



1

---

---

---

---

---

---

---

---



**Linda Yarrow**  
PhD, RDN, LD, CDE

Instructor  
Dept. of Food, Nutrition, Dietetics & Health  
College of Health & Human Sciences  
Kansas State University  
Manhattan, Ks

Clinical RDN  
Clay County Medical Center  
Clay Center, Ks

#AADE19

2

---

---

---

---

---

---

---

---

### Disclosure to Participants

- Notice of Requirements For Successful Completion
  - Please refer to learning goals and objectives
  - Learners must attend the full activity and complete the evaluation in order to claim continuing education credit/hours
- Conflict of Interest (COI) and Financial Relationship Disclosures:
  - Linda Yarrow, PhD, RDN, LD, CDE – No COI/Financial Relationship to disclose
- Non-Endorsement of Products:
  - Accredited status does not imply endorsement by AADE, ANCC, ACPE or CDR of any commercial products displayed in conjunction with this educational activity
- Off-Label Use:
  - Participants will be notified by speakers to any product used for a purpose other than for which it was approved by the Food and Drug Administration.

#AADE19

3

---

---

---

---

---

---

---

---

**Medical Nutrition Therapy to Reduce Risk for Cardiovascular Disease and Manage Cardiovascular Disease**

- Learning Objectives
  - Describe relationship between DM and CVD and risk reduction through medical nutrition therapy
  - Compare and contrast dietary patterns and behavior changes for CVD risk reduction/management
  - Demonstrate appropriate macro- & micronutrient recommendations to reduce CVD risk and/or manage CVD

#AADE19

---

---

---

---

---

---

---

---

4

**Relationship between DM and CVD**

- Diabetes is a major cause of CV events
- People with DM are at least twice as likely as people without DM to have heart disease or strokes
- Risk of death is at least twice that of people of similar age with DM
- 65% of deaths in people with DM are due to either coronary or cerebrovascular events

#AADE19

---

---

---

---

---

---

---

---

5

**Chronic Hyperglycemia is Independent Risk Factor for CVD**

- 1% increase in A1C is associated with a 1.2-1.3 fold increased risk of CVD
- People with T1DM have a 10-fold increased risk for CV events overall. Those between ages 20-39 have a five-fold increased risk
- UKPDS: people with T2DM with A1C in upper tertile had 50% increase in CV risk
- EPIC-Norfolk study: men with DM had 28% greater risk of CV events for each 1% A1C increase

#AADE19

---

---

---

---

---

---

---

---

6

**Chronic Hyperglycemia is Independent Risk Factor for CVD – WHY?**

- Previous assumption: MI and thrombotic stroke result of progressive occlusion of blood vessels
- New assumption: rupture of weakened areas with plaques of partially occluded vessels often leads to acute coronary and thrombosis.
- Rupture allows release of highly thrombogenic plaque contents into vessel lumen
- Interaction of lipids and necrotic substances with platelets and coagulation factors triggers acute thrombosis.

#AADE19

7

---

---

---

---

---

---

---

---

**DM and CV Risks – WHY?**

- Diabetes, insulin resistance, and glucose intolerance are associated with enhanced thrombosis by affecting platelets and production of clotting factors which increases the development of thrombi that cause acute events
- In acute coronary events, endothelial function is altered and increased atherosclerotic change to include:
  - Increased vasospasm
  - Enhanced thrombosis
  - Increased local inflammatory response

#AADE19

8

---

---

---

---

---

---

---

---

**Cardiometabolic Risk:**

- Hyperglycemia and insulin resistance affect vascular function; when both are present, effects are greater than each alone
- May produce vasoconstrictive substances and advanced glycation end products that disturb endothelial function causing increased stiffness and decreased compliance of the arterial wall

#AADE19

9

---

---

---

---

---

---

---

---

### Synergistic Effect

- Abnormal lipid metabolism
- Smoking
- Diabetes
- HTN
- Advanced age
- Microalbuminuria
- Central obesity

#AADE19

10

---

---

---

---

---

---

---

---

### Role of Glycemic Management

- Evidence is controversial regarding to what extent improved glucose control can reduce risk of CV events, particularly for T2DM.
- Studies suggest that glycemic control may have greater CV benefit in people with DM if started early in the disease process
- Persons with elevated LDL cholesterol levels before age 40 had a 64% higher risk of having a heart attack, compared with those with low levels of LDL cholesterol

#AADE19

11

---

---

---

---

---

---

---

---

### CVD Risk Reduction – Nonmodifiable

- Age, gender, family history/genetics, race/ethnicity
- Clinical decision making: these factors can't be altered to reduce risk but can be used when determining aggressiveness of intervention

#AADE19

12

---

---

---

---

---

---

---

---

### CVD Risk Reduction –Modifiable

- Lifestyle (weight management, activity)
- Tobacco cessation
- Statin use
- HTN
- Hyperglycemia
- Aspirin use
- Albuminuria

#AADE19

13

---

---

---

---

---

---

---

---

### Multifactorial Approach: D5

- Goals to reduce risk for complications:
  - Glycemia: A1C <8%
  - Blood pressure: <140/90
  - Lipids: LDL <100
  - Tobacco: tobacco free
  - Aspirin use: as appropriate

#AADE19

14

---

---

---

---

---

---

---

---

### Diet & Lifestyle Modifications: Review of Diet Patterns

- Mediterranean diet: olive oil, fruit, nuts, vegetables, grains. Modest intake of fish and poultry, low intake of red/processed meats, dairy, sweets. Wine in moderation.
  - 2019 Meta-analysis (Matinez-Gonzalez et al): “a large, strong, plausible, and consistent body of available prospective evidence to support the benefits of the MedDiet on cardiovascular health..... No other dietary pattern has undergone such a comprehensive, repeated, and international assessment of it's cardiovascular effects.”
  - 2018 (Ahmad et al): higher MED intake was associated with approximately 1/4<sup>th</sup> relative risk reduction in CVD events and included improved insulin resistance and glucose metabolism

#AADE19

15

---

---

---

---

---

---

---

---

**Diet & Lifestyle Modifications: Review of Diet Patterns**

- DASH diet: high fruits/vegetables, low fat dairy, whole grains, poultry/fish, nuts; low in sugar and red meats
  - 2015 meta-analysis (Siervo et al): improved cardiovascular risk factors on DASH plan and appeared to have greater beneficial effects in subjects with an increased cardiometabolic risk
    - Lower systolic and diastolic bp, total cholesterol, lower LDL
  - Research supports DASH plan improves insulin resistance, hyperlipidemia, and overweight/obesity.

#AADE19

---

---

---

---

---

---

---

---

16

**Diet & Lifestyle Modifications: Review of Diet Patterns**

- Low CHO vs High CHO: controversial
  - Low CHO linked to lower triglycerides, higher HDLs, lower glucose
  - Long term safety not known and some studies report association with increased risk of death due to CVD and cancer
  - 2019 study reports low CHO diet linked to a-fib
  - 2019 study (NHANES): those with lowest intake of CHO had a 32% higher risk of all-cause death. Risks of death from coronary heart disease, cerebrovascular disease, and cancer were increased 51%, 50%, and 35% respectively.

#AADE19

---

---

---

---

---

---

---

---

17

**Diet & Lifestyle Modifications: Review of Diet Patterns: Grains, Nuts, Seeds, Legumes**

- National Lipid Association & AHA:
  - Whole grains associated with reduced risk of cardiac events and stroke, as well as reduced risk of T2DM
  - Consistent association between intake of nuts, seeds, legumes with lower cardiovascular event risk and improved cardiovascular profiles
- People with T2DM who ate 5 servings of nuts weekly had 34% lower risk of CVD mortality, 31% reduced all-cause mortality, 20% lower coronary heart disease risk, and 17% lower risk of total cardiovascular disease incidence
- Consume:  $\geq 3$  1-oz equivalent servings of fiber-rich whole grains/day;  $\geq 4$  servings/wk nuts

#AADE19

---

---

---

---

---

---

---

---

18

### Diet & Lifestyle Modifications

- Weight management
- Increased PA
- Reduce saturated fat and trans fat
- Increase Omega 3
- Soluble fiber
- Plant stanols & sterols

#AADE19

19

---

---

---

---

---

---

---

### Impact of Weight Loss

- Higher BMI = higher CVD risk, T2DM, and overall mortality
- Weight loss as low as 3% produced clinically significant benefits
- Bariatric surgery: good results post 2-3 years but longer term (10 years), DM and HTN more likely to recur

#AADE19

20

---

---

---

---

---

---

---

### Impact of Physical Activity (PA)

- PA reduces CV events in people with DM
- Moderate to high levels of PA decreased total and CV mortality
- 40 minutes moderate to vigorous, 3-4 times per week

#AADE19

21

---

---

---

---

---

---

---

### Impact of Nutrients: Cholesterol



#AADE19

22

---

---

---

---

---

---

---

---

### Impact of Nutrients: Cholesterol

Organization	Cholesterol Recommendation
USA Dietary Guidelines 2015	No recommendation. "this change does not suggest that dietary cholesterol is no longer important to consider.....eat as little dietary cholesterol as possible"
Canada Dietary Guidelines	No recommendation. "Cholesterol is not a nutrient of concern for overconsumption."
2013 AHA/ACC Guidelines (2018 update)	No recommendation. Emphasis on SFA.
International Atherosclerosis Society	Dietary cholesterol <200 mg/day
American Diabetes Assoc. 2018	Dietary Guidelines recommendations
WHO	No recommendation. Advisable to keep intake as low as possible.
Nat'l Lipid Association	Dietary cholesterol <200 mg/day

#AADE19

23

---

---

---

---

---

---

---

---

### Impact of Nutrients: Eggs

- 2015 Dietary Guidelines: "cholesterol is not a nutrient of concern for overconsumption"
- 2018 JAMA study: association between eating more eggs and higher risk of CVD & death
- Limitations: findings are observational and not cause and effect; study was based on diet recall; other lifestyle factors were not adequately factored in.

#AADE19

24

---

---

---

---

---

---

---

---

### Impact of Nutrients: Eggs (2015 reports)

- NLA: observational evidence suggests that egg and dietary cholesterol consumption are not associated with increased CVD with the possible exception of increased risk in those with DM.
  - Patients with DM who ate eggs more than once per day had a 69% increased risk of CVD
  - Uncertain as to reason for difference
- American Journal of Clinical Nutrition: “high egg consumption did not have an adverse effect on the lipid profile of people with T2DM in context of increased MUFA and PUFA consumption.” High egg diet may provide greater satiety, protein, micronutrients, and aid with weight management.
  - Defined as 2 eggs/day for 6 days/wk

#AADE19

25

---

---

---

---

---

---

---

---

### Impact of Nutrients: Saturated Fat



#AADE19

26

---

---

---

---

---

---

---

---

### Impact of Nutrients: Saturated Fat

- LDL theory of atherosclerosis: SFA impair the action of LDL receptor cells to remove LDL from blood circulation and lower LDL cholesterol level
- Ideal amount of dietary fat for persons with DM is controversial
- All: replace SFA with unsaturated fats and not refined CHO. Replacing with CHO reduces total cholesterol and LDL but increases triglycerides and lowers HDL

#AADE19

27

---

---

---

---

---

---

---

---

### Impact of Nutrients: Saturated Fat

Organization	Cholesterol Recommendation
USA Dietary Guidelines 2015	<10% of total kcal
Canada Dietary Guidelines	Choose foods with healthy fats instead of saturated fat
2013 AHA/ACC Guidelines (2018 update)	5-6% of total kcal
National Academy of Medicine	total fat 20-35%, "SFA as low as possible while consuming a nutritionally adequate diet"
American Diabetes Assoc. 2018	Dietary Guidelines recommendations
WHO	Less than 10% of total kcal
Nat'l Lipid Association	<7% of total kcal

#AADE19

28

---

---

---

---

---

---

---

---

---

---

### Impact of Nutrients: Saturated Fat

- Common sources: red meat, whole milk, whole-milk cheeses, butter, coconut, many commercially prepared baked goods
- Recent reports: meta-analysis of 21 studies concluded there was not enough evidence to conclude that SFA increases the risk of CVD, but replacing fat with polyunsaturated fat may reduce risk of CVD
  - Limitations to meta-analysis include measurement error in assessment of diet; did not consistently distinguish between replacing SFA with unsaturated fats and replacing them with CHO, inconsistent adjustment for other dietary and lifestyle factors

#AADE19

29

---

---

---

---

---

---

---

---

---

---

### Impact of Nutrients: Saturated Fat

- AHA Presidential Advisory (2017)
  - Randomized controlled trials that lowered intake of dietary saturated fat and replaced it with polyunsaturated vegetable oil reduced CVD by ~30%, similar to the reduction achieved by statin treatment
  - Replacing SFA with unsaturated fat decreases LDL cholesterol levels; polyunsaturated fats have a greater impact than monounsaturated fats
  - A decrease of 1% of total daily kcal from SF and 1% increase in total daily kcal from PUFA resulted in lowering LDL cholesterol by 2.1 mg/dl
  - 1% increase in monounsaturated fat resulted in LDL reduction of 1.6 mg/dl
  - Limited research suggests replacement of SFA with MUFA or PUFA reduces the concentration of all sizes of LDL

#AADE19

30

---

---

---

---

---

---

---

---

---

---

**Impact of Nutrients: Saturated Fat**

**THE AMAZING HEALTH BENEFITS OF Coconut Oil**

- ✓ LOWERS CHOLESTEROL
- ✓ IMPROVES DIGESTION
- ✓ STABILIZES GLUCOSE LEVELS
- ✓ DEFENDS AGAINST VIRUSES
- ✓ REGENERATES CELLS
- ✓ BALANCES HORMONES
- ✓ INCREASE THYROID PRODUCTION
- ✓ INCREASE METABOLISM
- ✓ FIGHTS INFECTIONS
- ✓ SAVES OFF MEMORY LOSS



#AADE19

31

---

---

---

---

---

---

---

---

**Impact of Nutrients: Saturated Fat**

- Coconut Oil
  - 72% of American public rated coconut oil as a healthy food compared with 37% of nutritionists
  - Fatty acid profile is 82% saturated of which half is lauric acid
  - Increasing lauric acid and decreasing CHO can result in increased LDL and increased HDL
  - Recent studies show that increasing HDL without decreasing LDL does not impact CVD
  - Systemic review of 7 controlled trials found coconut oil raised LDL cholesterol in all 7 trials, significantly in 6 of them.

#AADE19

32

---

---

---

---

---

---

---

---

**Effects of Red Meat, White Meat, and Non-meat Protein Sources**

- 2019 Study: examined recommendation to limit red meat to reduce CVD risk
- Lean red meat vs. lean white meat had similar effects on plasma lipid
  - Increase in concentration of LDL cholesterol and apoB due to increase in large, cholesterol rich LDL particles
  - Meta-analyses: higher CVD risk with processed red meat
- Tested low vs. high SFA: consuming more SFA led to higher levels of LDL regardless of red vs. white vs. plant protein
- Plant based proteins resulted in lower LDL cholesterol and apoB independent of SFA content

#AADE19

33

---

---

---

---

---

---

---

---

**Impact of Nutrients: Polyunsaturated Fats & Monounsaturated Fats**

- Polyunsaturated fatty acids exist in the n-3 or n-6 isomeric configuration. n-6 (corn oil) are more prevalent than n-3 in American diet.
  - a-Linolenic acid (n-3): soybean oil, canola oil, walnuts, some chickens and their eggs, grass fed beef
  - EPA and DHA (n-3): fish and dietary supplements
- Monounsaturated fats (n-9) : Olive oil, canola oil, nuts

#AADE19

34

---

---

---

---

---

---

---

---

**Omega 3 Fatty Acids: a-linolenic acid**

- Impact on CVD (vegetable omega-3)
  - Meta-analysis found no significant change in relative risk for CVD
  - Higher intake was associated with lower risk of fatal CHD. Does not lower LDL but has been shown to have antiarrhythmic properties in experimental studies (supported by Cochrane review)

#AADE19

35

---

---

---

---

---

---

---

---

**Omega 3 Fatty Acids: DHA & EPA**

- Impact on CVD
  - Body can't manufacture them so obtain through diet: fatty fish
  - Reduce inflammation
  - Improve arterial elasticity (Promotion of nitric oxide-induced endothelial relaxation)
  - Reduce platelet aggregation (antithrombotic)
  - Reduce triglycerides
  - Reduce blood pressure
  - Impeded growth of atherosclerotic plaques
  - Slowing of heart rate
  - Reduced susceptibility to cardiac arrhythmias

#AADE19

36

---

---

---

---

---

---

---

---

### Omega 3 Fatty Acids: DHA & EPA

- Impact on CVD: Cochrane Review 2018
  - 79 RCTs
  - Little or no effect on all-cause mortality, cardiovascular mortality, cardiovascular events, CHD mortality, stroke, or arrhythmia
- Conclusion: Little or no effect on mortality or CV health. Previous suggestion of benefit from EPA/DHA supplements are from trials with higher risk of bias. Low quality evidence suggests ALA may slightly reduce CVD event and arrhythmia risk.
- High quality evidence that EPA/DHA reduce serum triglyceride and raise HDL

#AADE19

37

---

---

---

---

---

---

---

---

### Omega 3 Fatty Acids: DHA & EPA

- ASCEND: lack of evidence of protective effects of omega-3 for overall CV benefits
  - Patients with dm and no evidence of cardiovascular disease. Did not measure triglycerides.
  - Received 1 gram capsule of n-3 PUFA
  - Follow-up at 7.4 years: no difference in incidence of serious vascular events compared to placebo
  - Possible that higher doses of 2-4 g may reduce triglyceride levels and produce benefits in some patients with CVD

#AADE19

38

---

---

---

---

---

---

---

---

### Omega 3 Fatty Acids: DHA & EPA

- 2019 – Effects of Nutritional Supplements and Dietary Interventions on Cardiovascular Outcomes (Khan et al.)
  - 227 RCTs
  - Found support that omega-3 LC-PUFA intake reduced major CVD outcomes
- REDUCE-IT: 25% reduction in cardiovascular endpoints with the use of icosapent ethyl, a modified and highly purified form of EPA (4 g/day) and included high risk participants (dm) with controlled LDL on statin but high triglyceride levels.
  - Available only by prescription
  - Unclear: results due to specific product or higher doses of omega-3 PUFA
- VITAL: benefit of omega-3 PUFA at 1 g/day for reduction of MI and 19% reduction in major CVD outcomes for those with low dietary fish intake. Did not show reduction in major CV events.

#AADE19

39

---

---

---

---

---

---

---

---

### Omega 3 Fatty Acids: DHA & EPA

- 2019 – Effects of Nutritional Supplements and Dietary Interventions on Cardiovascular Outcomes (Khan et al.)
  - Mediterranean diet, modified dietary fat, reduced dietary fat, reduced saturated fat, omega-6 PUFA, or omega-3 ALA did not reduce the risk for mortality or cardiovascular events
  - Reduced salt intake and folate supplementation had positive CVD risk reduction

#AADE19

40

---

---

---

---

---

---

---

---

### Mini Case Study

- 53 yo female
- 186# BMI: 30
- PMH: T2DM, pre-HTN, osteoarthritis
- Family hx: bipolar
- Fbg: 142 Alc: 6.7
- Medications: None
- TC: 171
- LDLd: 129
- HDL: 42
- Trig: 64
- ApoB: 93 (<60)
- LDL-P: 1729 (<1020)
- Small LDL-P: 972 (<501)
- Apo A: 123 (>150)
- HDL-P: 35.5 (>38)
- HDL2-C: 9 (>17)
- Hs-CRP: 12.0 (<1.0)

41

---

---

---

---

---

---

---

---

### Three Months Later

- 186# → 175#
- 6% weight change
- BMI: 28.2
- Fbg: 142 → 128
- ApoB: 93 (<60) → 66
- LDL-P: 1729 (<1020) → 876
- Apo A: 123 (>150) → 139
- Small LDL-P: 972 (<501) → 206
- HDL-P: 35.5 (>38) → 32.2
- HDL2-C: 9 (>17) → 24.0
- Hs-CRP: 12.0 (<1.0) → 6.4

42

---

---

---

---

---

---

---

---

**Impact of Nutrients: *Trans* fats**

- Unsaturated fatty acids that are MUFA or PUFA containing at least 1 double bond in the *trans* configuration
  - occurring in 1) meat and milk of ruminant animals and 2) produced by chemical and enzymatic action for use in partially hydrogenated vegetable oils (low cost, improves shelf life, withstand repeated heating)
- Higher intake is consistently associated with risk of CVD
- Raises LDL & triglycerides, lowers HDL
- FDA: revoked GRAS status, list on Nutrition Facts Label
- Banned in U.S. as of 2018
- Limit intake to as low as possible

#AADE19

---

---

---

---

---

---

---

---

43

**Impact of Nutrients: Soluble (Viscous) Fiber**

- Resistant to digestion in small intestine and have a gelling property
  - Pectins, gums, mucilages, hemicellulose
  - Oats, barley, legumes, apples, pears, broccoli, carrots
- Studies have consistently shown reductions in total cholesterol and LDL
  - 5-10 g soluble fiber daily can lower LDL by 5-11 points or more
  - Ensure adequate fluid intake
  - Encourage diet first
  - Consider supplements

#AADE19

---

---

---

---

---

---

---

---

44

**Impact of Nutrients: Plant Stanols & Sterols**

- Phytosterols: compounds that occur naturally in plant foods and compete with cholesterol for absorption
  - Research supports lowering of TC & LDL
  - 2 g/day reduced LDL by 5-10%
  - Effect plateaus at doses >3 g/day
  - Some studies suggest consumption multiple times daily is more effective than a single dose
  - Consume with or shortly after a meal where bile is stimulated
  - Studies also showed reduction in triglycerides
- Fortified foods (orange juice, margarine, yogurt) vs. supplements

#AADE19

---

---

---

---

---

---

---

---

45

### Mini Case Study

48 yo male 304# BMI: 42.6 PMH: obesity, asthma , PUD

- Family hx: dm, CHF, CAD, CVA
- Chol: 564
- HDL: 12
- LDL: not calculated
- Trig: 3802
- hsCRP: 7.2
- Fbg: 269 Alc: 10.1
- Drinking 24 cans soda/week
- Non-smoker, ETOH 2x/month
- Dx: 1) mixed hyperlipidemia  
2) T2DM 3) obesity
- Plan: start Crestor 10 mg, start Metformin 500 mg, dietary consult

#AADE19

---

---

---

---

---

---

---

---

46

### Three Month Follow-Up

- 48 yo male 304# BMI: 42.6
- Chol: 564 → 302 (not on statin)
- HDL: 12 → 48
- LDL: not calculated → 196
- Trig: 3802 → 290
- Fbg: 269 → 110

#AADE19

---

---

---

---

---

---

---

---

47

### Impact of Nutrients: Alcohol

- ETOH may be associated with reduced mortality from heart disease in some populations
  - Red wine flavonoids & antioxidants
  - Reduce platelet aggregation, improve fibrinolysis, increase HDL, promote NO release
- Moderate ETOH intake does not have a detrimental effect on long term glucose control in people with DM
  - Monitor hypoglycemia, weight gain, hyperglycemia
  - Women 1 drink/day, men 2 drink/day
- Due to risk of alcohol abuse, focus on consumption of healthy diet for flavonoids & antioxidants

#AADE19

---

---

---

---

---

---

---

---

48

**Diet Review for CHF and HTN: Sodium**

- ADA: limit sodium consumption to <2300 mg/day
- Diets <2000 mg/day may increase risk of readmission and mortality
- Restriction to <1300 mg/day not recommended
  - Palatability
  - Sustainability

#AADE19

49

---

---

---

---

---

---

---

---

**Diet Review for CHF and HTN: Diet Composition**

- Focus on increased fruits and vegetables
  - DASH Diet
  - Mediterranean diet
- Fluid restrictions
- Minimize loss of lean mass
- Consider disease burden combined with DM

#AADE19

50

---

---

---

---

---

---

---

---

**Diet Review for CHF and HTN: PA**

- Increased physical activity, higher cardiorespiratory fitness, and lower sedentary time are associated with reduced heart failure incidence
- Consider severity of disease/symptoms, level of education, exercise self-efficacy, and motivation

#AADE19

51

---

---

---

---

---

---

---

---

### CV and Evidence for Supplementation

- Evidence does not support supplementation with vitamins A, C, E, folic acid due to lack of evidence of efficacy and concern related to long-term safety
- Vitamin D: recent studies support direct association with CVD
  - Low levels of vitamin D have been associated with increased insulin resistance, HLP, and HTN
  - Benefit of supplements?: impact on CVD still being explored. Some studies report vitamin D supplements could prevent HF in elderly but showed no protection against MI and stroke
- Coenzyme Q10
  - 2014 Cochrane review – did not confirm improvement or worsening of CHF
  - May protect against lipid peroxidation, improve antioxidant function, and reduce inflammation
  - No consensus on whether supplements lead to improved glycemic control in patients with T2DM

#AADE19

---

---

---

---

---

---

---

---

52

### Take Away Message

- Consider Mediterranean diet and DASH diet
- Reduce SFA and increase PUFA & MUFA
- Minimal intake of *trans* fats
- Focus on increased whole grains, fruits, vegetables, nuts, legumes, lean protein
- **Individualize based on cultural and food preferences**
- Consume ETOH in moderation
- Weight loss of 5-10% of actual body weight
- Recommend plant stanols/sterols and viscous fiber
- EPA + DHA:  $\geq 2$  servings/week of fish/sea food
- EPA + DHA supplements: consider therapeutic dose under medical supervision for those with high triglycerides. Consider 1 g/day for patients with heart failure and potential impact on reduced cardiac mortality.

#AADE19

---

---

---

---

---

---

---

---

53

### Questions?



#AADE19

---

---

---

---

---

---

---

---

54