Cardiometabolic Risk Markers
What are we looking for and why? (Not all of these markers below are tested every year)

Pre-Diabetes.

Insulin- fasting level, good < 10, ideal <5
Glucose - I generally like to see this number between 80-99
HOMA-IR - estimate of insulin resistance (lower is better)
Hemoglobin A1c - 3 month average blood sugar - given as a percentage: 5% or lower. Above 5.4% there is an associated risk of dementia with aging.

HbA1c Blood Sugar Conversion Chart

HbA1c	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
Glucose	68	71	74	77	80	82	85	88	91	94
HbA1c	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
Glucose	97	100	103	105	108	111	114	117	120	123
HbA1c	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9
Glucose	125	128	131	134	137	140	143	146	148	151
HbA1c	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9
Glucose	154	157	160	163	166	169	171	174	177	180
HbA1c	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9
Glucose	183	186	189	192	194	197	200	203	206	209
HbA1c	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
Glucose	212	214	217	220	223	226	229	232	235	237
HbA1c	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9
Glucose	240	243	246	249	252	255	258	260	263	266
HbA1c	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9
Glucose	269	272	275	278	280	283	286	289	292	295
HbA1c	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9
Glucose	298	301	303	306	309	312	315	318	321	324
HbA1c	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9
Glucose	326	329	332	335	338	341	344	346	349	352

*diabetesknow.com

Lipid/inflammation focused risk markers

Below I will define these terms and give suggestions as to what you can do to raise or lower as indicated. Main goal is to reduce ApoB and CRP.

CRP-hs - measure of inflammation, we want this to be low, if elevated we need to focus on a "clean" diet, exercise, omega 3 fatty acids, and potentially searching for other causes (infection, toxins, metals, etc) of inflammation in your body
CRP is also a measure of inflammation, not as "sensitive".

Triglycerides - these guys transport and store dietary fats, they promote the formation of small LDL particles (which we do not want). Reducing carbohydrates, sugar, high fructose corn syrup, and alcohol in your diet will help this, in addition to omega 3 fatty acids, niacin, Red Yeast Rice.

Total Cholesterol - total amount of Cholesterol - this is not representing the number of lipoproteins
LDL - low density lipoprotein -

- **Total LDL particle #** - this drives the risk for CHD and MI
- **Dense LDL III**- small particles
- **Dense LDL IV**- small particles

To alter the particle size and reduce the number: Omega 3 Fatty Acids, Niacin, plant sterols, statins

Total HDL Particles - high density lipoprotein - generally good, but can be an indicator of other issues, if too high
Non-HDL Cholesterol = total cholesterol - HDL

- **Non-HDL particles**

VLDL particles (very low density lipoprotein) - gets converted to LDL and IDL (primarily transports triglycerides)

To lower- same as triglycerides!

***Lipoprotein (a)** - inherited trait, strongly linked to blood clots, very atherogenic, associated with increased risk of heart disease (acts like glue that traps APO-B or LDL into a plaque), if elevated we need to work hard on every other factor that we can modify.

This tends to be a bit tougher to modify, but Niacin, Aspirin, Statins, Flax Seeds, Co Q10, EGCG (active chemical in Green tea) Omega 3 Fatty Acids, Vitamin C, E (gamma and delta tocotrienols), almonds and a few other things can impact this.

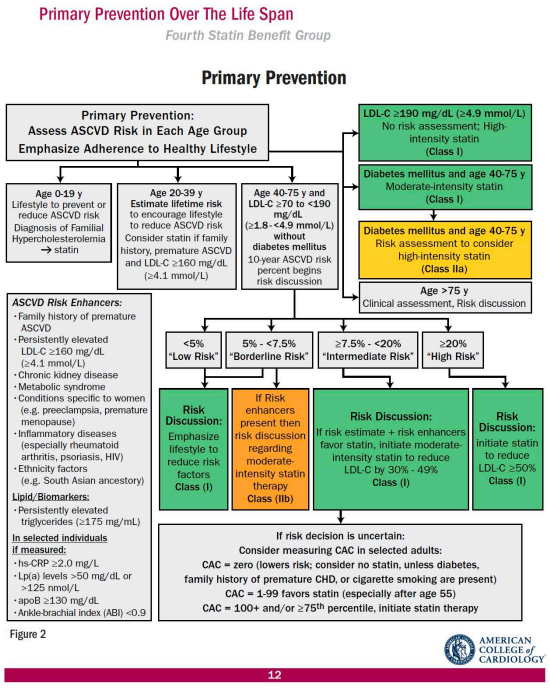
***Apolipoprotein B** - represents the harmful (atherogenic) particles, indirect measure of LDL-P - at this point the most accurate and reliable risk indicator

To lower APO-B: Niacin, Omega 3 Fatty Acids, Plant Sterols, EGCG, Astaxanthin

Homocysteine - inflammatory marker, when high is associated with low vitamin B6, B12, and folate - usually due to “SAD” - Standard American Diet - low nutrient density

Uric acid - goal <5, risk factor for hypertension (elevated blood pressure), this is a product of purine metabolism (we create and ingest purines). Too much of this can cause elevated blood pressure, salt sensitivity, fat storage, lipogenesis, and gout. Limit high purine sources: alcohol, sardines, anchovies, seafood, shellfish, organ meats. Maintain appropriate body weight, avoid sugar, eat lots of fruits and vegetables.

Assessing cardiovascular risk:



	Treatment Goals		
Risk Category	Non–HDL-C (mg/dL)	LDL-C (mg/dL)	Apo B[a] (mg/dL)
Low	<130	<100	<90
Moderate	<130	<100	<90
High	<130	<100	<90
Very high	<100	<70	<80

Abbreviations: Apo B, apolipoprotein B; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol.

[a] Apo B is a secondary, optional target of treatment.

From Jacobson TA, Ito MK, Maki KC, et al. National Lipid Association recommendations for patient-centered management of dyslipidemia: part 1 - executive summary. J Clin Lipidol 2014;8(5):476; with permission.

General recommendations

Diet: Plant based, Mediterranean, limit red meat, sugar, and simple carbs

Movement: Aerobic activity: at least 30 minutes most days of the week.
Strength: 2-3 times weekly, major muscle groups.
Simple option: Key 3 Exercises (squat, chest press, and single arm row.)

Sleep: 7-8 hours per night is ideal

Stress: Prayer, meditation, yoga, breathing exercises, journaling, etc daily