Scientific Approach to Nutrition 2018

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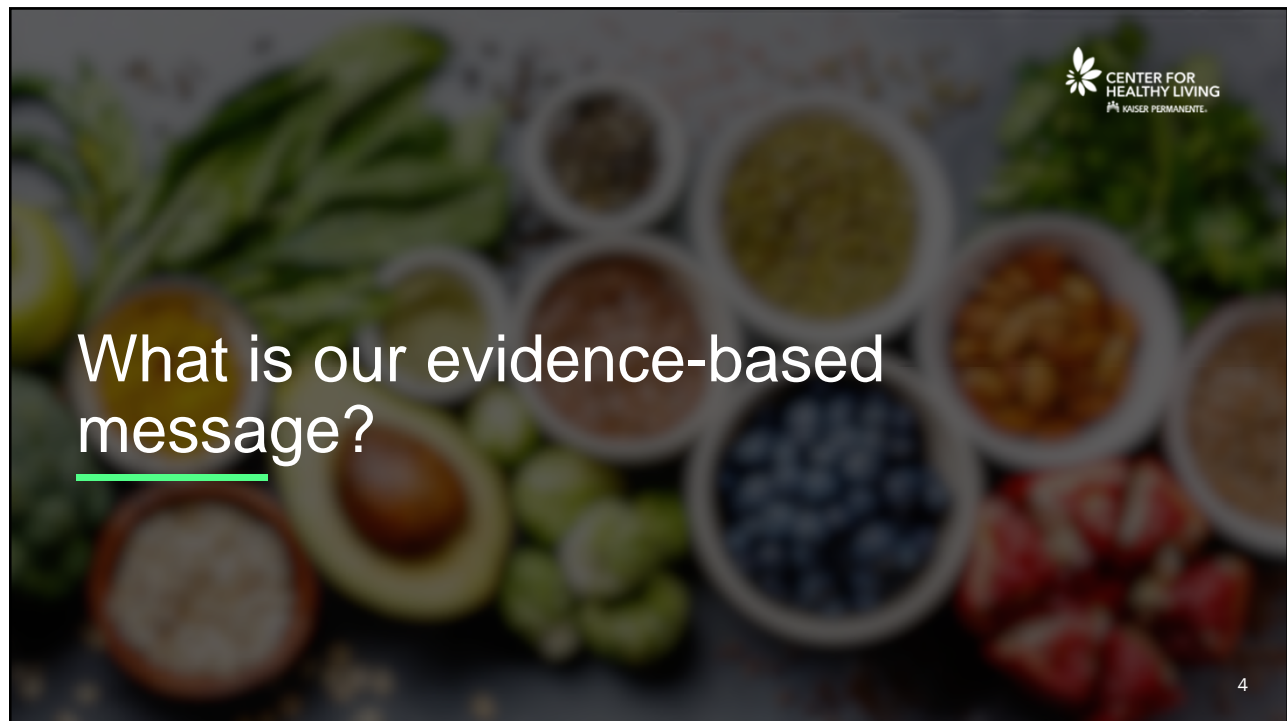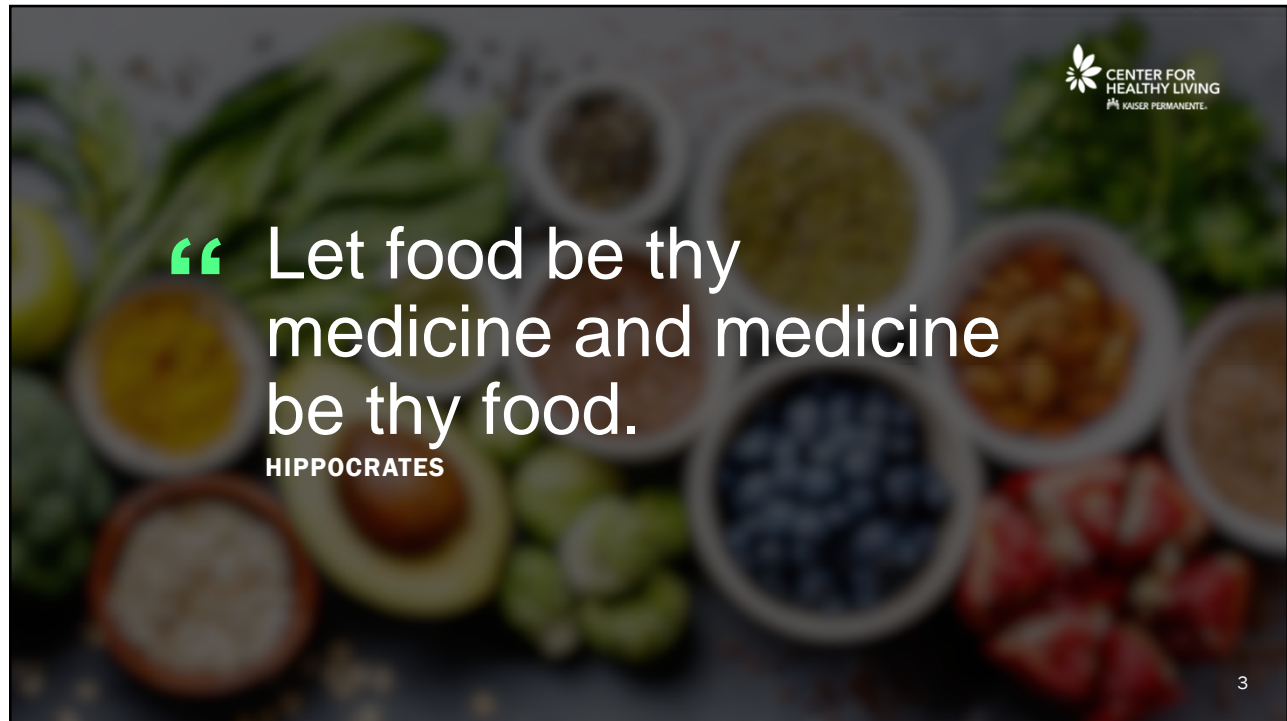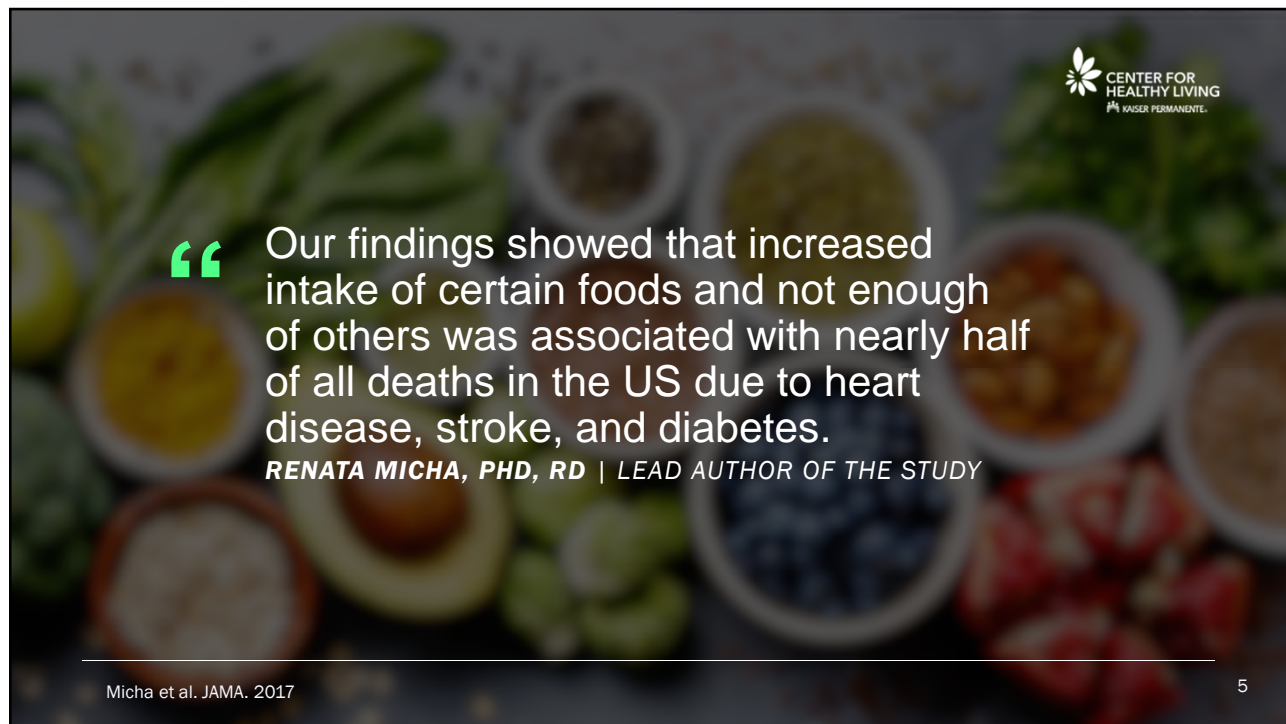

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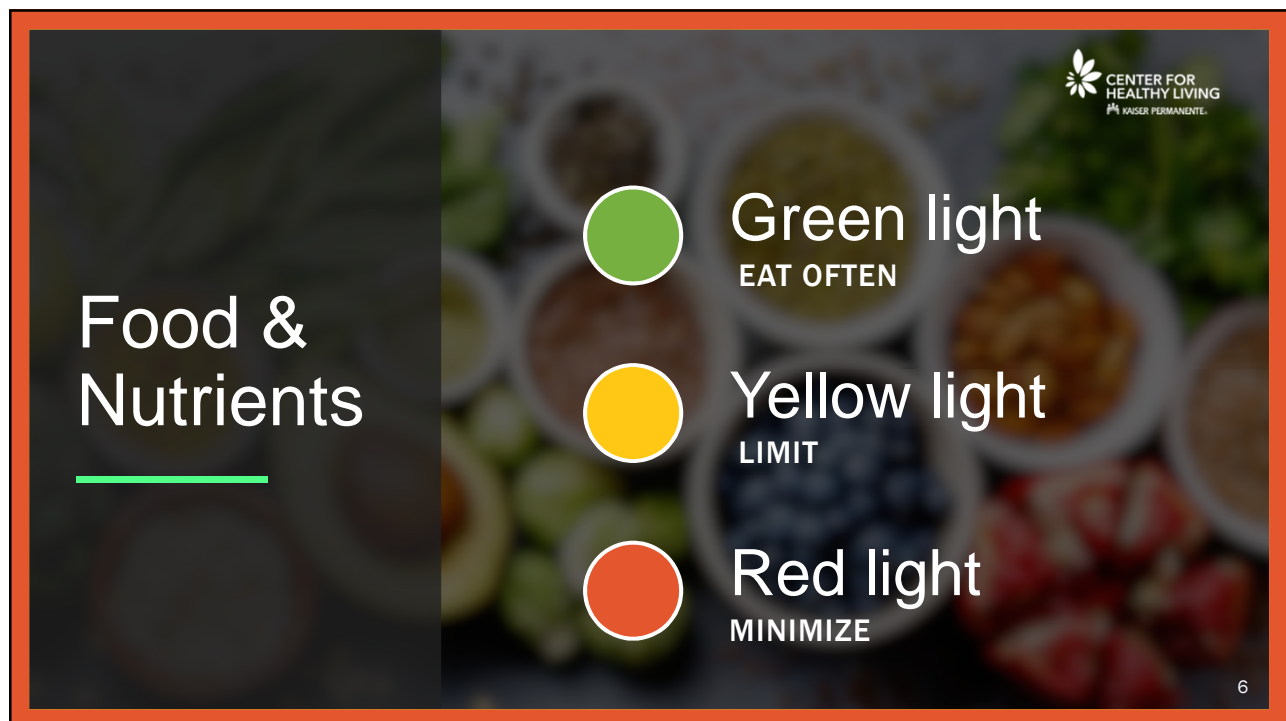
Let food be thy medicine and medicine be thy food.

HIPPOCRATES

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What is our evidence-based message?

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"
Our findings showed that increased intake of certain foods and not enough of others was associated with nearly half of all deaths in the US due to heart disease, stroke, and diabetes.
RENATA MICHA, PHD, RD | LEAD AUTHOR OF THE STUDY

Micha et al. JAMA. 2017

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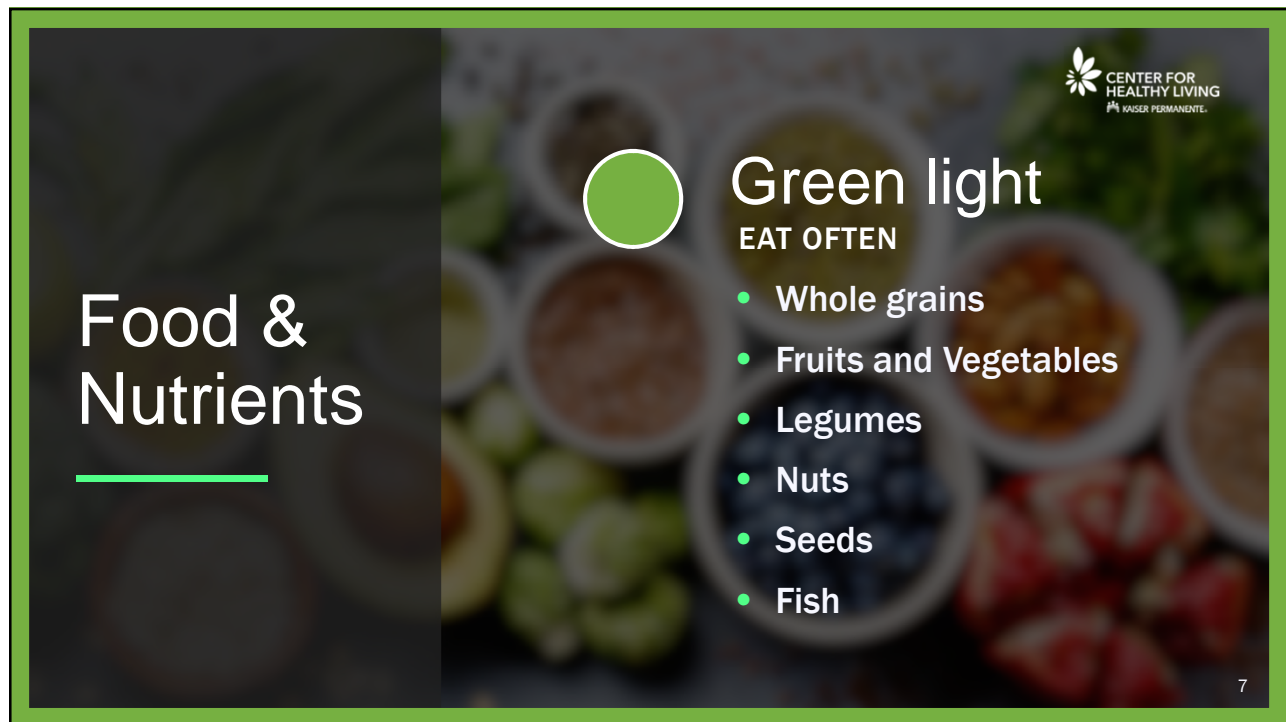
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Food & Nutrients

Green light
EAT OFTEN

Yellow light
LIMIT

Red light
MINIMIZE

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Food & Nutrients

Green light
EAT OFTEN

- Whole grains
- Fruits and Vegetables
- Legumes
- Nuts
- Seeds
- Fish

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Whole Grains

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WHOLE GRAINS

All-cause, CVD, Cancer mortality

Meta-analysis 18 cohort studies; n=1,041,692; Total deaths:

Each serving (28g/d) of whole grain associated with:
- 9% ↓ All-cause mortality
- 14% ↓ CVD mortality
- 3% ↓ Cancer Mortality

Zhang et al. Eur J Clin Nutr 2016

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WHOLE GRAINS

Weight Loss

6 wk, randomized, single blind, controlled, n=81; whole vs. refined grains

Whole grain group had:
- RMR: ↑ 43 kcal/day
- Stool weight: ↑ 76 g/day
- Stool energy: ↑ 57 kcal/day
- Daily energy loss: ↑ 92 kcal/day (~5.5lb in 1 year)

Tang et al. Am J Cardiol. 2015

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Whole Grains and CV Risk Factors

WHOLE GRAINS

10 wk randomized trial; n=75; whole grains vs fruits/veg vs whole grains + fruits/veg

Whole grain highest reduction in
- Weight (p=0.03)
- Waist Circumference (p=0.001)
- SBP (p=0.04)
- FBG (p=0.03)
- TG (p=0.001)

Highest increase in
- HDL (p=0.01)

Fatahi et al. J Am Coll Nutr. 2018

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Fruit and Vegetables

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FRUIT AND VEGETABLES

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Blood pressure and diabetes

N=512,891, 10 locations in China; 3.2 million person-yrs. f/u
N=512,891, 7 yr. f/u; China Kadoorie Biobank study

Eating fresh fruits DAILY vs. RARELY/NEVER:
- SBP ↓ 4 mmHg
- Blood glucose ↓ 9 mg/dl
- Diabetes incidence ↓ 12 %

Du et al. N Engl J Med. 2016
Du et al. PloS Med. 2017

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FRUIT AND VEGETABLES

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Mortality

Meta-analysis; 16 studies, 833,234 people

For each additional serving of fruits/vegetables (max 5 servings/day):
- All-cause mortality: ↓ 5%
- Cardiovascular mortality: ↓ 4%

Wang et al. BMJ. 2014

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FRUIT AND VEGETABLES

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Cancer mortality

Meta-analysis; 95 studies, n = 2,123,415

FRUITS/ VEGETABLES	CANCER MORTALITY
200 g/day (~2.5 servings)	↓ 4%
600 grams/day (~7.5 servings)	↓ 14%

Inverse association between:
- Cancer mortality
- Green yellow vegetables
- Cruciferous vegetables

1 serving = 80 grams

Aune et al. International Journal of Epidemiology. 2017

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Legumes

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LEGUMES

Legumes and All-Cause Mortality

Meta-analysis; 6 studies; n=218,997

Highest vs. lowest legume intake

- **7% ↓** in all-cause mortality

Li et al. Biomed Res Int 2017

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LEGUMES

Legumes and All-Cause Mortality

Meta-analysis; 17 studies

Legume intake up to ~150g/d (3/4 cup)

- **16% ↓** in all-cause mortality

Schwingshackl et al. Am J Clin Nutr. 2017

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LEGUMES

Legumes and CVD Mortality

Meta-analysis; 14 studies; n=367,000

Highest vs. lowest legume intake

- 10% ↓ in CVD mortality

Marventano et al. Public Health Nutr 2017

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Nuts

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NUTS

Nuts, CVD, all-cause mortality

Meta-analysis; 20 prospective cohort studies; n=467,389

Highest vs. lowest nut consumption:
- All cause mortality: 19% ↓
- Cardiovascular mortality: 27% ↓

Mayhew et al. British Journal of Nutrition. 2016

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NUTS

Cancer

Meta-analysis; 36 observational studies; n=30,708 pts; follow-up 4.6 to 30 yrs
Meta-analysis; 15 studies; n=354,933

Highest vs. lowest nut consumption and cancer risk
- Colorectal cancer: 24% ↓
- Endometrial cancer: 42% ↓
- Pancreatic cancer: 32% ↓
- Overall cancer death 14% ↓

Wu et al. Nutrition Reviews. 2015
Grosso et al. Am J Clin Nutr. 2015

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Seeds

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Flaxseed and Weight, Lipids, Sugars

Single-blinded, randomized control study; n=53 w/ T2D BMI 20.5 to 48.9; 12 wks,

	Flaxseed 10mg/d	Placebo	P-value
Weight	↓ 3.8 kg	0 kg	P < 0.05
BMI	↓ 1.5kg	↓ 0.1	P < 0.05
FBG	↓ 26.7 mg/dl	↓ 1.9mg/dl	P < 0.05
Total Cholesterol	↓ 37.3 mg/dl	↓ 10.4 mg/dl	P < 0.05
LDL	↓ 21 mg/dl	↓ 4.3mg/dl	P < 0.05
HbA1c	↓ 0.8%	↑ 1.0%	P < 0.05

Soltanian et al. Nutr Metab. 2018

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SEEDS

Flaxseed and HTN

Randomized, double-blind, placebo controlled trial; n=110; duration 6 mos;

Flaxseed 30 g/d vs placebo
- SBP ↓ 10mmHg
- DBP ↓ 7mmhg

Rodriguez-Leyva et al. Hypertension. 2013

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Fish

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CAD

FISH

Meta-analysis; 11 prospective cohorts; 8 case controlled; n=408,305

Fish consumption ≥ 4x/week associated with:
- 21% ↓ ACS

Each additional 100 gram fish/week associated with:
- 5% ↓ risk of ACS

Leung Yinko et al. Am J Med. 2014

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Hypertension

FISH

Case controlled study; n=15,303 in China; age ≥ 15;

Highest vs. lowest fish consumption

- 30% ↓ risk of hypertension prevalence*
  - *Adjusted for smoking, activity, education, eployment status, BMI and pulse*

Yu et al. American journal of Hypertension. 2018

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FISH

Cancer mortality

EPIC Trial; n=509,3087 men; 23 centers, 10 countries; 11-18 yr f/u

No relationship with fish consumption and cancer mortality

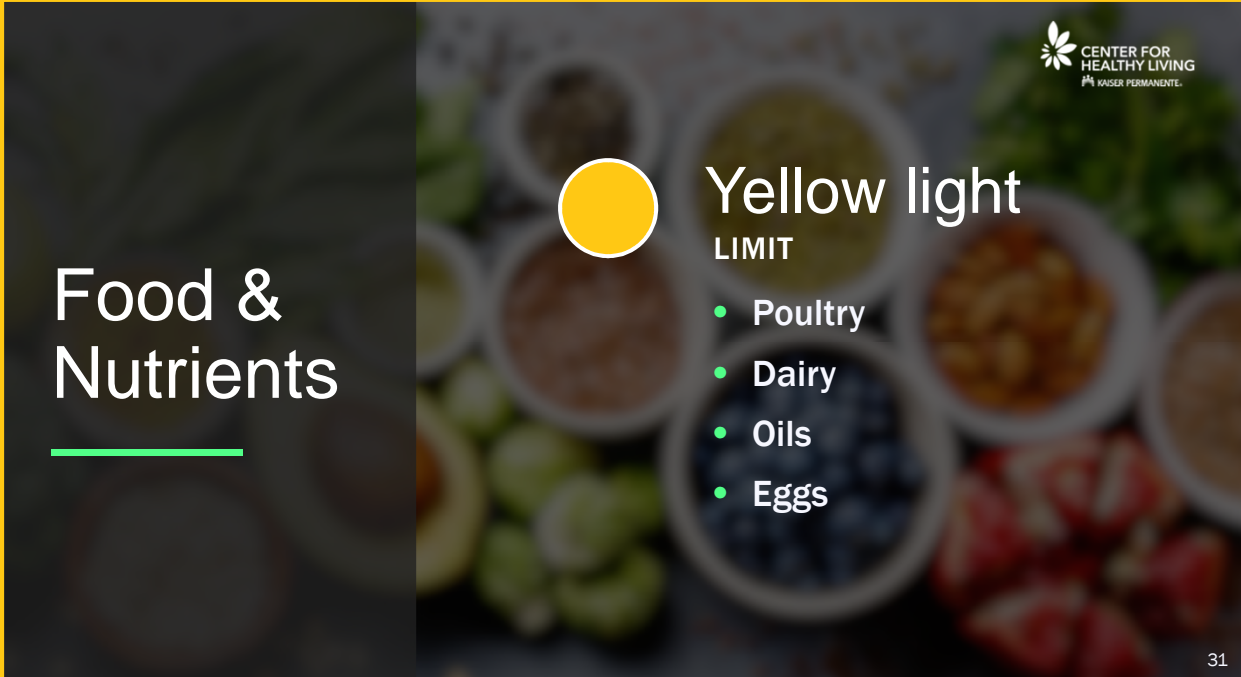Engeset et al. Eur J Epidemiol. 2015

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FISH

Mercury and Fish

Highest	High	Low (18 oz/wk)	Lowest (36 oz/wk)
Swordfish	Grouper	Trout	Wild/Alaskan Salmon
Shark	Chilean Sea Bass	Haddock	Shrimp
King mackerel	Bluefish	Pollock	Scallops
Gulf tilefish	Halibut	Atlantic croaker	Sardines
Marlin	Sablefish (black cod)	Crawfish	Oysters
Orange roughy	Spanish mackerel (Gulf)	Catfish	Squid
	Fresh tuna	Crab	Tilapia
		Flounder/Sole (flat fish)	
		Atlantic mackerel	
		Mullet	

Consumerreports.org. Accessed 8/2018

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Food &
Nutrients

Yellow light
LIMIT
- **Poultry**
- **Dairy**
- **Oils**
- **Eggs**

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Poultry

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POULTRY

Stroke Risk

Meta-analysis, 7 studies; n=354,718

Highest vs lowest poultry consumption

- No association w/ total, ischemic or hemorrhagic stroke risk

Mohammadi et al. Clin Nutr ESPEN. 2018

33

POULTRY

Total Cancer Mortality

Meta-analysis, 14 prospective studies; n=2,378,204

Highest vs lowest poultry consumption

- No association

Zhang et al. Nutr Cancer. 2018

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POULTRY

Hypertension

Meta-analysis; 10 prospective cohort studies; n=351,819

Highest vs lowest poultry consumption
- 15% ↑ risk of hypertension

Zhang et al. Journal of Human Hypertension. 2018

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POULTRY

Cancer

Prospective cohort study; n=138,266; dietary assessment 1982, 1992

Highest vs lowest poultry consumption
- 27% ↑ pancreatic cancer risk

McCullough, ML et al. Cancer Causes Control. 2018

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Dairy

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CVD/stroke

Health Professionals study (n=43,652 men); Nurses Health Study (n=87,907 for 1980-2012, n=90,675 for 1991-2011)

Replacing Dairy w/ 5% calories from PUFA
- 24% ↓ risk of CHD
- 25% ↓ risk of stroke

Chen et al. AJCN. 2016

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All-Cause Mortality

Meta-analysis 27 studies

Intake ≤ 1000 g/d associated w/
- **15% ↑** risk of all cause mortality

Chen et al. AJCN. 2016

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Parkinson's Disease

Nurses Health Study (n=80,736), 26 yr. f/u; Health Professionals Study (n=48,610), 24 yr. f/u); meta-analysis of 4 previous studies

≥ 3 servings/day low-fat dairy vs < 1
- **39% ↑** risk for Parkinson's disease
- Absolute risk 1%

Hughes et al. Neurology. 2017

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Cancer mortality

Meta-analysis; 11 studies; n=778,929

Total dairy intake (milk, yogurt, cheese, butter)
- NOT associated with all cancer mortality
- BUT... ↑ whole milk (serving/day) in men
  - 43% ↑ prostate cancer mortality

Lu et al. Nutritional Journal. 2016

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Oils

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OILS

Olive Oil and CAD

Meta-analysis; 32 cohort studies; n=841,211

Higher MUFA intake:
- **11%** ↓ All-cause mortality
- **12%** ↓ CV mortality
- **17%** ↓ Stroke

Schwingshackl et al. Lipids in Health and Disease. 2014

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OILS

Coconut oil

82% saturated fat
- **67%**: Lauric (12:0), Myristic (14:0), Palmitic (16:0)
- **3%** Stearic acid

6% monounsaturated fat (Oleic)

2% polyunsaturated fat (Linoleic)

Only **13-15% MCT's** (capric and caprylic acid)

Sacks et al. Circulation. 2017

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OILS

Coconut oil and CVD

Review 21 studies (8 clinical; 13 observational)

Coconut oil ↑ total and LDL greater than unsaturated plant oils

Coconut flesh or squeezed coconut does NOT lead to adverse cardiovascular outcomes

Eyres et al. Nutrition Reviews. 2016
Prior et al. Am J Clin Nutr. 1997
Lindeberg et al. J Intern Med. 1993

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OILS

Coconut oil and CVD

Review 21 studies (8 clinical; 13 observational)

Pukapukans and Tokelauans
- Diet: low sugar, high fiber; coconut, breadfruit and fish

Kitava studies (Melanesian Island)
- Overall fat intake 21%
- Diet: whole coconuts, tubers, fish and fruit

Eyres et al. Nutrition Reviews. 2016
Prior et al. Am J Clin Nutr. 1997
Lindeberg et al. J Intern Med. 1993

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Eggs

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Eggs and All-cause Mortality

Meta-analysis 8 studies; 322,334 participants

Egg intake 60g/d (1 jumbo egg)

- **10%** ↑ risk all-cause mortality

Schwingshackl et al. Am J Clin Nutr. 2017

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EGGS

All-cause Mortality, Cancer, CVD

EPIC-Spain; prospective cohort; n=40,621; 18 yrs f/u

Highest vs lowest consumption

- No association for all-cause, cancer, and CVD mortality
- Conclusion: moderate egg consumption up to **1 egg** per day not correlated with main mortality causes.

Zhang et al. Journal of Human Hypertension. 2018

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EGGS

Hypertension

Meta-analysis; 10 prospective cohort studies; n=351,819

Highest vs lowest consumption

- **21% ↓** risk of HTN

Zhang et al. Journal of Human Hypertension. 2018

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EGGS

Dietary Choline and CVD

Meta-analysis 6 studies; 184,010 participants

Highest vs lowest consumption
- No association for CHD, stroke or CVD

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Meyer et al. Nutrients. 2017

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Food & Nutrients

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Red light
MINIMIZE

- **Salt**
- **Red and processed meats**
- **Sugar sweetened foods and beverages**
- **Artificial sweeteners**
- **Refined grains**

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Salt

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SALT

Cardiometabolic deaths

Comparative risk assessment model NHANES (1999–2002, 2009–2012)

High Na intake (>2g/d) linked to:
- 66,508 or 9.5% of deaths from heart disease, stroke, and T2DM

Micha et al. JAMA. 2017

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Red and Processed Meats

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RED MEAT

Red Meat and Mortality

Meta-analysis 12 studies

Each additional 100 g/d associated w/

- 10% ↑ risk of all-cause mortality

Schwingshackl et al. Am J Clin Nutr. 2017

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RED AND PROCESSED MEATS

RISK PER SERVING

Health Professionals f/u study (37.698 men); Nurses' Health Study (n=83,644)

	RED MEAT	PROCESSED MEAT
Total Mortality	13% ↑	20% ↑
Cancer Mortality	10% ↑	16% ↑
Cardiovascular Mortality	18% ↑	21% ↑

Pan et al. Arch Int Med. 2012

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Sugar-sweetened foods and beverages

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Cardiovascular mortality

NHANES survey 1988-2006; n=111,733

Consuming 10%-24.9% calories from added sugars vs <10%
- **30% ↑** risk

Consuming ≥25% calories from added sugars vs <10%
- **175% ↑** risk

Yang et al. JAMA Int Med. 2013

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All-cause mortality

Meta-analysis 5 studies

Sugar sweetened beverage intake of 250 ml/d (~8 fl. Oz.)
- **7% ↑** risk

Schwingshackl et al. Am J Clin Nutr. 2017

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Artificial sweeteners

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ARTIFICIAL SWEETENERS

Risk of Weight Gain

San Antonio Heart Study; 1979-1988; n=5158

Overall adjusted BMI w/ Artificial Sweetener users vs nonusers

- 47% ↑

Consuming > 21 Artificial Sweetened beverages/wk vs none

- 93% ↑ risk of becoming overweight or obese

Fowler et al. Obesity. 2012

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Stroke and Dementia

Framingham Heart Study Offspring Cohort; n=2888, age > 45 for stroke; n=1484, age > 60 for demntia; f/u 10 yrs

None vs ≥ 1/d artificially sweetened soft drink

- **196% ↑** risk of stroke
- **147% ↑** risk of all-cause dementia

Pase et al. Stroke. 2017

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Refined grains

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REFINED GRAINS

Red/Processed Meat + Refined Grains

Randomized, cross-over study; 8 week; n=49 without T2DM

Red meat, refined grains vs whole grains, dairy, legumes, no red meat had:

- ↑ insulin concentration (p=0.019)
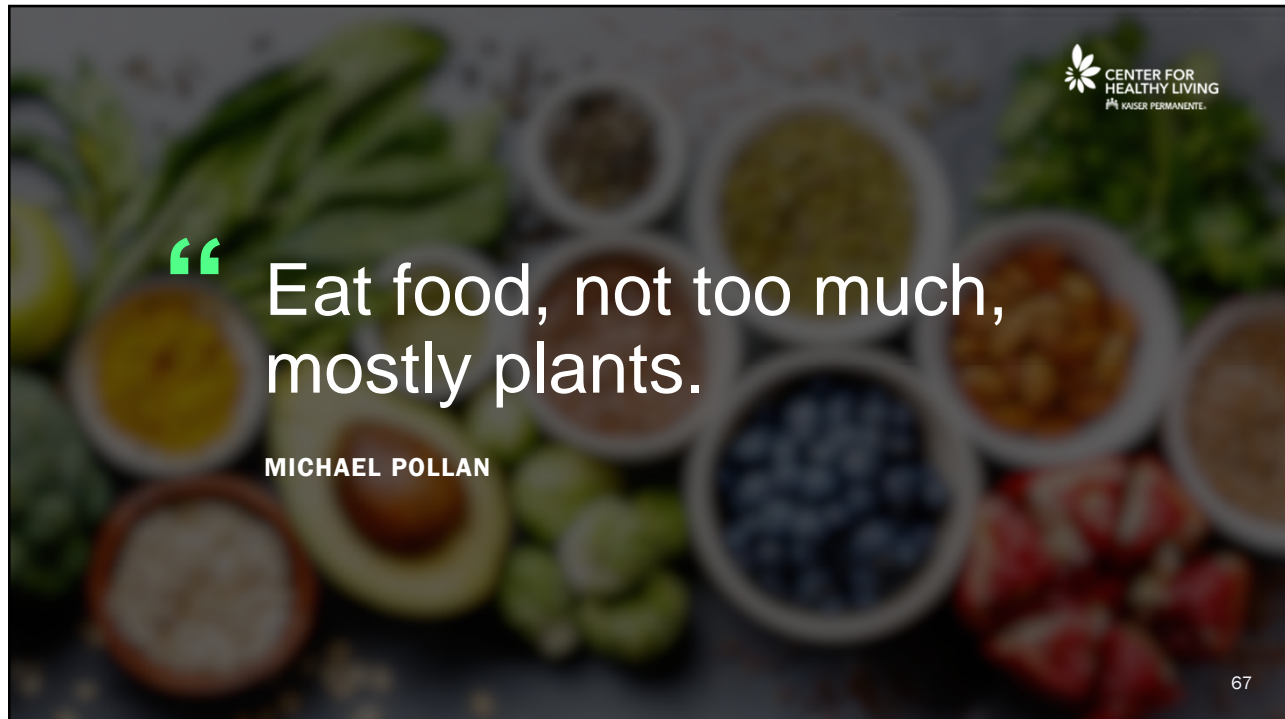- ↑ glucose concentration (p=0.05)
- ↓ insulin sensitivity index (p-0.014)
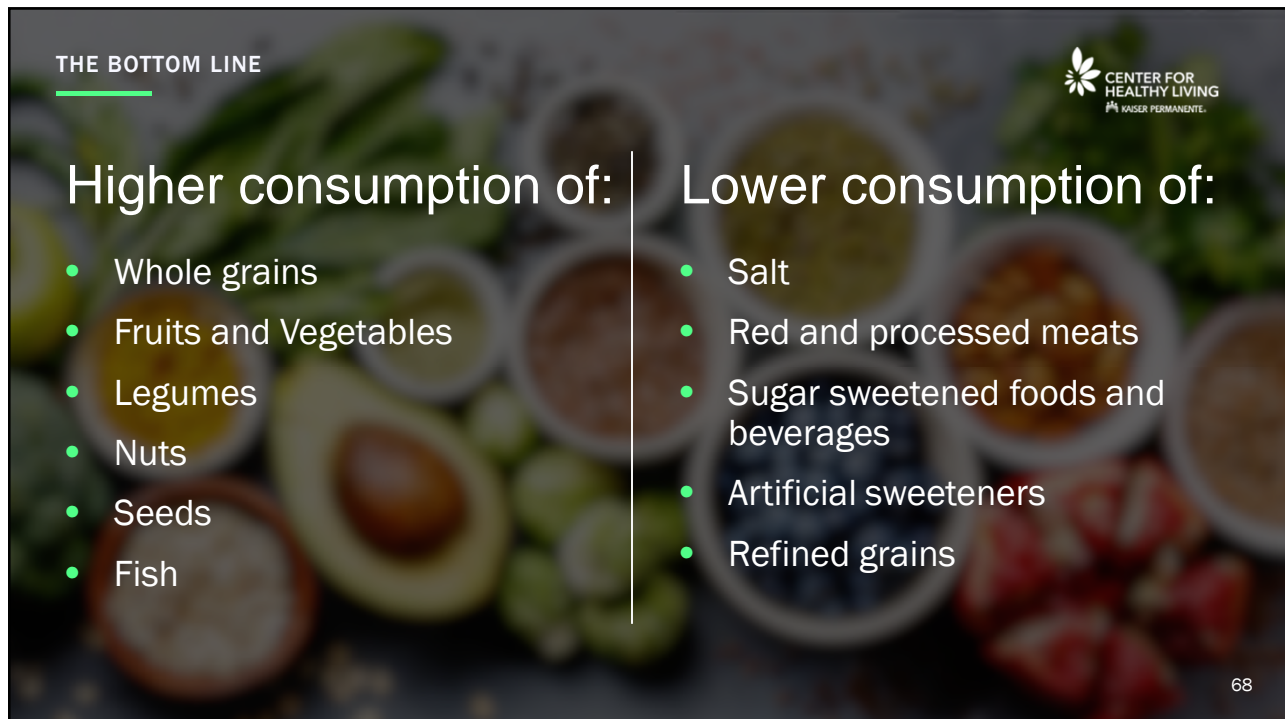
Kim et al. Metabolism. 2017

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The Bottom Line

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> " **Eat food, not too much, mostly plants.**
>
> **MICHAEL POLLAN**

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THE BOTTOM LINE

Higher consumption of:

- Whole grains
- Fruits and Vegetables
- Legumes
- Nuts
- Seeds
- Fish

Lower consumption of:

- Salt
- Red and processed meats
- Sugar sweetened foods and beverages
- Artificial sweeteners
- Refined grains

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Healthy Plate

Protein
Grain/Starch
Vegetables

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Thank you!

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