

National Lipid Association Diet and Lifestyle Recommendations

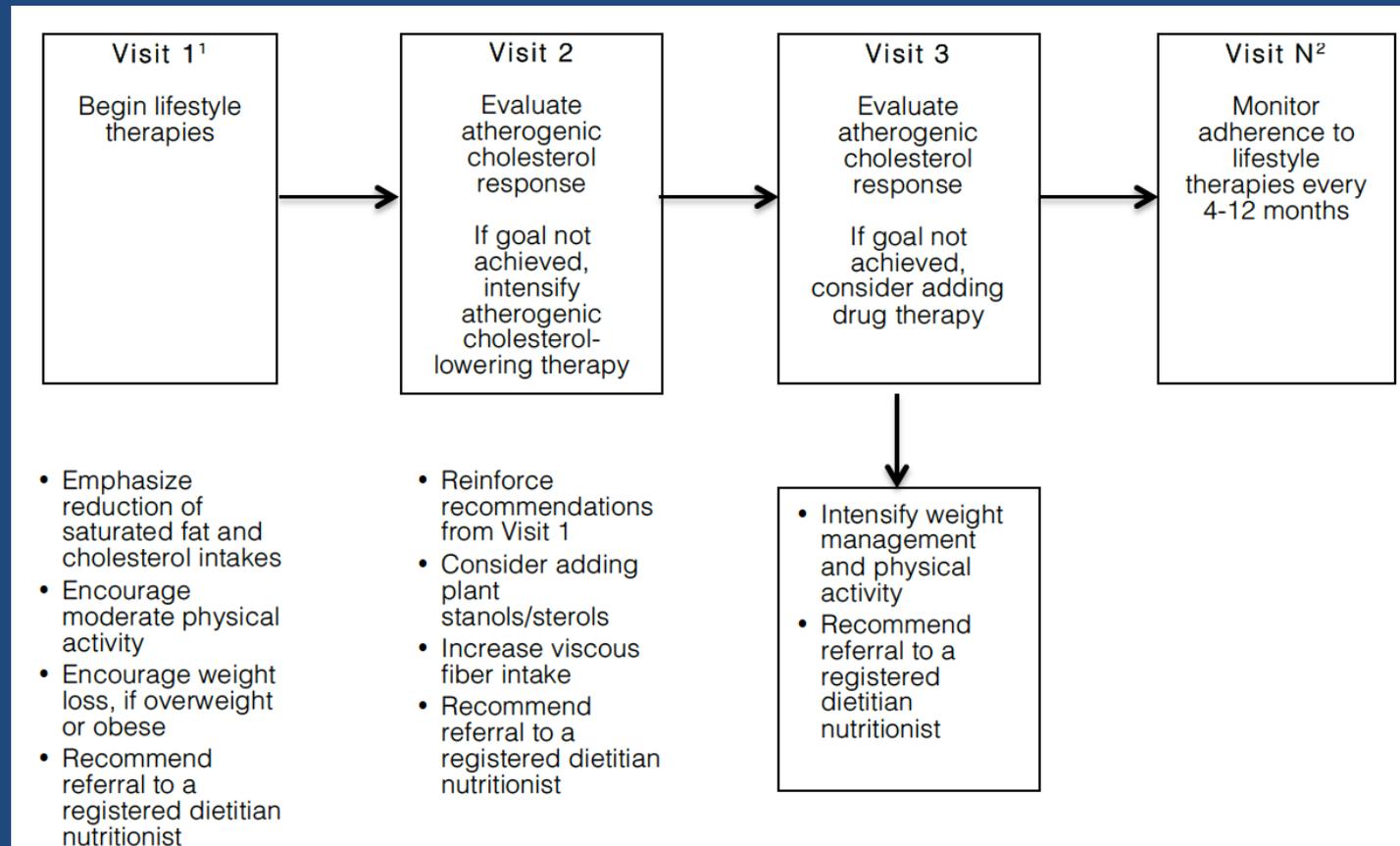
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Objectives

- Summarize 2015 NLA Nutrition Therapy Recommendations for Patient-Centered Management of Dyslipidemia for atherosclerotic cardiovascular disease (ASCVD) prevention.
- Describe/clear up current confusion regarding saturated fat and dietary cholesterol (i.e. eggs)
- Discuss nutrition therapy for hypercholesterolemia & hypertriglyceridemia.

NLA Part 1 Recommendations For Patient Centered Management of Dyslipidemia: Sept 2014



¹For people at high or very risk for ASCVD in whom drug therapy is indicated, it may be started concomitantly with lifestyle therapies. For other patients, a trial of lifestyle therapies should be undertaken before initiation of drug therapy.

²In most cases, goal levels should be achieved in approximately 6 months.

2015 NLA Part 2 Recommendations to Lower Atherogenic Cholesterol

Four Major Content Areas

- Lifestyle Therapies
 - **Nutrition**
 - Exercise/Physical Activity
- Groups with Special Considerations: Children to Seniors, Hispanic, Latinas, African Americans, South Asians, American Indians
- High risk conditions: HIV, rheumatoid arthritis, residual risk conditions
- Improving Patient Outcomes
 - Patient Adherence
 - Team-based Collaborative Care

Role of Nutrition in Lowering Atherogenic Cholesterol (LDL-C and Non-HDL-C)

Evidence reviewed

- Effectiveness of MNT by RD
- Cardio-protective eating patterns and ASCVD risk: DASH, Med, Vegetarian
- Role of weight loss, saturated, omega-6, omega-3 and mono fats, dietary cholesterol, fiber, plant sterols and plant stanols, legumes, soy, nuts and alcohol on atherogenic cholesterol

Evidence Graded for Strength of Recommendation

A =Strong

B =Modest

C =Weak

D =Recommend Against

E =Expert opinion

Consideration given to net benefits, risks or harms

2015 NLA Nutrition Recommendations

Medical Nutrition Therapy (MNT) by RDN

- 1. Nutrition education/medical nutrition therapy (MNT) by a registered dietitian (RD) with follow-up and monitoring are recommended to promote long-term dietary adherence. Clinicians should, when feasible, refer patients to a RD for MNT to individualize a cardio-protective dietary pattern and promote successful lifestyle modifications.
 - **Strength of Evidence A**

Role of RD in the Management of Dyslipidemia

Systematic Review (8 studies): 1991-2006

RD intervention: 6 weeks to 6 months reduced
LDL-C: 7-15%

Recommended 3-6 MNT visits over 8-12 weeks

2 studies: magnitude of LDL-C reduction
increased with time spent with RD

McCoin, Sikand et al J Am Diet Assoc 2008; 233-239

2015 NLA Nutrition Recommendations Medical Nutrition Therapy (MNT) by RD

Data strongly indicate that MNT provided by a RD is effective for improving lipid profiles and cardio-metabolic risk factors and may favorably effect quality of life and patients' sense of well being.

Journal of Clinical Lipidology (2015) 9, S1–S122

Lowering Atherogenic Cholesterol (LDL-C and Non-HDL-C)

2. The NLA Expert Panel supports a cardio-protective eating pattern for the management of dyslipidemia and overall cardiovascular health, <7% of energy from saturated fat, with minimal intake of *trans* fat to lower levels of atherogenic cholesterol [LDL-C & non-HDL-C].

Strength of evidence A

3. The cardio protective eating pattern should **limit cholesterol intake to <200 mg/day** to lower levels of atherogenic cholesterol (LDL-C and non-HDL-C)

Strength of evidence B

NLA 2015 Nutrition Recommendations

Dietary Cholesterol in Hyper-responders

4. For known or suspected hyper-absorbers due to genetic or other reasons, consider further reduction in dietary cholesterol beyond the <200 mg/day that is recommended as part of the cardio-protective eating pattern.

Consumption of very low intakes of dietary cholesterol (near 0 mg/day) may be helpful for such individuals (e.g. apo-E4 carriers, genetic defects in ABC G5 and G8 that transport sterols including cholesterol)

Strength of Evidence B

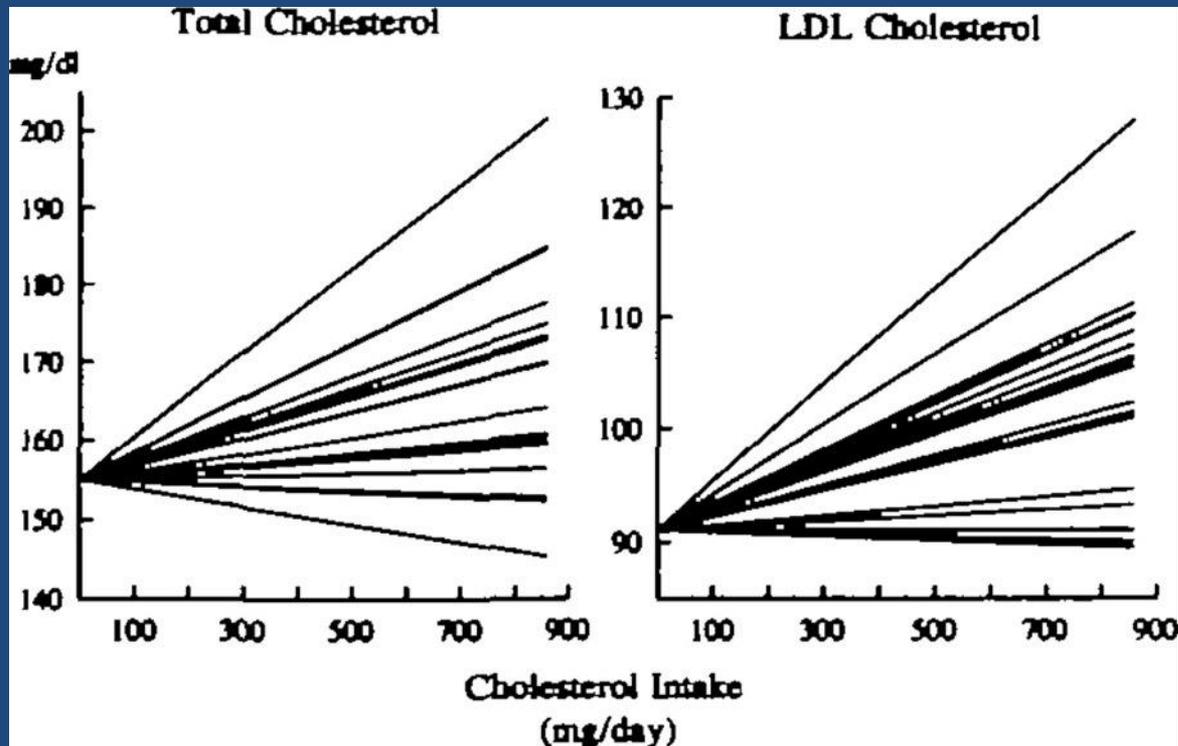
Eggs and Cholesterol Observational Evidence

Observational evidence suggests that eggs and dietary cholesterol consumption are not consistently associated with increased ASCVD risk except in persons with diabetes.

Observational studies are subject to various types of bias and confounding.

Journal of Clinical Lipidology (2015) 9, S1–S122

Individual Variability in Dose-Response Relationship for Total-C and LDL-C with Increasing Dietary Cholesterol



- Results show a wide range of mostly positive responses to dietary cholesterol. However, three subjects actually had negative cholesterol responses to increasing eggs, while several responded by more than twice the mean.

Ginsberg et al. ArteriosclerThromb. 1994;14:576-86

Conclusions Regarding Dietary Cholesterol for Prevention of ASCVD

- Scientific evidence supports NLA recommendation for <200 mg/day of dietary cholesterol
- Variability in response to dietary cholesterol makes it difficult to identify hyper-responders prior to MNT
- Even small reductions in LDL-C have CVD benefits
- The growing prevalence of diabetes is a further justification for restriction of dietary cholesterol

2013 AHA/ACC Guidelines on Lifestyle Management to Reduce CVD Risk: ACC/AHA Report

Summary of Recommendations for Lifestyle Management

LDL-C - Advise adults who would benefit from LDL-C lowering to:	Evidence
<p>1. Consume a dietary pattern that emphasizes intake of vegetables, fruits, and whole grains; includes low-fat dairy products, poultry, fish, legumes, non-tropical vegetable oils and nuts; and limits intake of sweets, sugar-sweetened beverages and red meats.</p> <ul style="list-style-type: none">a. Adapt this dietary pattern to appropriate calorie requirements, personal and cultural food preferences, and nutrition therapy for other medical conditions (including diabetes mellitus).b. <i>Achieve this pattern by following plans such as the DASH dietary pattern, the USDA Food Pattern, or the AHA Diet.</i>c. <i>Consider referral to a registered dietitian nutritionist (RDN)</i>	A (Strong)
<p>2. Aim for a dietary pattern that achieves 5% to 6% of calories from saturated fat.</p>	A (Strong)
<p>3. Reduce percent of calories from saturated fat.</p>	A (Strong)
<p>4. Reduce percent of calories from <i>trans fat</i>.</p>	A (Strong)

Cholesterol Controversies



Scientific Report of the 2015 Dietary Guidelines Advisory Committee

Advisory Report to the Secretary of Health and Human Services
and the Secretary of Agriculture

“Cholesterol is not a concern for overconsumption” according to the DGAC 2015 Advisory Committee



Current Intake of Dietary Cholesterol in the US, NHANES 2011-2012

Gender	Cholesterol Intake
Males 20+	338 mg/day
Females 20+	229 mg/day
Combined	282 mg/day

DATA SOURCE: What We Eat in America, NHANES 2011-2012

The 2015 US Dietary Guidelines Removed the 300 mg/day limit on Dietary Cholesterol

The Key Recommendation from the *2010 Dietary Guidelines* to limit consumption of dietary cholesterol to 300 mg/day is not included in the 2015 edition, but this change does **not** suggest that dietary cholesterol is no longer important to consider when building healthy eating patterns.

<http://health.gov/dietaryguidelines/2015/guidelines>

Hijacking of the 2015 Dietary Guidelines Science on Cholesterol

“It’s OK to eat foods rich in cholesterol,” the *Los Angeles Times* claimed about the new U.S. Dietary Guidelines for 2015-2020.

“Go ahead and have some eggs,” wrote the *Washington Post*. The Guidelines are “stepping back” from previous advice about cholesterol, the newspaper explained.

Persons with Diabetes

NIH and CDC Cholesterol Recommendation: 2015

Recommendation for dietary cholesterol in persons
with diabetes= < 300 mg/d. (page 17)

*Guiding Principles for the Care of People with or at Risk for
Diabetes 2015 published by Diabetes Education Program.*

2015 NLA Nutrition Recommendations to lower levels of Atherogenic Cholesterol

5. Any of the following healthy eating patterns: emphasize variety of plant foods, lean protein, < 7% SFA, minimal trans fat e.g. DASH, USDA (healthy U.S.-style), AHA, Mediterranean-style, and vegetarian/vegan.

However the dietary pattern should be individualized by a RD based on patients' specific dyslipidemia, cultural and food preferences.

Strength of evidence A

Practical Tips to Limit Dietary Cholesterol

- Cardio-protective eating pattern < 7% saturated fat, 200 mg/d dietary cholesterol
- Limit egg yolks to 2-4/week depending on overall diet and LDL-C
- Avoid organ meats like livers and gizzards
- Note that shrimp and shellfish do NOT contain significant amounts of cholesterol

Study: Which Dietary Patterns are Effective for CVD Risk Reduction & lowering LDL-C?

Conclusion: All whole foods dietary patterns are effective including

DASH (Dietary Approaches to Stop Hypertension)

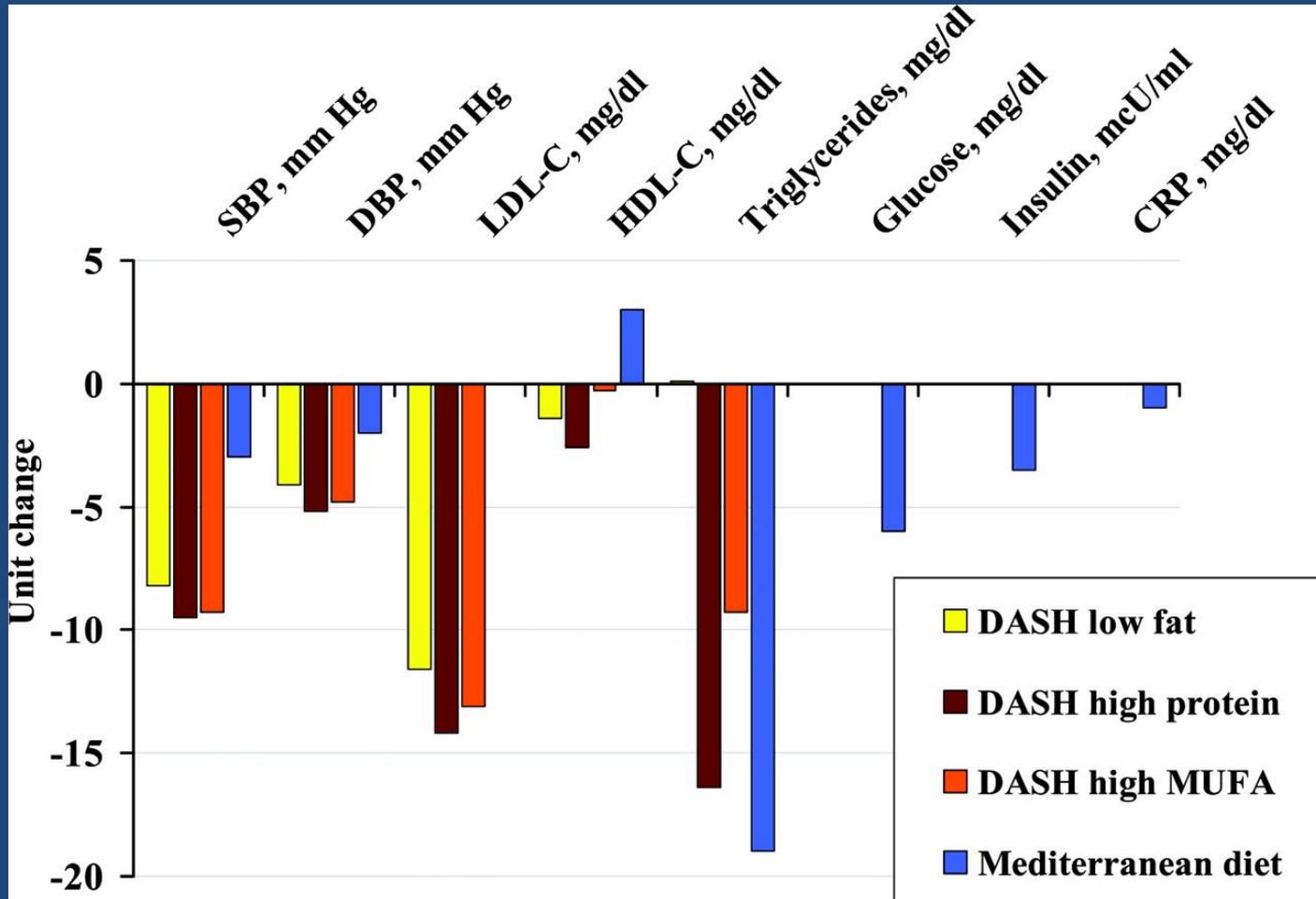
Healthy Eating Index (HEI) (USDA diet)

Alternative Healthy Eating Index (AHEI) (AHA diet)

Mediterranean

Reedy et al. J Nutr. 2014

Effects of Dietary Patterns on CVD risk factors in Randomized Controlled trials.



Mozaffarian D et al. Circulation.
2011;123:2870-2891

2015 NLA Nutrition Recommendations

Saturated Fat

- 6. May be partially replaced with unsaturated fats (mono- and polyunsaturated fats), as well as proteins, to reach a goal of <7% of energy from saturated fats.
- Replace with foods high in unsaturated fats e.g. liquid vegetable oils and vegetable oil spreads, nuts and seeds; lean protein foods, such as legumes, seafood, lean meats, and non- or low-fat dairy products.
 - **Strength of evidence: A**

The 2015 US Dietary Guidelines

Saturated Fat

Strong and consistent evidence shows that replacing saturated fats with unsaturated fats, especially polyunsaturated fats, is associated with reduced blood levels of T-C and LDL-C. Additionally, strong and consistent evidence shows that replacing saturated fats with polyunsaturated fats is associated with a reduced risk of CVD events (heart attacks) and CVD-related deaths.

[**http://health.gov/dietaryguidelines/2015/guidelines**](http://health.gov/dietaryguidelines/2015/guidelines)

Reducing Saturated Fat Lowers CHD Risk

Li et al. JACC 2015; 66(14) 1538-47

- Prospective Cohort Study of 84,268 women (Nurses Health Study) and 42,908 men (Health Professionals Follow up Study) for 20-24 years.
- Replacing 5% of calories from saturated fat
 - With PUFAs lowers risk 25%
 - With MUFAs lowers risk 15%
 - With whole grain carbs lowers risk 9%

What is the controversy on Saturated fats?

Reviews | 18 March 2014

Association of Dietary, Circulating, and Supplement Fatty Acids With Coronary Risk: A Systematic Review and Meta-analysis

Rajiv Chowdhury, MD, PhD; Samantha Warnakula, MPhil*; Setor Kunutsor, MD, MSt*; Francesca Crowe, PhD; Heather A. Ward, PhD; Laura Johnson, PhD; Oscar H. Franco, MD, PhD; Adam S. Butterworth, PhD; Nita G. Forouhi, MRCP, PhD; Simon G. Thompson, FMedSci; Kay-Tee Khaw, FMedSci; Dariush Mozaffarian, MD, DrPH; John Danesh, FRCP*; and Emanuele Di Angelantonio, MD, PhD*

[\[+\] Article and Author Information](#)

Ann Intern Med. 2014;160(6):398-406. doi:10.7326/M13-1788

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The authors concluded that the evidence does not clearly support cardiovascular guidelines that encourage high consumption of polyunsaturated fatty acids and low consumption of saturated fatty acids.

Problems with Chowdhury et al. 2014

See comments on *Ann Intern Med* website:

<http://annals.org.ezp-prod1.hul.harvard.edu/article.aspx?articleid=1846638>

- Gross errors in data abstraction from original papers
- Omitted important studies, especially on PUFA
- Omitted important evidence (e.g., feeding studies)
- Lack of specific comparisons, and failure to acknowledge this
- Misrepresented findings (especially for long-chain N-3 PUFA)
- Failed to acknowledge other summaries based on primary data that had different conclusions

Response to Chowdhury et al. 2014

“To give people the message that they don’t have to worry about saturated fat and can go back to butter, cheese, and lots of red meat would be really wrong.”

Alice Lichtenstein, PhD, RD

Past Chair, Amer Heart Assoc Nutrition Committee

Professor of Nutrition, Tufts University

Comparison of Saturated Fat Recommendations

For Lowering Atherogenic Lipids	
National Lipid Association 2015	< 7% of calories
International Atherosclerosis Society 2013	< 7% of calories
ACC/AHA 2013 Guidelines	5-6% of calories
American Diabetes Association 2014	< 10% of calories

For Americans in General	
Academy of Nutrition and Dietetics 2014	< 10% of calories
2015 Dietary Guidelines for Americans	< 10% of calories

2015 NLA Nutrition Recommendations

Weight Reduction

- 7. Weight loss of 5-10% body weight is generally recommended for overweight or obese individuals to lower atherogenic lipoproteins and improve other ASCVD risk factors.

Any dietary approach will result in weight loss if energy intake is reduced. Several healthy patterns e.g. Mediterranean-style, DASH, USDA, and vegetarian diets, can be tailored to personal and cultural food preferences and appropriate calorie needs to lose weight.

Strength of Evidence A

2015 NLA Nutrition Recommendations

Weight Management

- 8. Any energy-reduced dietary pattern that meets nutrient needs is recommended that contains a moderate quantity of carbohydrate, lower glycemic index and load, and higher protein.
 - **Strength of Evidence: C**

Weight Reduction: Best Meal Plan?

Jensen et al. 2013 ACC/AHA/TOS Guideline for the Management of Overweight and Obesity in Adults

A variety of dietary approaches can produce weight loss in overweight and obese adults...if reduction in dietary energy intake is achieved including low fat, higher protein, low carbohydrate (30 g to 130 g)

Adopting new dietary patterns such as DASH, Mediterranean or Vegetarian

At least 14 visits over 6 months with a Registered Dietitian Nutritionist (RD) for behavior modification and monitoring

2015 NLA Nutrition Recommendations

Dietary Adjuncts

Plant Sterols/Stanols and Viscous Fiber

9. **Plant sterols and stanols** (~2 g/day) are recommended for cholesterol lowering, as well as **viscous fibers** (5 to 10 g/day or even greater, if acceptable to the patient), as adjuncts to other lifestyle changes. **Strength of Evidence B**

However, individuals with phytosterolemia (sitosterolemia) should avoid foods fortified with stanols and sterols (defect in at least one transporter e.g., ABC G5 and G8)

Viscous Dietary Fiber

Effectively lower LDL-C without affecting TG and HDL-C.

Forms gel to bind bile acids in small intestine leading to increased excretion.

Viscous fibers are water soluble.

Beta glucan (oats), psyllium, pectin & guar gum

Some soluble fibers are non-viscous (wheat dextrin).

Predicting Reductions in LDL-C and non-HDL-C

Diet low in saturated and trans fat and dietary cholesterol: -5 to -10%

Loss of 5% of body weight: -3 to 5%

2 g /day plant sterols/stanols

or

7.5 g/day viscous fiber: -4 to -10%

Total reduction: -12 to -25%

2015 NLA Nutrition Recommendations Patients with TG \geq 150 mg/dL

- 10. Lifestyle therapy, including weight loss, if overweight or obese, physical activity, and restriction of alcohol, sugars and refined starches.

Partial replacement of sugars and refined starches with combination of unsaturated fats, proteins, and high-fiber foods may help to reduce TG and non-HDL-C concentrations.

Strength of evidence A

Triglyceride Reduction=20-50% with Diet in Patients with TG 150-500 mg/dl

Dietary Factor	% Change in TG
Weight loss of 5-10%	- 20%
Mediterranean diet pattern v. low fat diet	- 10-15%
Fiber (total, insoluble, soluble) in individuals with T2 DM	- 8-13%
Reduce added sugars	- 5-10%
Fructose (≥ 100 g/day)	+ Dose-response increase in TG
Marine-derived Omega 3 fatty acids (per gram)	- 5-10%
Eliminate trans fatty acids (per 1% replacement with MUFA/PUFA)	- 1%
Alcohol (per 1oz./day)	+ 0-10%

2015 NLA Nutrition Recommendations
Patients with TG levels ≥ 1000 mg/dL and
Selected patients with TG 500-999 mg/dL

- 11. A very low-fat diet (<15% of energy) and alcohol abstinence are recommended initially to minimize chylomicronemia.
- In diabetic patients, carbohydrate intake should not be substantially increased when reducing fat intake. MCT oil may be used as it will not induce chylomicron production.
- For patients **without lipoprotein lipase deficiency**, dietary fat may be liberalized with monitoring of the TG response once TG concentration is <500 mg/dL.

Strength of Evidence B

Nutrition Therapy for Severe HTG: Chylomicron Clearing Protocol (TG > 1000 mg/dl)

- **Limit total fat to 10-15% calories (20-40 g)**
- **Avoid alcohol**
- **No added simple or refined carbohydrate**
- **Spread calories and carbohydrates evenly throughout the day**
- **Limit calories, if weight loss indicated**
- **If extra calories needed, add MCT oil and increase gradually**
- **Exercise 30-60 minutes most days**
- **Adjust diabetes medications as appropriate to maintain glycemic control**
- **Once chylomicrons cleared and triglycerides <500 mg/dL, gradually advance to tolerance.**

Evidence for EPA and DHA for Primary Prevention Basis for Current Dietary Recommendations

Observational and RCTs: Compared with little or no intake, consumption of 250 -550 mg/day associated with 36% lower risk of CHD mortality and 17% total mortality. (Mozaffarian et al. JAMA 2006; 296:1885-1899)

Pooled analysis of observational studies: Highest versus lowest intake of EPA+DHA was associated with approx 37% reduction in CHD mortality. (Harris et al. Curr Atheroscler Rep. 2008;10:503-509)

2015 NLA Nutrition Recommendations

Fiber Rich Whole Grains

- 12. Consumption of at least three 1-oz. equivalent servings per day of fiber-rich whole grains is recommended.
 - **Strength of Evidence A**

2015 NLA Nutrition Recommendations

Nuts

- 13. Consumption of ≥ 4 servings/week (1 oz. per serving) of nuts (excluding peanuts) is recommended, because nut consumption has been consistently associated with reduced ASCVD risk. **Strength of Evidence A**
- Nuts may be included as a plant protein in a cardio-protective dietary pattern along with seeds and legumes or as a source of unsaturated fat.

2015 NLA Nutrition Recommendations

Soy protein foods

- 13. Soy protein foods are one source of plant protein among others (nuts and legumes), that may be used as a substitute for protein foods high in saturated fat as part of a cardio-protective eating pattern.
 - **Strength of Evidence B**

Is the Soy heart health claim still justified?

Intrinsic/Extrinsic LDL-C Lowering Effects of Soy

Intrinsic effect: -4-5 % with 30 gm/day of soy

Extrinsic effect: -4-5 % by replacement of animal products rich in saturated fat and cholesterol

Total LDL-C lowering: 7.9% to 10.3 %

Jenkins et al J Nutr 2010; 140:2302S-2311S

2015 NLA Nutrition Recommendations

Alcohol

- 14. If alcohol is consumed as part of a healthy dietary pattern, this should be in moderation (≤ 7 drinks per week for women and ≤ 14 drinks per week for men; consumed in a non-binge pattern).
- One drink= 12 oz. beer, 5 oz. wine, or 1.5 oz. distilled spirits.
 - **Strength of evidence A**

NLA Nutrition Recommendations for lowering Atherogenic Cholesterol: Summary

- Personalize whole foods dietary patterns for patient's specific dyslipidemia. Include fruits & vegetables, fiber-rich whole grains, fatty fish, nuts, seeds, legumes , lean protein and low-fat dairy .
- Limit dietary cholesterol 200 mg/d. Most foods high in saturated fat are also high in dietary cholesterol.
- Include dietary adjuncts viscous fiber, plant sterols/stanols, soy, long chain omega-3 fatty acids.
- Reduce sodium, sugar and saturated fat and weight reduction if overweight.
- Refer to a Registered Dietitian (RD) to personalize patients' nutritional needs and goals.

Questions?