

## 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

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

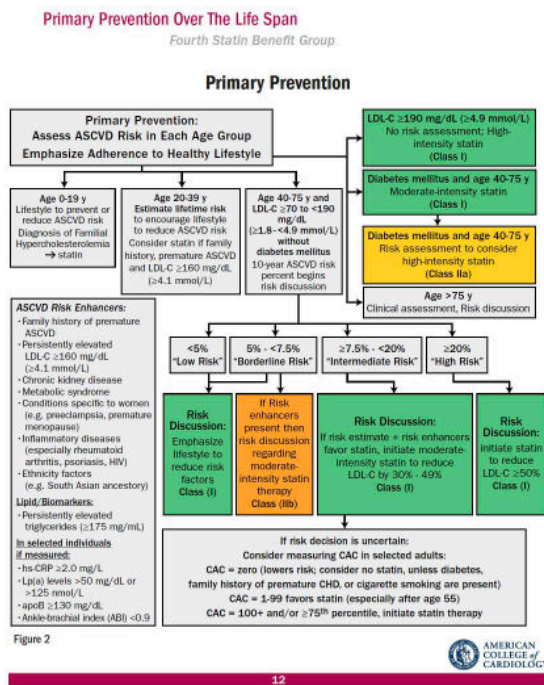
**Homocysteine** - inflammatory marker, when high is associated with low **vitamin B6, B12, and folate** - usually due to “SAD” - Standard American Diet - low nutrient density

**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:**



Risk Category	Treatment Goals		
	Non-HDL-C (mg/dL)	LDL-C (mg/dL)	Apo B <sup>a</sup> (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.

<sup>a</sup> 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

