Beyond Calcium: The Dairy Matrix and the Impact of Milk and Dairy Foods on Health

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About Us

Dairy Council of California is a leading nutrition organization working in collaboration to elevate the health of children and communities through fostering lifelong healthy eating patterns.

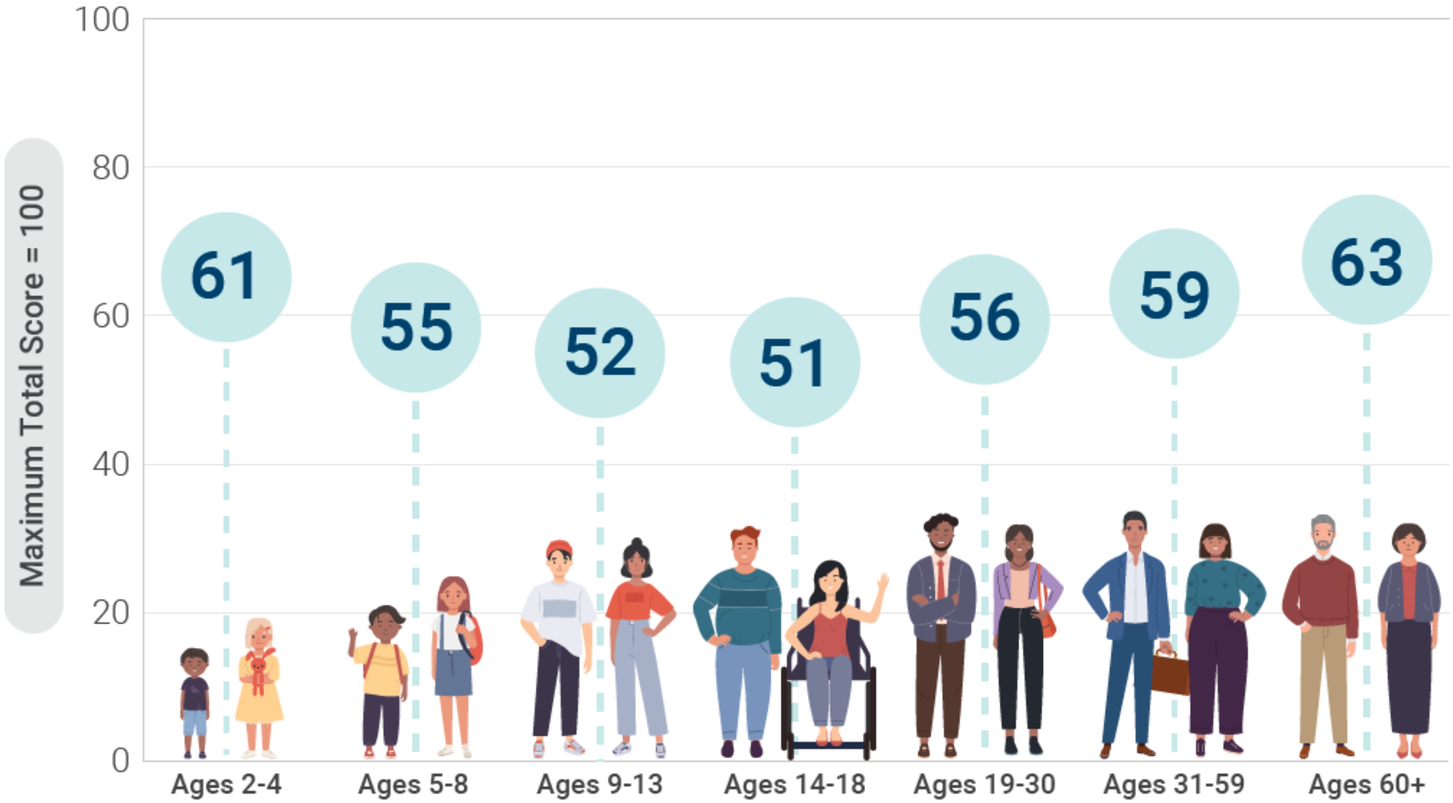
- Education
- Advocacy
- Collaboration

Learning objectives

1. Describe the shift from a nutrient-based approach to food-based dietary guidance.
2. Explore how the structure and combination of nutrients in milk and dairy foods, known as the dairy matrix, makes them effective at delivering nutrients.
3. Recognize the impact of dairy foods on health outcomes across the life span and on chronic disease risk.
4. Identify ways the food matrix concept can enhance public health by supporting more holistic, food-based nutrition interventions.

Most Americans Do Not Meet Dietary Recommendations

Adherence of the U.S. Population to the *Dietary Guidelines* Across Life Stages, as Measured by Average Total Healthy Eating Index-2015 Scores



NOTE: HEI-2015 total scores are out of 100 possible points. A score of 100 indicates that recommendations on average were met or exceeded. A higher total score indicates a higher quality diet.

Data Source: Analysis of What We Eat in America, NHANES 2015-2016, ages 2 and older, day 1 dietary intake data, weighted.

DietaryGuidelines.gov

Dietary Guidelines for Americans, 2020-2025

The Dietary Guidelines for Americans Through the Years

1985-1990

Maintain "desirable" weight

1995-2000

Food pyramid introduced

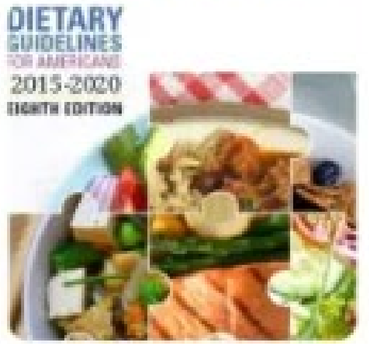
2005-2010

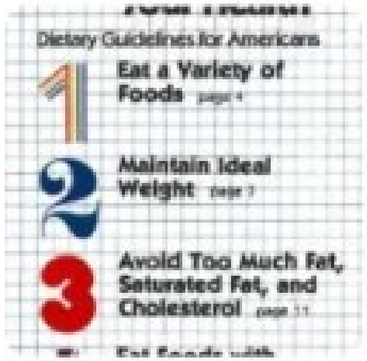
Core message: "Health promotion & disease prevention"

Dietary Guidelines for Americans

2015-2020

MyPlate & healthy eating patterns



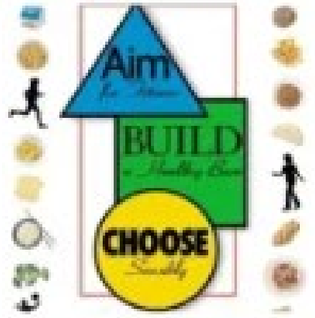


Eat a variety of foods

1980-1985

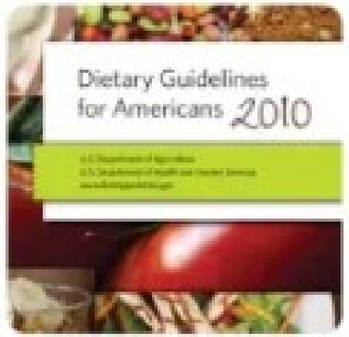
Serving suggestions for food groups

1990-1995



"Aim for fitness, build a healthy base, choose sensibly"

2000-2005



Emphasizes diet & obesity epidemic link

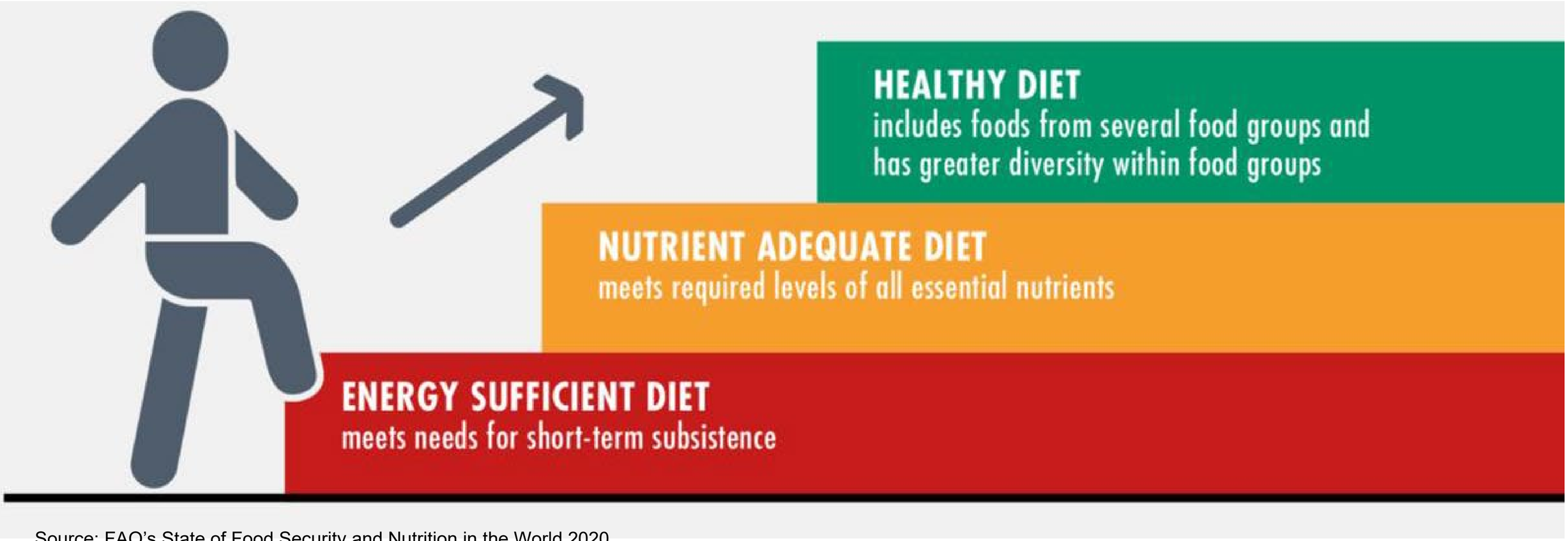
2010-2015

Healthy eating patterns for every life stage

2020-2025

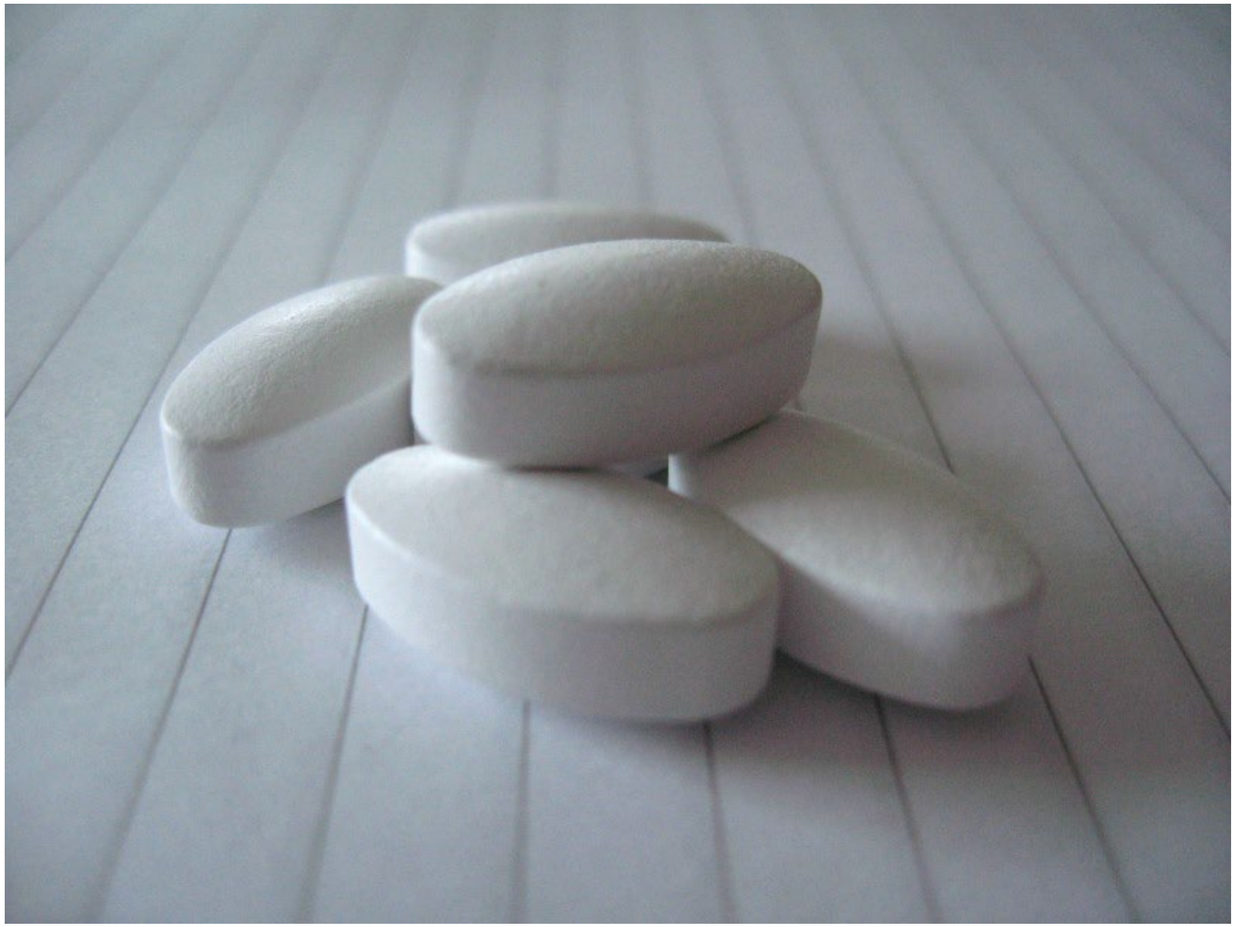
Source: Bringham Heart and Science

Shifting Dietary Patterns



Source: FAO's State of Food Security and Nutrition in the World 2020

Shifting from Isolated Nutrients to the Food Matrix



Food Matrix

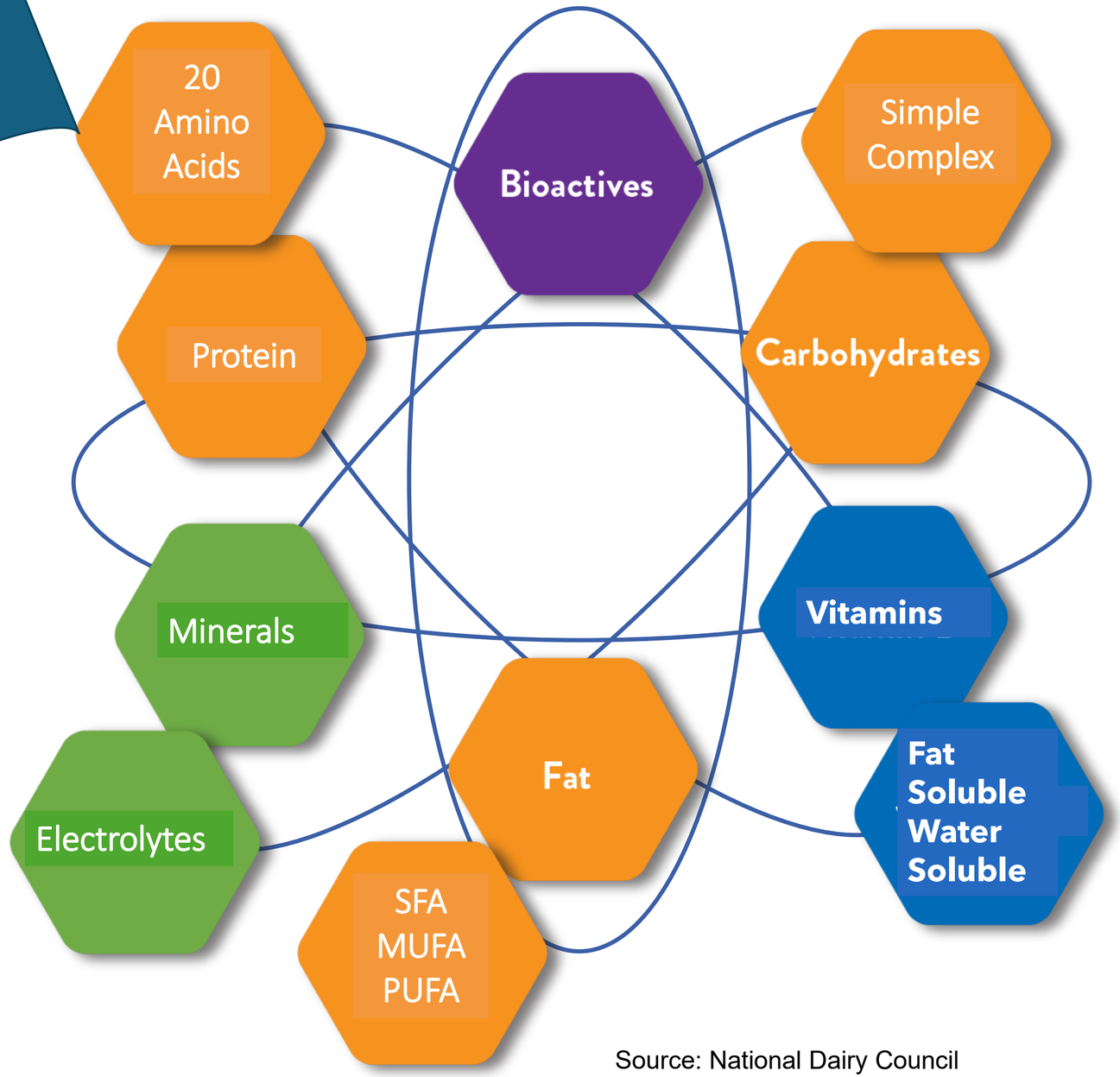
food ma·trix

Emerging Concept

noun

The nutrient and non-nutrient components of foods and their molecular relationships, i.e. chemical bonds, to each other.

-USDA



https://agclass.nal.usda.gov/mtwdk.exe?k=glossary&l=60&w=6026&s=5&t=2

Source: National Dairy Council

Dairy Foods' Matrix is Unique: Whole is Greater than the Sum of its Parts

- Protein
- Fat
- Carbohydrates
- Bioactives
- Vitamins
- Minerals

Macronutrients

Minerals

Vitamins

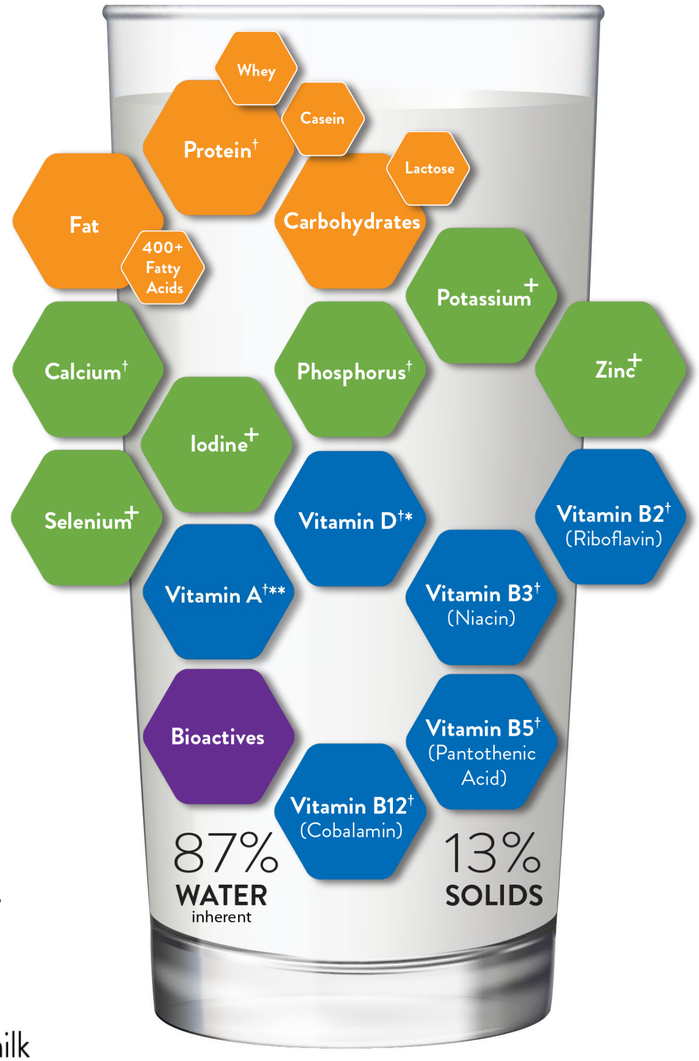
Bioactives

† **Milk is a good or excellent source of 13 essential nutrients.**

* Vitamin D is added to milk

** Vitamin A is naturally occurring in whole milk and added to reduced-fat, low-fat and fat-free milks

Liquid Matrix



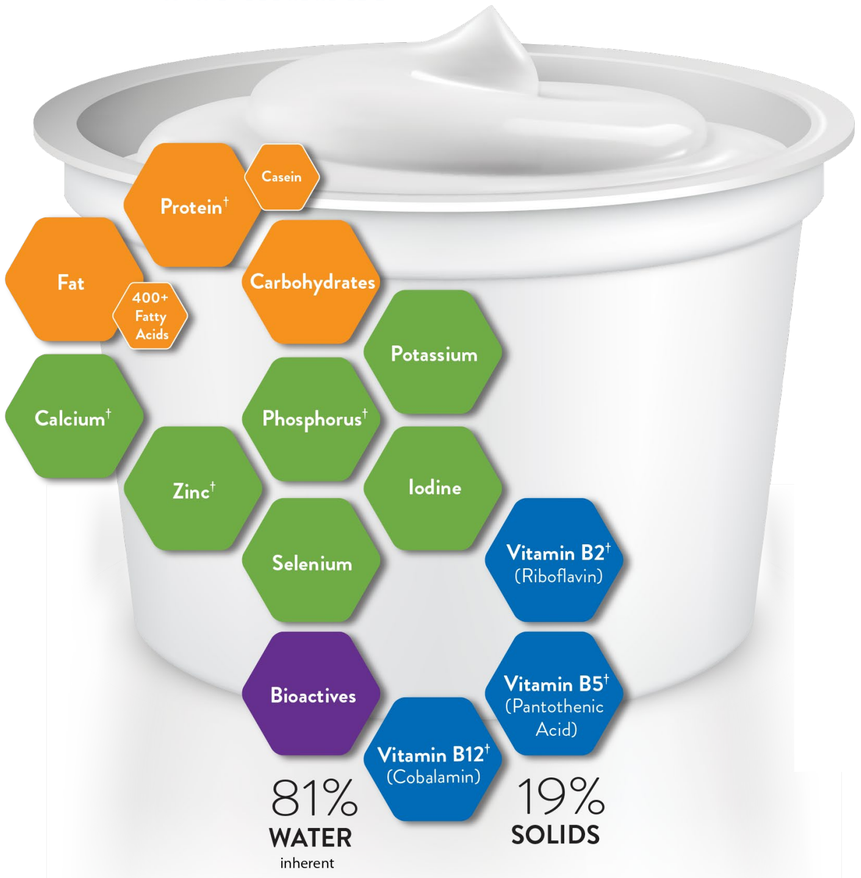
FDA's Daily Value (DV) for potassium of 4700 mg is based on a 2005 DRI recommendation. In 2019, NASEM updated the DRI to 3400 mg. Based on the 2019 DRI, a serving of milk provides 10% of the DRI. FDA rule-making is needed to update this value for the purpose of food labeling.

Source: National Dairy Council

Nutrition Data sourced and calculated from FoodData Central: 1077

Milk Matrix Transformation:
Fermentation → Yogurt and Cheese

Gel Matrix



- Macronutrients
- Minerals
- Vitamins
- Bioactives

† **Yogurt is a good or excellent source of 7 essential nutrients**

Solid Matrix

Short chain fatty acids

Bioactive Peptides

- Macronutrients
- Minerals
- Vitamins
- Bioactives

† **Cheese is a good or excellent source of 6 essential nutrients**

* Vitamin A is naturally occurring in whole milk and added to reduced-fat, low-fat and fat-free milks.

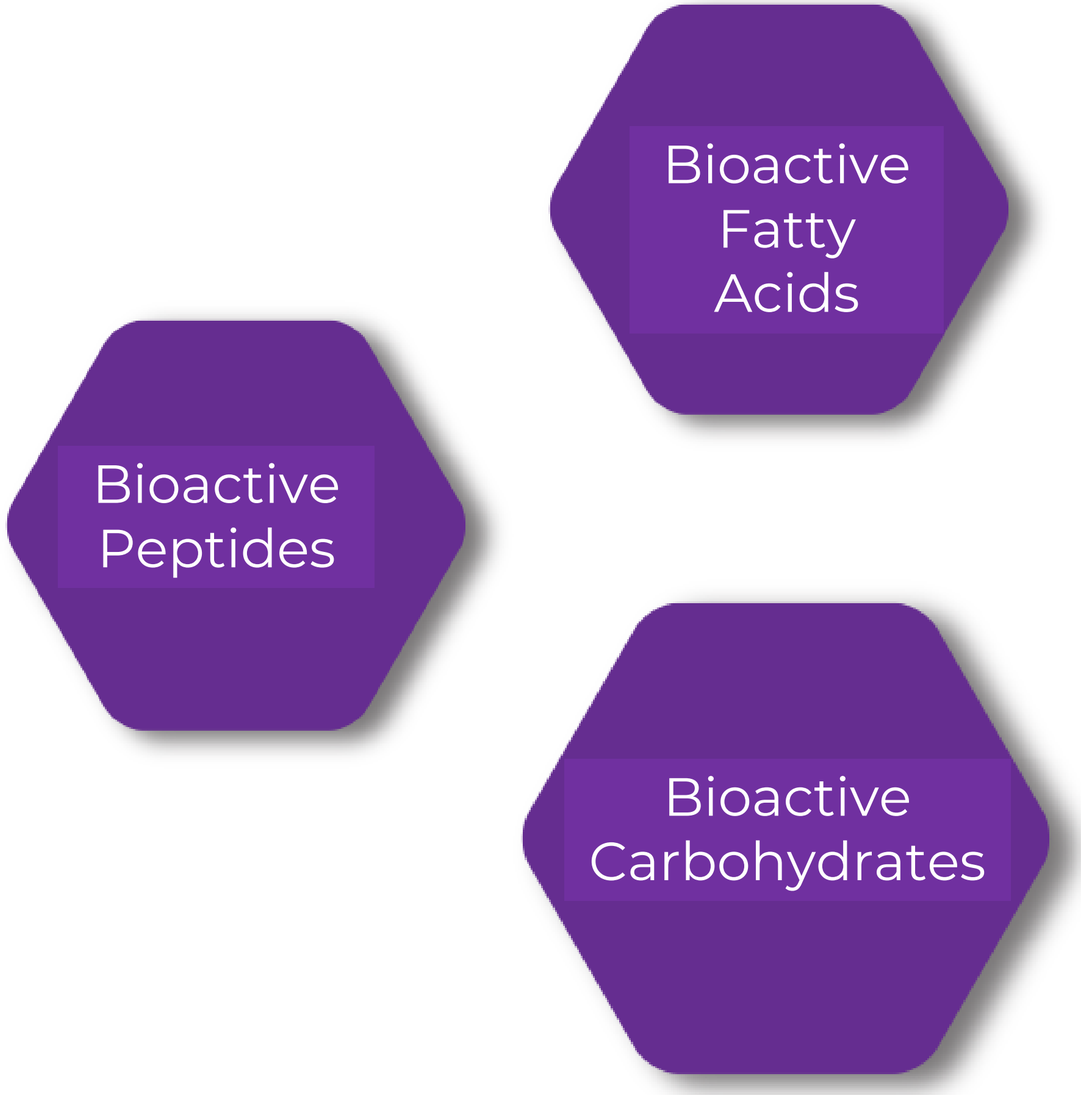
Greek Yogurt - Food Data Central: 171304
Cheddar Cheese - Food Data Central: 170899

Source: National Dairy Council

Milk Bioactives

"Bioactives are constituents in foods, other than those to meet basic nutritional needs, that are responsible for a change in human health."

-Office of Disease Prevention & Health Promotion, National Institutes of Health

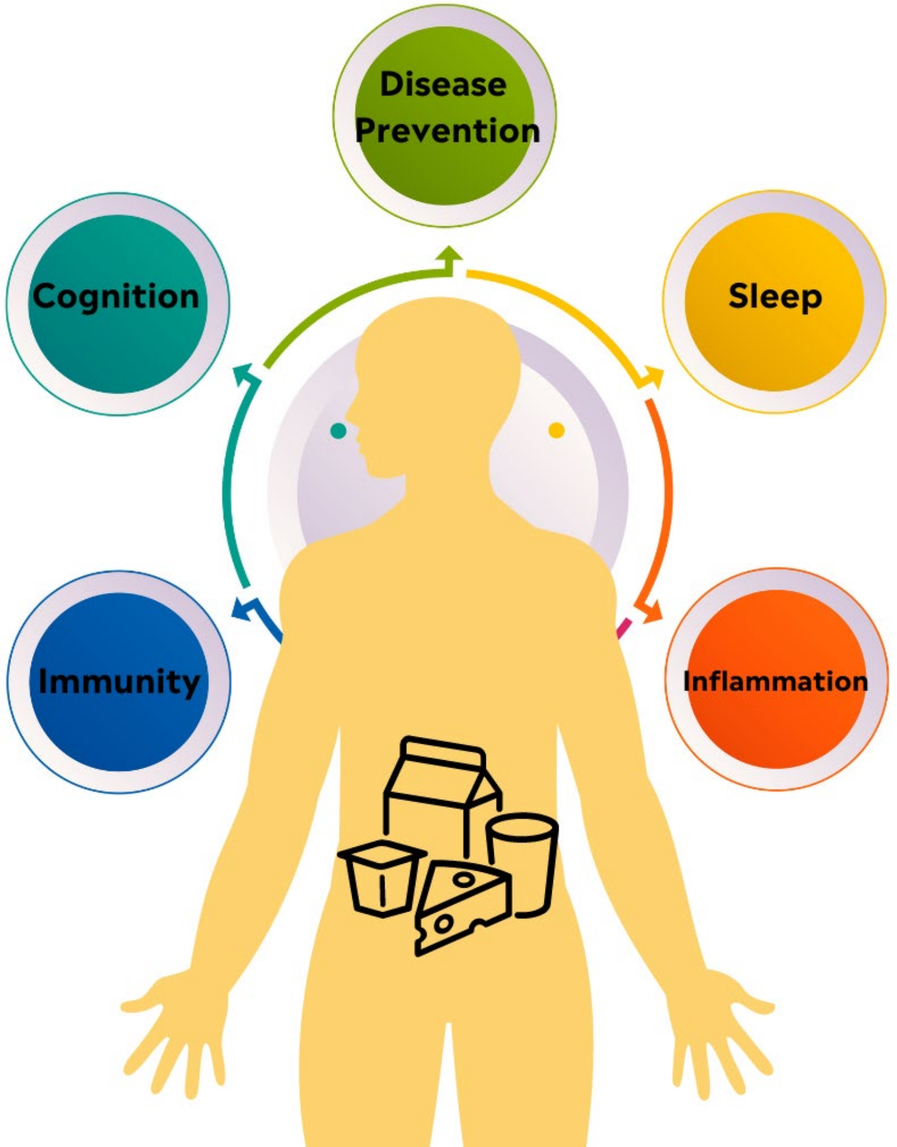


NIH, Office of Dietary Supplements. Federal Register Vol. 69 No. 179 FR Dec 04–20892, Sept. 16, 2004

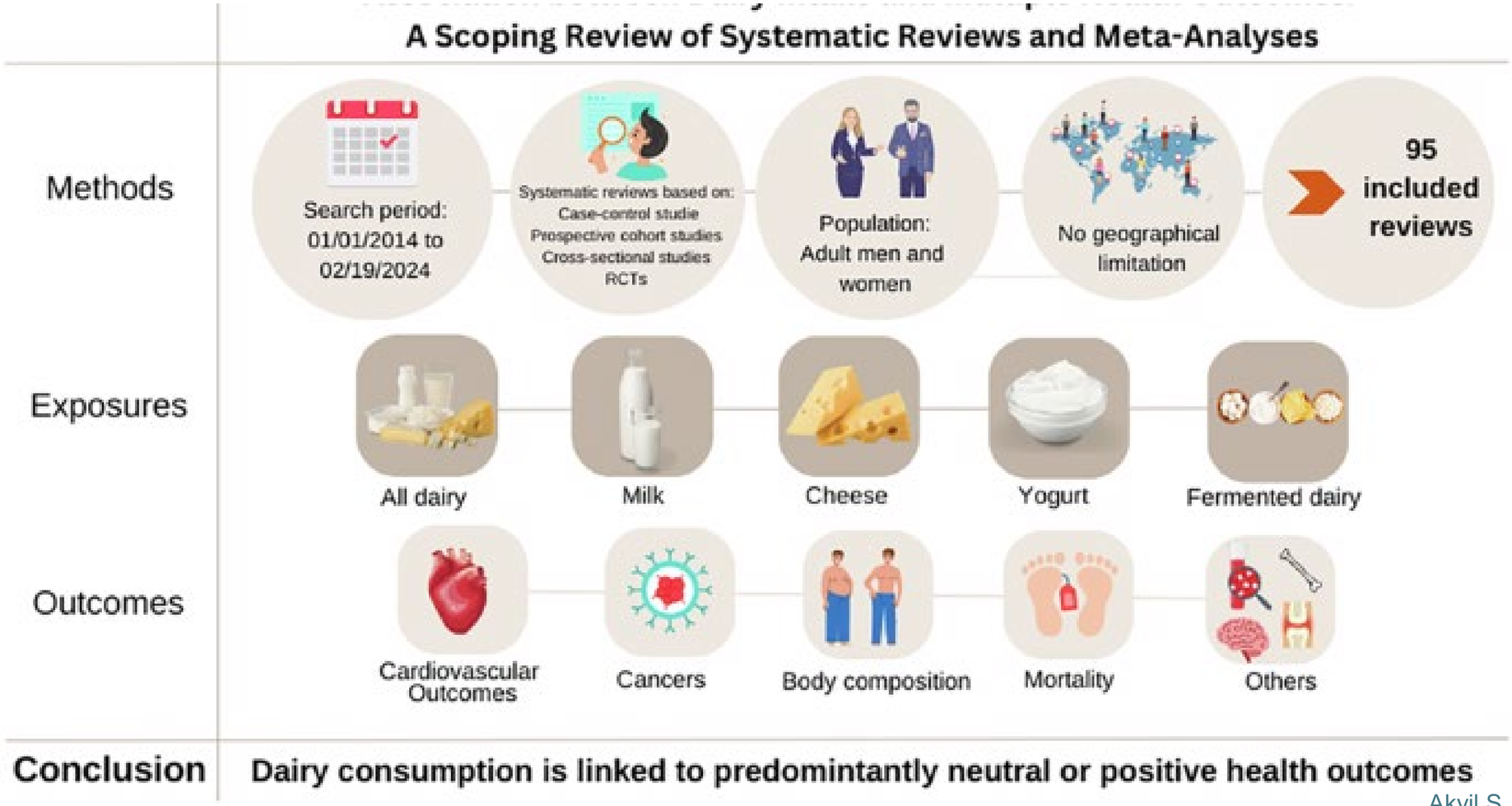
Source: National Dairy Council

Functional Health Benefits of Dairy

- Inflammation
- Cognition
- Sleep
- Immunity
- Disease prevention



Association between dairy intake and multiple health outcomes



Akyil S, et al. Eur J Clin Nutr 2025

Qualified Health Claim for Yogurt + Reduced Risk of Type 2 Diabetes

“Eating yogurt regularly, at least 2 cups (3 servings) per week, may reduce the risk of type 2 diabetes according to limited scientific evidence.”

Dairy Supports Health at Every Life Stage

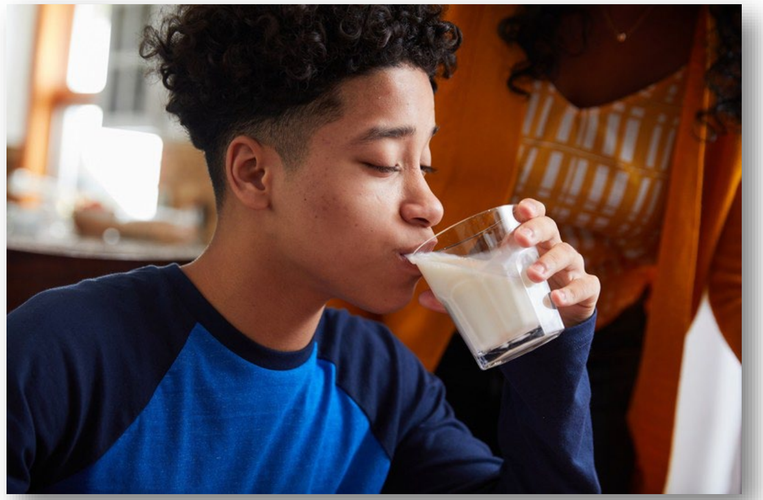
Source: National Dairy Council

Dairy Foods Fit Within Diverse and Cultural Eating Patterns

- Yogurt
- Cultured Buttermilk
- Sour Cream
- Kefir
- Koumiss
- Labneh (pictured)

Lactose Intolerant?

- Lactose-free milk is an excellent option for children and teens who are lactose intolerant.
- Yogurt with live cultures or cheese are also nutritious choices and contain lower lactose levels than milk.



Lactose in Dairy

Lactose-free Dairy Milk
1 CUP (8oz) SERVING

Ricotta Cheese
1/4 CUP SERVING

Greek Yogurt
3/4 CUP SERVING

Kefir
1 CUP (8oz) SERVING

0g | 1g | 1.9g | 3.2g | 4.2g | 5.7g | 8.5g | 12g

Amount of Lactose per Serving

Natural Cheeses
1.5 OZ SERVING

Cottage Cheese
1/2 CUP SERVING

Yogurt
1 CUP (8oz) SERVING

Dairy Milk
1 CUP (8oz) SERVING

Source: National Dairy Council

Recommended Eating Patterns Include Dairy

Mediterranean Diet

2 ½ servings/day

DASH Diet

2-3 servings/day

Dairy adds to the nutrients, flavor and texture in plant-forward plates.

Tips for Adding Daily Dairy

- Add milk to oatmeal or cheese to grits in the morning
- Add yogurt to fruit and/or vegetable-packed smoothies
- Add cheese to fresh chopped salads or steamed vegetables
- Top cottage cheese with fresh or canned fruit
- Make savory dips with thick protein-rich yogurt
- Sip on kefir for a probiotic boost

In Summary…

- Nutrition science continues to evolve
- Foods are more than the sum of their nutrients
- The dairy food matrix and its unique combination of nutrients and bioactives may help explain:
  - why dairy foods are associated with functional health benefits and multiple positive health outcomes
- Dairy foods fit into healthy, culturally relevant eating patterns

Ways to Collaborate: Public Health – Community Partnership

Continuum of Collaboration

Let's Eat Healthy

Launch the Initiative

2020

Well Nourished Brighter Futures

Stakeholder Convening Report

2021

First 1000 Days

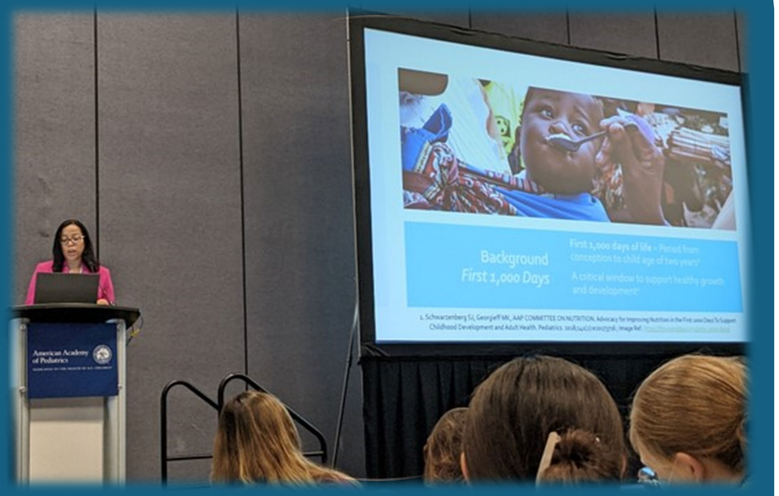
UC Irvine + Dairy Council NIH Grant

2021

Dietary Guidelines for Infant and Toddlers

Culturally Diverse Resources NACCHO

2023



Conference Presentations

Journal Publications

AAP-CA1
CALIFORNIA CHAPTER 1
INCORPORATED IN CALIFORNIA
American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN®

Professional Associations

Professional Development Opportunities and Publications

California Local School Wellness Policy Collaborative

Uniting state leaders committed to improving student wellness and academic success.

The California Local School Wellness Policy Collaborative empowers school communities and partners to strengthen local school wellness policies and systems in California. Through free resources, training and statewide collaboration, we help school wellness leaders put policies into action—supporting whole child health and academic achievement.

- **Access** ready-to-use tools and templates
- **Participate** in training on policy implementation, evaluation and compliance
- **Learn** best practices from districts across California
- **Connect** with statewide wellness leaders

PSE Nutrition Support

Action Items for Service Providers & Advocates:

- Engage in multi-sector collaboration with diverse partners
- Advocate for maternal and child nutrition policies and programs
- Participate in professional training on early life nutrition
- Provide families nutrition resource navigation
- Provide families simple, effective nutrition education

Lindsay et al 2024

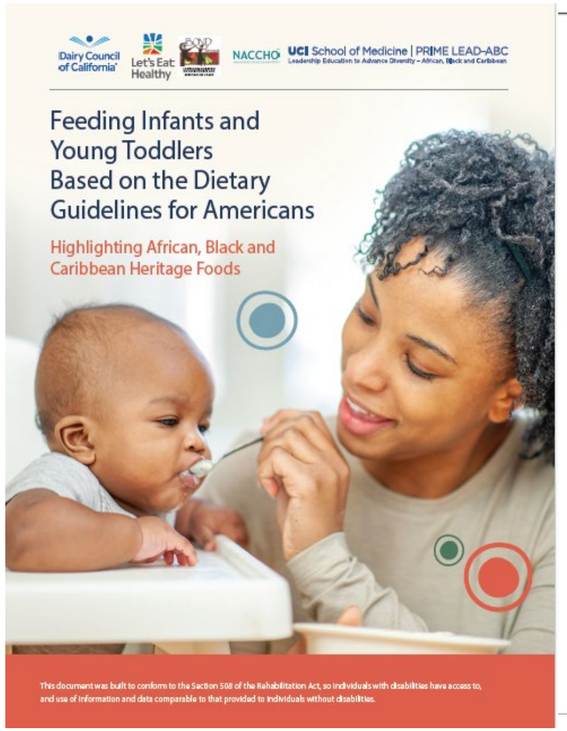
Communications and Local Health Departments Support

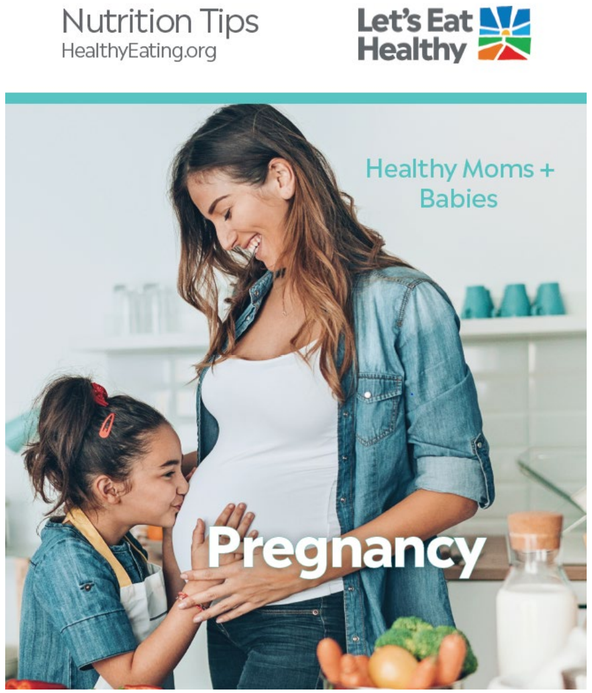
"What you offer your child to drink in the first 5 years of life can shape taste preferences and health outcomes for a lifetime. Thankfully, the best-choice beverages are simple: water and milk."

Clarisse Casilang, MD, FAAP (Cohort 5, Orange County)

Ensuring Healthier Children and Communities through Collaboration

Access Nutrition Resources and Publications





Available at no charge @ DairyCouncilofCa.org

Nuestros Sabores/Our Flavors: A Culinary Medicine Symposium

Nuestros Sabores/Our Flavors: A Culinary Medicine Symposium
Tuesday, October 28 (start at 11:30am) through Wednesday, October 29 (finish at 4:15pm)
University of California at Davis

Join National Dairy Council and Dairy Council of California to celebrate culinary heritage with Nuestros Sabores!

This invite-only event will bring together thought leaders in healthcare, nutrition and culinary medicine from across the nation.

Together, we will:

- Explore with behind-the-scenes milk processing and innovation tours
- Experience flavors with cheese and honey tasting
- Learn about the impact of nutrition in the First 1,000 Days of Life
- Optimize gut health with fermented foods
- Discuss culinary medicine case studies and application
- Share emerging health and nutrition trends

Join us for this memorable experience that will inform you about dairy science, connect you with passionate colleagues and equip you with knowledge and resources to share the importance of food choices to enhance health outcomes.

DAIRY COUNCIL OF CALIFORNIA

RSVP!
Seats are limited for this invite-only engagement.

NDC NATIONAL DAIRY COUNCIL

Questions?

Thank you!

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Survey Link