



Food (and Water) as Medicine for a Healthy Planet

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Conflicts of Interest/Disclosures

I have no relevant conflicts of interest to disclose

Images included in this presentation were from my personal image library or sourced using Google Images with “fair to use” or “free to use” designation.

Special recognition to 2nd year nutrition graduate students completing OHSU MS in Human Nutrition program who each gave a full-length seminar on a topic linked to Climate Change, Global Health, Environmental Contaminants and Sustainability. A few slides from each of their presentations are included in the presentation.

Allie Helein

Marissa Abeyta

Alice Hsieh

Megan McNairn

Simran Bhakta

Kelsie Bryant

Cole Theobald`

Anthony Salazar

"Climate change is the greatest threat to global health in the 21st century."

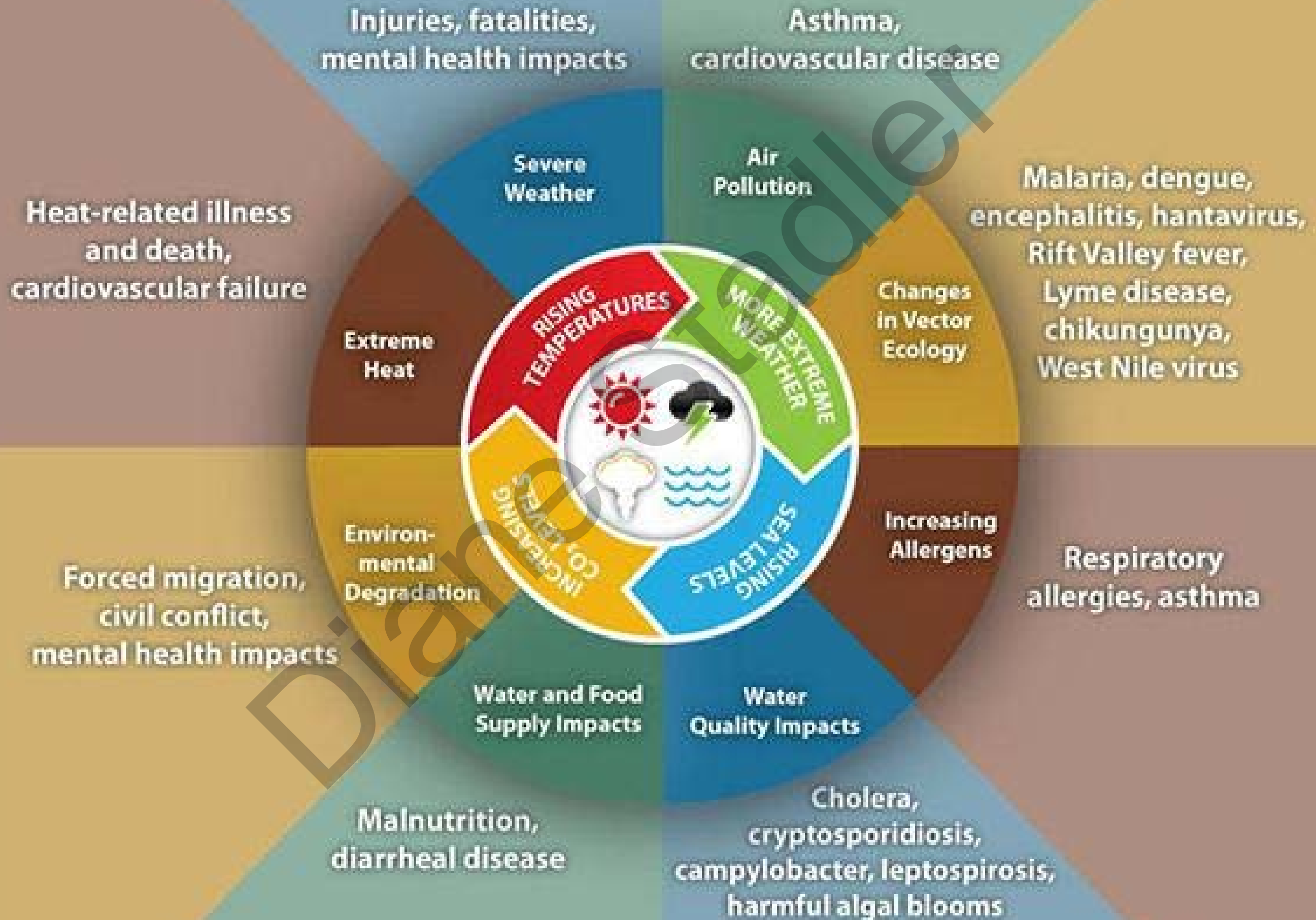
The World Health Organization

We should care
because...

Planetary Health
= Human Health

Diane Stadler

Impact of Climate Change on Human Health





“Climate Change is a clear and present danger”

- The climate crisis is the greatest threat to human health, and to the health of Earth’s ecosystems on which humans rely.
- More frequent and severe heat waves, droughts, and storms will amplify the global burden of disease, degrade population health, and exacerbate health disparities.
- To address this threat, we have a front-line opportunity to amplify the conversation and responsibility to:
 - Educate ourselves, colleagues, patients, and our communities on the causes and consequences of the climate crisis,
 - Recognize vulnerabilities associated with climate change in classrooms, clinics, our neighborhoods, and beyond
 - Do something about this.

Intergovernmental
Panel on Climate
Change (IPCC)

“Consumption of healthy and sustainable diets presents major opportunities to reduce Greenhouse Gas (GHG) emissions from food systems and improve health outcomes.”

Changing
dietary habits
is hard

“From meat to beans
in 10 short years...”

~Sonja Connor, MS, RD

OHSU Associate Professor Emeritus
Past President, Academy of Nutrition & Dietetics

How diverse are our diets?



Globally, 75% of our calories are derived from 12 crops and 5 animals sources:

61% from:

- Rice, wheat, sugarcane, corn, soy, potatoes, palm oil, cassava, sorghum, millet, ground nuts, sweet potatoes

14% from:

- Chicken, pork, beef, buffalo, goat

◦ Resulting in:

- Reduced dietary diversity
- Dependence on limited number of crops
- Vulnerability of farmers that cultivate crops or raise animals

The Planetary Health Plate

Protein Sources (daily average):

- Beef, lamb, and pork ~ 14 g
- Chicken and other poultry ~ 29 g
- Eggs ~ 13 g
- Fish ~ 28 g
- Legumes ~ 75 g
- Nuts ~ 50 g





Transition to a healthy planetary diet by 2050 will require substantial global dietary shifts including:

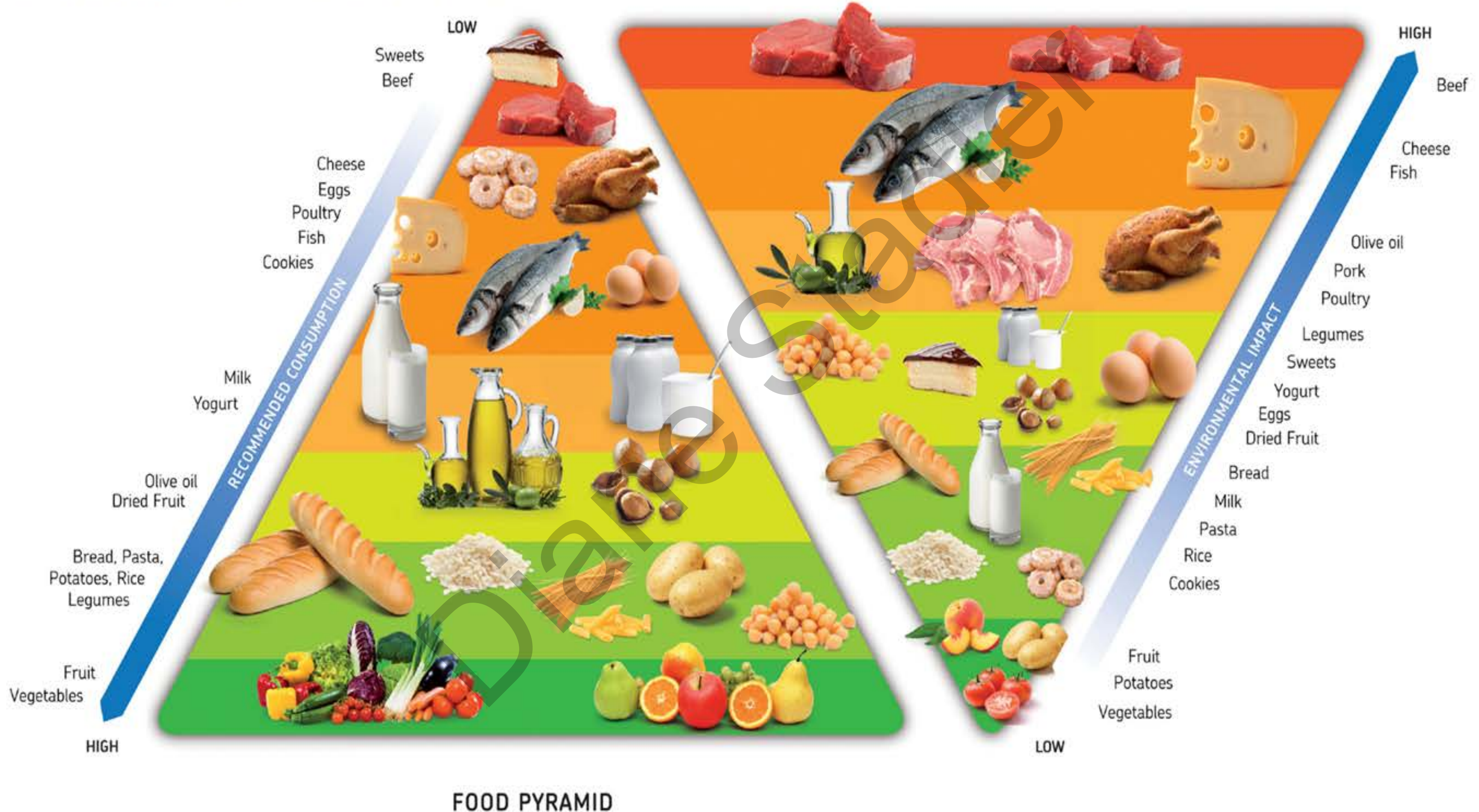
A _____ percent increase in the consumption of healthy foods like fruits, vegetables, legumes, and nuts

And at least a _____ percent reduction in the consumption of less healthy foods like red meat and those containing added sugar.

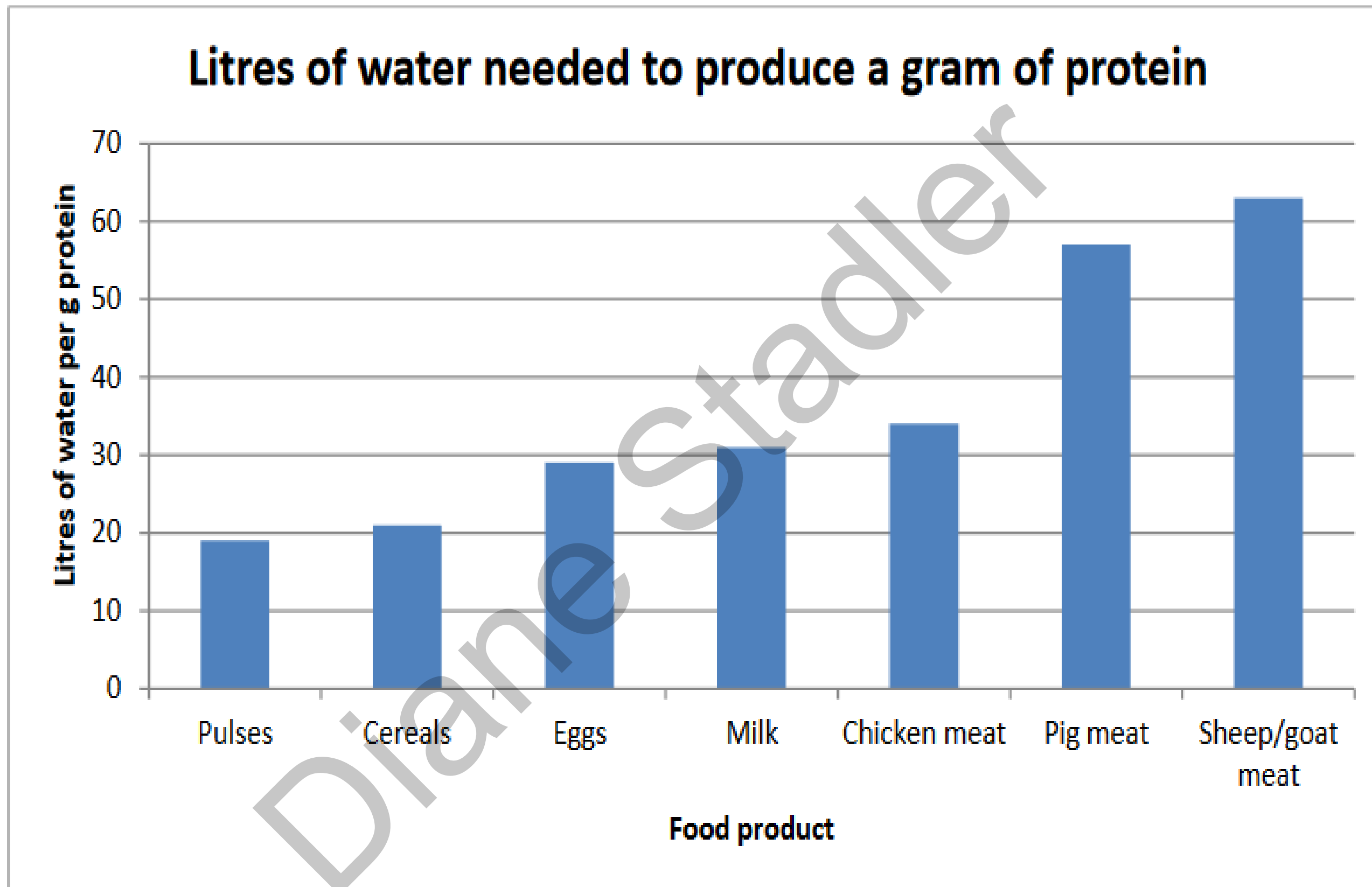
- A. 20%, 80%
- B. 50%, 50%
- C. 80%, 20%
- D. 90%, 10%

A
The Double Pyramid for Adults, 5th Edition

ENVIRONMENTAL PYRAMID



FOOD PYRAMID

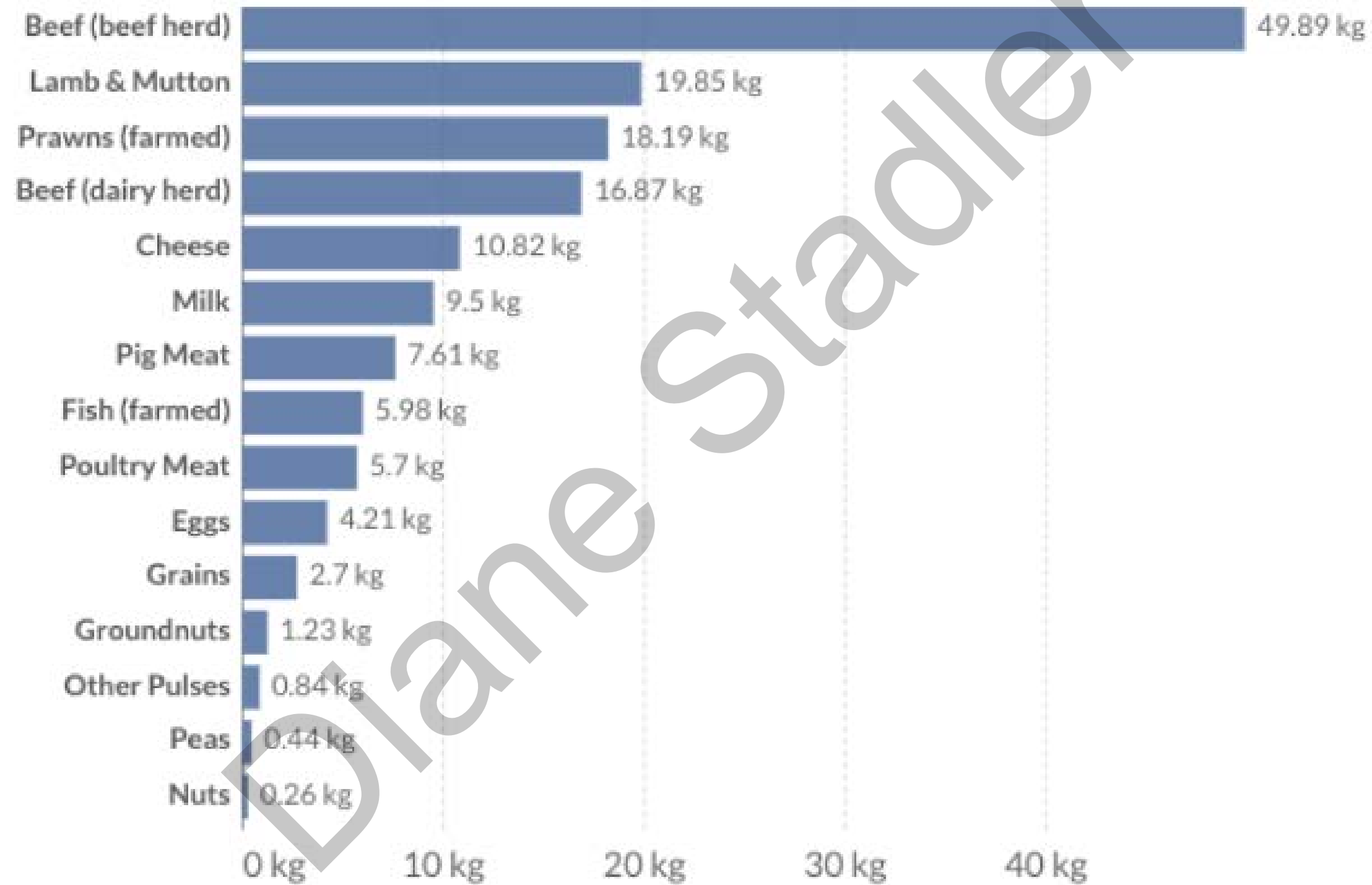


Source: Mekonnen MM and Hoekstra AY. 2012. A global assessment of the water footprint of farm animal products. *Ecosystems* 15:401-15.

Greenhouse gas emissions per 100 grams of protein

Emissions are measured in carbon dioxide-equivalents.

+ Add food



Source: Joseph Poore and Thomas Nemecek (2018). Additional calculations by Our World in Data.
OurWorldInData.org/environmental-impacts-of-food • CC BY

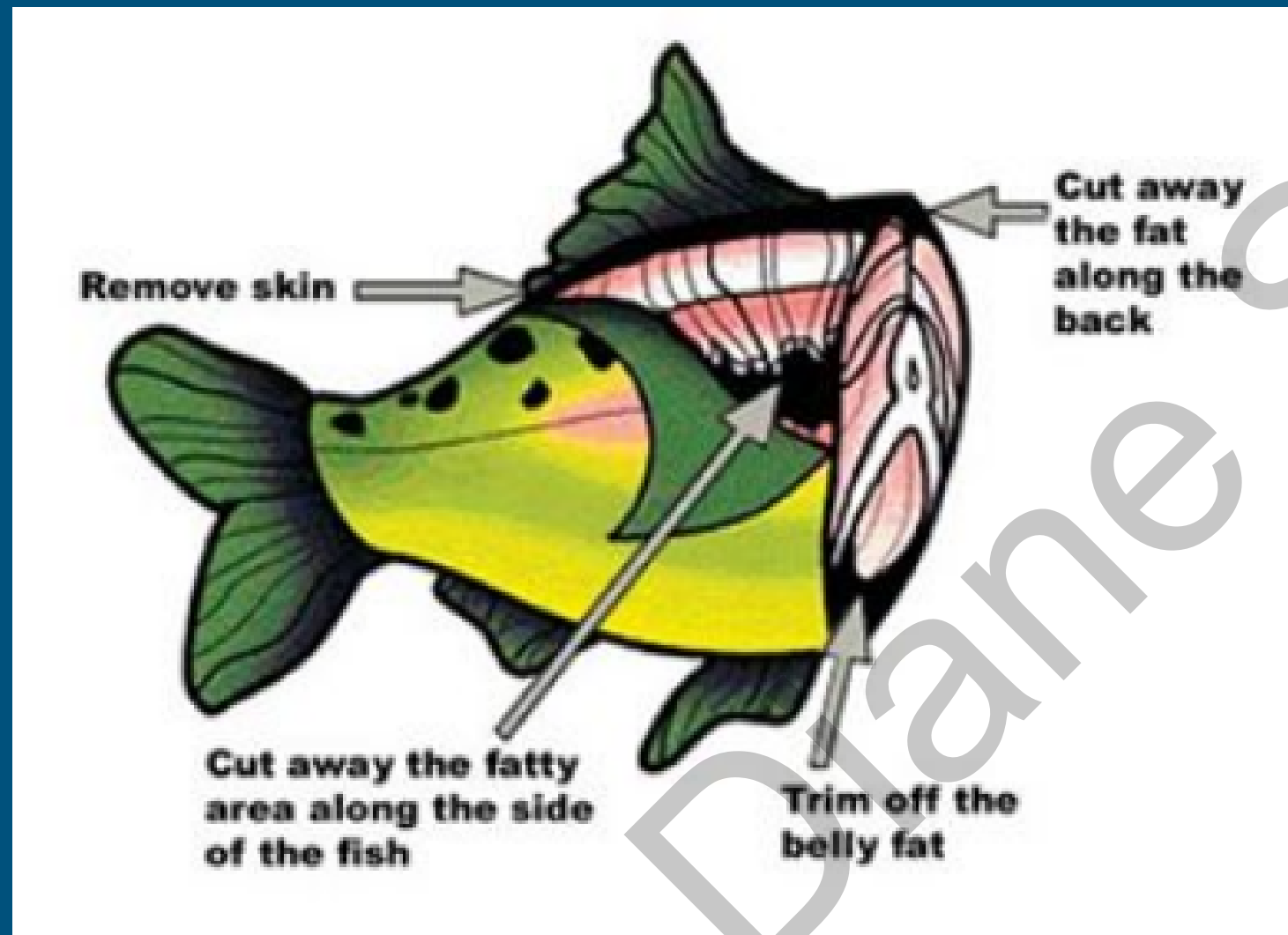
We are Told to Eat More Fish...

- **The Dietary Guidelines for Americans (DGA)** recommend *at least 8 oz/week* for adults
- For those pregnant or breastfeeding, the DGA recommends 8 - 12 oz/week of a variety of seafood from choices *lower* in mercury



Fish Preparation to Reduce Contaminants

- PCBs and DDT concentrate in the fat of fish.



Tips

Cut off the skin and fat before cooking fish

Boil, grill, or bake on a rack, so the fat drips off the fish

Do not use fat residues for sauces

If Everyone Followed the 8 oz/Week Recommendation...

- ~240 million adults in the U.S.
- (8 oz/week) x 240 million adults =
~ 1.9 billion oz fish/week
- Or ~120 million pounds of fish/week for *adults*.



If Everyone Followed the 8 oz/Week Recommendation...

- ~73 million non-adults (< 18 y/o)
- DGA for children, 2 servings of:
 - 1 oz at age 1 - 3
 - 2 oz at age 4 - 7
 - 3 oz at age 8 - 10
 - 4 oz at age 11
- So, anywhere from 2-8 oz total per week
- That could translate to ~147 million - ~589 million oz. of fish/week



Theoretical Amount of Fish Consumed by U.S.

- 1.9 billion oz for Adults +
368 million oz for Children (the average of 2-8 oz)
= 2.3 billion oz total
- Approximately 2.3 billion oz of fish/week
 - That is 143 million lbs/week
 - Or, ~7 billion lbs per year

Amount of Fish Produced

- The U.S. in 2019 produced ~ 120 billion lbs of fish
- Edible portion: 12 - 88%
- So, if just using fish produced in U.S., the edible portion is between 14 - 105 billion pounds, depending on the fish.
- Is the U.S. is producing enough fish to meet the recommendation by the DGA?
- Is all this fish safe to eat?

U.S. Foods

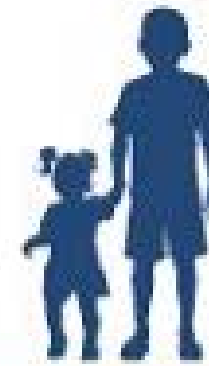
Bass	Without Skin Filet	59%
Clams	Edible Portion	15%
Cod	Filet Without Skin	30%
Crab	Blue From Shell	17%
	Dungeness From Shell	27%
	King From Shell	25%
Crawfish	Tail	12%
	Back	23%
Flounder	Filet Without Skin	41%
Frog Legs	Flesh	65%
Halibut	Filet Without Skin	59%
Trout	Filet Without Skin	59%
Lobster	Meat Body Claw Tail	28%
Oyster	Meat and Liquor	18%
Snapper	Filet With Skin	73%
Salmon	Meat Boneless Raw	88%
Shrimp	Cleaned Without Shell	81%

What is a serving? As a guide, use the palm of your hand.



Pregnancy and breastfeeding:
1 serving is 4 ounces

Eat 2 to 3 servings a week from the "Best Choices" list (OR 1 serving from the "Good Choices" list).



Childhood:

On average, a serving is about:

- 1 ounce at age 1 to 3
- 2 ounces at age 4 to 7
- 3 ounces at age 8 to 10
- 4 ounces at age 11

Eat 2 servings a week from the "Best Choices" list.

Best Choices

Anchovy	Herring	Scallop
Atlantic croaker	Lobster, American and spiny	Shad
Atlantic mackerel	Mullet	Shrimp
Black sea bass	Oyster	Skate
Butterfish	Pacific chub mackerel	Smelt
Catfish	Perch, freshwater and ocean	Sole
Clam	Pickering	Squid
Cod	Plaice	Tilapia
Crab	Pollock	Trout, freshwater
Crawfish	Salmon	Tuna, canned light (includes skipjack)
Flounder	Sardine	Whitefish
Haddock		Whiting
Hake		

Good Choices

Bluefish	Monkfish	Tilefish (Atlantic Ocean)
Buffalofish	Rockfish	Tuna, albacore/white tuna, canned and fresh/frozen
Carp	Sablefish	Tuna, yellowfin
Chilean sea bass/Patagonian toothfish	Sheepshead	Weakfish/seatrout
Grouper	Snapper	White croaker/Pacific croaker
Halibut	Spanish mackerel	
Mahi mahi/dolphinfish	Striped bass (ocean)	

Choices to Avoid HIGHEST MERCURY LEVELS

King mackerel	Shark	Tilefish (Gulf of Mexico)
Marlin	Swordfish	Tuna, bigeye
Orange roughy		

What about fish caught by family or friends? Check for [fish and shellfish advisories](#) to tell you how often you can safely eat those fish. If there is no advisory, eat only one serving and no other fish that week. Some fish caught by family and friends, such as larger carp, catfish, trout and perch, are more likely to have fish advisories due to mercury or other contaminants.

2021

www.FDA.gov/fishadvice
www.EPA.gov/fishadvice





Roasted Pumpkin Soup - Submitted by Fatima Amiri

Ingredients

- 2 lb pumpkin, peeled, seeds removed, cut into 4 cm pieces (4C solid pack pumpkin puree)
- 7.5 g ginger, roughly chopped (1 heaping tbsp.)
- 2 garlic cloves, minced
- 2 tbs extra virgin olive oil
- 1 L (4 cups) vegetable stock
- 1/3 cup (85g) mascarpone (whipped softened cream cheese, crème fraiche, sour cream)
- 2 tbs finely chopped fresh dill (2 tsp dried dill)
- 1/3 cup (50g) toasted hazelnuts,

Instructions

1. Preheat oven to 180°C. Place pumpkin, ginger, and garlic on a large baking tray and drizzle with oil. Season, then toss to coat. Roast for 30 minutes or until the pumpkin is soft (do not let the garlic burn).
2. Puree mixture in a blender or food processor with 2 cups (500ml) stock, then season. If there are lumps, strain through a fine sieve.
3. Place soup in a large saucepan with the remaining 2 cups (500ml) stock and warm over medium-low heat.
4. Divide soup among 4 bowls, top with mascarpone, and serve with dill and nuts.

Source of Key Nutrients & prices

- Pumpkin: Rich in Vitamin A, B6, C, iron, potassium, cholesterol, sodium, carbohydrates, fiber, and protein=> \$3
- Ginger: Magnesium, calcium, iron, vitamin C & B-6=> \$0.78
- Garlic: Vitamin C, Vitamin B6, Thiamin, potassium, calcium, phosphorous, copper, and manganese=>\$0.22
- Olive oil=>\$0.5
- Vegetable stock=>3.24
- Mascarpone=>\$1
- Organic Dill=>\$0.98
- Hazelnuts=> \$4
- Total Cost: \$13.72

Food Waste...



Food Waste is defined as:

- A. Unintended damage to food during production, storage, processing or distribution before it reaches the consumer.
- B. Food no longer good for consumption that is intentionally discarded for composting by the consumer.
- C. Greenhouse gas emissions from composted food that are not captured to generate biofuel.
- D. Good quality food fit for consumption that is consciously discarded at or before retail and/or consumption stages.

True or False

One third of all food produced is never eaten.

Yet, ~700 million people go hungry each day

Yielding a reduced Return on Investment (ROI) in natural resources, human labor, financial capital

Consumers Can Make Impact

6% of global greenhouse gas emissions come from food losses and waste



Emissions from food that is never eaten accounts for 6% of total emissions



Ritchie, *Our World in Data*, 2020

Implications of Declining Water Supply from the Colorado River Basin



Geographical Location

- Flows through California, Arizona, Nevada, New Mexico, Colorado, Utah, Wyoming, and Northwest Mexico
- Split into upper and lower basin
- Water storage in Lake Powell and Lake Mead



Transitioning Crops Grown in the Colorado River Basin Region

From those with high water needs

Alfalfa

Cotton

Corn

To those with lower water needs

Lettuce

Wheat

Citrus

Barley

Winter vegetables

Acres (1000s)											
Crop	AZ	CA	CO	NV	NM	UT	WY	US Total	Mexico	CRB Total	% total
Total Forage	307	289	332	17	37	124	208	1,315	79 ^a	1,394 ^a	41%
Alfalfa hay	257	181	157	-	29	104	55	783	79	863	26%
Other tame hay	28	97	119	-	0.2	10	21	285	-	275	8%
Pasture	53	2	263	8	15	153	131	628	23	651	19%
Wheat	86	43	41	-	-	0.1	-	169	250	420	12%
Vegetables ^b	138	96	4	-	11	0.1	-	250	30	280	8%
Cotton	171	22	-	-	-	-	-	193	60	253	8%
subtotal	754	452	641	25	64	277	339	2,555	443	3,077	89%
Total Irrigated	876	504	697	25	99	322	342	2,868	499	3,367	

There is a Need for Mixed Model of Food Production

- Organic farming practices better for fruit and vegetable production
- Conventional model more suited for growing bulk number of calories
- Mixed model that employs pros of current models is needed
 - Balance of crop yield with environmental protection

Walsh, *Time*, 2012

Soil Ammendment



FOOD WASTE FOR COMPOST

GO FOR IT

No-Nos



Advocacy in Action

Occupational/Environmental Impacts on Planetary Health, Bullseye Glass, SE Portland

March 2016 – The Oregonian

- Manufacturer of specialty glass for artwork
- High levels of toxic heavy metal oxides measured in air-quality and soil samples
 - Cadmium used to create warm-toned colors
 - Arsenic used to smooth glass
- Cadmium 49x and arsenic 159x benchmark levels
 - Chronic cadmium exposure linked to lung cancer
 - Chronic arsenic exposure linked to skin, lung, bladder cancer
- Operations shut down
- Similar glass manufacturing businesses identified throughout US
- Businesses had employed an “Exemption” from EPA regulations
- Required to retrofit furnaces with caps, filters, “bag-houses” to remove toxins from emissions

Social and Environmental Determinants of Health—The Continuing Story of Lead Exposure

FDA proposes new levels for lead in baby food, but critics say more action is needed

By Sandee LaMotte, CNN

Updated 4:24 PM EST, Mon January 30, 2023



Article sources: [npr.org](https://www.npr.org), [healthday.com](https://www.healthday.com), [foodsafetynews.com](https://www.foodsafetynews.com), [who.int](https://www.who.int), [cnn.com](https://www.cnn.com)

Common sources of lead

- Homes built before 1978 (when lead-based paints were banned)
- Peeling paint or paint chips
- Certain water pipes
- Some toys and jewelry
- Candies and baby food
- Traditional home remedies
- Certain jobs and hobbies involve working with lead-based products
- Soil and air near airports

Do you participate in any of the following hobbies or activities that are a possible source of lead exposure?

- Home remodeling/renovation
- Car or boat repair
- Glazing/making pottery
- Reloading/target shooting at ranges
- Eating rifle-hunted game meat
- Furniture refinishing
- Making/handling lead shot and fishing weights/sinkers
- Using lead soldering/welding
- Oil painting (artistic)
- Making stained glass
- Jewelry making
- Repairing old painted wooden or metal toys

Local City Ordinances Banning New Installation of Gas Appliances

February 2023, Eugene, OR, City Council passed ordinance to ban natural gas hookups in new, low-rise residential construction.

March 2023, Milwaukie, OR, City Council approved two resolutions:

- 1. Banning natural gas hook ups in new construction
- 2. Removing natural gas appliances from existing city-owned buildings

Benefits & Disadvantages of Cooking with Gas stoves

Open flame and instant heat, inexpensive

Fueled by combustible gas, most commonly natural gas

- Mixture of gases, primarily methane
- Additional trace gases

41% of households in the world cook using gas heat (WHO)

1/3rd of households (~40+ million homes) in US use gas stoves

Contributes to GHG: methane, carbon monoxide, nitrous oxide

Lower air quality

Potential health risks (asthma, respiratory diseases)



Image sources: Popular Mechanics

Alice Hsieh, GPHN Graduate Nutrition Seminar, 2023

House approves Oregon Senate Bill 543 to ban foam food containers and packaging material by 2025

Wednesday, April
26, 2022

Bans food vendors from serving meals in containers made of polystyrene foam a.k.a., Styrofoam

Prohibits use or sales of foam packing peanuts and single-use foam coolers.

Hard to recycle and break into small pieces that easily scatter making the hard to pick up.

Bans containers with PFAS, “forever chemicals” that coat cardboard and make it resistant to grease. (Per- and Poly-fluorinated substances)

--they don't break down

--linked to certain cancers, higher cholesterol, and lower infant birth weight

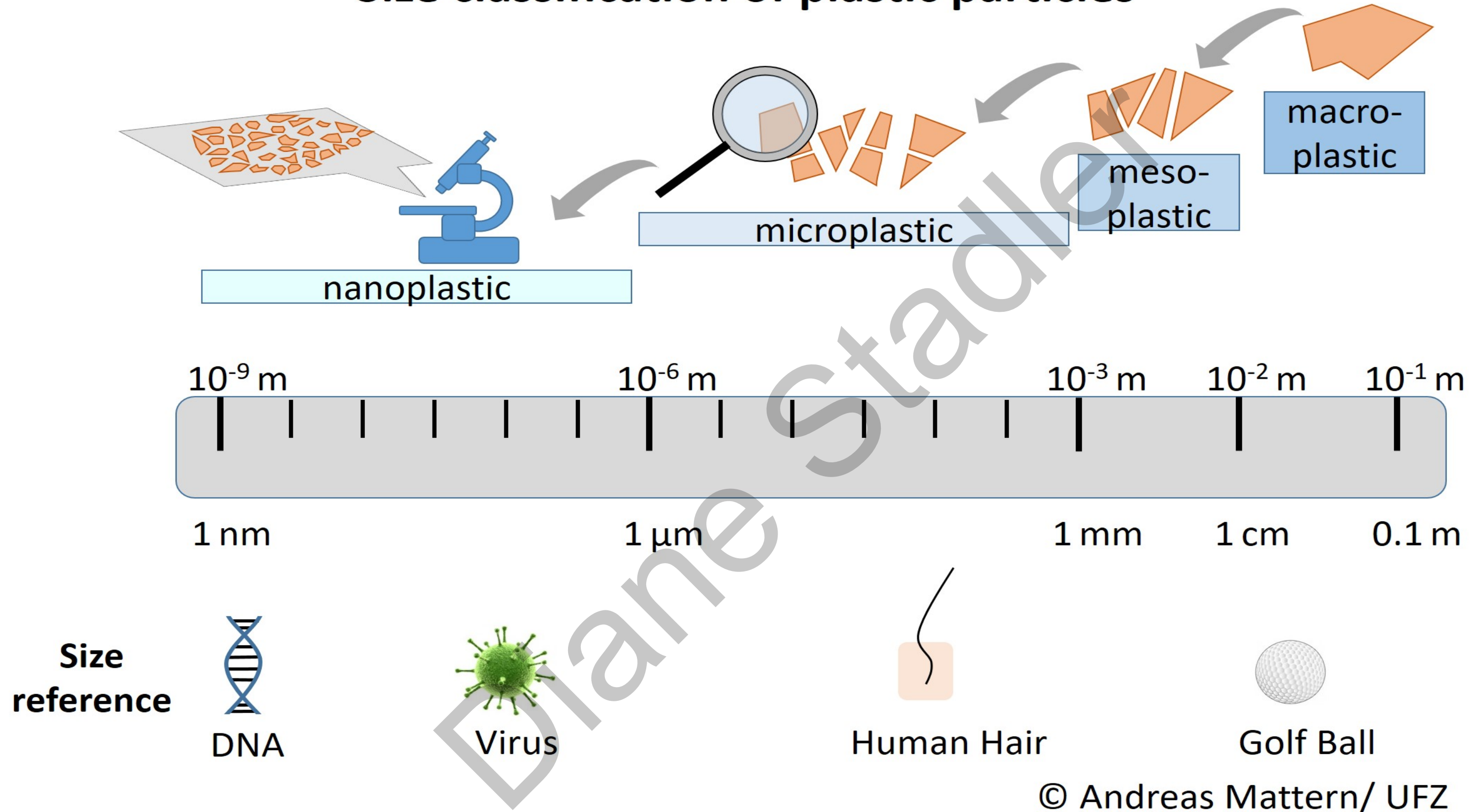
Imposes fines of \$100-\$500 a day for those who distribute banned products

Excludes some containers used to ship and store food that has not been prepared to eat (egg cartons)

“Predominant waste we clean up” Maxine Dexter, D-Portland

Dirk VanderHart (OPB)

Size classification of plastic particles



Reducing/
Eliminating
Plastics



Photo credit: Diane Stadler

Oregon House Bill 582 Plastic Pollution & Recycling Modernization Act

Overhauls state policies to modernize Oregon's recycling system to make it easier for the public to recycle, expand access to recycling services, upgrade services and facilities that sort recyclables, and optimize social and environmental benefits.

Effective January 2022.

Changes start July 2025.

Which of the following strategies to enhance recycling will be enacted if this bill because this bill was passed?

- a. A consistent statewide recycling collection list will be created along with educational materials to reduce confusion among the public.
- b. Access will be expanded by providing recycling collection sites within multifamily communities and unifying costs to transport recycled items across the state.
- c. Producers will be required to finance system improvements to avoid additional costs to ratepayers
- d. All of the above

3-blocks worth
of trash along
Moody Avenue



Senate Bill 545 A

Passed April 26, 2023

Directs Oregon Health Authority to adopt rules allowing restaurants and grocery stores to allow consumers to fill consumer-owned clean containers with food.

This practice has not been allowed under FDA rules to prevent cross-contamination with pathogens or allergens

Pressure to change state regulations followed China's decision in January 2018 to stop importing items from the US for recycling.

Establishes a “national model for enabling reuse” of containers

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Plastics in the Food System



Home Plastic Container Audit

Unintended
Consequences
of promoting
increased fruit
and vegetable
consumption...





Alternatives to plastics in cooking

- Silicone
- Metal
- Glass
- Wood
- Beeswax
- More

9 PRACTICAL TIPS FOR A HEALTHY & SUSTAINABLE DIET



eat more fruits and vegetables



eat locally, when in season



avoid eating more than needed, especially treats



swap animal protein for plant-based ones



choose whole grains



choose sustainably sourced seafood



eat dairy products in moderation



avoid unnecessary packaging



drink tap water





We Have the Power to Change

"You cannot do all the good the world needs, but the world needs all the good that you can do."

- Shelbi, B.S. Environmental Science

This is How Shopping Less Can Save the Planet:

<https://www.youtube.com/watch?v=BmB3f4vNkgc>

Your Thoughts?

Diane Stadler

Please reach out with
questions, comments, &
suggestions:

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