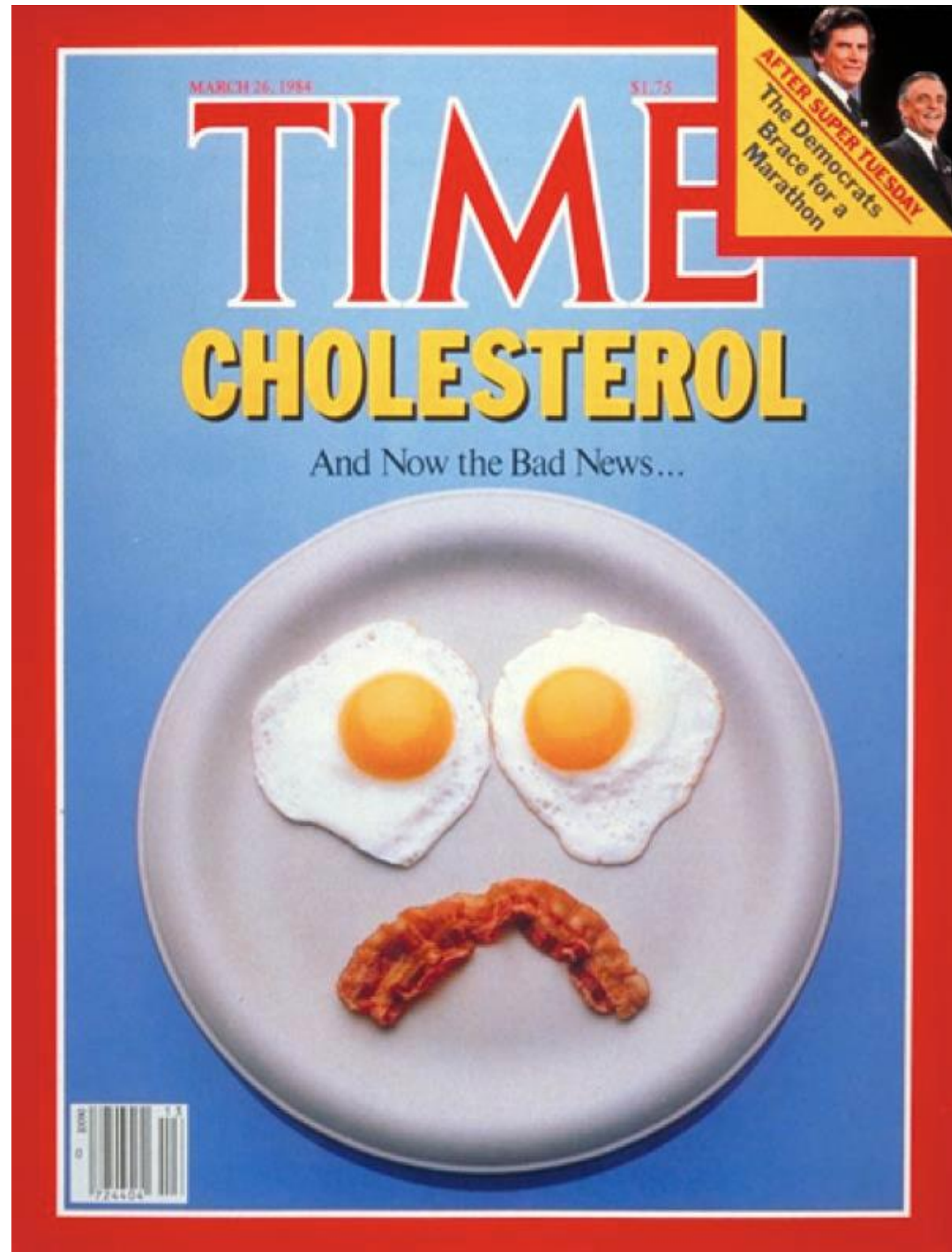
A Risk factors and related deaths

Risk factors

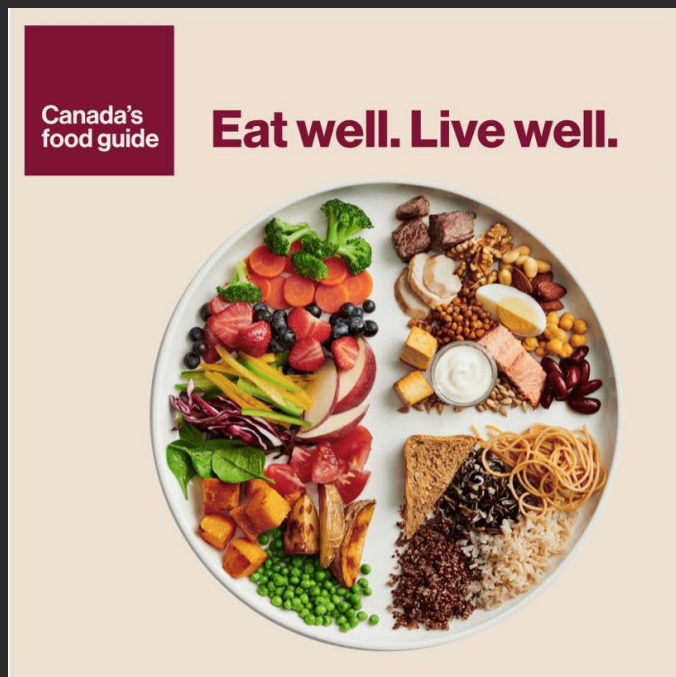
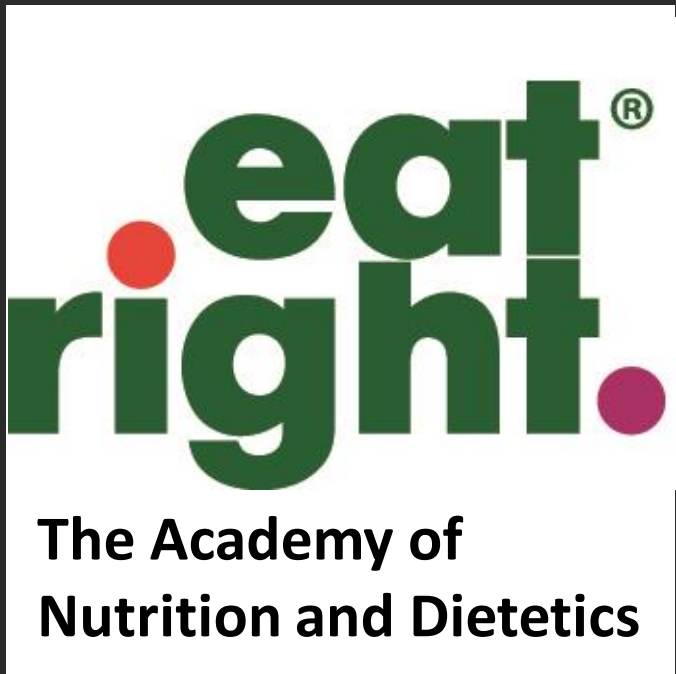
Dietary risks

Tobacco use
High systolic blood pressure
High body mass index
High fasting plasma glucose
High total cholesterol
Impaired kidney function
Alcohol and drug use
Air pollution
Low physical activity
Occupational risks
Low bone mineral density
Residential radon and lead exposure
Unsafe sex
Child and maternal malnutrition
Sexual abuse and violence
Unsafe water, sanitation, and handwashing





Nutrition Confusion and Controversy





Broad Consensus on Dietary Risk Factors

- ▶ Overconsumption of calories
- ▶ Low intake of high fiber plant foods
 - Vegetables and fruits
 - Legumes
 - Whole Grains
 - Nuts and seeds
- ▶ High intake of foods with added sugar, fat, and salt
- ▶ High intake of refined carbohydrates
- ▶ High intake of sweet beverages
- ▶ High intake of red and processed meat
- ▶ High intake of deep-fried and fast foods



Eat Mostly



Minimize



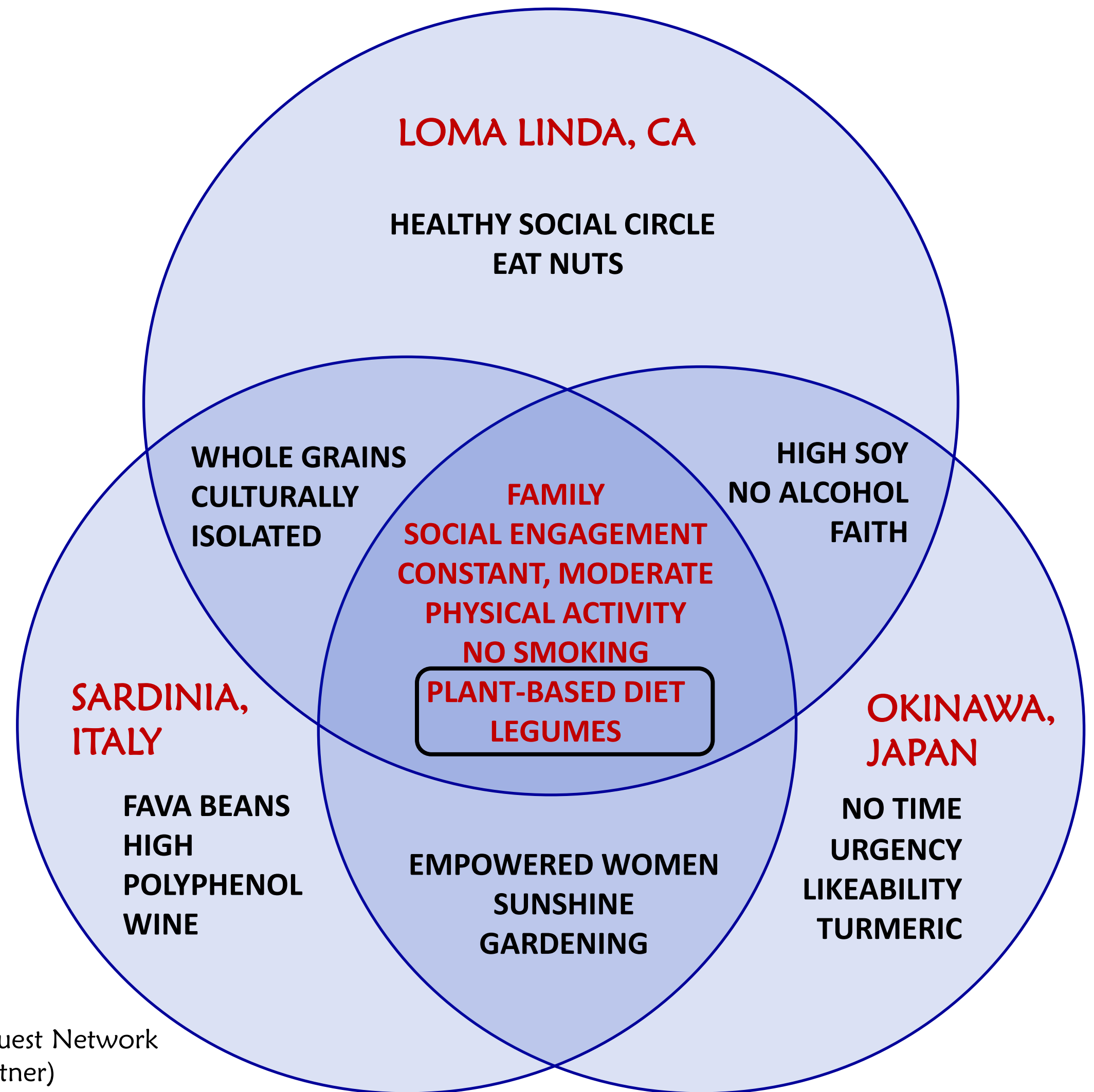
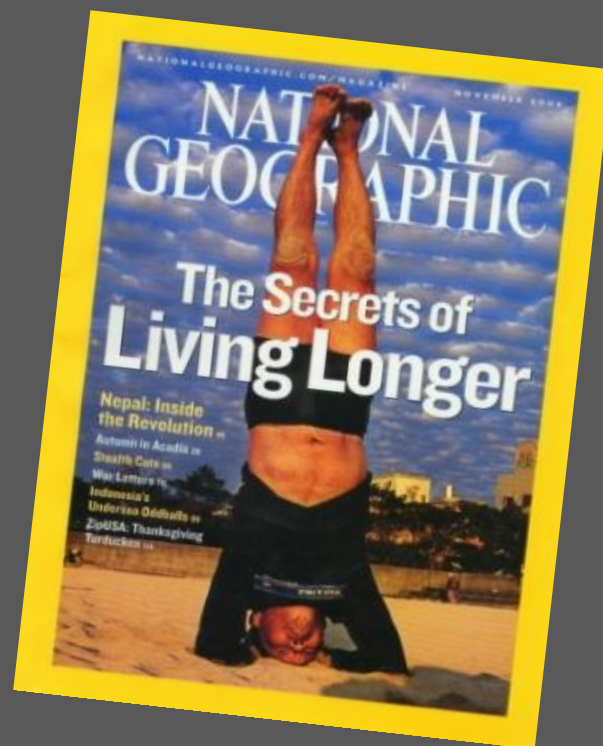


The Healthy Diet Acid Test: The Healthiest, Longest Lived Populations

The Blue Zones



- ▶ Some lifestyle practices are unique to each Blue Zone.
- ▶ Some are shared by 2 or more Blue Zones.
- ▶ Some are common to every Blue Zone known.



Source: Quest Network
(Dan Buettner)

Health Advantages of Plant-diets

- ▶ Improved mortality/longevity.
- ▶ Reduced overweight and obesity.
- ▶ Lower rates of heart disease, type 2 diabetes, cancer, hypertension, NAFLD, cataracts, gastrointestinal disorders, and gout.





Experts Agree

Dietary patterns that maximize whole plant foods and minimize highly processed foods and animal products are the most healthful.

**Do we have to
think about
chronic
disease during
childhood?**





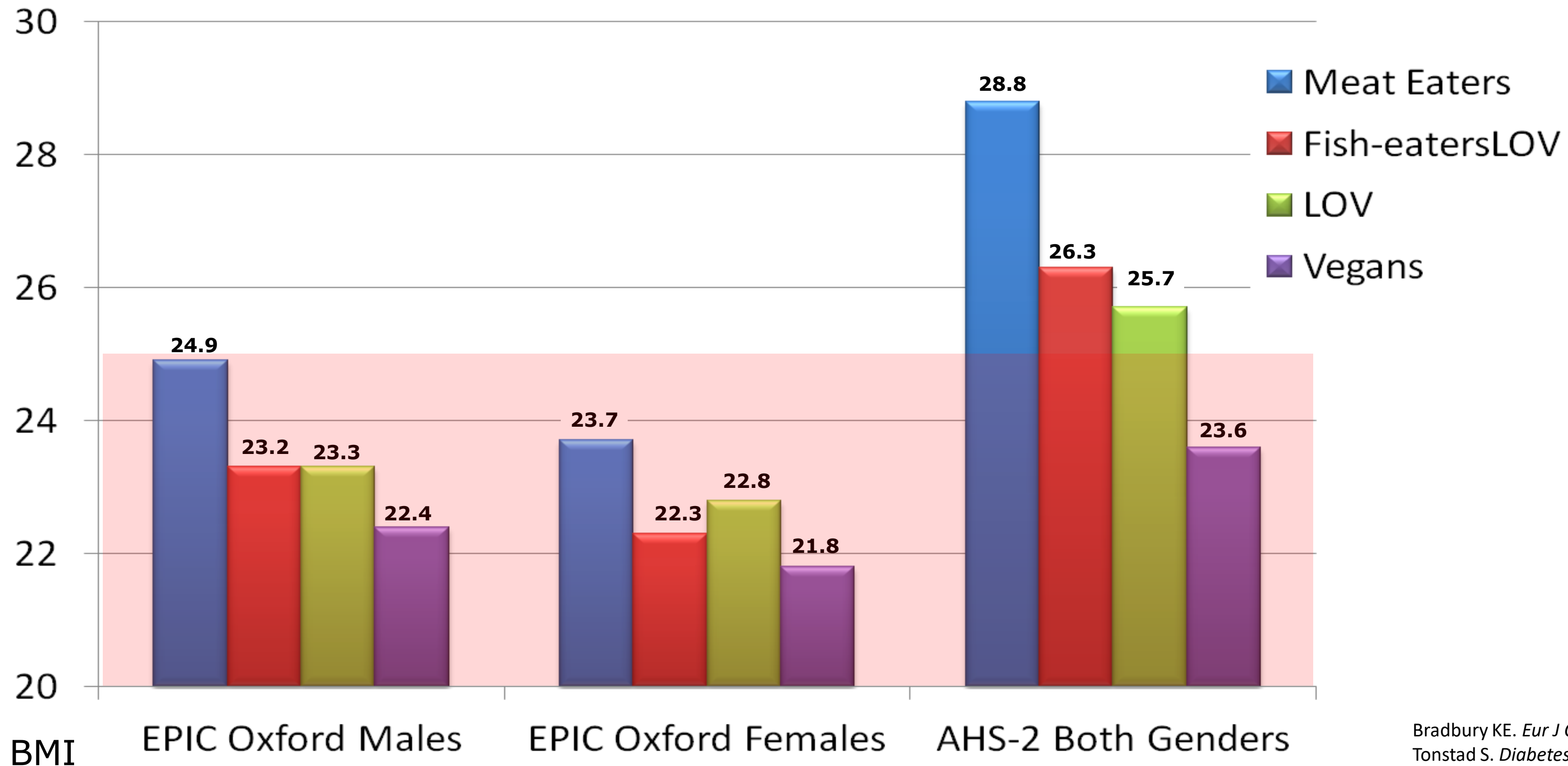
While ensuring optimal growth and development is the number one nutrition priority in childhood, we do need to do what we can to minimize the risk of lifestyle-induced disease during childhood and beyond.



Overweight and Obesity in Children

- ▶ Approximately 20% of America children and teens are obese. In the 1970s, it was 5%.
- ▶ 70-80% of adolescents that are obese will remain obese in adulthood.
- ▶ **Childhood obesity is associated with:**
 - Metabolic disorders
 - Cardiovascular disease
 - Type 2 diabetes
 - Liver disorders
 - Sleep apnea
 - Lung disorders
 - Menstrual disorders

Less Overweight and Obesity Among Plant-based Eaters



Heart Disease in Children

- ▶ Atherosclerosis begins early in life.
- ▶ Fatty streaks are found in the aorta of children younger than 3 years.
- ▶ By age 10, nearly ALL kids have fatty streaks.
- ▶ Fatty streaks are typically present in the coronary arteries of people in their 20s.



Less Heart Disease Among Plant- based Eaters

Meta-analysis showed a 25% reduced risk of incidence and mortality from ischemic heart disease among vegetarians and vegans.



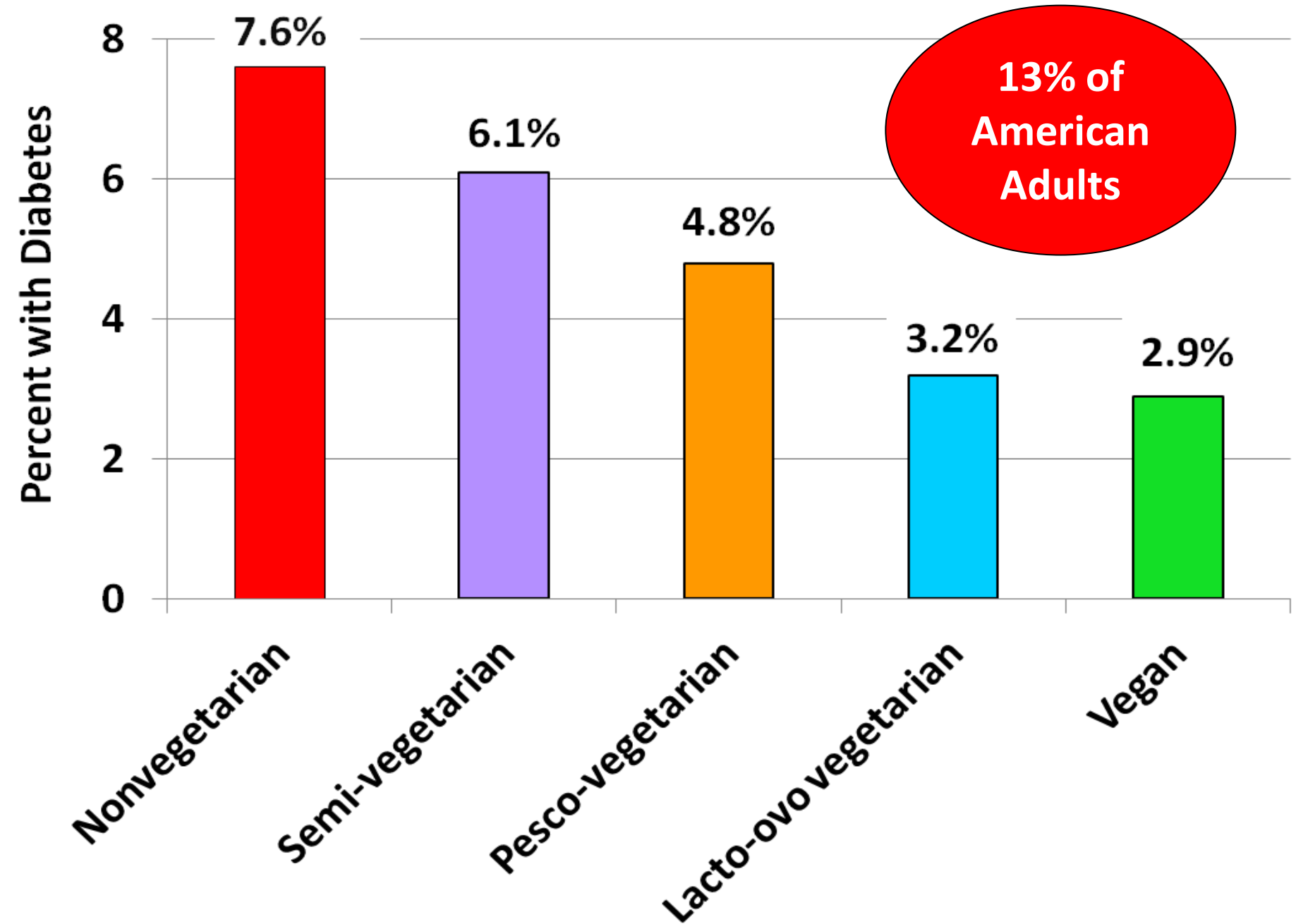
Type 2 Diabetes in Children

- ▶ Type 2 diabetes was rare in children 20-30 years ago. Rates are escalating in this age group today, with cases seen in children as young as age 8.
- ▶ Complications appear earlier and are more severe.
- ▶ Risk factors: obesity, mom with gestational diabetes, certain ethnic groups (Native Americans, Blacks, Hispanics), family history.



Less Type 2 Diabetes Among Plant-based Eaters

AHS-2 60,903 health-conscious participants, aged ≥ 30



Tonstad S, Butler T, Yan R, Fraser GE. Type of vegetarian diet, body weight, and prevalence of type 2 diabetes. Diabetes Care. 2009;32(5):791-6.



Cancer in Children

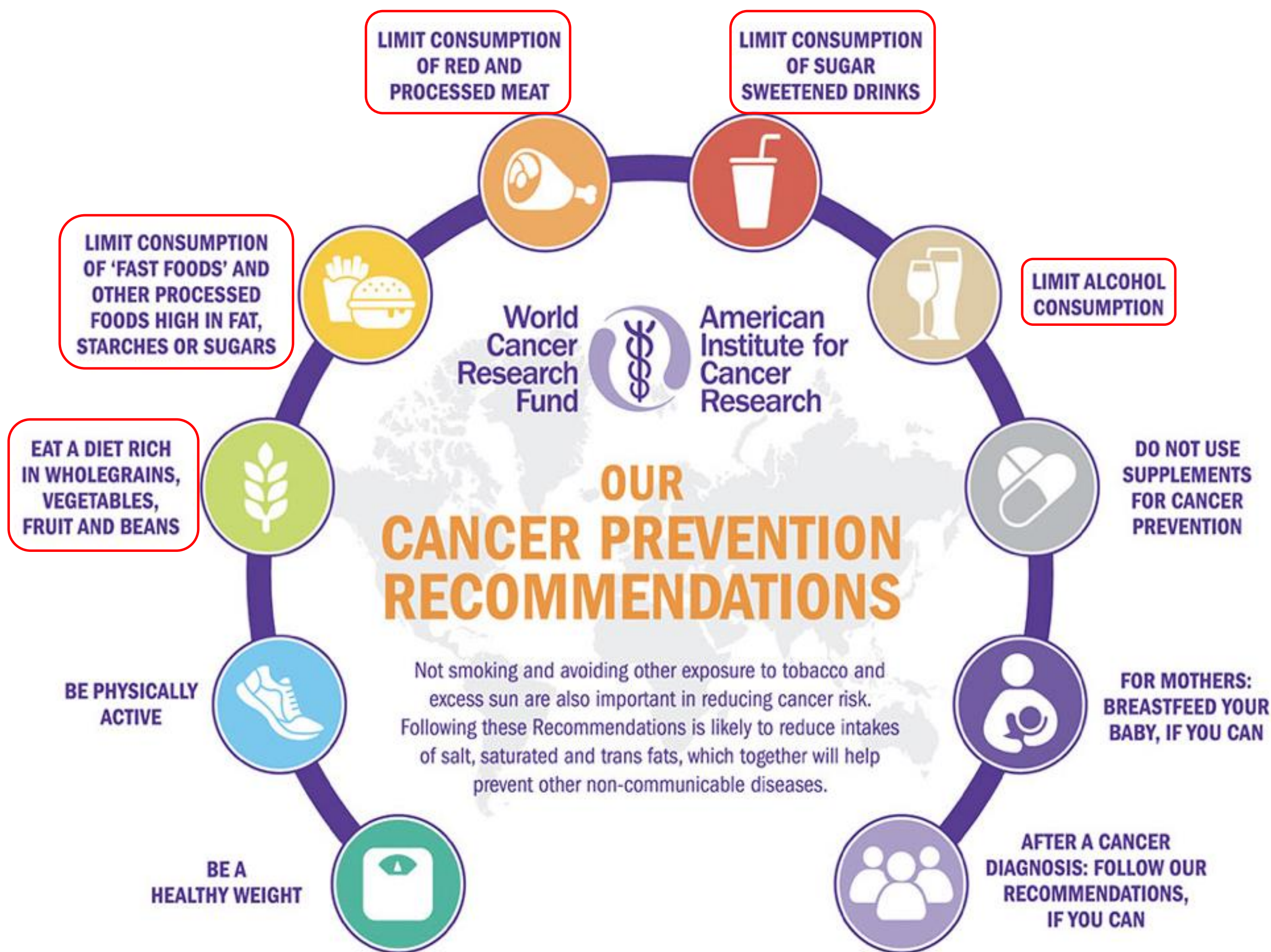
- ▶ Cancer rates have been rising steadily increasing over the last several decades, in the US and globally, with the largest increases reported in infants.
- ▶ According to the National Cancer Institute, overall cancer rates have increased 27% since 1975 in children under 19 years.



Less Cancer Among Plant-based Eaters

Compared to similar, health-conscious meat eaters, cancer rates were:

- **EPIC Oxford**
 - 11% lower among LOV
 - 19% lower among vegans
- **AHS-2**
 - 8% lower among LOV
 - 16% lower among vegans



WHO's International Agency for Research on Cancer



Processed Meat

Group 1: Carcinogen

(asbestos, tobacco)



Red Meat

Group 2A: Probable Carcinogen

(DDT, glyphosate)

**What diet is
best for
health?**





“The evidence is strong, consistent, and compelling that a diet of predominantly, or even exclusively, whole plant foods can promote health, selectively treat and reverse disease, and confer comparable benefit to the planet.



What we should be eating, then, for disease reversal and health promotion, for the sake of people and planet alike, is clear enough. Welcomed by some, clearly inconvenient to others, the truth is that we should ALL be eating plant-predominant diets.



SUSTAINABLE

Environmental Impacts of Animal Agriculture

14-18% of all greenhouse gases; more than all forms of transportation combined.

Responsible for 91% of destruction of the Amazon.

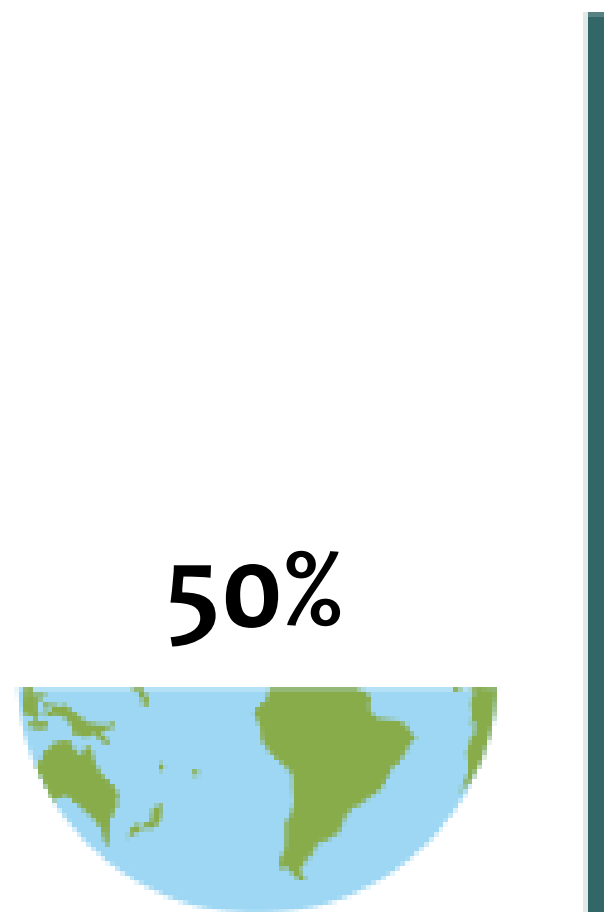


Leading cause of rainforest destruction, species extinction, ocean dead zones, and water pollution.

Occupies 40% of the earth's habitable land mass.

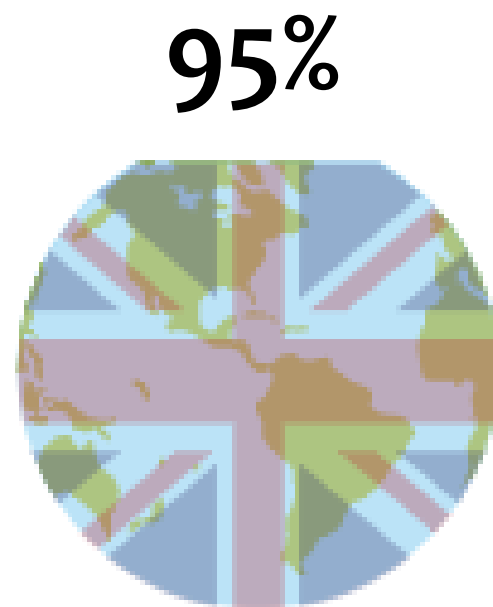
Habitable land area used for food production

Actually:



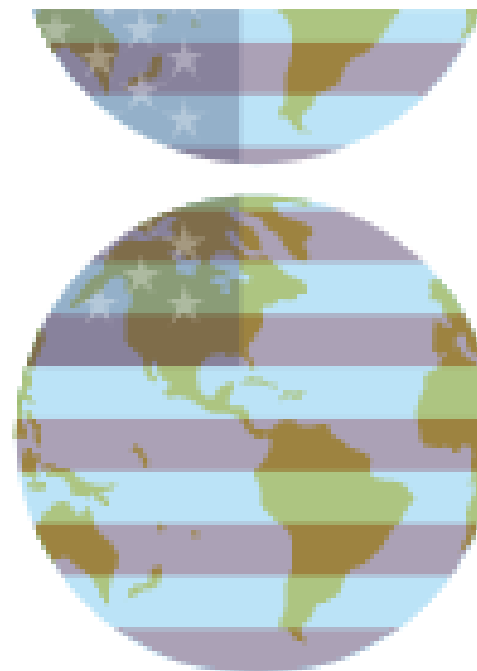
If everyone adopts:

UK Diet



US Diet

138%



Vegan Diet

12%



omni
CALCULATOR



Proceedings of the National Academy of Sciences 2016

By 2050, greenhouse gas emissions would be reduced by:

- **29%** if we followed **global dietary guidelines** (eat more fruits and vegetables; eat less meat, sugar and calories)
- **70%** if we ate a **vegan diet**

Recommendation → a global shift towards a plant-based diet.

Land Needed for Omnivore vs Plant-based



STANDARD AMERICAN DIET

2 football fields (1.3 acres each) feed *1 person* per year

PLANT-BASED DIET

2 football fields (1.3 acres each) feed *14 people* per year

Wasting Valuable Food

After cows arrive at the feedlot, they consume 12 pound of food to gain enough weight to produce a pound of beef.



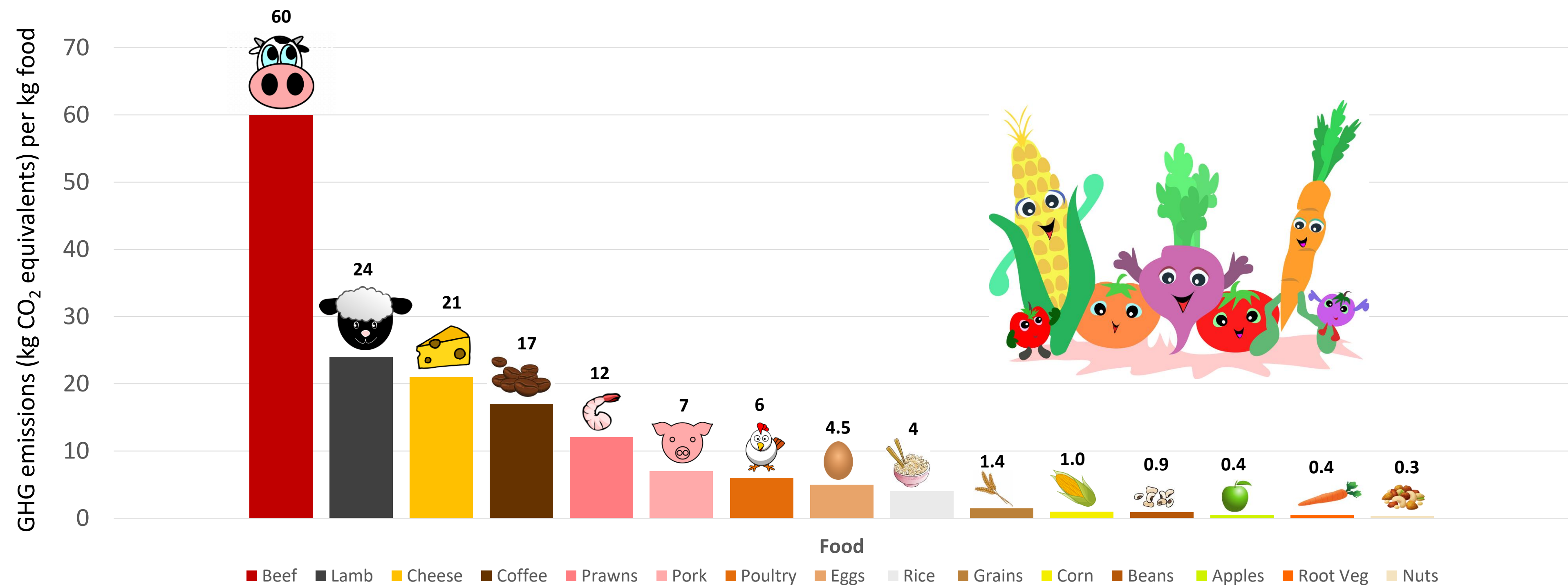


**50% of world's
grains go towards
feeding livestock.**

**While close to 1
billion people go
hungry each day.**



Carbon Footprint of Food



HOW DOES MEATLESS MONDAY HELP?

IF THE WORLD ATE **15%** LESS MEAT,

IT WOULD BE LIKE:



TAKING **240** MILLION CARS
OFF THE ROAD EACH YEAR

Simple Changes



Big Impact

**MEATLESS
MONDAY**

MEATLESSMONDAY.COM



Summary Report —

The EAT-Lancet Commission on Food, Planet, Health

Can we feed a future population of 10 billion people a healthy diet within planetary boundaries?

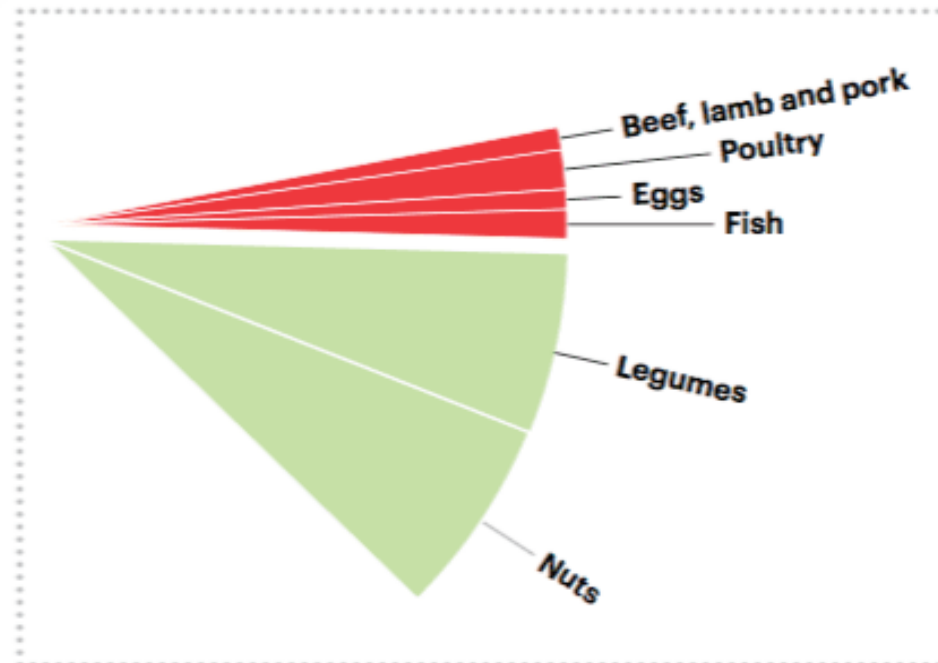
<https://eatforum.org/eat-lancet-commission/>



“Food is the single strongest lever to optimize human health and environmental sustainability on earth.”



“A diet rich in plant-based foods and with fewer animal source foods confers both improved health and environmental benefits.”





*“Changing how we eat
will not be enough, on its
own, to save the planet,
but we cannot save the
planet without changing
how we eat.”*

*Jonathan Safran Foer
We Are the Weather: Saving the Planet
Begins at Breakfast*



HUMAINE

Animal- Centered Diets Hurt Animals

It makes no sense to cause pain, suffering and death in other living beings if it is unnecessary.



ASPCA Poll

94% of Americans agree that animals should not suffer.





REALITY

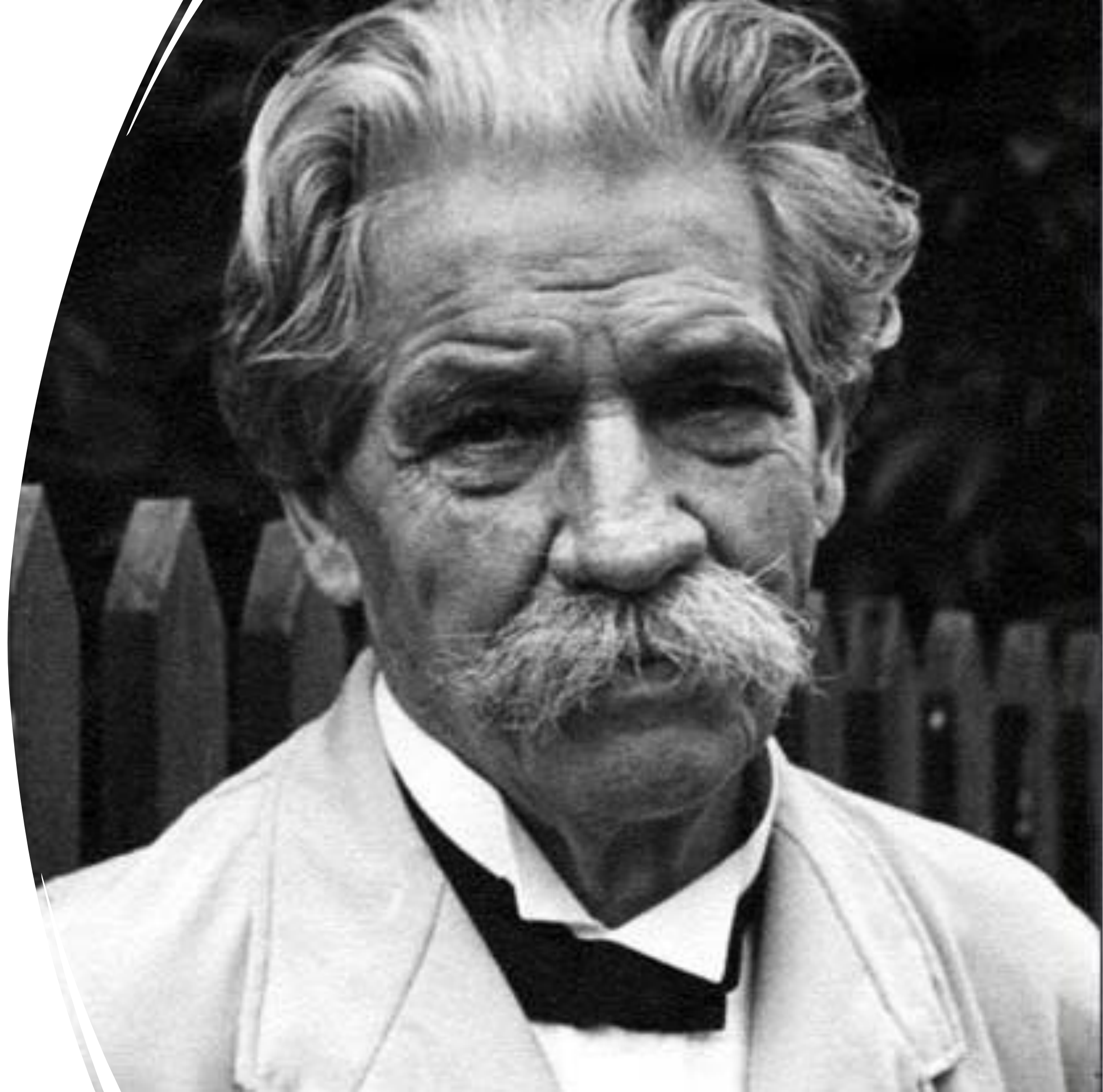
**10 billion land animals are slaughtered for food every year in America.
An estimated 99% are raised in CAFOs.**



Food For Thought

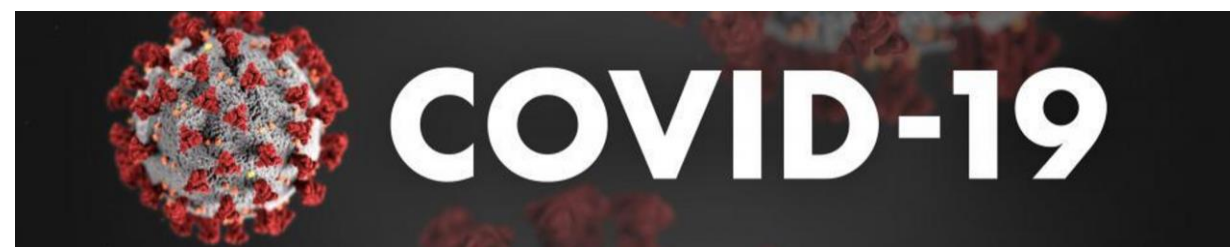
“...the time is coming when people will be amazed that the human race existed so long before it recognized that thoughtless injury to life is incompatible with real ethics. Ethics in its unqualified form is extended responsibility to everything that has life.”

Dr. Albert Schweitzer
Winner, Nobel Peace Prize, 1952



The New York Times

Our hand has been reaching for the doorknob for the last few years. Covid-19 has kicked open the door."



The New York Times

On the other side is not something new, but something that calls from the past — a world in which farmers were not myths, tortured bodies were not food, and the planet was not the bill at the end of the meal."



The New York Times

*One meal in front of the other,
it's time to cross the threshold.
On the other side is home."*



Opinion

The End of Meat Is Here

If you care about the working poor, about racial justice, and about climate change, you have to stop eating animals.



Being plant-based isn't about personal purity or about moral superiority.

It is about making a conscious choice to widen your circle of compassion. It is about recognizing the consequences of our food choices beyond ourselves.



By Getting Our Nutrition From Plants....
We ALL Win!

Safety and Adequacy



Are plant-based diets safe for infants and children?

Will my children's growth and development be adversely affected?

Will my family meet their nutritional requirements?



Plant-Based Diets Are Safe For Children

- ▶ British Vegan Children (1988): “children reared to be vegan can grow up to be normal children”
- ▶ Farm Study – US (1989)
- ▶ Seventh Day Adventist Children – US (1990)
- ▶ Systematic review of vegetarian diets in children (2017)
- ▶ VeChi Study – Germany (2019)



Findings

- ▶ Lacto-ovo vegetarian children grow least as well as omnivorous children.
- ▶ Vegan children grow normally, although growth may be slower during the toddler years.
- ▶ **Negative findings?** Some early reports of adverse impacts from communities using highly restrictive diets.



O'Connell JM et al. *Am J Clin Nutr.* 1988; 48: 822–825.

Sanders TAB. *Am J Clin Nutr.* 1988;48(3 Suppl):822-825

Sabaté, J. *European Journal of Clinical Nutrition.* 1991; 45: 51–58.

Nathan I et al. *European Journal of Clinical Nutrition.* 1997; 51: 20–25.

Leung SSF et al. *J Paediatr Child Health.* 2001;37(3):247–253.

Yen CE et al. *Nutr Res.* 2008;28(7):430–436.

Schürmann S, et al. *European Journal of Nutrition.* 2017; 56 (5): 1797-1817.

Weder S et al. *Nutrients.* 2019;11(4):1–18.

“It is the position of the AND that appropriately planned vegetarian diets, including total vegetarian or vegan diets, are healthful, nutritionally adequate, and may provide health benefits in the prevention and treatment of certain diseases. Well planned vegetarian diets are appropriate for individuals during all stages of the lifecycle, including pregnancy, lactation, infancy, childhood, adolescence, and for athletes.”

Position of the Academy of Nutrition and Dietetics: Vegetarian Diets. Journal of the Academy of Nutrition and Dietetics. July 2016;116: 1970-1980.



*“It is the position of the AND that **appropriately planned** vegetarian diets, including total vegetarian or vegan diets, are healthful, nutritionally adequate, and may provide health benefits in the prevention and treatment of certain diseases. **Well planned** vegetarian diets are appropriate for individuals during all stages of the lifecycle, including pregnancy, lactation, infancy, childhood, adolescence, and for athletes.”*

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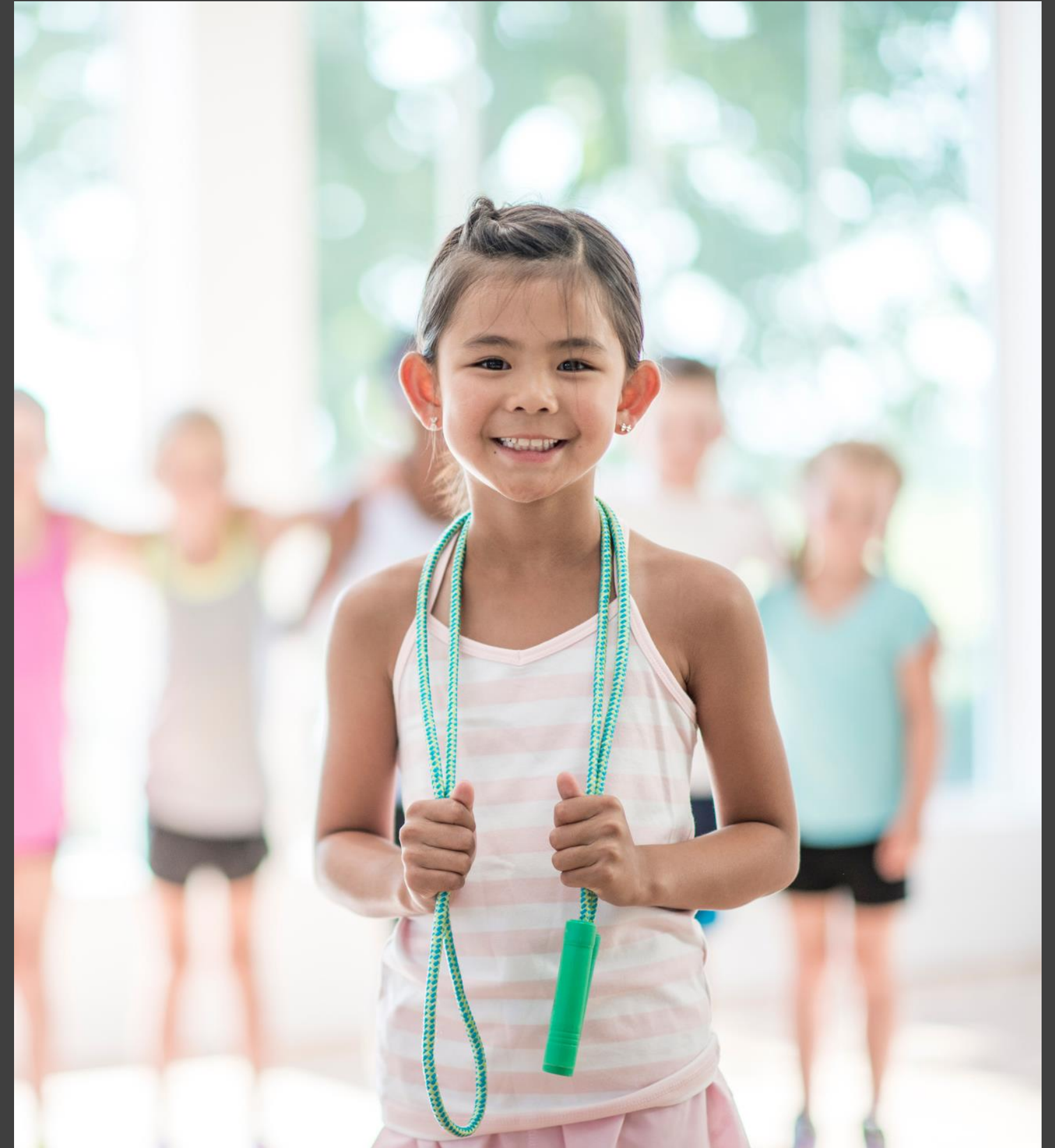
ALL diets for
children, regardless
of dietary pattern,
need to be
appropriately
planned.



“Well Planned?”

Advantages Associated with Plant-based Diets

- Higher quality diets.
- Higher intakes of fruits, vegetables, and associated nutrients.
- Lower intakes of sweets and salty snacks.
- Lower intakes of total and saturated fat.
- Reduced risk of obesity.



Ensure Adequate



Quality



Quantity



Variety

4 CORE CONCEPTS





1. Promote optimal growth, development, and well-being.

- ▶ A variety of dietary patterns, including well-planned plant-based diets, can adequately support the growth and development of children.
- ▶ All diets for children must provide adequate calories and nutrients.

2. Prevent immediate childhood health concerns.

- ▶ The diet must prevent conditions of poor nutrition such as iron-deficiency anemia, dental caries, and overnutrition or undernutrition.
- ▶ This means providing a variety of nutrient dense foods, fortified foods, and supplements where indicated.





3. Establish eating habits that support health throughout life and minimize the risk of chronic diseases.

- ▶ Eating patterns established in childhood profoundly impact food choices in adulthood.
- ▶ Plant-based diets tend to have higher diet quality scores.
- ▶ Plant-based children have healthier body weights, eat more fruits and vegetables, eat more fiber, eat fewer sweets and salty snacks, and eat less saturated fat.



4. Nurture children's natural ability to eat intuitively and with joy.

As parents, we can encourage intuitive eating and a life-long healthy relationship with food by:

- Honoring our child's appetite – division of responsibility for feeding.
- Keeping experiences around food positive and pleasant.
- Exploring food together.
- Avoiding food rewards and punishments.

Expert Advice

“The secret of feeding a healthy family is to love good food, trust yourself, and share that love and trust with your child... when the joy goes out of eating, nutrition suffers.”

Ellyn Satter



Division of Responsibility (Ellyn Satter)

LEADERSHIP

what
when
where



AUTONOMY

how much
whether

Division of Responsibility (Ellyn Satter)

LEADERSHIP

pasta, broccoli,
beans, fruit

6 pm

kitchen table

AUTONOMY





Do's

- ☑ Family meals
- ☑ Positive role model
- ☑ Healthy choices
- ☑ Physical activity

Don'ts

- ☒ Dieting
- ☒ Weight talk/teasing
- ☒ Excessive screen time



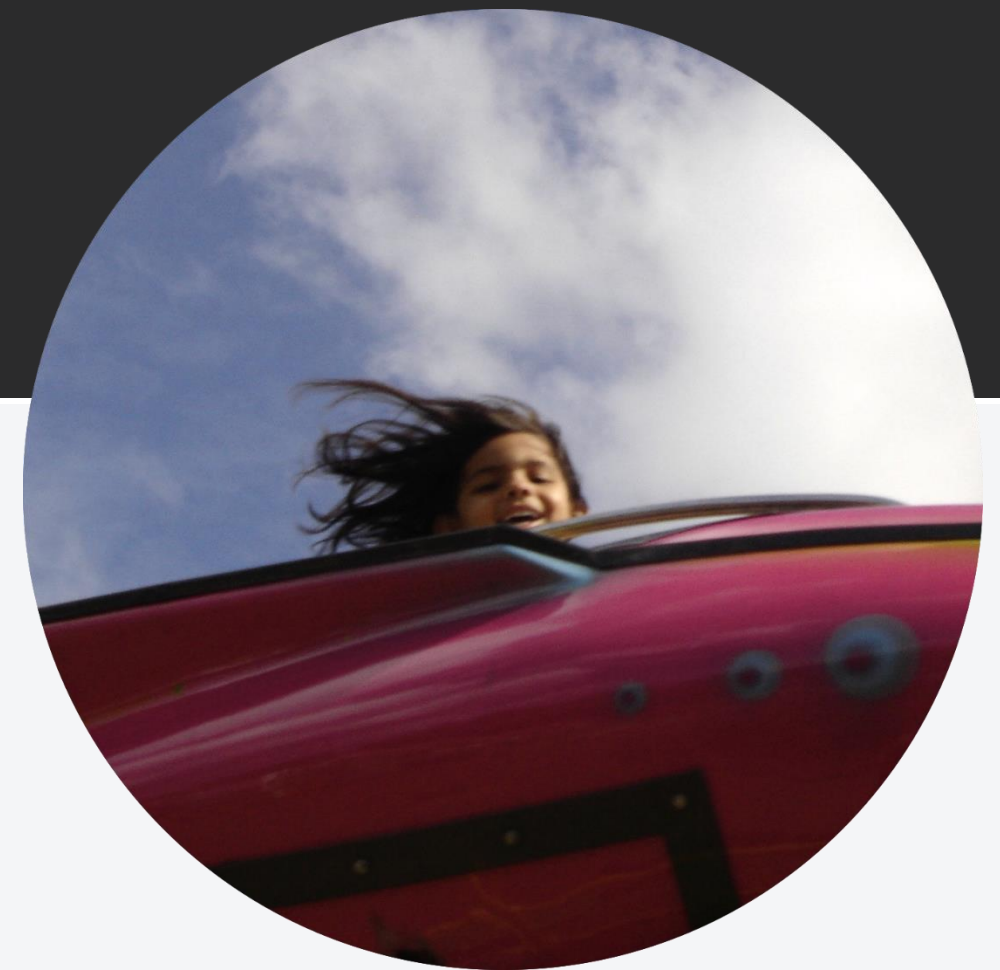
Guiding Principles. . .



PATIENCE



**ADVENTURE &
CURIOSITY**



FUN

Considerations at various stages of growth



Developmental Stages



INFANCY

- Feed on demand



OLDER BABY

- Transition to the table
- Don't get pushy
- TAKE NO for answer!



TODDLER

- 1-3 years: peak of "neophobia"
- Picky eating



SCHOOL-AGED

- Continued support and structure
- Avoid pushing, cheerleading, & shaming



ADOLESCENCE

- Family meals are critical
- Develop food-management skills

Infants (0-12 m)



Best Milks for Baby





Breastmilk is Best

- Exclusive breastfeeding for the first 6 months.
- Continue for as long as it benefits you and your baby (2-4 years).
- Multiple advantages for baby and mother.



Breast Milk of Vegetarians

Compared to breastmilk of nonvegetarians, breastmilk of well-nourished vegetarians contains:

1. Similar levels of macro- and micronutrients.
2. Smaller amounts of omega-3 fatty acids.
3. Fewer environmental contaminants (lowest among vegans).

Sanders TAB. *Am J Clin Nutr.* 1978;31:805-813.

Hergenrather J. *N Engl J Med.* 1981;304(13):792.

Rogan wJ. *N Engl J Med.* 1980 Mar 26;302(13):1450-53

What are Safe Alternatives to Breast Milk?

The only acceptable substitute for breast milk in the baby's first year is **commercial infant formula**.

- **Lacto-ovo vegetarians** → cow's milk-based formula
- **Vegans** → soy-based formula





Is Soy Formula Safe?

- ▶ Study compared infants fed:
 - breast milk (BF)
 - cow's milk formula (MF)
 - soy formula (SF)
- ▶ All 3 groups - normal range for brain development and cognitive function
- ▶ BF babies outscored MF and SF babies slightly.
- ▶ MF and SF babies did not differ significantly.



American Academy of Pediatrics (AAP) Weighs In

Isoflavones in soy formula do not adversely affect human development, reproduction, or endocrine function.

What About Homemade Formula?

- ▶ Homemade formulas are NOT appropriate for infants.
- ▶ Severe malnutrition in infants has been traced to homemade formula.
- ▶ In addition, for infants up to 12 months, breast milk or formula must NOT be replaced with cow's milk, goat's milk, soymilk, almond milk or any other non-dairy milks.



Complementary Feeding





When Should Baby Start Solids?

- **Start solids around 6 months when baby shows signs of readiness.**
- **Why not earlier?**
 - Not developmentally ready.
 - Not physiologically ready.
 - Greatest immune protection from breastmilk occurs while baby is exclusively breastfed.
- **Why not later?**
 - By 6 months babies need the additional calories and iron provided by solids.
 - This is a critical period for adapting to various tastes and textures.

First Foods

Iron-rich foods:

- Iron-fortified infant cereals mixed with breast milk or infant formula
- Well-cooked blended or mashed tofu, lentils or beans

Other foods:

- **Vegetables:** Cooked and blended, mashed or steamed
- **Fruit:** Soft fruits, cooked or grated hard fruits, avocado
- **Grain products:** well cooked grains, breads, cereals
- **Nut and seed butters and creams**



Timing of Introduction and Allergies

- ▶ **Old Thinking** – delay intro of allergens to 12 months, or 2-3 years for highly more allergenic foods or for high-risk infants.
- ▶ **New Thinking** – do not delay introduction of potential allergens; introduce early (about 6 months); medical support for infants at very high risk.





What Textures are Appropriate?

- ▶ A 6-month-old baby can safely handle a variety of textures, including pureed, mashed, finely chopped and even lumpy foods.
- ▶ Soft finger foods are also appropriate at this stage.

Baby Food No-No's

There are several foods that are NOT considered safe for babies:

- Unpasteurized dairy
- Cow's milk (to 12 months)
- Processed meat
- Honey
- Raw sprouts
- Sugar-sweetened beverages
- Juices (even 100% fruit juice)
- Foods with added sugars (to age 2)
- Protein powders
- Chocking hazards (hard, round or sticky foods)
- **Limit commercial rice products**





Solids vs Milk

Baby's milk is still the main source of calories:

- ~80% of kcal – 6-8 months
- ~50% of kcal – 9-12 months
- ~30% of kcal – 1-2 years

Baby-Led Weaning vs Spoon Feeding

- ▶ Baby-led weaning allows baby greater control of food intake.
- ▶ Babies are given food and encouraged to explore it and eat whatever they can get into their mouths independently.
- ▶ A compromise may be advised, especially for slower growing babies. Providing iron and calorie-dense foods on a spoon can help to ensure adequate intakes.



Supplements?

Breastfed

- **Vitamin D** – 10 mcg (400 IU) (to 12 months)
- **Iron** – 1 mg/kg beginning from 4 months until recommended intakes are met with solid foods

Formula Fed

- None if iron-fortified formula is used

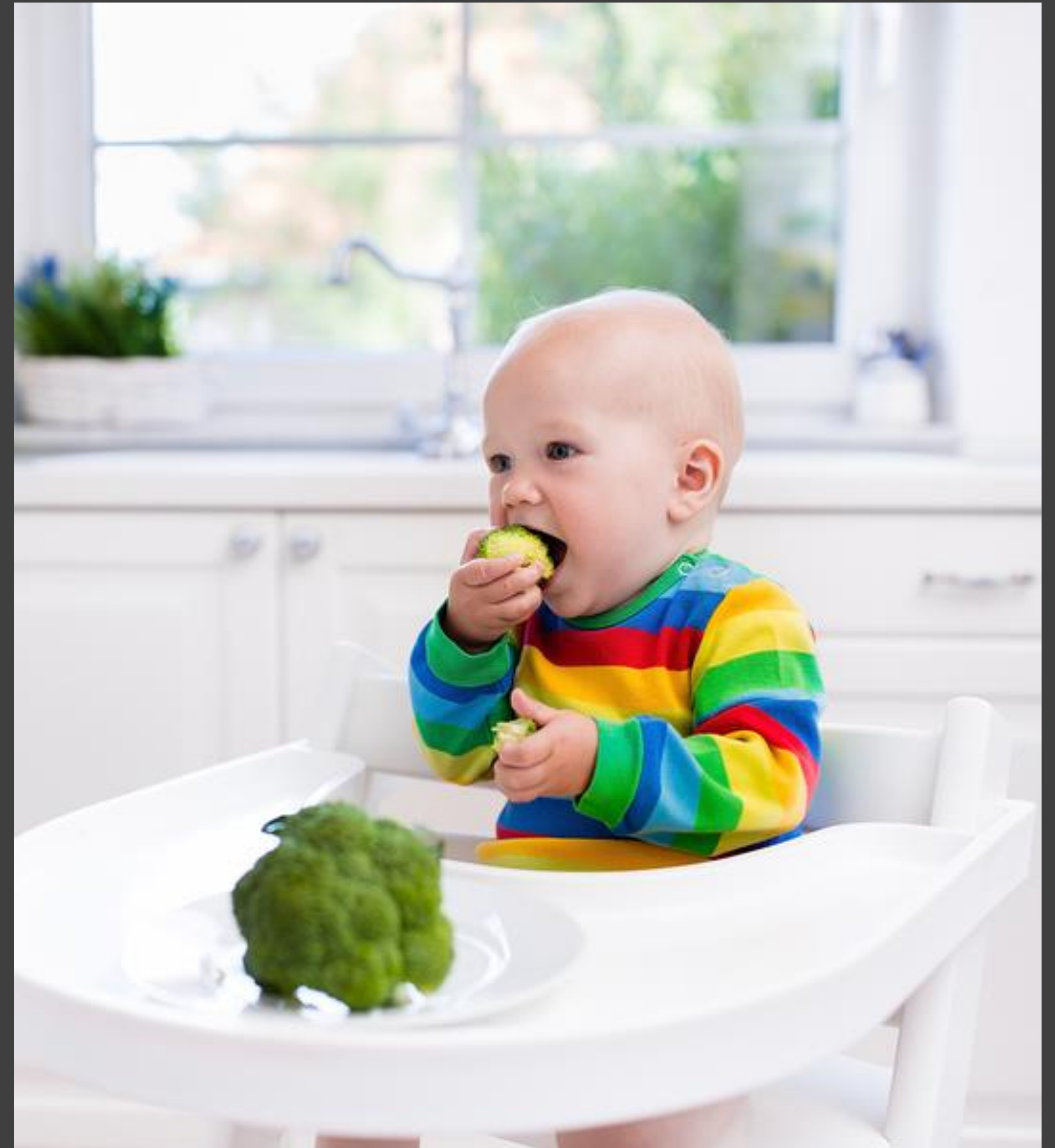


Toddlers (1-3 years)



Feeding Guidelines

- Avoid distractions
- Keep the atmosphere pleasant
- Limit meal duration (20 minutes)
- Provide 3 meals plus snacks with water in between
- Encourage self-feeding
- Continue to introduce new foods – can take 10-15 exposures before a food is accepted.





Appropriate Foods

- Focus on healthy family foods with a variety of flavors, textures, and colors.
- Minimize processed foods with added salt and sugar.

Ensure Adequate Calories

- ▶ Provide regular meals and snacks.
- ▶ Feed sufficient, but not excessive fiber.
- ▶ Include grains or starchy vegetables and legumes or tofu at most meals.
- ▶ Include fat sources at each meal.





Fat for Toddlers

- Low fat diets are inappropriate for toddlers.
- 40% of calories at age 1.
- Slowly reduce to about 30% by age 3.
- Do not restrict high fat whole foods such as avocado, tofu, nut and seed butters and creams.
- Use concentrated fats and oils judiciously, as they can crowd out foods that provide iron, zinc, calcium and other essential nutrients.



Milks for Toddlers

- ▶ Starting at 1 year, full-fat, fortified soymilk can be introduced. Soy milk has about the same amount of protein as cow's milk, and more iron.
- ▶ Soy milk has less fat than 2% cow's milk, so include other fat sources.
- ▶ Toddler formulas can be an option for toddlers with feeding difficulties or poor dietary intakes.

Low Protein Milks

- ▶ Fortified almond, coconut, oat, rice and hemp milks provide insufficient protein to serve as a primary milk for toddlers – about 1 gram of protein per cup (250 ml).
- ▶ Rice milk should be avoided by children under 5 years old due to its arsenic content.





Other Beverages

- ▶ Apart from milks, select water as the main beverage.
- ▶ Avoid sugar-sweetened beverages.
- ▶ If juice is provided, limit to not more than 4 ounces/120 ml/day (whole fruits are better choices).

How much salt and sugar?

Salt

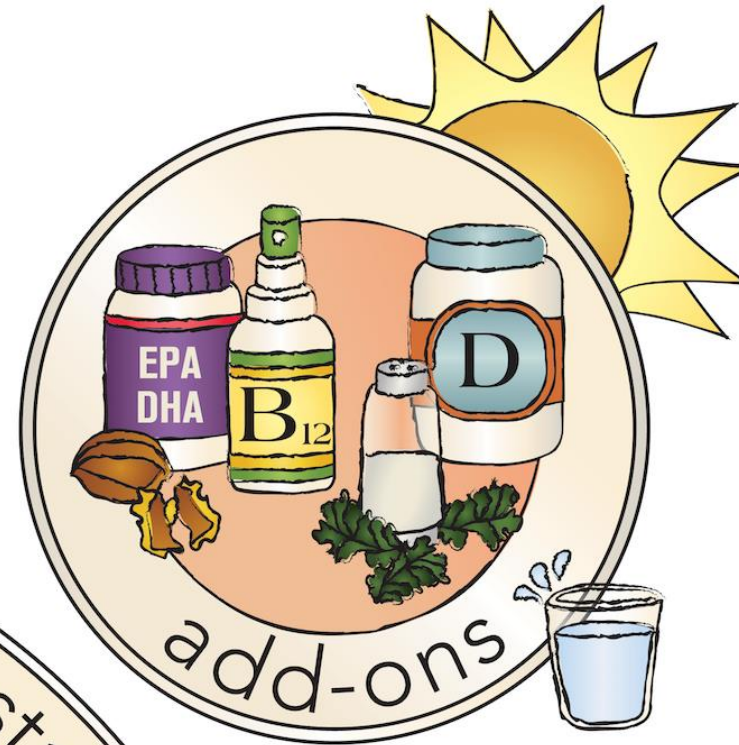
- CDRR cut off (maximum intake for chronic disease risk reduction) is 1200 mg.
- Many kid's meals exceed this limit in one meal.

Sugar

- AHA recommends no added sugar for toddlers to age 2, and no more than 6 tsp per day for children over the age of 2.
- A little sugar in a healthy muffin or cookie is not the issue; processed foods are.



The Plant-Based Plate



Food Guides

- ▶ Provide a variety of foods from each food group.
- ▶ Include foods from at least 3-4 of the 5 food groups at each meal.
- ▶ Include foods from at least 2 food groups at snack time.

Health Canada A global leader in nutrition policy.



Canada's
food guide

Eat well. Live well.

Eat a variety of healthy foods each day

Have plenty
of vegetables
and fruits

Eat protein
foods

Make water
your drink
of choice



Choose
whole grain
foods

Discover your food guide at
Canada.ca/FoodGuide

Supplements?

- ▶ **Vitamin D** – 600 IU
- ▶ **Vitamin B12** – 10 mcg/day or 250 mcg 2x/week
- ▶ **Iodine** – 90 mcg/day
- ▶ **EPA/DHA** – 70 mg/day (optional)
- ▶ **Multivitamin** (optional)



Liquid supplements are recommended at this age.

Children and Adolescents





Nurture a Healthy Relationship with Food

- ▶ Engage children in food selection at the market or grocery store.
- ▶ Cook with kids. Children love to pour, stir, chop, and shake.
- ▶ Grow a garden with your kids (or grow herbs, sprouts, etc.).
- ▶ Make family meals a priority. Keep the atmosphere positive and fun.



Instilling Healthy Habits

- ▶ Include a variety of wholesome, minimally processed foods.
- ▶ Avoid short order cooking.
- ▶ Limit highly processed, fast foods, and fried foods.
- ▶ Avoid sugar-sweetened beverages.
- ▶ Do not be overly restrictive. Occasional treats are OK.



Are Treats OK?

- ▶ Absolutely!
- ▶ Make healthy versions of popular favorites – cookies, bars, muffins, popsicles, ice cream, sparkling drinks.
- ▶ Limit exposure to less healthful choices such as candy and salty snacks, but do not forbid them.
- ▶ Being overly restrictive can result in food obsessions and an unhealthy relationship with food.



Challenges for Older Children/Teens

- ▶ Overweight, underweight, eating disorders
- ▶ Skipping breakfast or other meals
- ▶ Making healthy choices outside of the home
- ▶ Maintaining family connections
- ▶ Nutrition adjustments for athletes
- ▶ Adolescent challenges – acne



Family Meals Matter

- Family meals have more to do with positive adolescent outcomes than socioeconomic status, family structure, after school activities, tutors, or church.
- **Family meals:**
 - Help children perform better in school
 - Eat more healthfully
 - Make kids and parents happier
 - Provide an opportunity to share values and build family traditions.
 - Stay connected.

Supplements?

- ▶ **Vitamin D** – 600 IU
- ▶ **Vitamin B12** – 25-100 mcg/day or 500-1,000 mcg 2x/week
- ▶ **Iodine** – 90-150 mcg/day
- ▶ **EPA/DHA** – 90-160 mg/day (optional)
- ▶ **Multivitamin** (optional)

Chewable supplements are suitable for most children.



Avoiding Nutrition Shortfalls

- Protein
- Omega 3s
- Iron
- Zinc
- Calcium
- Vitamin D
- Vitamin B₁₂
- Iodine



Protein

Can children get
enough protein
without animal
products?





Absolutely!

Even the largest mammals on the planet can get enough protein from plants.

How Much Protein Do Children Need?

Protein RDA – Life Stage		g/kg	g/day	Suggested Increase PB	PB g/day
Infants	2-6 m (5.9 kg)	1.52	9.1	N/A	N/A
	6-12 m (9.1 kg)	1.2	11	N/A	N/A
Children	1-3 (12.3 kg)	1.05	13	30%	17
	4-8 (20 kg)	0.95	19	20%	23
	9-13 (36 kg)	0.95	34	15%	39
Males	14-18 (60.9 kg)	0.85	52	15%	60
Females	14-18 (54.1 kg)	0.85	46	15%	53

This RDA is not individual. It applies only to the specific “reference body weight” shown for each category.



Although there is no separate RDA for vegetarian/vegan children, many experts suggest an increase of 10-30%.



Smaller Increase (10%) or no increase for:

- ▶ Children who regularly include soymilk, tofu, veggie meats, nut butters and other low fiber foods.
- ▶ Lacto-ovo vegetarian children who regularly include eggs and dairy products.

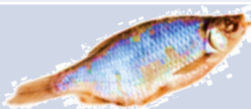


How Much Protein Do Toddlers Consume?

- **Germany – VeChi Study**
- 430, 1-3-year-old children
- **Average intakes:**
 - *Omnivores* – 2.7 mg/kg/day
 - *LOV* – 2.3 mg/kg/day
 - *Vegans* – 2.4 mg/kg/day

RDA - 1.05 g/kg/day

Plant Protein Sources

Plant Food	Protein (g)	Animal Food	Protein (g)
Soybeans, 1/2 c, cooked	15	Meat, 2 oz 	10-15
Tofu, firm, 1/4 cup 	10	Poultry, 2 oz	10-15
Veggie meat, 2 oz	10-15	Fish , 2 oz 	10-15
Lentils, 1/2 cup, cooked 	9	Milk, 2%, 1 cup 	8
Other legumes, 1/2 cup, cooked	7-9	Eggs, 1 large	6
Soy milk, 1 cup 	6-8	Cheese, 1/2 oz 	3.5
Hempseeds, 2 Tbsp	6.5	Sources: USDA Nutrient Database Release 27 (Manitoba Hemp Hearts Product Label) 	
Pumpkin seeds, 2 Tbsp 	5		
Kamut, spelt, wheat, 1/2 cup, cooked	5-6		
Amaranth, 1/2 cup, cooked 	5		
Quinoa, 1/2 cup, cooked	4		
Nuts, most, 2 Tbsp	2.5-4		
Oatmeal, 1/2 cup, cooked 	3		

Plant-Based Eaters Generally Get Plenty of Protein Unless:

- ▶ They get insufficient calories.
- ▶ They eat nutritionally inadequate diets that are low in protein:
 - High fat, high sugar, junk-food diets.
 - Fruitarian diets.





Ensuring Sufficient Intakes

- Include at least one protein-rich choice at each main meal:
 - Tofu, tempeh, edamame, or other soyfoods
 - Beans, lentils, split peas
 - Veggie “meats”
 - Seitan
 - Seeds, nuts
- Include a protein-rich choice at snack time.
- Select milks with 6-10 g protein per cup (soy, pea, cow’s milk).

Omega-3 Fatty Acids

Don't kids need fish for
omega-3 fatty acids?



Not Necessarily.

Omega-3s also come from plants.

Land Plants (ALA)

- Seeds – flax, chia, hemp
- Nuts – walnuts
- Soy, greens



Sea Plants (EPA/DHA)

- Microalgae (supplements)
- Macroalgae (seaweed – EPA only)





Birth-12 months

Sufficient in:

- Breastmilk (higher levels if mother gets direct sources of EPA/DHA).
- Formula fortified with DHA.

How much n-3 beyond 12 months?

Age Group	US Adequate Intakes (AI) ALA (g/d)	Suggested ALA no EPA/DHA (g/d)	Suggested EPA/DHA (mg/d)
Children 1-3 yrs	0.7	1.4	70 (DHA)
Children 4-8 yrs	0.9	1.8	90
Girls 9-13 yrs	1.0	2.0	100
Boys 9-13 yrs	1.2	2.4	120
Girls 14+ yrs	1.1	2.2	110
Boys 14+ yrs	1.6	3.2	160



Plant Sources of Omega-3 (ALA)

Food	Omega-3 (grams)
Walnuts, 1 oz.	2.6
Chia seeds, 1 Tbsp	2.5
Ground flax, 1 Tbsp	1.6
Hempseeds, 1 Tbsp	1.0
Leafy greens, 1 cup	<0.1





Boosting Omega-3s

- ▶ Incorporate ALA-rich seeds (ground flax, chia and hempseeds), and walnuts (or their butters, creams, oils) in the daily diet.
- ▶ Add an EPA/DHA supplement.

VITAMIN





How much vitamin B12 is needed?

- ▶ Age 0-6 m – 0.4 mcg
- ▶ Age 7-12 months – 0.5 mcg
- ▶ Age 1-3 years – 0.9 mcg
- ▶ Age 4-8 years – 1.2 mcg
- ▶ Age 9-13 years – 1.8 mcg
- ▶ 14 years+ - 2.4 mcg

Are Plant Eaters at Higher Risk?

- ▶ **Yes!** Plant foods are not reliable B12 sources, unless they are fortified.
- ▶ Even foods commonly thought to be reliable sources – organic vegetables, seaweed, fermented foods and mushrooms – cannot be relied on as sources of vitamin B12.





B₁₂ Stores

- Stores *may* last 2-3 years or more in adults.
- However, breast fed babies born to B₁₂ deficient mothers can develop B₁₂ deficiency within months or even weeks of birth.



Be Sure of B₁₂

- ▶ Breastfed babies require a B₁₂ supplement if the mother does not include consistent, reliable B₁₂ sources in her daily diet.
- ▶ Formula contains B₁₂.
- ▶ Once breastfeeding slows or stops infants must be provided with an alternative sources of B₁₂.



Symptoms of Deficiency?

- Regression of developmental skills
- Hypotonia (poor muscle tone)
- Vomiting
- Diarrhea
- Lethargy
- Failure to thrive
- Tremors, twitches
- Brain damage

What are Reliable B₁₂ Sources?

1. Supplements
2. Vitamin B₁₂-fortified foods
3. Animal products (for LOV or plant-predominant eaters)



How Much B₁₂?

Age	US RDA	Recommended Dose/ 2 doses/day	Recommended Dose/ 1 dose/day
0-6 months*	0.4 mcg	0.4-1 mcg per dose	5 mcg
6-12 months	0.5 mcg	0.5-1 mcg per dose	5 mcg
1-3 years	0.9 mcg	1 mcg per dose	10 mcg
4-8 years	1.2 mcg	1.5 mcg per dose	25 mcg
9-13 years	1.8 mcg	2 mcg per dose	50 mcg
14+ years	2.4 mcg	3 mcg per dose	100 mcg



**** Generally sufficient
from breastmilk or
formula***

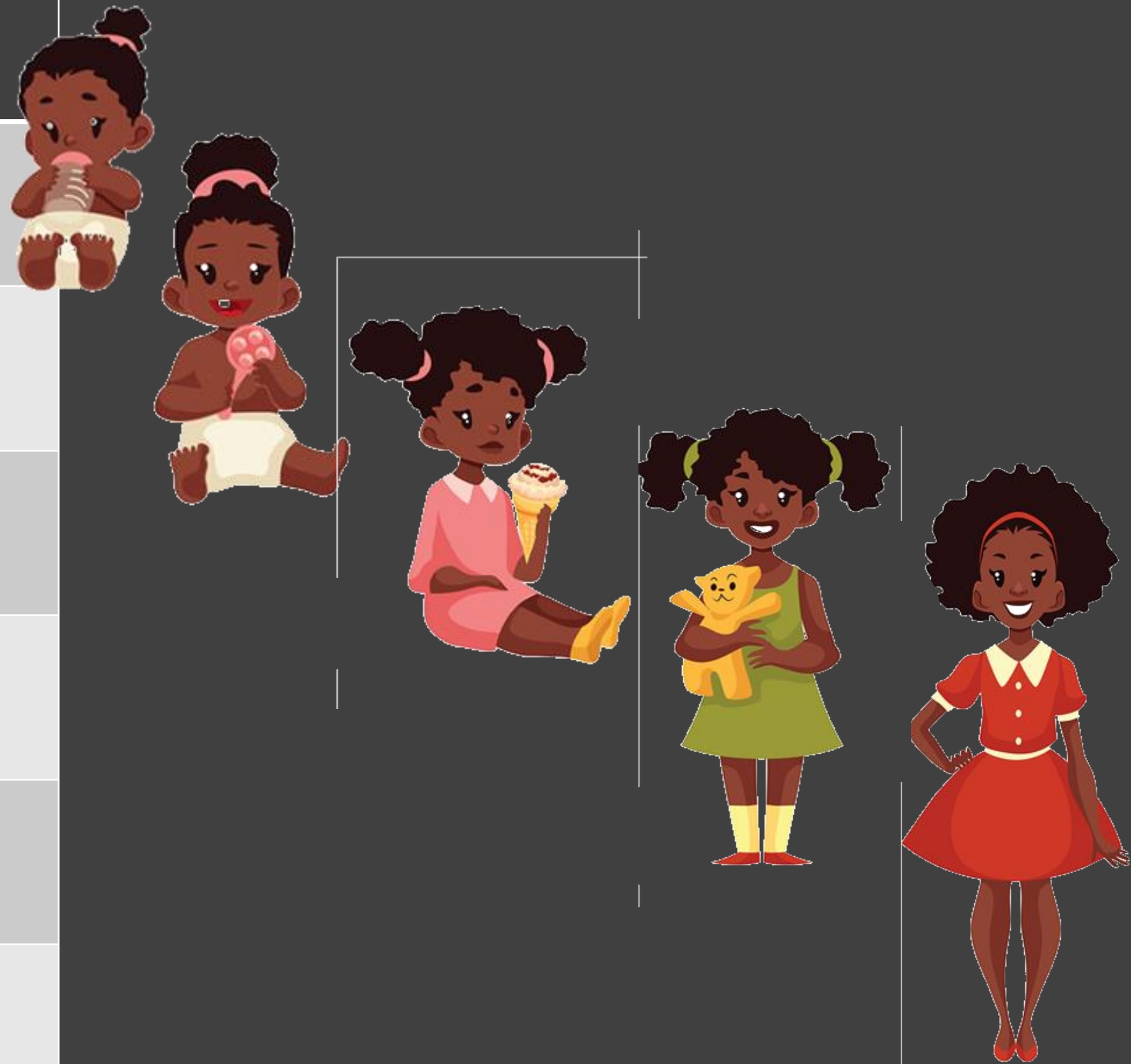
- ▶ Liquid drops or sprays are suggested for children up to 3 years of age.
- ▶ Chewable supplements can be used thereafter, if desired.

Iron



How Much Iron is Needed?

Age	US RDA (mg)
7-12 months	11
1-3 years	7
4-8 years	10
9-13 years	8
Girls 14-18 years	15
Boys 14-18 years	11





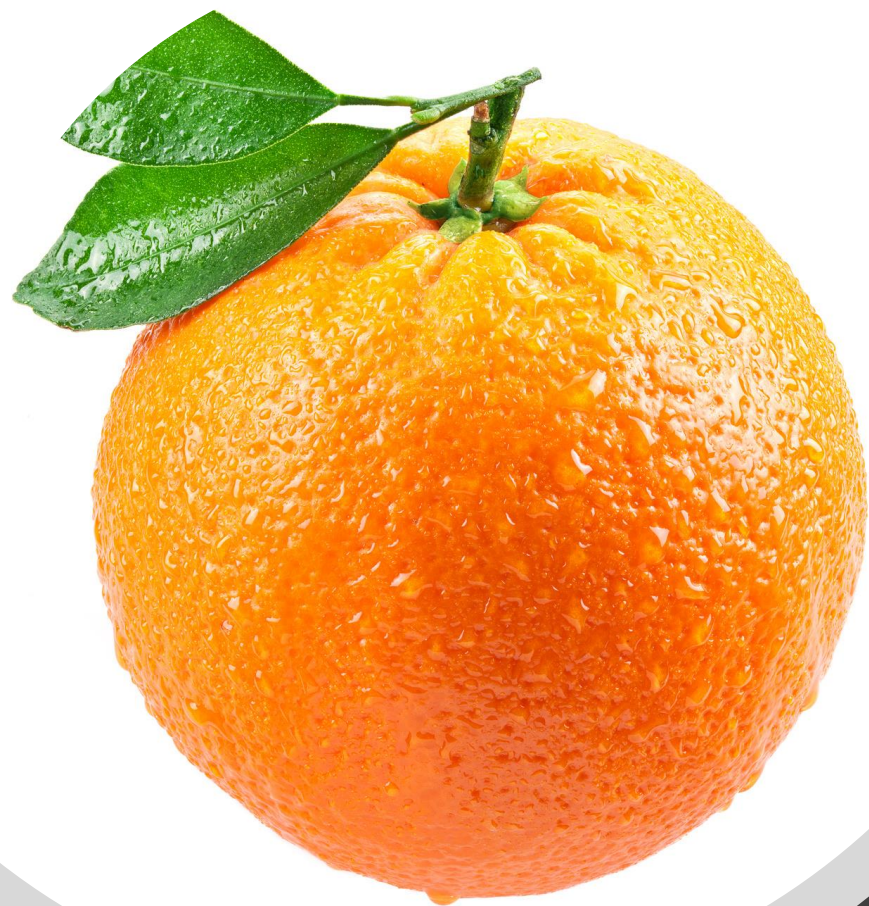
Factors Increasing Risk of Iron Deficiency

Infants

- Premature birth or low birth weight
- Early introduction to cow's milk (before 1 year)
- Use of unfortified infant formula
- Late introduction to solid foods (>6 months)

Children/Teens

- Drinking too much milk – > 24 ounces per day (ages 1-5 years)
- Insufficient dietary sources
- Lead exposure
- Health conditions; chronic infections
- Heavy menstrual bleeding



Maximizing Iron Status

1. Moderate intake of iron absorption inhibitors (e.g., phytates, polyphenolic compounds).
2. Boost intake of iron absorption enhancers (e.g., vitamin C, carotenoid-rich foods, allium veggies).
3. Replace meat with legumes rather than dairy.
4. Select iron-rich foods within each food group.



Iron Supplements

Breastfed

- **Full-term Infants** – AAP suggests 1 mg/kg from 4 months until recommended intake is met with solid foods (e.g., iron-fortified infant cereal)
- **Premature Infants** – typically 2 mg/kg from 1 through 12 months

Formula-fed

- Choose iron-fortified formula





Supplements for Children?

- ▶ Test iron levels at about 1 year.
- ▶ Supplement, if indicated.
- ▶ Select multivitamin with iron.

Zinc





Zinc in Plant Foods

- ▶ Zinc absorption can be significantly lower from plant foods, especially if foods are high in phytates.
- ▶ No separate recommendations for vegetarians.

How much zinc do we need?

Age	RDA (mg)	UL (mg)
0-6 m	2	4
7-12 m	3	5
1-3 y	3	7
4-8 y	5	12
9-13 y	8	23
Females 14-18 y	9	34
Males 14-18 y	11	34





Factors Increasing Risk for Inadequate Intakes

- Exclusive breastfeeding >6 m
- Very high phytate intakes
- Picky eating
- Highly refined diets
- Overly restrictive diets
- Eating disorders
- GI disorders (malabsorption)



How to Boost Zinc

- ▶ Limit the use of very high phytate foods (e.g., wheat bran) and use food preparation techniques that reduce phytates.
- ▶ Ensure sufficient calories – include regular nutritious snacks for small children.
- ▶ Include a multivitamin with zinc.
- ▶ Include zinc-rich foods at each meal.



Calcium

How Much Calcium is Recommended?

Age	Calcium RDA (mg/day)
1-3 years	700
4-8 years	1000
9-18 years	1300



Calcium Intakes in Plant-based Children

- ▶ Lacto-ovo vegetarian children as much or more calcium than non-vegetarians.
- ▶ Vegan or 100% plant-based children often fall below the RDA for calcium.



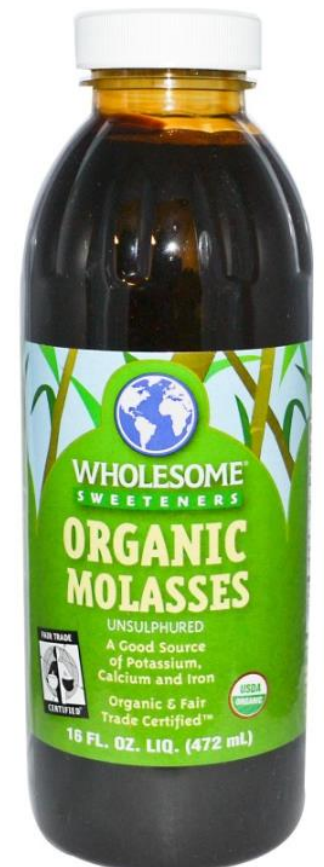
Can Children Get Enough Calcium Without Dairy?

YES!

1. By including sufficient calcium-rich plant foods and calcium-fortified foods.
2. By being aware of factors that can impact calcium absorption.

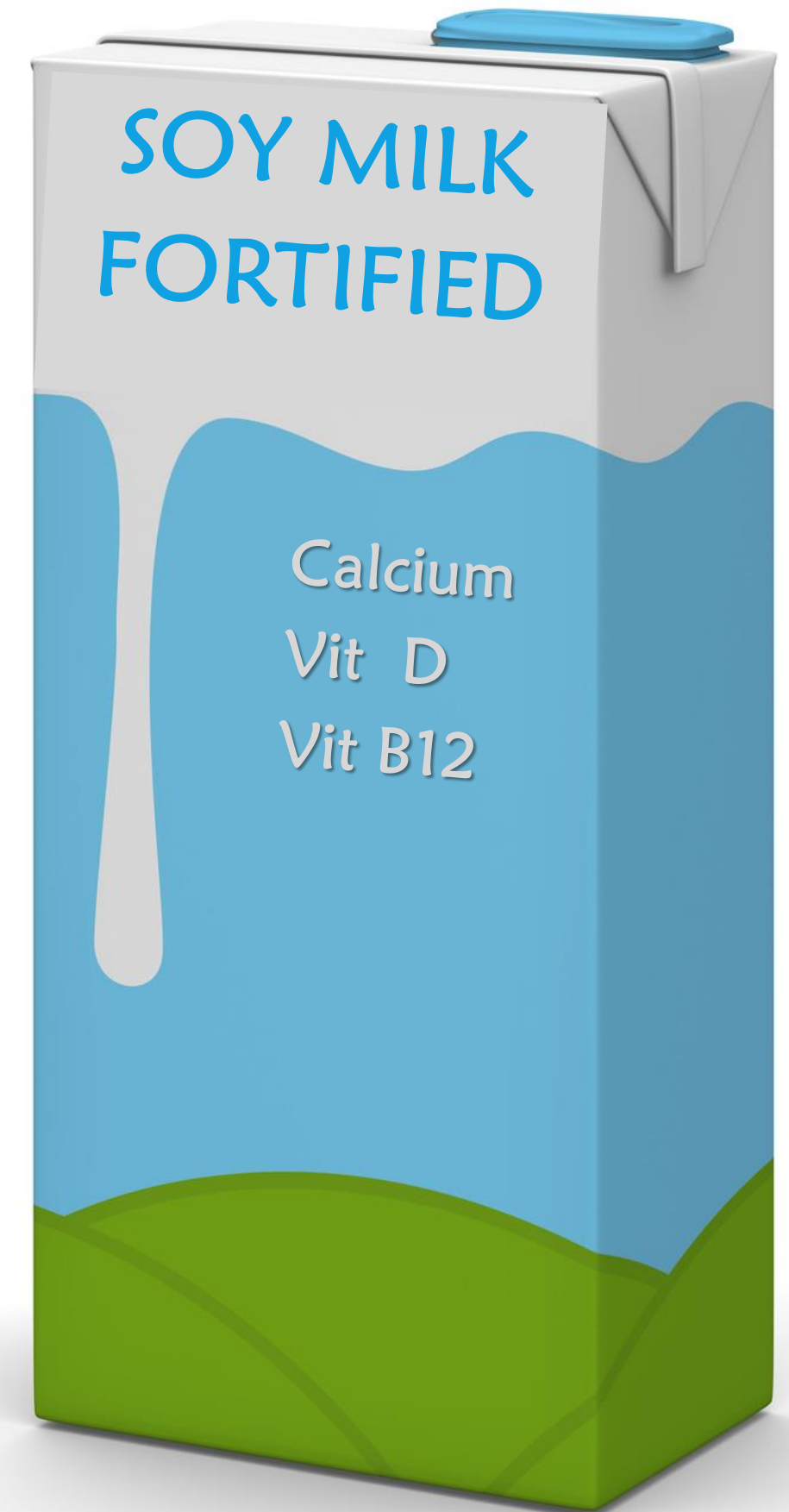


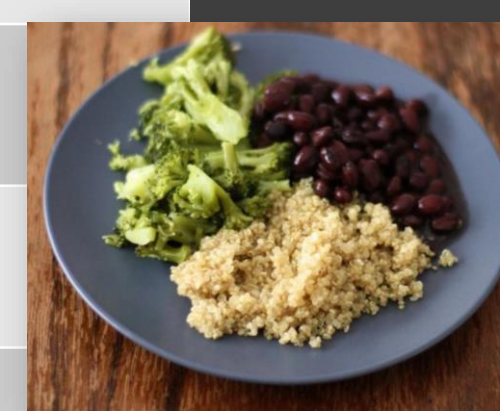
Calcium-rich Plant Foods



Select Calcium-fortified Non-Dairy Milks and Other Foods with Added Calcium

- ▶ It is much easier to provide a small child with 1,000 mg calcium when calcium-fortified foods are included.
- ▶ Calcium-fortified milks provide about 300-450 mg calcium per cup, so 2 servings along with other calcium-rich choices will generally meet needs.



Child Menu with 1000 mg Calcium		Calcium (mg)	
Breakfast	Oatmeal + berries, ½ cup each	14 + 5	
	Fortified non-dairy milk, 1 cup	300	
	Chia seeds, 1 Tbsp	27	
Snack	Small whole grain muffin	43	
Lunch	Peanut butter and banana wrap	124	
	Veggies and cashew dip	36	 
Snack	Smoothie with 1 cup fortified non-dairy milk	330	
Dinner	Black beans, ½ cup	23	 
	Quinoa, ¼ cup	8	
	Broccoli, ½ cup	31	
	Chocolate pudding, 1/3 cup	90	
TOTAL		1,000	

Be Aware of Factors that Impact Calcium Absorption

Negative Impact

- Excessive oxalates or phytates
- Excessive sodium
- High acid load
- Alcohol
- Caffeine

Positive impact

- Vitamin D





Other Factors Affecting Absorption

Amount Consumed

- Absorption efficiency decreases as calcium intake increases

Age and Life Stage

- Calcium absorption is as high as 60% in infants and young children.
- Absorption decreases to 15-20% during adulthood, except for pregnancy when it is higher.



Calcium Bioavailability

High (40-60%)	Moderate (30%+)	Fair (20%+)	Low (~ 5%)
Juice (with calcium citrate malate)	Tofu (with calcium)	Sweet potatoes	Rhubarb
Greens (low oxalate) ▸ broccoli ▸ kale ▸ Chinese greens ▸ turnip greens ▸ mustard greens	Dairy products ▸ milk ▸ cheese ▸ yogurt	Legumes (most) Soy milk	Greens (high oxalate) ▸ spinach ▸ beet greens ▸ Swiss chard

Calcium Bioavailability

Iodine



Iodine Insufficiency

- ▶ Severe deficiency results in cognitive impairment and is the #1 cause of preventable brain damage in the world.
- ▶ Mild deficiency in pregnant women and infants can lower IQ by 10 to 15 points, adversely affecting learning ability.
- ▶ Risk is higher in vegans.



Iodine RDA US

Age	RDA (daily)	UL
0-6 m	110 mcg	Not established.
7-12 m	130 mcg	Not established.
1-3 y	90 mcg	200 mcg
4-8 y	90 mcg	300 mcg
9-13 y	120 mcg	600 mcg
14 + y	150 mcg	1,100 mcg



RDA increases:
220 mcg - pregnancy
290 - lactation



Food Sources

- ▶ **Richest Sources** – seaweed, dairy products, fish, seafood, eggs and iodized salt.
- ▶ **Note:** Seaweed can easily exceed the UL (e.g., as little as 1/8 tsp kelp can exceed the UL for toddlers). Nori is much lower in iodine (1 full-sized sheet provides about 100 mcg, although amounts vary).



How to Boost Intake

- ▶ If using salt, select iodized salt or iodized sea salt.
- ▶ Include controlled amounts of seaweed, particularly if not consuming seafood, dairy and eggs.
- ▶ Use a supplement (multivitamin or iodine drops)

SUMMARY

Well designed plant-based diets are safe and appropriate for growing children.

We are more likely to meet children's nutritional needs with a thoughtfully planned plant-based diet than we are by feeding them a typical Western diet.





But the most compelling reasons for shifting to a plant-based diet are the benefits beyond personal health... the benefits future generations, to all life on earth, and to our planet itself.

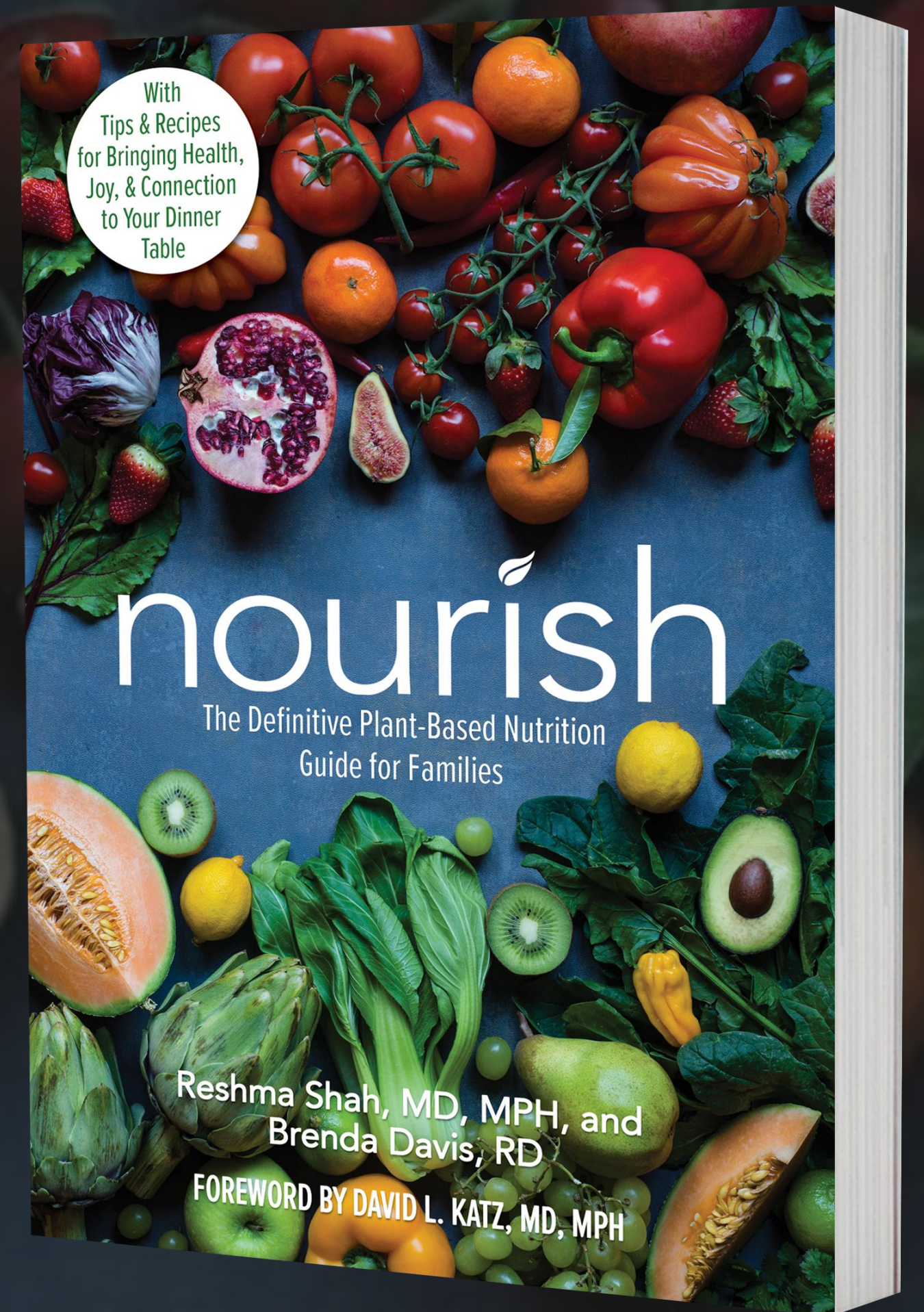
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QUESTIONS?

