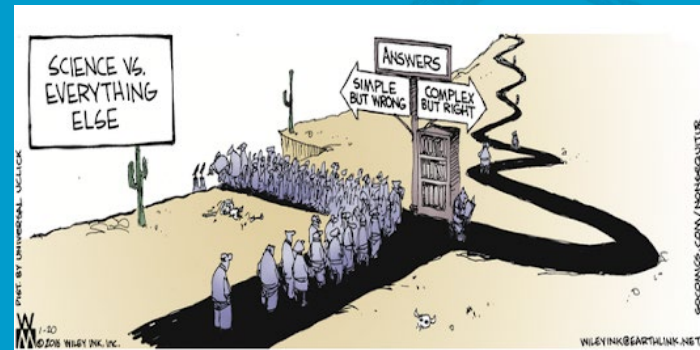


# Keynote: State of the Science on Seafood Nutrition & Update on Dietary Guidelines 2020-2025

Tom Brenna, PhD

Depts of Pediatrics, of Chemistry, and of Human Nutrition,  
University of Texas at Austin



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17 Sept 2019



**Cornell University**  
Division of  
Nutritional Sciences





# Outline

*SNP Reason for being: Gaps in Seafood consumption*

*2019: Science ↔ Policy*

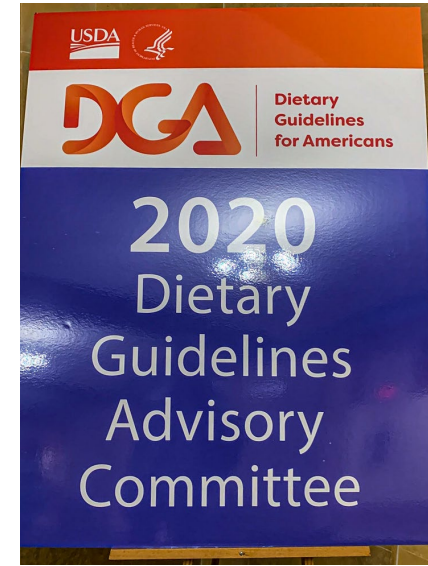
- DGAC for 2020 DGA.
- History, process, what's evidence?
- Traditional
  - Pregnancy and kids (2+ years), as usual
- New in 2020
  - B-24 (=birth to 24 months)
  - Questions available in advance
  - Supplements?





# Glossary

- DGAC ≠ DGA
- DGAC = Dietary Guidelines Advisory Committee
  - n=20 nutrition scientists. All from Universities/Medical Schools/Schools of Public Health (no industry, no government (but some with government experience))
  - Charge: Evaluate recent evidence available to update existing guidelines
  - Produce a report for input to DGA
- DGA = Dietary Guidelines for Americans
  - The final US government policy including input from DGAC, public comments including industry, political input.



# 40 years of Dietary Guidelines

1980



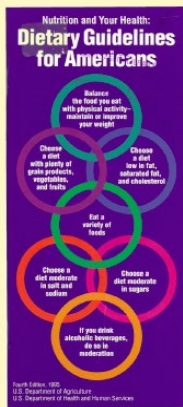
1985



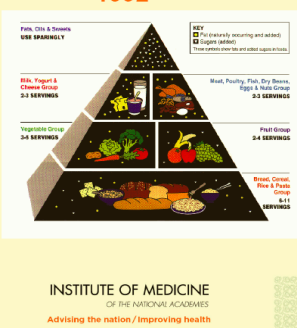
1990



1995



Food Guide Pyramid 1992



MyPyramid 2005

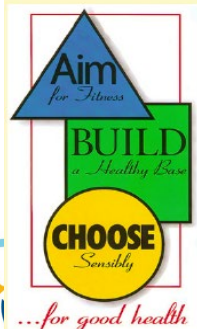


MyPlate 2011

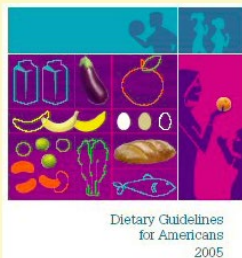


National Nutrition Monitoring and Related Research Act of 1990 (Public Law 101-445 - Oct. 22, 1990) TITLE III--DIETARY GUIDANCE SEC. 301. ESTABLISHMENT OF DIETARY GUIDELINES.

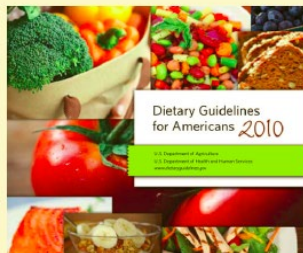
2000



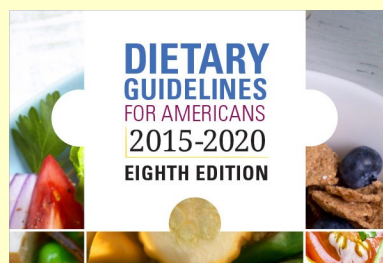
2005



2010



2015-2020



JTB Observations

- No Dietary Guidelines were based on the previous one
- No established "Procedures" until this year when an effort was made to "reevaluate" DGAC procedures.



# DGA origin, 1977

## DIETARY GOALS FOR THE UNITED STATES

SECOND EDITION

PREPARED BY THE STAFF OF THE  
SELECT COMMITTEE ON NUTRITION  
AND HUMAN NEEDS  
UNITED STATES SENATE

*"...this is the first comprehensive statement by any branch of the Federal Government on risk factors in the American diet. ... Too much fat, too much sugar or salt, can be and are linked directly to heart disease, cancer, obesity, and stroke, among other killer diseases."*

George McGovern

U.S. Senator, South Dakota, 14 Jan 1977

### SELECT COMMITTEE ON NUTRITION AND HUMAN NEEDS

GEORGE MCGOVERN, South Dakota, *Chairman*

EDWARD M. KENNEDY, Massachusetts

HUBERT H. HUMPHREY, Minnesota

PATRICK J. LEAHY, Vermont

EDWARD ZORINSKY, Nebraska

CHARLES H. PERCY, Illinois

ROBERT DOLE, Kansas

RICHARD S. SCHWEIKER, Pennsylvania

ALAN J. STONE, *Staff Director*

MARSHALL L. MATZ, *General Counsel*

## Eat a Variety of Foods

- *"The greater the variety, the less likely you are to develop either a deficiency or an excess of any single nutrient. Variety also reduces your likelihood of being exposed to excessive amounts of contaminants in any single food item."*

## Maintain Ideal Weight

- *"If you are too fat, your chances of developing some chronic disorders are increased.... To lose weight, you must take in fewer calories than you burn. ... fewer calories or increase your activity"*

## Avoid Too Much Fat, Saturated Fat, and Cholesterol

- *"There is controversy about what recommendations are appropriate for healthy Americans. ... reduction in our current intake of total fat, saturated fat, and cholesterol is sensible."*

## Eat Foods with Adequate Starch and Fiber

- *"If you limit your fat intake, you should increase your calories from carbs... Complex carb foods are better than simple carbs..."*



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# DGAC Scope

**Food based** recommendations to meet **nutrient** recommendations. **New in 2020:**  
**some? supplements**

- DGAC does not revise DRIs.
  - e.g. DRI for calcium is set by the a DRI process under oversight of the National Academy of Medicine. DGAC recommends diet to meet recommended intakes.
- **If you don't like the DRIs, see the NAM, not the DGAC.**
  - e.g., is the DRI for calcium too high?
- Are vitamins added to breakfast cereals supplements? No, not the way we are treating them. Foods with added nutrients are just food.
- Are omega-3 fed to chickens supplements. No.
- But, supplement studies, at least in principle, can be used to inform “drivers”.
  - e.g., studies of omega-3 EPA-DHA could be used to inform food requirements

100% transparent.

- The basis of all conclusions are published documents and available.



*Not an optical illusion, this timeline is not evenly scaled*

*New for 2020*

## 2020 Dietary Guidelines Advisory Committee Timeline\*



*In all prior years, the topics were identified by the DGAC. For 2020, the topics were decided before the DGAC was named.*



### Data Analysis

A collection of analyses that uses national data sets to help us understand the current health and dietary intakes of Americans. These data help make the *Dietary Guidelines* practical, relevant, and achievable.

[Learn More](#)

### Food Pattern Modeling

Analysis that helps us understand how changes to the amounts or types of foods and beverages in a pattern might impact meeting nutrient needs across the U.S. population.

[Learn More](#)



### NESR Systematic Reviews

Systematic reviews that answer questions on diet and health by searching for, evaluating, and synthesizing all relevant, peer-reviewed studies.

[Learn More](#)

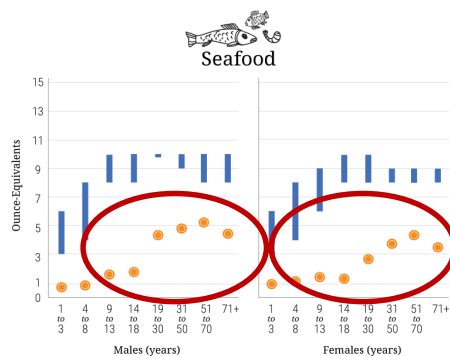
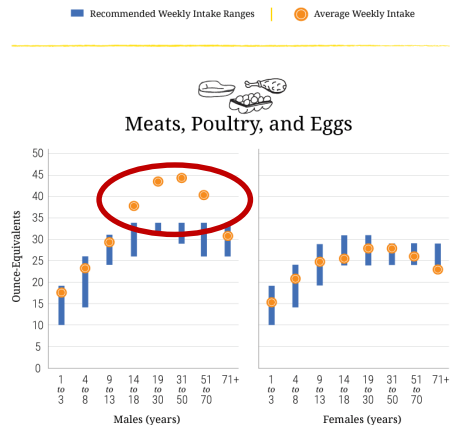
## 2020 Dietary Guidelines Advisory Committee: Approaches to Examine the Evidence

This is not new from 2015

- **Data Analysis** of national data sets (e.g. NHANES) for health of Americans and dietary intakes
- **Food Pattern Modeling** for nutrient intake
- →→ **NESR Systematic Reviews** for diet and health relationships
  - NESR = Nutrition Evidence Systematic Review (USDA). Formerly known as NEL (Nutrition Evidence Library)



# Example of Data Analysis



The 2015 Dietary Guidelines for Americans considered NHANES component “What we eat in America” WWEIA

- Men over consume meat/poultry and eggs
- All Americans under consume seafood

Shift from meat to seafood is recommended.

No recommendation was made to *eliminate*

- meat
- dairy



<https://health.gov/dietaryguidelines/2015/guidelines/chapter-2/a-closer-look-at-current-intakes-and-recommended-shifts/#figure-2-6>



## Nutrition Evidence Systematic Review

U.S. DEPARTMENT OF AGRICULTURE

### NESR Systematic Reviews for the 2020 Advisory Committee

The NESR team will be using its rigorous, protocol-driven methodology to support the 2020 Advisory Committee to conduct systematic reviews. NESR's general methodology for answering a systematic review question involves:

- searching for and selecting articles,
- extracting data and assessing the risk of bias of results from each included article,
- synthesizing the evidence,
- developing a conclusion statement,
- grading the evidence underlying the conclusion statement, and
- recommending future research.





From <https://nesr.usda.gov/2020-dietary-guidelines-advisory-committee-systematic-reviews>

# Systematic Reviews for the 2020 Dietary Guidelines Advisory Committee

A NESR systematic review is a research project that answers a clearly formulated scientific question. It uses rigorous and transparent methods to search for, evaluate, analyze, and synthesize **all** relevant research studies to answer the scientific question. This allows the Advisory Committee to look at the total body of scientific evidence that has been published on a particular topic. Thus, one study is not used to answer a question, rather the question is answered based on all of the available and relevant peer-reviewed scientific studies.

# 2015 NEL Evidence Table

## What is the relationship between dietary patterns and risk of dementia/cognitive decline/Alzheimer's disease?

Author, Year Study Design; Location (Cohort) Risk of Bias*	Sample Size (Gender; Age) Number of cases; Duration of Follow-up	Dietary Patterns**	Results	Summary of Findings
<b>Cognitive Function / Cognitive Decline</b>				
Feart, 2009 Prospective Cohort Study (PCS); France (Three-City Cohort) Risk of Bias: 2/26	N = 1,410 (63% female; Age = 76y) N/A cases; 5 y	Mediterranean diet score (MDS)	MMSE (global cognition): Higher MDS score was associated with fewer errors on the MMSE over time (B = -0.008, 95% CI = -0.01 - -0.0003; P for trend = 0.04)  IST (verbal fluency/speed), BVRT (visual memory), FCSRT (verbal episodic memory): NS	Higher adherence to a Mediterranean diet (assessed using the MDS) was associated with fewer MMSE errors (i.e., global cognition). However, Mediterranean diet adherence was not associated with other measures of cognitive performance.
Kesse-Guyot, 2014 PCS; France (SU.VI.MAX 2) Risk of Bias: 4/26	N = 2,983 (46% women; Age = 55y) N/A cases; 13 y	"Carotenoid Rich Dietary Pattern"  Reduced Rank Regression Response variables: Plasma carotenoid concentrations	Higher adherence to a carotenoid-rich dietary pattern (T3 v T1) was associated with better scores on the: • Composite cognitive performance scores: Mean difference = 1.04 (95% CI = 0.20 - 1.87; P for trend = 0.02) • RI-48 task: Mean difference = 0.90 (95% CI = 0.01 - 1.79; P for trend = 0.05) • Backward digit span task: Mean difference = 1.00 (95% CI = 0.12 - 1.89; P for trend = 0.03) • Trail making test: Mean difference = 1.09 (95% CI = 0.25 - 1.94; P for trend = 0.01) • Semantic fluency task: Mean difference = 1.00 (95% CI = 0.12 - 1.88; P for trend = 0.03)  Forward digit span or phonemic fluency tasks: NS	Adherence to a "carotenoid rich" dietary pattern (i.e., Higher in salad dressing, nuts, fish, tomatoes, poultry, cruciferous vegetables, fruits, and dark and green leafy vegetables, and lower in high-fat dairy, red meat, organ meat, and butter) was associated with better overall cognitive performance, as well as several individual neurocognitive tasks.
Kesse-Guyot, 2013 PCS; France (SU.VI.MAX 2) Risk of Bias: 4/26	N = 3,083 (46% women; Age = 65y) N/A cases; 13 y	Mediterranean diet score (MDS)  Mediterranean-style dietary pattern score (MSDPS)	MDS: Backward Digit Span: Lower adherence was associated with poorer performance (High vs. low; -0.64 (95% CI = - 1.60 - 0.32; P = 0.03)  Composite cognitive score, RI-48 cued recall, forward digit span, trail-making, semantic fluency, or phonemic fluency: NS  MSDPS: Phonemic Fluency: Lower adherence was associated with poorer performance (High vs. low; -1.00 (95% CI = -	Adherence to Mediterranean dietary patterns (i.e., MDS, MSDPS) was not associated with global cognitive performance, or with most measures of neurocognitive function examined. MDS was associated with improvement on the backward digit span, and the MSDPS was associated with better phonemic fluency.

Prepared by NEL (now NESR)

- Author, Year, Study Design, Location, **Risk of Bias**
- Sample size (Gender, age), Number of cases, Follow-up
- Dietary Patterns
- Results
- Summary of Findings



# Dietary Patterns, (Sea)Food, Nutrients

- “Dietary pattern” is a technical term describing a methodological approach to establishing the frequency of food consumption
- Food is a complex mixture of components which can be altered by production methods
- Food is \*not\* nutrients or contaminants, though scientists often analyze effects of food-borne components in this way. For instance:
- Seafood is not omega-3, it is a food and its effects on health are the net result of
  - the mixture of components in seafood
  - substitution for foods that would otherwise be consumed

xkcd

WE HUMANS ARE SACKS OF CHEMICALS WHICH STAY ALIVE BY FINDING OTHER CHEMICALS AND PUTTING THEM INSIDE US.



# DGAC 2020

■ Designates “In progress”

Seafood	
Status	Question
■	<a href="#">What is the relationship between seafood consumption during pregnancy and lactation and neurocognitive development of the infant?</a>
■	<a href="#">What is the relationship between seafood consumption during childhood and adolescence (up to 18 years of age) and neurocognitive development?</a>
■	<a href="#">What is the relationship between seafood consumption during childhood and adolescence (up to 18 years of age) and risk of cardiovascular disease?</a>



## Business/Economy

### Seafood will get more attention in development of new U.S. dietary guidelines

✍ Author: Laine Welch | Fish Factor 🕒 Updated: 4 days ago 📅 Published 4 days ago

*Sockeye salmon from the Bristol Bay fishery. (Marc Lester/ADN archive 2003)*

# Current US Seafood Consumption Guidelines: Eat Seafood Twice A Week

USDA/HHS: Dietary Guidelines for Americans



**10 tips**  
Nutrition  
Education Series

## eat seafood twice a week

**10 tips** to help you eat more seafood

**Twice a week, make seafood—fish and shellfish—the main protein food on your plate.\*** Seafood contains a range of nutrients, including healthy omega-3 fats. According to the 2010 Dietary Guidelines for Americans, eating about 8 ounces per week (less for young children) of a variety of seafood can help prevent heart disease.

- 1 eat a variety of seafood**  
Include some that are higher in omega-3s and lower in mercury, such as salmon, trout, oysters, Atlantic and Pacific mackerel, herring, and sardines.
- 2 keep it lean and flavorful**  
Try grilling, broiling, roasting, or baking—they don't add extra fat. Avoid breading or frying seafood and creamy sauces, which add calories and fat. Using spices or herbs, such as dill, chili powder, paprika, or cumin, and lemon or lime juice, can add flavor without adding salt.
- 3 shellfish counts too!**  
Oysters, mussels, clams, and calamari (squid) all supply healthy omega-3s. Try mussels marinara, oyster stew, steamed clams, or pasta with calamari.
- 4 keep seafood on hand**  
Canned seafood, such as canned salmon, tuna, or sardines, is quick and easy to use. Canned white tuna is higher in omega-3s, but canned "light" tuna is lower in mercury.
- 5 cook it safely**  
Check oysters, mussels, and clams before cooking. If shells don't clamp shut when you tap them, throw them away. After cooking, also toss any that didn't open. This means that they may not be safe to eat. Cook shrimp, lobster, and scallops until they are opaque (milky white). Cook fish to 145°F, until it flakes with a fork.
- 6 get creative with seafood**  
Think beyond the fish fillet. Try salmon patties, a shrimp stir-fry, grilled fish tacos, or clams with whole-wheat pasta. Add variety by trying a new fish such as grilled Atlantic or Pacific mackerel, herring on a salad, or oven-baked pollock.
- 7 put it on a salad or in a sandwich**  
Top a salad with grilled scallops, shrimp, or crab in place of steak or chicken. Use canned tuna or salmon for sandwiches in place of deli meats, which are often higher in sodium.
- 8 shop smart**  
Eating more seafood does not have to be expensive. Whiting, tilapia, sardines, canned tuna, and some frozen seafood are usually lower cost options. Check the local newspaper, online, and at the store for sales, coupons, and specials to help save money on seafood.
- 9 grow up healthy with seafood**  
Omega-3 fats from seafood can help improve nervous system development in infants and children. Serve seafood to children twice a week in portions appropriate for their age and appetite. A variety of seafood lower in mercury should also be part of a healthy diet for women who are pregnant or breastfeeding.
- 10 know your seafood portions**  
To get 8 ounces of seafood a week, use these as guides: A drained can of tuna is about 3 to 4 ounces, a salmon steak ranges from 4 to 6 ounces, and 1 small trout is about 3 ounces.

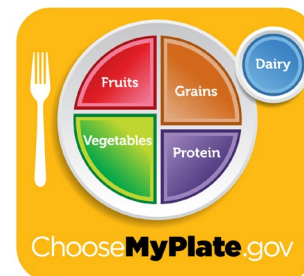
\*This recommendation does not apply to vegetarians.

**USDA** United States Department of Agriculture  
Center for Nutrition Policy and Promotion

**ChooseMyPlate.gov**

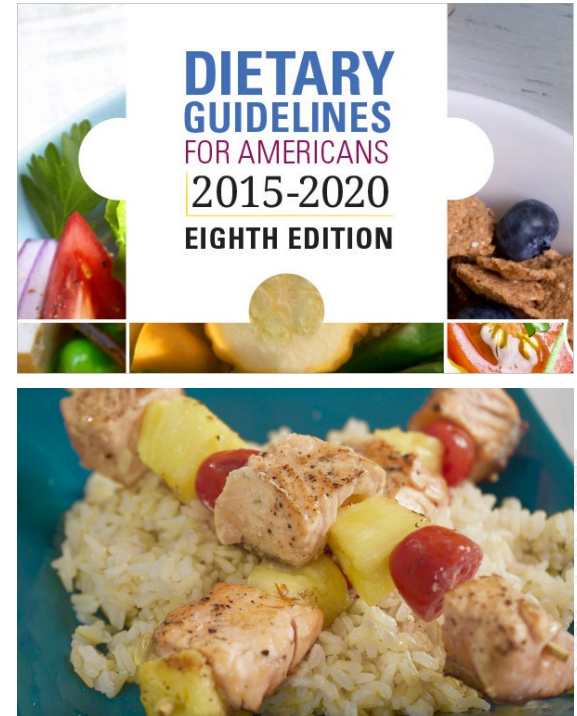
Go to [www.ChooseMyPlate.gov](http://www.ChooseMyPlate.gov) for more information.

DG TipSheet No. 15  
December 2011  
USDA is an equal opportunity provider and employer



# DGA 2015-2020 Seafood Advice

- For the general population, **consumption of about 8 ounces per week of a variety of seafood, which provide an average consumption of 250 mg per day of EPA and DHA**, is associated with reduced cardiac deaths among individuals with and without preexisting CVD.
- Strong evidence from mostly prospective cohort studies but also randomized controlled trials has shown that **eating patterns that include seafood are associated with reduced risk of CVD**, and moderate evidence indicates that these eating patterns are associated with reduced risk of obesity.





# DGA 2015-2020 Seafood Advice (cont.)

- **Women who are pregnant or breastfeeding should consume at least 8 and up to 12 ounces of a variety of seafood per week**, from choices that are lower in methyl mercury.
- Consumption by women who are pregnant or breastfeeding of at least 8 ounces per week from seafood choices that are sources of DHA is associated with improved infant health outcomes.



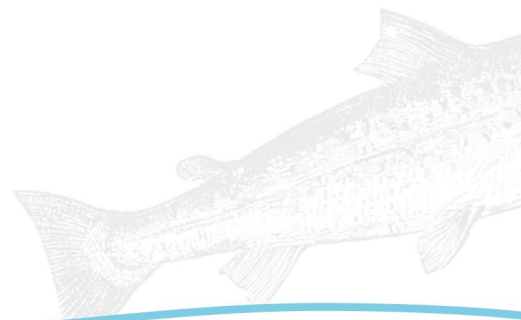


# Today's Agenda

- Seafood Consumption: Neurocognitive Development and Pre-Term Birth
  - Systematic Review of DGAC seafood questions
- Addressing the US Seafood Supply and Demand – Moderated Session
- Seafood in practice (Lunch)
- The Power of Storytelling to Impact Change
- Building Lifelong Seafood Consumers
- Summary and reception



Reading Market,  
Philadelphia, USA



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