What to Eat – and *Why ?*

Edwin Cox, M.D.

OLLI
Fall 2022

Class information

Web site for our class:

http://olli-what-to-eat-and-why.weebly.com

Slides will be posted there weekly

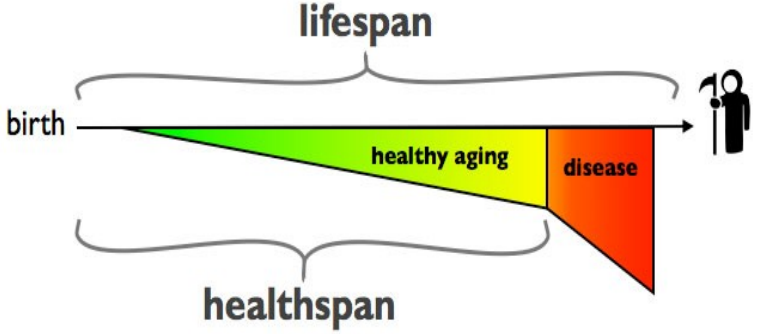
My email address:

Ed Cox <ebcox@yahoo.com>

The goals: a long, and healthy, life

To live as long as possible (maximum lifespan)

To stay as well as possible (maximum healthspan) within the lifespan



The Fountain of Youth

For time immemorial, people have sought longer life, eternal youth

Ancients sought baths and elixirs that would extend life or make them immortal

Ponce de Leon was reportedly seeking waters in Florida that would restore youth

Postponing senescence through lifestyle modifications

Dietary composition

- That's the main theme of this course

Dietary restriction

- Clearly demonstrated in many lower species
- Theoretical, but unproven, applicability to humans
- Calories
- Protein

Exercise

The Facts of Life

There are certainties – and uncertainties

Certainty

- We will die
- Many will develop diseases that impair quality of life

Uncertainty

- Can we live longer by lifestyle choices?
- Can we avoid illness and disability by lifestyle choices?

This course will answer those questions affirmatively

Lifestyle

* Physical activity
* Food
* Drink

Smoking, alcohol, recreational drugs

Education, occupation, wealth

Social interaction (church, civic organizations, clubs)

Hobbies (esp. risky)

"No, you won't live longer if you give up sex and alcohol. But it'll seem like it."

A primary focus in my life: Safety

Wore seat belts in the car

Didn't play in traffic

Washed hands frequently

Use tissues to wipe my nose

Avoided tobacco

Fresh air and exercise

Diet: avoided fatty foods, but not much else

Epiphany: what should I eat?

2012: I was visiting my sister and her family; "We just went vegan!", she said

Her guru - T. Colin Campbell of "The China Study" - claimed that a plant-based diet provided superior health

I wondered: Was I missing an important opportunity to maximize my longevity and avoidance of chronic diseases if I didn't do the same?

My medical training and experience did not shed light on the question

I realized I wanted to know for *myself* what I should be eating!

Perhaps I could pass the insights to my children and grandchildren to help them optimize *their* prospects for health and longevity

First stop: The popular media

Current best-selling books

Articles in newspapers and magazines

Websites and blogs

- Especially respected medical centers, specialists and governmental authorities

But, the Diet Gurus didn't agree

Nutrition advisors say...

- Atkins Diet: Carbohydrate is the culprit; restrict carbohydrates, consume mainly protein and fat; animal sourced foods are fine
- Campbell Diet: Animal proteins are toxic; plant-based, whole-food diet avoids harm
- USDA: Fats, especially saturated fat, cause heart attacks and strokes; eat a low-fat diet, substituting in as much carbohydrate as you want

They reach mutually exclusive conclusions - they can't all be right!

All have elements of truth, but each misses the mark, due to "cherry-picking" data!

I was about to give up...

We've been conditioned to think, *que sera, sera*, "what will be, will be"

Just accept that nobody *really* knows what to do to stay alive and well

We might as well eat, drink and be merry

When disease strikes, look to doctors to push back, i.e., pills, surgery, chemotherapy

But, doing that just makes us pawns of powerful commercial forces – the "manufactured food" industry

- They wants us to buy prepared foods that yield them big profits but expose us to disease and premature death
- That made me MAD!

My approach:
Let the evidence speak!

What I did as a physician when faced with challenging patients

- Consult original sources in the medical literature for the best current treatment results

Accept nothing pre-processed through anyone else's filter

Leverage my background in statistics and epidemiology to rigorously evaluate data

Yet, there was no guarantee that I would find much of value

- Perhaps diet wasn't as important as some people made it out to be
- Or maybe the right research had not been done
- Or maybe the necessary diet was just too limited and unappealing to be practical

Timing...
is everything!

My research started in 2013

- Numerous large, high-quality studies were just bearing fruit

I focused on published research dealing with individual questions

- How does total mortality relate to dairy consumption?
- What is the incidence of diabetes relative to nut consumption?
- Does eating more fiber prevent colon cancer?

No single researcher had compiled an complete overview that synthesized the results into a comprehensive plan

- My goal was a holistic approach to lifestyle, weighing the pros and cons of all elements to arrive at a balanced approach

Success!

A few insights emerged from the first pass; I compiled my findings into the first iteration of this course in 2014

I continued to research and update knowledge base

- Dramatic new research results have greatly expanded the insights

The course is now in its twelfth iteration, with several useful new findings from 2020 research reports

All you need to know

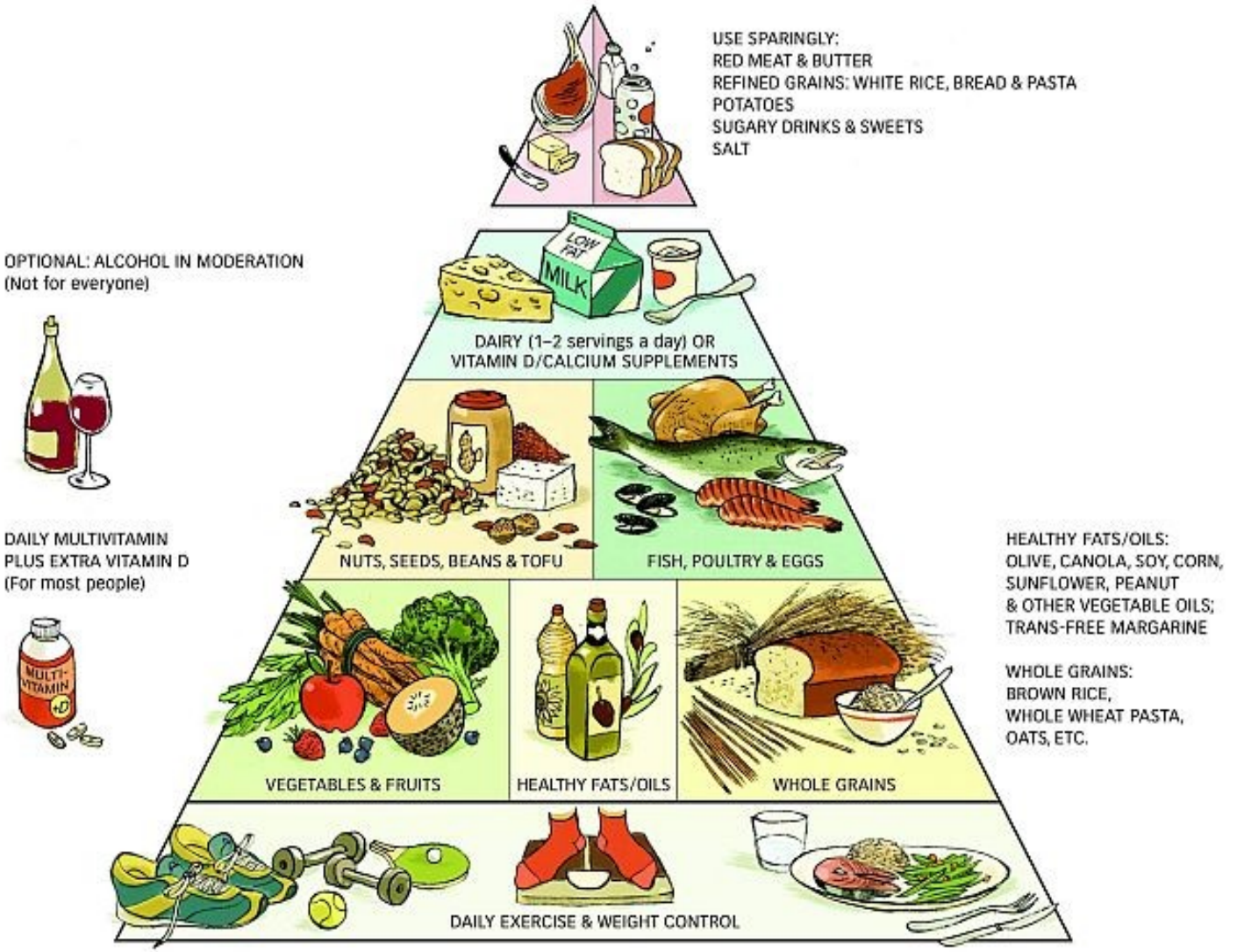
Base main diet around nuts, whole grain foods, vegetables, fruits, beans, fish, poultry, olive oil, vegetable oils

Modest amounts of dairy, eggs

Avoid - or sparing amounts of - red meat, processed meats, sugary beverages, refined grains (white bread, white rice, refined cereal, desserts)

Alcohol in small amounts if not otherwise excluded

Harvard Healthy Eating Pyramid



Now you know *what* to eat.

Why ask why?

Know the rationale for eating specific foods and avoiding others, empowering you to...

- Think for yourself
- Make informed choices
- Develop willingness to try new foods that are good for you
- Resist being swept along with each new fad
- Gain skills to critically evaluate new recommendations
- Reduce enticing foods that are detrimental
- Satisfy curiosity

What you eat can make you sick, or keep you well

Everyone knows about "food poisoning"

- Acute illness due to micro-organisms or toxic substances

Not talking about that; talking about chronic diseases

- Long term exposure to harmful foods
- Avoidance of beneficial foods

Diseases to focus on: Sutton's law

When famed serial bank robber Willie Sutton was asked, "Why do you rob banks?", he replied, "That's where they keep the money!"

Let's focus on common impactful diseases highly influenced by lifestyle

Diseases where diet, exercise and/or smoking make a difference

Impactful lifestyle diseases

Coronary heart disease ("heart attacks")

Cerebrovascular disease ("strokes")

Type 2 diabetes mellitus & metabolic syndrome

Non-alcoholic steatohepatitis (NASH)

Obesity and its complications

Cancer

- Lung cancer
- Head, neck and esophageal cancer
- Bladder cancer

Impactful lifestyle diseases

All are, to a great extent, "autogenic" diseases - diseases caused by specific behaviors that we choose

All are largely preventable

Prevention may not be easy; many contributing behaviors have addictive components that are difficult to extinguish

Necessary measures are not all settled and agreed upon

- Example: restricting red meat

Requires knowledge, discipline and application of measures over decades

Requires going counter to societal pressures, especially advertising

Impactful lifestyle diseases

I don't say "it's your fault" if you have one of these diseases

- We are just now learning some of these relationships, and there is much still to learn
- Messaging has been muddled in the US, and advertising has tremendous influence
- The addictive aspects are very difficult to treat
- Not everyone cares

Yet, we should, we must, recognize the huge burden these diseases pose and the great opportunity to avoid them, just by better diet

Terminology and categories

We need to talk about terms that will be used again and again

We want to be very specific about their meaning

Food has several different dimensions

- Chemical composition
- Source: animal and plant
- Role: fuel, building blocks, essential molecules

Diet or diet

"diet": The technical term for "the composition and amount of what we eat and drink"

May be qualified by adjectives such as low-sodium, low-carb, vegetarian, vegan, lacto-ovo-vegetarian, or pescetarian

"Diet": A term used, capitalized, accompanied by a specifying adjective, to indicate a deliberate pattern of food and drink selection to meet a particular set of objectives.

- The Pritikin Diet, the Mediterranian Diet, the Adkins Diet, and so on.

Distinction not always crystal-clear.

Diet by Chemical Composition

Water

Carbohydrates (50% Cal)

- Sugars
- Starches
- Fiber

Lipids (35% Cal)

- Saturated Fats
- Monounsaturated Fatty Acids
- Polyunsaturated Fatty Acids
- Cholesterol

Proteins (15% Cal)

Vitamins

- Fat-soluble (A,D,E)
- Water-soluble (B complex, C)

Minerals

- Calcium
- Sodium
- Potassium
- Magnesium

Antioxidants

Phytosterols

Diet by Roles of Food Components

Fuel

Hydration

Building Blocks (Growth & Repair)

- Amino Acids → Proteins (structural, enzymes)
- Lipids → Membranes, hormones, transport
- Sugars & Starches → Glycogen, polysaccharides

Minerals

Vitamins

Probiotics

Prebiotics

Diet by Type of Food

Plant-sourced

- Grains - Cereals
  - Whole grain
  - Refined
- Roots - Tubers
- Leaves
- Fruits
  - Nuts
  - Legumes
  - Other

Animal-sourced

- Dairy
  - Milk
  - Butter
  - Cheese
  - Other
- Red meat
- White meat
- Processed meat
- Eggs
- Fish / seafood

Diet definitions

Omnivore

- All food types – animal- and plant-sourced

Vegan or Strict Vegetarian

- Only plant-sourced foods

Lacto-ovo-vegetarian

- Plant-sourced foods plus eggs & dairy

Pescotarian

- Plant-sourced foods plus seafood, eggs & dairy

Semi-vegetarian

- Plant-sources foods plus animal-source foods less than once per week

Units of measure

International vs English units

Weights

- International (IU): gram (g), kilogram (kg)
- English: oz, lb (avoirdupois)
- 1 kg = 2.2 lb, or 1 lb = 454 g

Liquid measure

- IU: liter (l), milliliter (ml), cubic centimeter (cc)
- English: oz (liquid), pint, quart, gallon
- 1 liter = 1.057 quart

I will refer mostly to IU

- Rules of thumb: 1 oz ≈ 30 g = 2 tbsp = 6 tsp

Quest for the Perfect Diet

Tales abound, touting the existence of mythical diets that confer long life and good health

- The Blue Zones, by Dan Buettner

Does the Perfect Diet exist?

Does it apply to the general population, or just certain subsets?

The Perfect Diet

It is now possible to classify most foods and food groups as beneficial, neutral or contrary to health

Those designations are largely independent of one another

Diets that are based upon beneficial foods and avoid contrary foods *should* be optimal

In this course, we will examine the data for the benefit or harm of individual foods and food groups, and assemble the beneficial foods into the Perfect Diet

This exercise will define the best diet for the greatest number; however, we don't yet know how to prescribe individualized optimal diets

Longevity and diet

RESEARCH ARTICLE

Estimating impact of food choices on life expectancy: A modeling study

Lars T. Fadnes[1,2]*, **Jan-Magnus Økland**[1,3], **Øystein A. Haaland**[1,3], **Kjell Arne Johansson**[1,2,3]

1 Department of Global Public Health and Primary Care, University of Bergen, Norway, **2** Bergen Addiction Research, Department of Addiction Medicine, Haukeland University Hospital, Bergen, Norway, **3** Bergen Center for Ethics and Priority Setting, University of Bergen, Norway

PLOS Medicine 2022

Longevity and diet

These researchers leveraged the vast wealth of results in the last decade from diet monitoring studies

Compiled the results into a mathematical model projecting change in life expectancy with change in diet

Results were explored for diet changes beginning at age 20, age 40, age 60 and age 80

Gain in life expectancy with feasible and optimized diet

Table 1. LE for males and females at different ages from the United States, China, and Europe for different diets. Gain in LE when changing from a typical Western diet to a feasibility approach or optimized diet is also indicated.

Region		Typical Western		Feasibility approach				Optimized			
		Male	Female	Male		Female		Male		Female	
	Age	LE	LE	LE	Gain	LE	Gain	LE	Gain	LE	Gain
United States	20	57.8	62.5	65.1	7.3	68.7	6.2	70.8	13.0	73.3	10.7
	40	39.4	43.3	46.0	6.5	49.0	5.7	51.1	11.7	53.3	10.0
	60	22.4	25.3	27.2	4.8	29.9	4.5	31.2	8.8	33.3	8.0
	80	9.0	10.3	10.9	1.9	12.3	2.0	12.4	3.4	13.7	3.4

Compared to "typical Western" diet, the "optimized" diet "pulls out all the stops"

The "feasability" diet represents what nearly everyone could readily do

The optimal diet vs. TWD (per the Fadnes study)

Increase whole grains markedly (seven servings)

Include nuts daily (one oz)

Increase legumes markedly

Double fruit and vegetable intake

Include fish regularly

Reduce red meat markedly

Reduce processed meats markedly

Reduce poultry somewhat

Reduce eggs and dairy somewhat

Reduce refined grains

Reduce sugar-sweetened beverages markedly

Maintain moderate healthy oil intake (mono- and polyunsaturated vegetable oils)

Years gained by food type - starting from age 20

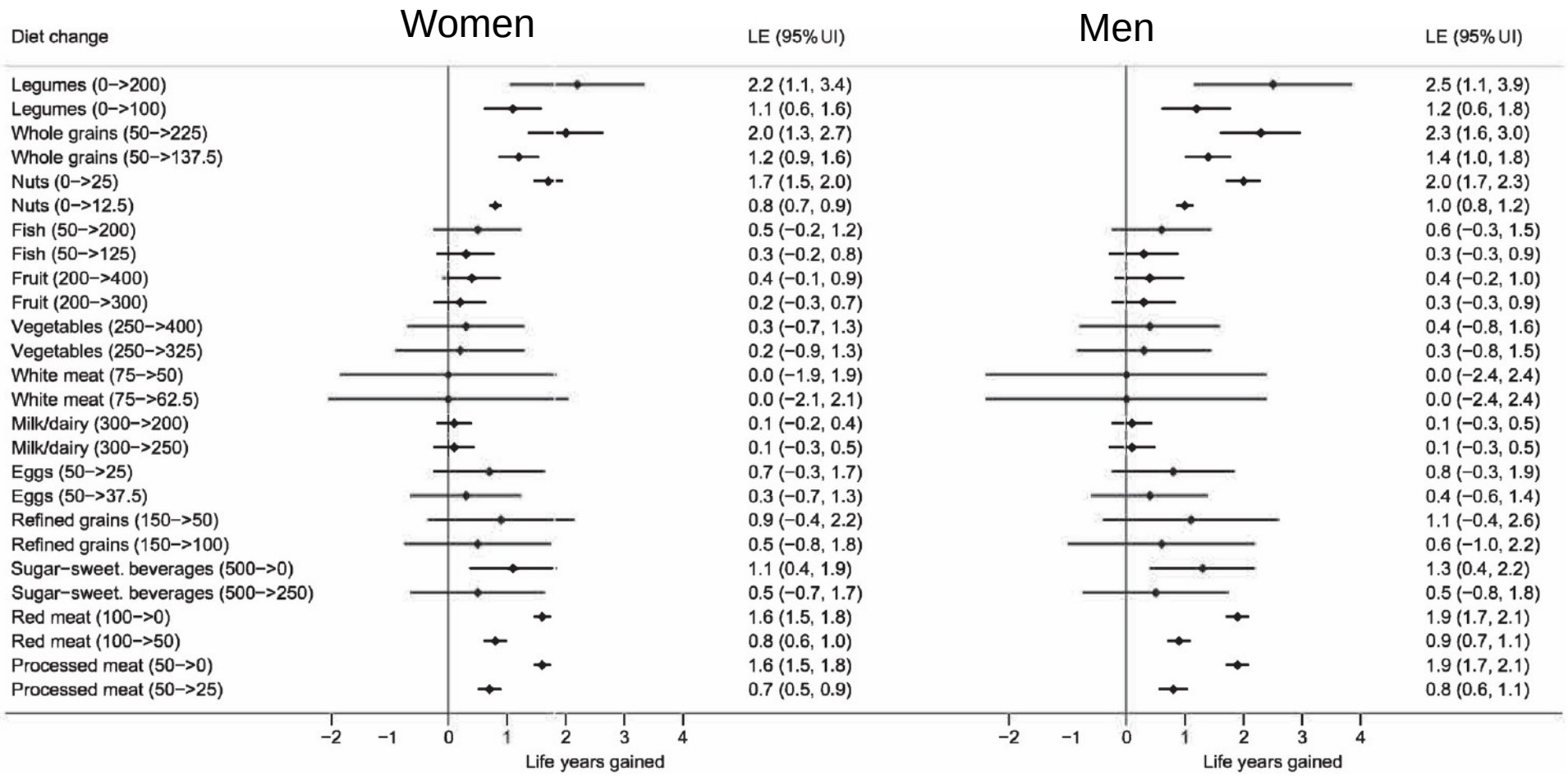


Fig 1. Expected life years gained for 20-year-old female adults (left forest plot) and males (right forest plot) from the United States who change from a typical Western diet to an optimized or feasible approach diet with changes indicated in grams per day. Estimates per food groups and total

Years gained by food type - starting from age 60

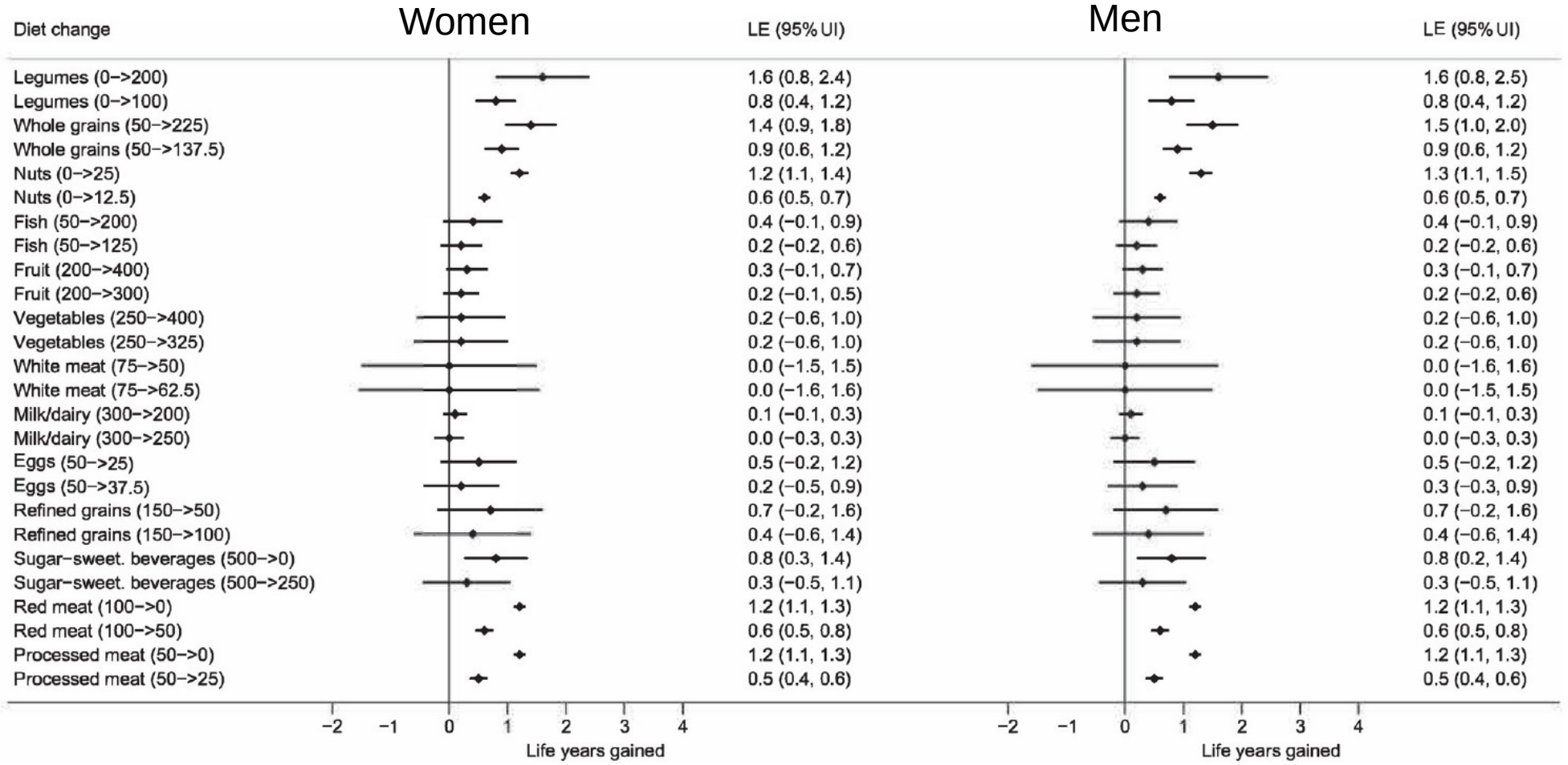


Fig 2. Expected life years gained for 60-year-old female adults (left forest plot) and males (right forest plot) from the United States who change from a typical Western diet to an optimized or feasible approach diet with changes indicated in grams per day. Estimates per food groups and total

Key measures

Emphasize whole grains, nuts, legumes as the foundation

Fruits and vegetables are important as well

Reduce/eliminate red meat and processed meat

Reduce/eliminate sugar-sweetened beverages

Reduce refined grains (especially desserts)

Poultry, eggs, dairy generally OK in modest amounts

Fine tuning the diet

Additional insights from other studies will inform, modify and extend these guidelines

More information

Web site for our class:

http://olli-what-to-eat-and-why.weebly.com

My email address:

Ed Cox <ebcox@yahoo.com>