Heart Health Optimization

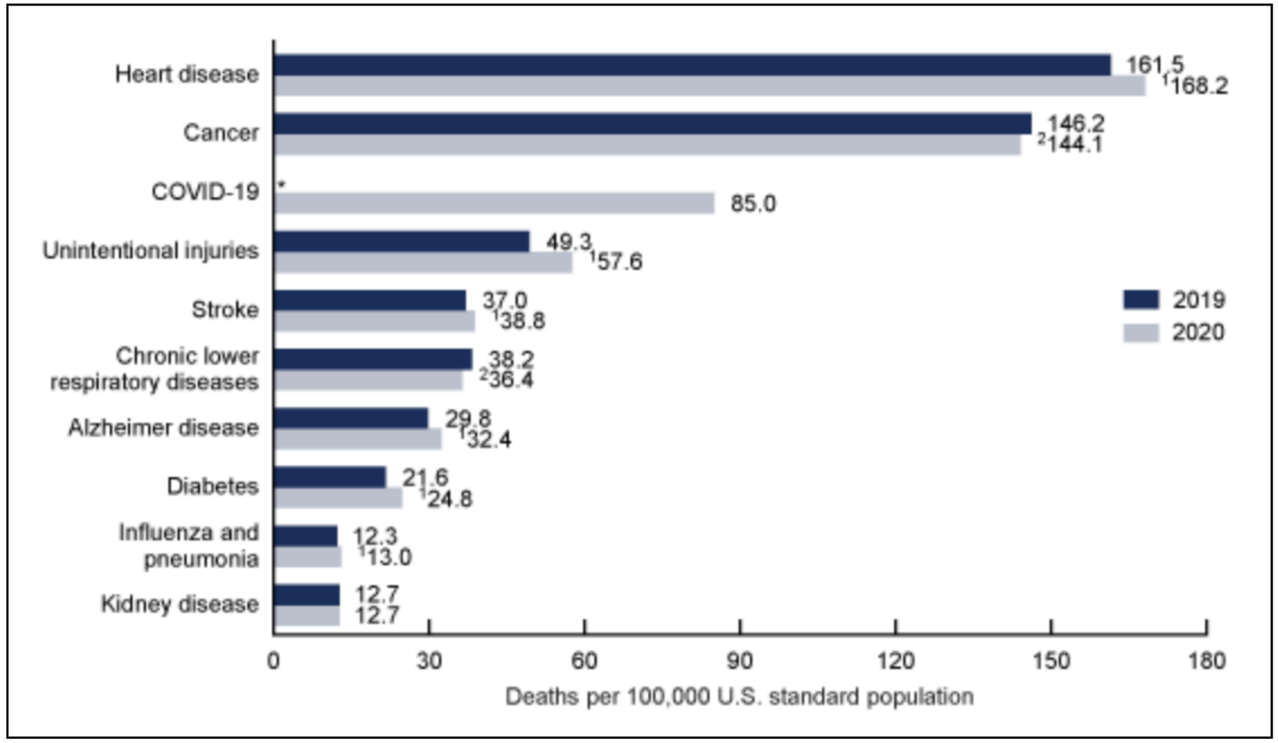
A Cardiologist's Practical Tips to Reduce Your Cardiovascular Risk

Dr Nicole Harkin, MD, FACC

Why care about heart disease?

- Cardiovascular disease is the leading cause of death in the US and worldwide
- Top killer of both men and women
- Not just a disease of the "old"
- 80% of heart disease is preventable

Figure 4. Age-adjusted death rates for the 10 leading causes of death in 2020: United States, 2019 and 2020



CDC.gov,, NCHS Data Brief No. 427, December 2021

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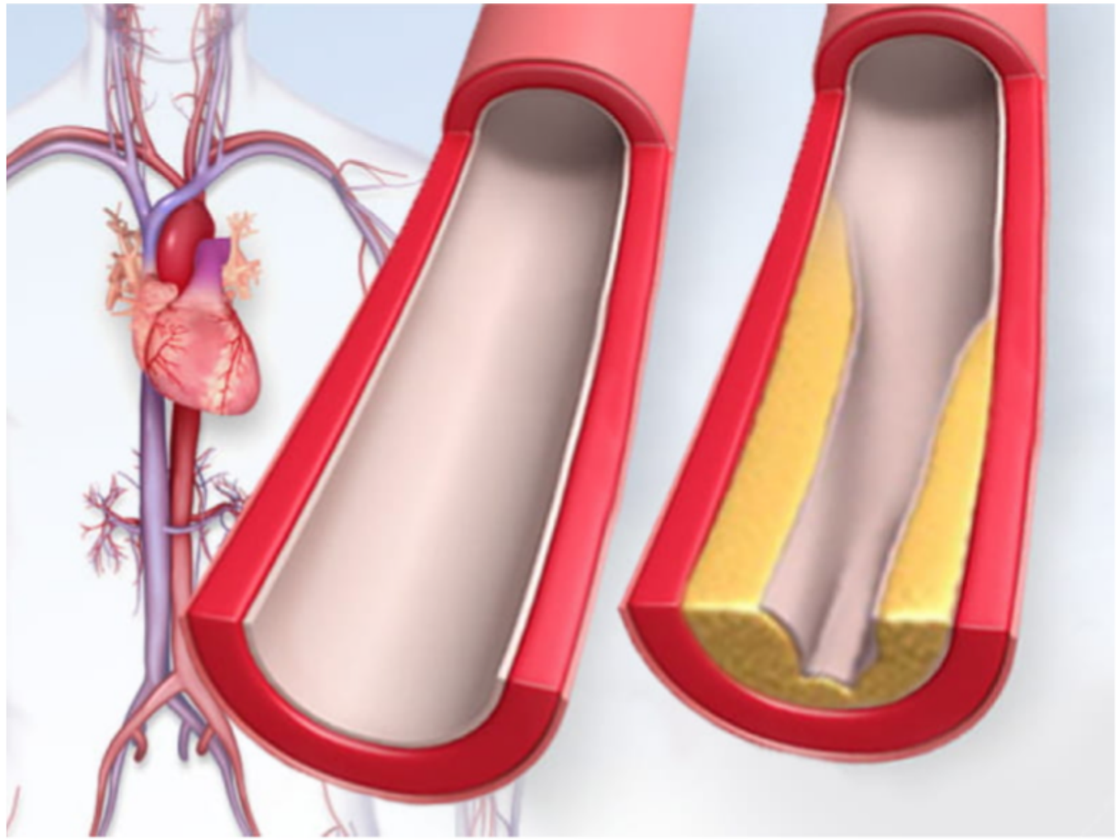
Heart disease - what is it?

- Atherosclerosis is a buildup of cholesterol in the arteries of the heart
  - LDL particles/apoB
  - endothelial dysfunction

- When large, can impair the flow of blood to the heart
  - chest pain or shortness of breath
  - obstructive coronary artery disease

- Other times, these plaques can also rupture, causing a heart attack

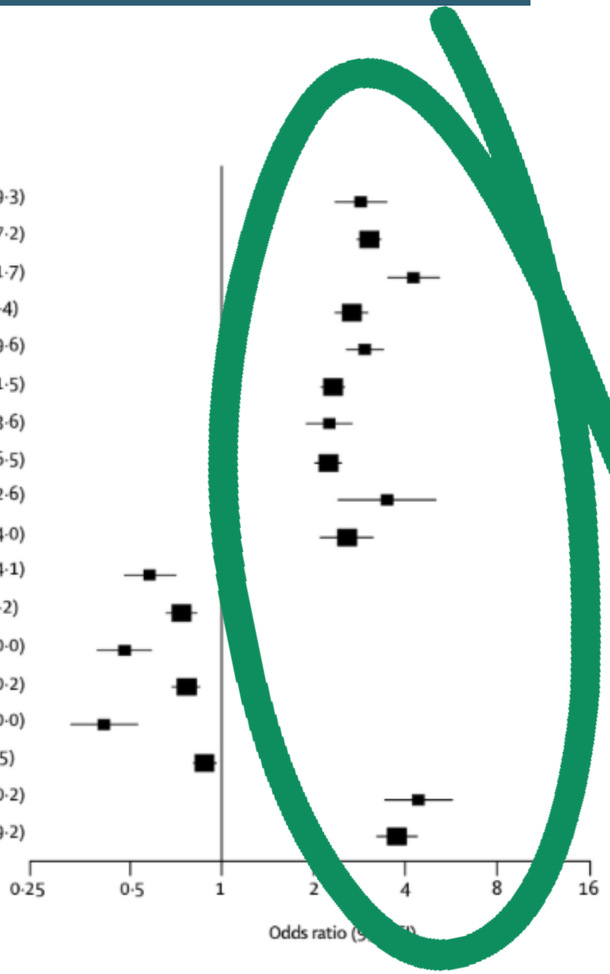


AHA.org

Who gets heart disease

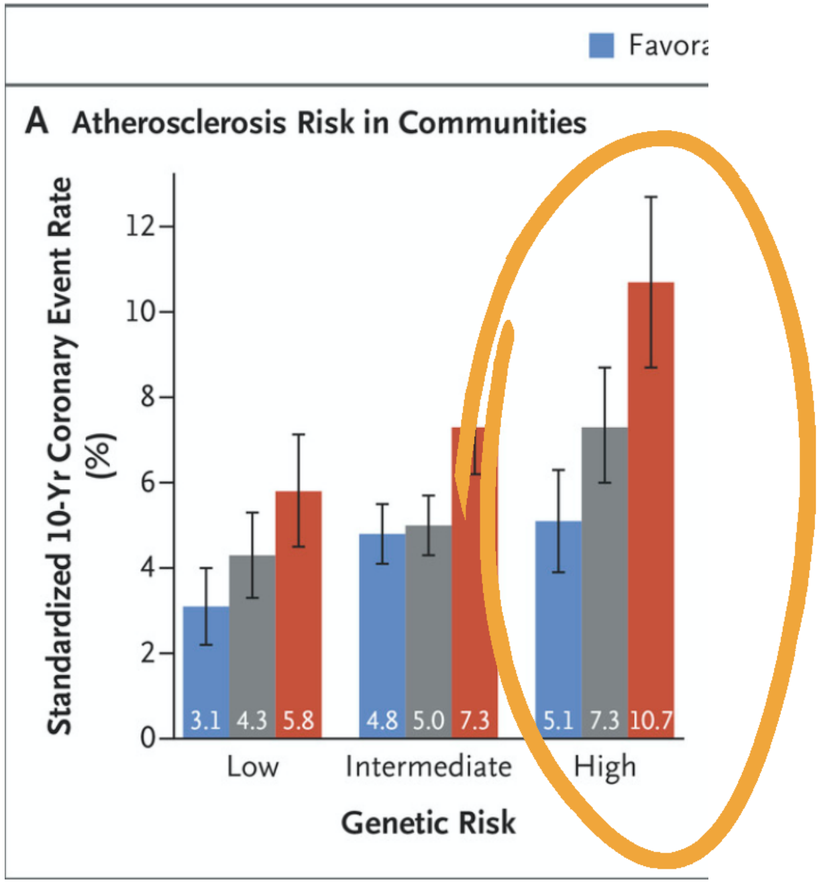
- 90% of heart disease risk attributed to these 9 risk factors
- Age is the most important risk factor
- On an individual level
  - Family history of heart disease
  - Inflammatory, autoimmune disorders
  - Early menopause
  - Pregnancy complications
  - Kidney disease
  - Chronic stress
  - Poor sleep quality

Risk factor	Sex	Control (%)	Case (%)	Odds ratio (99% CI)	PAR (99% CI)
Current smoking	F	9·3	20·1	2·86 (2·36–3·48)	15·8% (12·9–19·3)
	M	33·0	53·1	3·05 (2·78–3·33)	44·0% (40·9–47·2)
Diabetes	F	7·9	25·5	4·26 (3·51–5·18)	19·1% (16·8–21·7)
	M	7·4	16·2	2·67 (2·36–3·02)	10·1% (8·9–11·4)
Hypertension	F	28·3	53·0	2·95 (2·57–3·39)	35·8% (32·1–39·6)
	M	19·7	34·6	2·32 (2·12–2·53)	19·5% (17·7–21·5)
Abdominal obesity	F	33·3	45·6	2·26 (1·90–2·68)	35·9% (28·9–43·6)
	M	33·3	46·5	2·24 (2·03–2·47)	32·1% (28·0–36·5)
Psychosocial index	F	–	–	3·49 (2·41–5·04)	40·0% (28·6–52·6)
	M	–	–	2·58 (2·11–3·14)	25·3% (18·2–34·0)
Fruits/veg	F	50·3	39·4	0·58 (0·48–0·71)	17·8% (12·9–24·1)
	M	39·6	34·7	0·74 (0·66–0·83)	10·3% (6·9–15·2)
Exercise	F	16·5	9·3	0·48 (0·39–0·59)	37·3% (26·1–50·0)
	M	20·3	15·8	0·77 (0·69–0·85)	22·9% (16·9–30·2)
Alcohol	F	11·2	6·3	0·41 (0·32–0·53)	46·9% (34·3–60·0)
	M	29·1	29·6	0·88 (0·81–0·96)	10·5% (6·1–17·5)
ApoB/ApoA1 ratio	F	14·1	27·0	4·42 (3·43–5·70)	52·1% (44·0–60·2)
	M	21·9	35·5	3·76 (3·23–4·38)	53·8% (48·3–59·2)



INTERHEART study, 2004

Can we prevent heart disease? YES!



Khera et al, NEJM 2016

- Even people with a strong genetic predisposition can benefit from lifestyle changes!
- Healthy lifestyle (blue) associated with an almost 50% reduction in the risk of heart disease, even those at the highest genetic risk
- Genetics, while important, are not necessarily destiny

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So what should we eat?

- Emphasize
  - Vegetables
  - Fruits
  - Whole grains
  - Legumes (beans, lentils, and peas)
  - Nuts and seeds
  - Fish
- Limit
  - Processed meats
  - Refined carbs
  - Sugar sweetened beverages

Recommendations for Nutrition and Diet

Referenced studies that support recommendations are summarized in Online Data Supplements 4 and 5.

COR	LOE	Recommendations
I	B-R	1. A diet emphasizing intake of vegetables, fruits, legumes, nuts, whole grains, and fish is recommended to decrease ASCVD risk factors.[S3.1-1–S3.1-11]
IIa	B-NR	2. Replacement of saturated fat with dietary monounsaturated and polyunsaturated fats can be beneficial to reduce ASCVD risk.[S3.1-12,S3.1-13]
IIa	B-NR	3. A diet containing reduced amounts of cholesterol and sodium can be beneficial to decrease ASCVD risk.[S3.1-9,S3.1-14–S3.1-16]
IIa	B-NR	4. As a part of a healthy diet, it is reasonable to minimize the intake of processed meats, refined carbohydrates, and sweetened beverages to reduce ASCVD risk.[S3.1-17–S3.1-24]
III: Harm	B-NR	5. As a part of a healthy diet, the intake of *trans* fats should be avoided to reduce ASCVD risk.[S3.1-12,S3.1-17,S3.1-25–S3.1-27]

What types of diets does this include?

- Mediterranean diet
- Whole food plant based or plant predominant diet
- DASH diet

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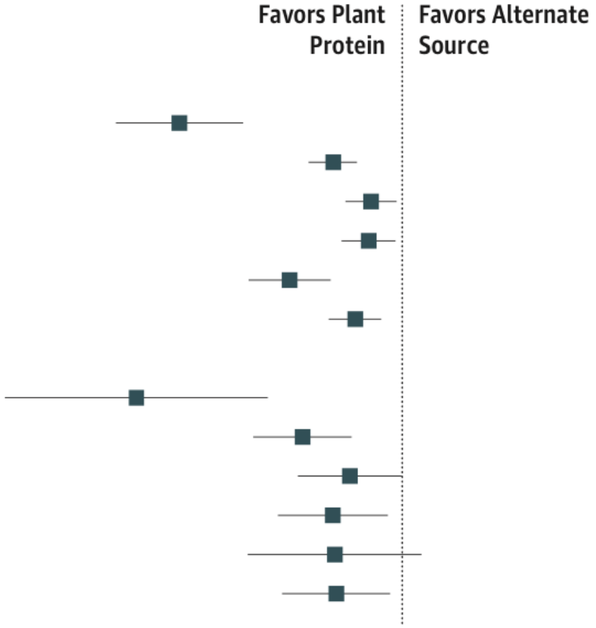
Swapping in plants

Figure. Risk for Mortality Associated With Replacement of 3% Energy From Various Animal Protein Sources With Plant Protein

Animal Protein Source by Cause of Death	HR (95% CI)
All cause	
Processed red meat	0.66 (0.59-0.75)
Unprocessed red meat	0.88 (0.84-0.92)
Poultry	0.94 (0.90-0.99)
Fish	0.94 (0.89-0.99)
Egg	0.81 (0.75-0.88)
Dairy	0.92 (0.87-0.96)
CVD	
Processed red meat	0.61 (0.48-0.78)
Unprocessed red meat	0.83 (0.76-0.91)
Poultry	0.91 (0.83-1.00)
Fish	0.88 (0.80- 0.97)
Egg	0.88 (0.75-1.04)
Dairy	0.89 (0.80-0.98)

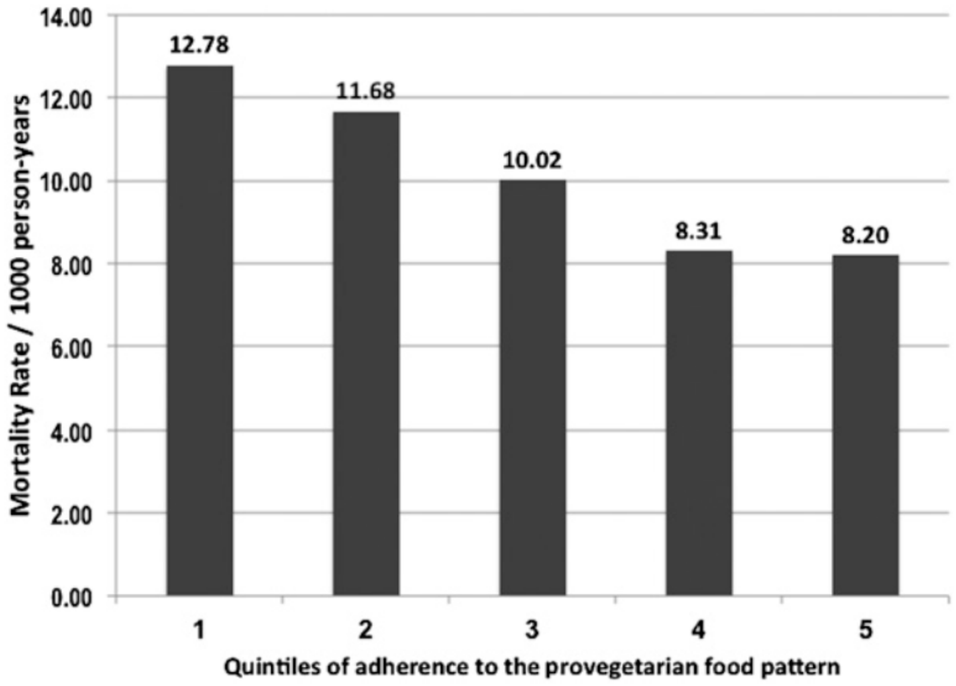


Song et al, JAMA 2017

- Small swaps make a difference
- Replacement of animal protein with plant protein associated with a reduced risk of dying from heart disease
  - 12% reduced risk of heart disease for each 3% total energy intake swapped
- Processed red meat > unprocessed red meat > egg

PREDIMED and plants

- Mediterranean diet vs omnivorous “low fat” diet
  - 30% risk reduction in CVD events
- Secondary analysis -> “provegetarian” food pattern
- Mortality reduction of 41% in those with highest vegetarian score



Martinez-Gonzalez et al, Am J Clin Nutr 2014

Why do more plants lower risk?

High in

- Fiber
- Micronutrients
- Antioxidants

Low in

- Calories
- Saturated fat
- Cholesterol
- Added salt
- Added sugar

Results in improvements in

- LDL Cholesterol
- Blood pressure
- Diabetes/insulin resistance
- Weight
- Inflammation
- TMAO (gut metabolite)

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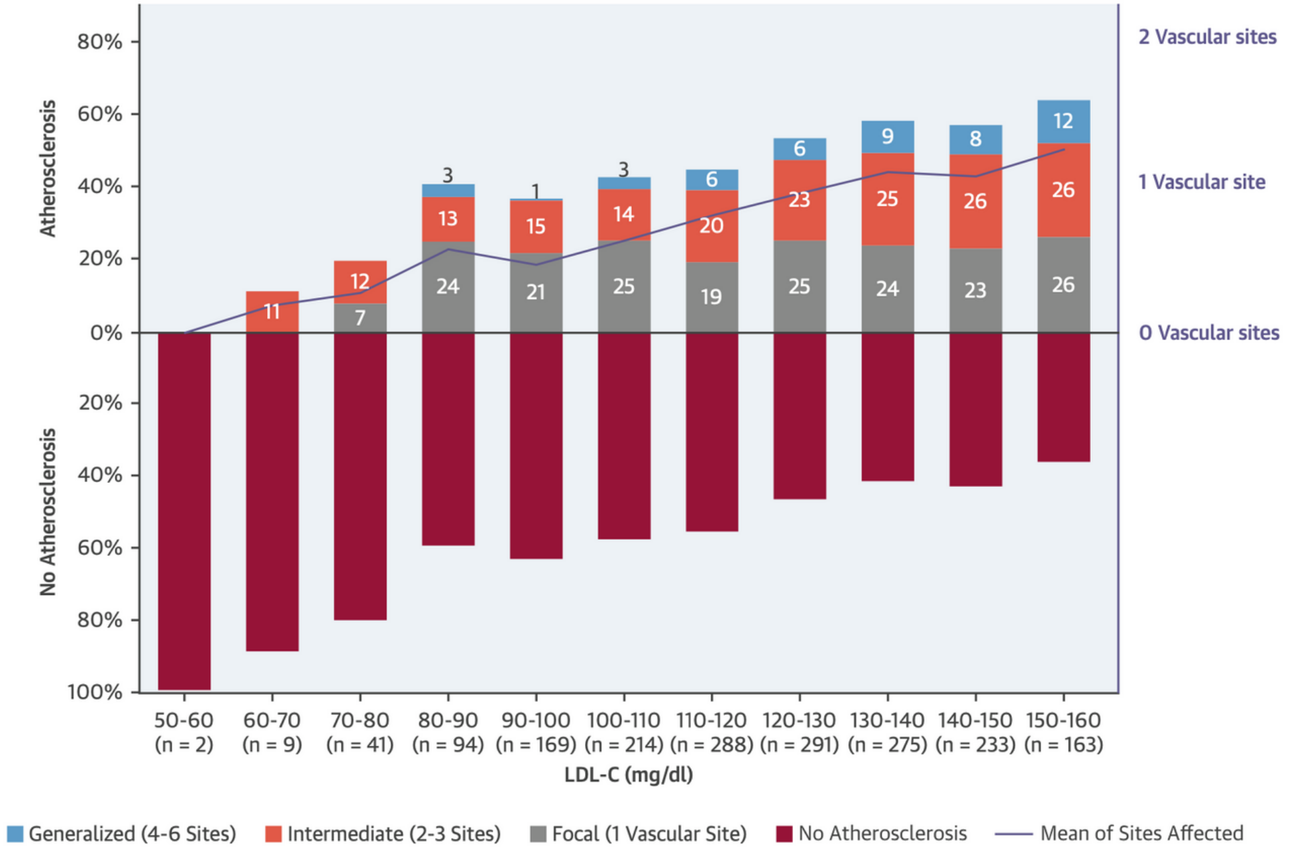
LDL Cholesterol

- Elevated LDL-cholesterol -> atherosclerosis
- Goal < 100 mg/dL, ideally < 70 mg/dL
- Lowering LDL-c is a top focus for heart disease prevention as lowering it consistently shows it lowers risk of heart disease, heart attack, and death

CENTRAL ILLUSTRATION Relation Between LDL-Cholesterol Levels and Atherosclerosis



Fernández-Friera, L. et al. J Am Coll Cardiol. 2017;70(24):2979-91.

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LDL-c and saturated fat

- Saturated fat increases LDL-c
  - Meat
  - Dairy (top source in US)
  - Butter
  - Coconut oil, palm oil

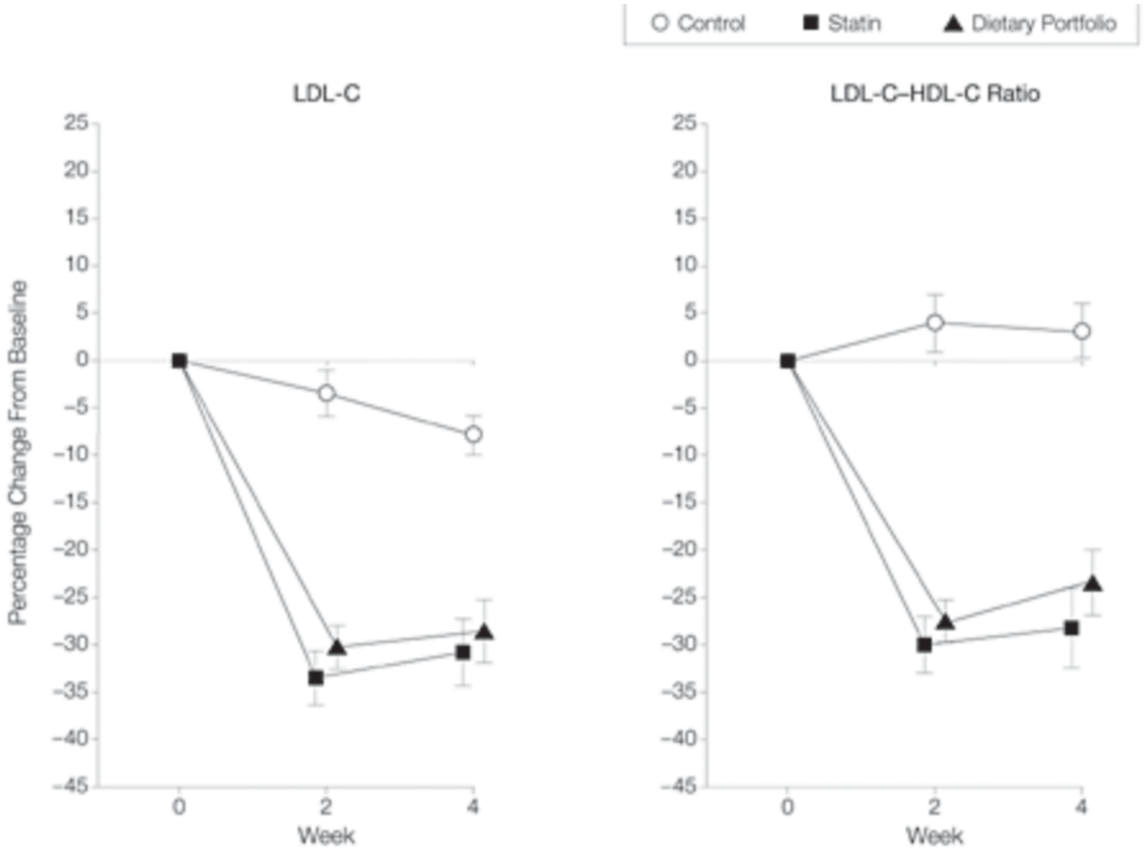
- LDL decreases when you swap saturated fat with polyunsaturated fat > monounsaturated fat > high quality complex carbs

LDL-c and fiber

- Fiber is a type of carbohydrate that isn't digestible
- Soluble fiber lowers LDL-cholesterol
- Recommended amount
  - 21-25 g for women
  - 20-38 g for men
  - lowering cholesterol -> more like 40 or 50 g

Portfolio Diet

- Portfolio diet
  - Soluble fiber
  - Nuts
  - Plant proteins
  - Plant sterols
- Results
  - Lowers LDL-c by 28.6%
  - Equivalent to low dose statin



Jenkins et al, , JAMA, 2003

Portfolio Diet

Lowering cholesterol with diet

Soluble Fiber

20 g

Oats, barley, beans, lentils, psyllium (aka Metamucil), eggplant, okra, Brussels sprouts, avocado, sweet potatoes, apples, oranges, and berries

Plant Protein (soy)

50 g

Consider soybeans, beans, peas, chickpeas, lentils, tofu, tempeh, soy milk, and plant protein powder

Nuts

42 g (about one handful)

Almonds, peanuts, nut butters, pistachios, walnuts. Really any nut works!

Plant stanols/sterols

2 g

Occur naturally in plants, very difficult to consume in sufficient quantities. Need to supplement or consume fortified products to reach this goal

Tips to increase fiber in your diet

START LOW AND GO SLOW
HYDRATE

Include at least one veggie per meal. Even breakfast! There's no rule you can't have salad at breakfast

Switch to whole grain pasta or bean pasta instead of white pasta

Add beans or lentils to your salads, soups, and pastas

Amp up your fiber intake with seeds! Chia and ground flax seeds are great fiber boosters. Add them to smoothies, oatmeal, salad dressings and more

Don’t peel your fruits and veggies. Just scrub them with a veggie brush!

Snack time is a great place to introduce fiber! Reach for nuts, an apple with nut butter, chia seed pudding, or veggies dipped in hummus

On packaged food, look for "high fiber." First ingredient should be whole grain (ie "whole wheat flour") and not an enriched grain (ie "wheat flour")

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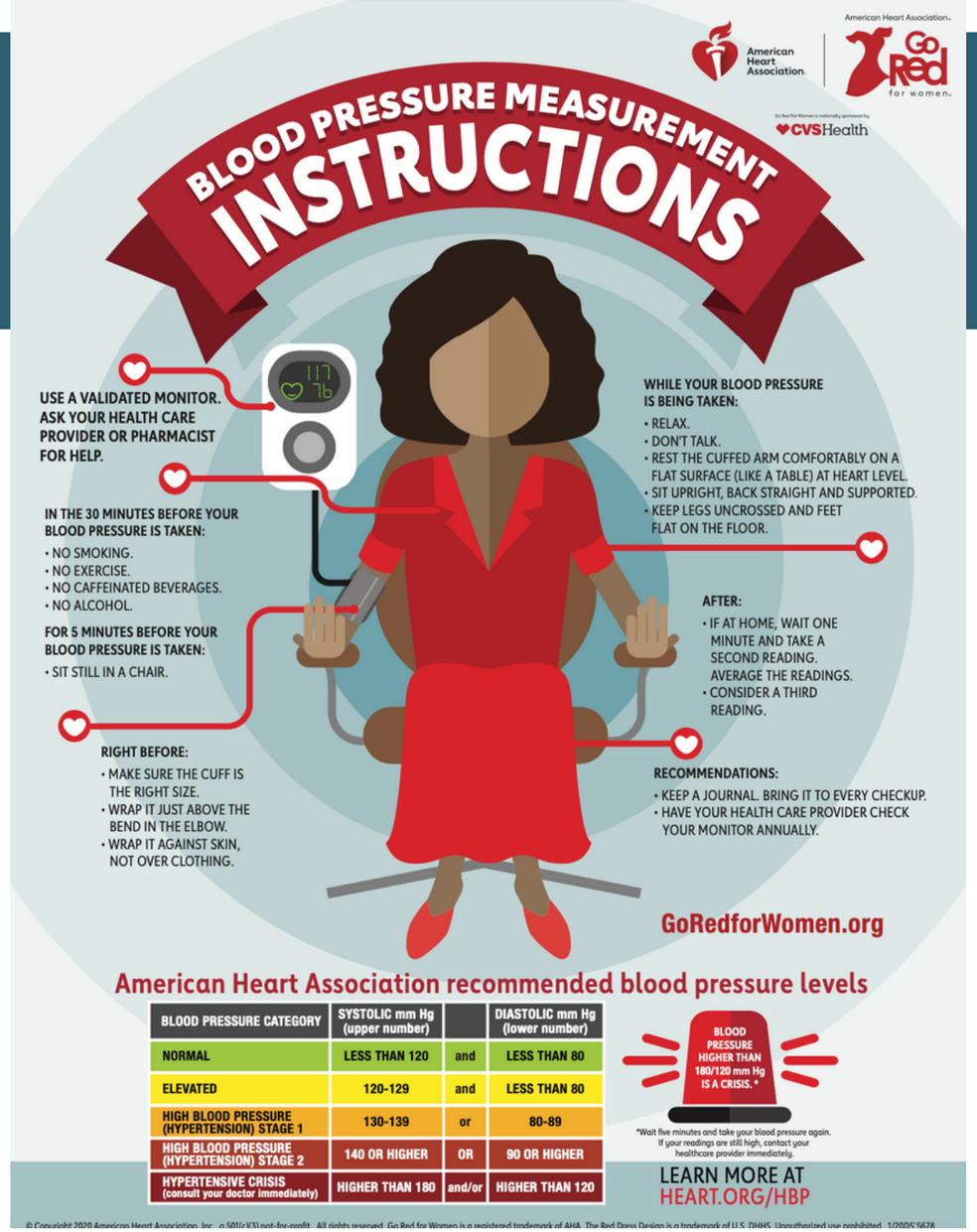
Other cholestrol tips

- Coconut oil
  - Saturated fat -> raises LDL-c
  - Significantly raised LDL cholesterol by 10.5 mg/dl (about 8%) when used in regularly in cooking

- Coffee
  - Filtered coffee is OK
  - Non-filtered coffee (ie French press) can raise cholesterol due to coffee lipid compounds

Hypertension

- High blood pressure –> consistently >130/80 mmHg
- Continuous graded association with cardiovascular risk as BP > 115/75 mmHg
- Lifestyle medicine first line – heart healthy diet, exercise, weight loss, stress reduction, and alcohol intake



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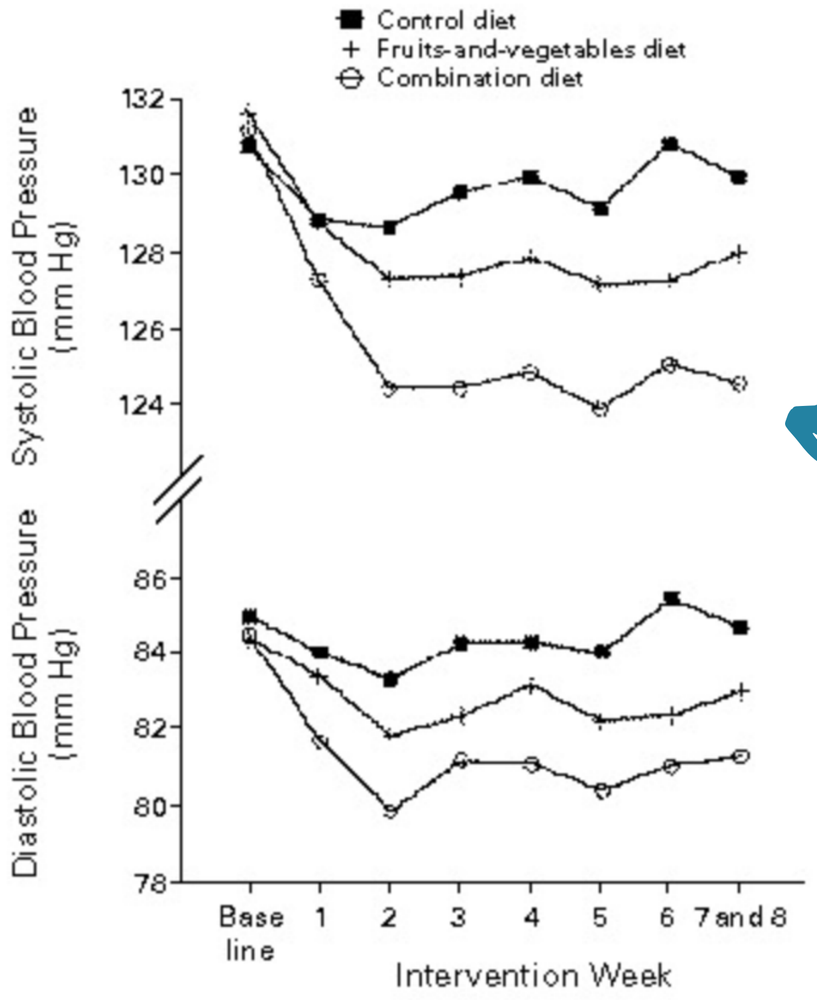
Dietary Approaches to Stop Hypertension



Appel et al, NEJM 1997

- Plant predominant diet
  - Approx 5 serv fruit, 4 serv veg, 1 serv legume/nut, 2 serv low fat dairy, 1 serv lean meats
- Lowered systolic blood pressure by 5.5 mmHg (11 mm Hg in those with HTN)
- Recommended by AHA to lower blood pressure

Salt and hypertension

- High sodium (>2000 mg/day) increases risk of heart disease
  - Avg US intake 3600 mg/day
- Wealth of data demonstrating salt increases blood pressure
- DASH diet w/ further BP reductions if sodium <1500 mg & <2300 mg

Dietary strategies to lower BP

Potassium packed foods

Sweet potato, white beans, black beans, edamame, avocado, tomatoes, beets, dried fruits (raisins, apricots), winter squash, spinach, nuts (almonds, cashews), pomegranates

Dietary nitrates

Consider about 1 cup of green leafy veggies a day. Beets (and beet juice) are also high in nitrates.

Decrease alcohol

Reduce alcohol ≤2 drinks daily for men and ≤1 drink daily for women

Decrease sodium

<2300 mg for most
<1500 mg if hypertensive

Less packaged food and read labels

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Reducing salt intake

Aim for <2300 mg sodium/d

This is about 1 tsp of salt a day

Read nutrition labels

75% of our sodium intake comes from processed and packaged foods. Look at canned foods, frozen entrees, bread, cereals, dressings, and sauces.

Pink Himalayan and sea salt still have sodium

It's pretty, but still sodium

Use other spices to add flavor

Pepper, cumin, oregano, thyme, paprika, etc. Potassium salt substitutes if OK with your doctor

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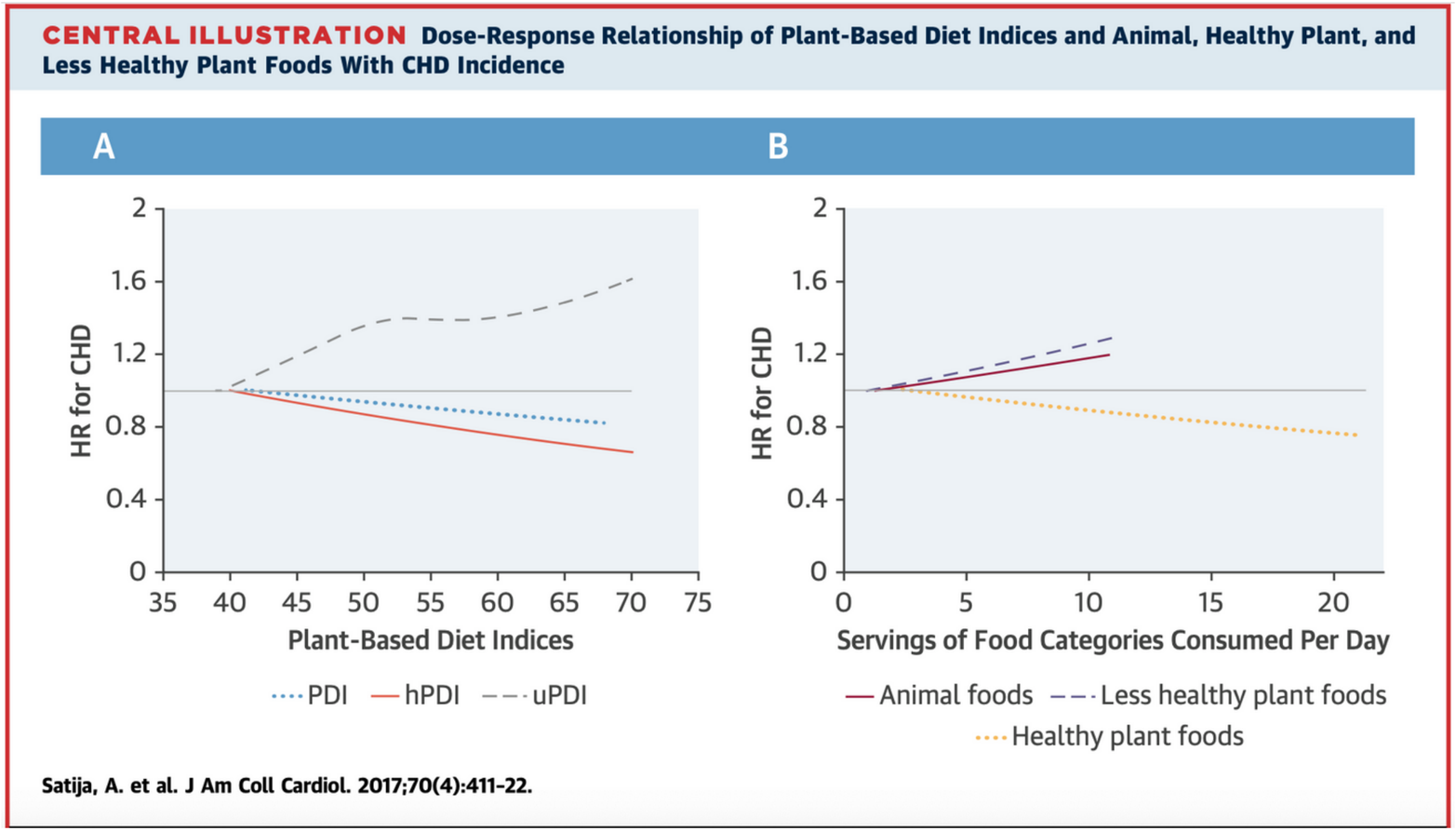
Avoid processed foods

- Vegan "junk food diet" may be no better than animal based diet
  - Healthy WFPB diet decreased risk by 25%
  - Unhealthy plant based diet increased risk by 32%
    - Juices/sugary drinks
    - Refined grains
    - Potatoes
    - Sweets/desserts



Added Sugar

- Added sugar -> rapid blood glucose spike compared to nature sugar
- Limit
  - 9 tsp for men
  - 6 tsp for women
- Sneaky sources
  - granola & breakfast cereals
  - yogurt, plant based milk
  - sauces
  - condiments
  - dressing
- Natural sugar still counts as added sugar

Heart healthy fats

- Polyunsaturated fats and monounsaturated fats lower LDL-c and heart disease risk

- Omega 3's are an essential fatty acid
  - ALA can be found in flax seeds, chia seeds, hemp seeds, pumpkin seeds, and walnuts
  - Benefits of supplementation inconsistent but can consider fish or algae oil

Exercise

- Ideally 150-300 minutes of moderate intensity exercise a week (or 75 minutes of vigorous)
  - Can break this up how you want
  - May be benefits beyond 300 min/week but diminishing returns

- SOMETHING is better than nothing if you can't hit that

- Decrease the amount of time that you are sedentary

Recommendations for Exercise and Physical Activity
Referenced studies that support recommendations are summarized in Online Data Supplements 6 and 7.

COR	LOE	Recommendations
I	B-R	1. Adults should be routinely counseled in healthcare visits to optimize a physically active lifestyle.[S3.2-1,S3.2-2]
I	B-NR	2. Adults should engage in at least 150 minutes per week of accumulated moderate-intensity or 75 minutes per week of vigorous-intensity aerobic physical activity (or an equivalent combination of moderate and vigorous activity) to reduce ASCVD risk.[S3.2-3–S3.2-8]
IIa	B-NR	3. For adults unable to meet the minimum physical activity recommendations (at least 150 minutes per week of accumulated moderate-intensity or 75 minutes per week of vigorous-intensity aerobic physical activity), engaging in some moderate- or vigorous-intensity physical activity, even if less than this recommended amount, can be beneficial to reduce ASCVD risk.[S3.2-5,S3.2-6]
IIb	C-LD	4. Decreasing sedentary behavior in adults may be reasonable to reduce ASCVD risk.[S3.2-3,S3.2-9–S3.2-11]

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Aerobic activity

Table 4. Definitions and Examples of Different Intensities of Physical Activity

Intensity	METs	Examples
Sedentary behavior*	1–1.5	Sitting, reclining, or lying; watching television
Light	1.6–2.9	Walking slowly, cooking, light housework
Moderate	3.0–5.9	Brisk walking (2.4–4 mph), biking (5–9 mph), ballroom dancing, active yoga, recreational swimming
Vigorous	≥6	Jogging/running, biking (≥10 mph), singles tennis, swimming laps

Resistance training

Bweir et al Diabetol Metab Syndr 2009

- Benefits
  - Improving strength
  - Bone health
- Possible heart health benefits
  - Body composition
    - Decrease visceral fat
  - Blood pressure
  - Glucose control
    - May be even better than aerobic
  -
- Consider twice per week as time allows

Minimize sitting!

- Sedentary lifestyle (ie prolonged sitting time) is an *independent* risk factor for heart disease
- Risk goes up with 8-10 hours of sedentary time a day
  - even in those who exercise!
- Maximize non-exercise activity thermogenesis (or NEAT)
  - aka non-exercise movement

Tips to increase NEAT

Get a standing desk. If this isn't an option, take frequent standing/stretch breaks

Build in frequent breaks in your day to walk around the house or the block

Use the stairs and not the elevator

Park your car further from the store or office

Consider breaking up your day when possible for small errands. The dry cleaners in the morning, a walk for an herbal tea in the afternoon

Walking meetings or pace while talking on the phone

If you have a commute, walk or bike to work

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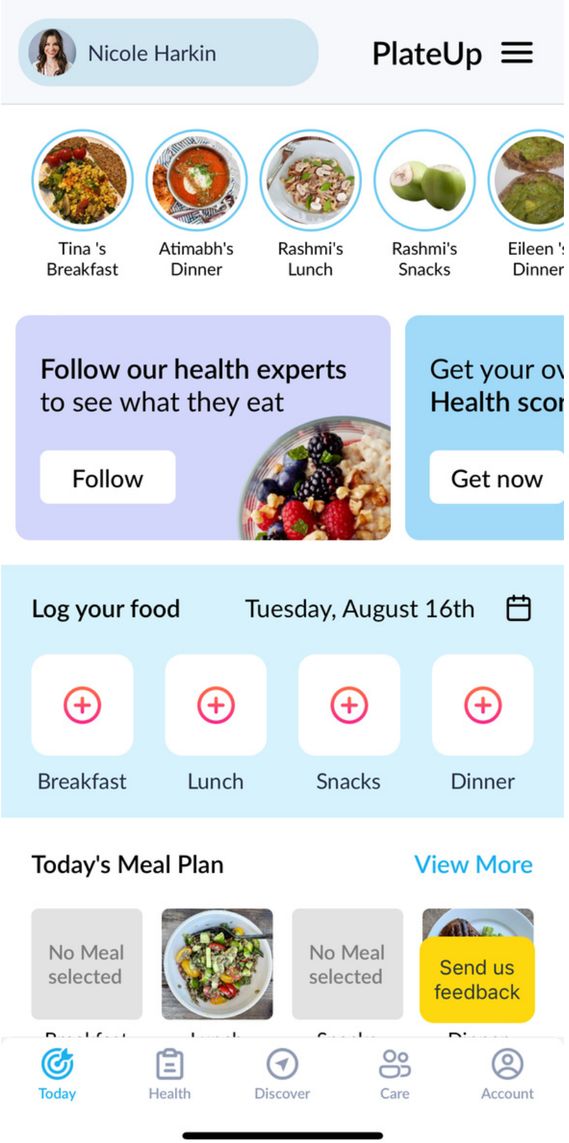
Parting words

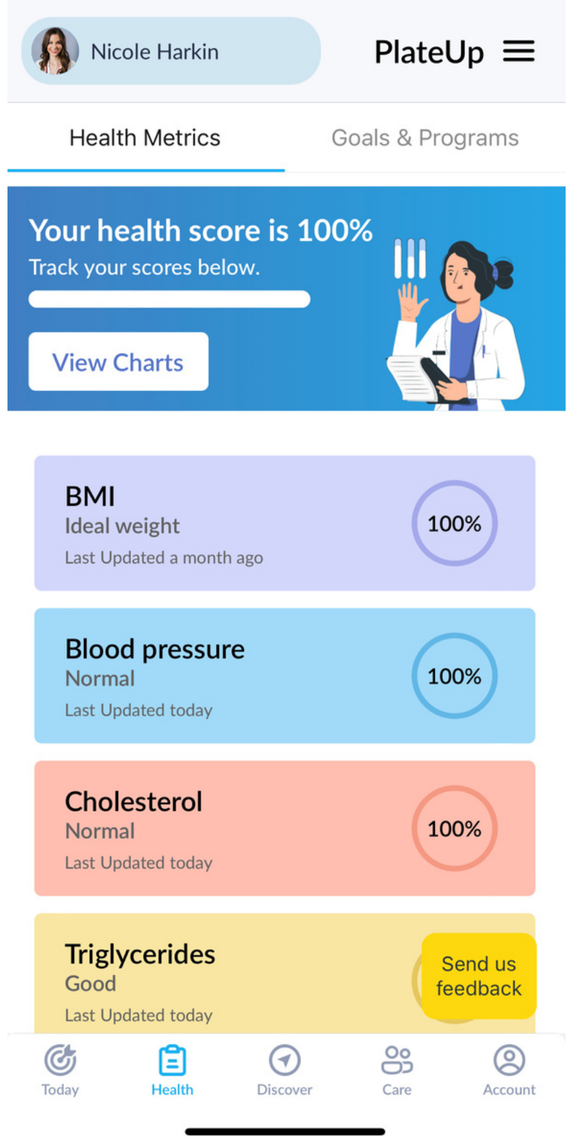
- Start slow and give yourself grace
- Focus on what you are adding in (not taking away)
- Create SMART goals
  - 2 to 3 at a time
- Modify existing favorites
- Easy swaps
  - Ie if you like pasta, swap for bean pasta and pack it with veggies

PlateUp

Free nutrion app to prevent and treat chronic disease

- Log the food you eat
- Discover and get inspired by recipes from experts and regular people
- Meal plan
- Log health metrics and share with providers
- Check off SMART goals tailored to your chronic condition or health goals
- Connect with your care team (RD, health coach, doctor) so they can keep track of your progress





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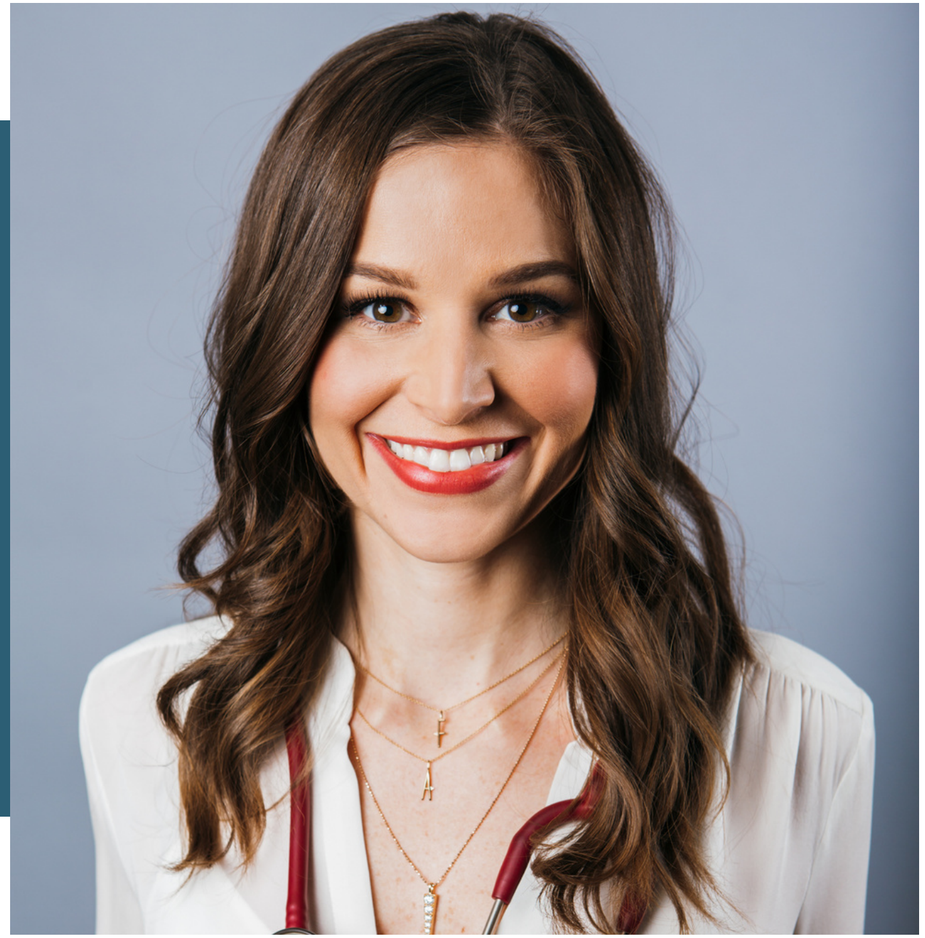

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