

QUICK REFERENCE GUIDE TO DIABETES FOR HEALTH CARE PROVIDERS

A special project of the Michigan Diabetes Outreach Network

Chapter 14

Lipid Management in Diabetes

Lipid abnormalities are common in persons with diabetes (up to 70% of type 2 have lipid disorders). Some problems can be resolved through blood glucose control. Others will require dietary or pharmacological intervention.

Desirable Lipid Levels (fasting)

	Cholesterol	LDL-cholesterol	HDL-cholesterol	Triglycerides
Adults	<200 mg/dl	<100 mg/dl <70 mg/dl (with cardiovascular disease)	> 40 mg/dl (men) > 50 mg/dl (women)	< 150 mg/dl
Children	<170 mg/dl	<100 mg/dl	> 35 mg/dl	< 150 mg/dl

Testing (Fasting Lipid Profile)

- **Adults:** At diagnosis and every year or every 2 years if low risk (LDL<100, HDL > 50 and TG < 150)
- **Children with type 1 diabetes (under age 12):** There is no need to screen in absence of parental history of dyslipidemia or early coronary disease. If levels are abnormal, follow-up annually.
- **Children with type 1 diabetes (over age 12):** Screen at diagnosis, but after glycemic control is achieved. If initial screening is normal, repeat screening every 5 years. If levels are abnormal, follow-up annually.
- **Children with type 2 diabetes:** Screen at diagnosis, regardless of age, but after glycemic control is achieved. If levels are normal, follow-up every 2 years.

Type 1

- Blood glucose control will often help correct dyslipidemia.
- Check thyroid function.

Type 2

- Most common type of dyslipidemia: high triglycerides with low HDL.
- Usually have smaller, denser, more atherogenic LDL-particles
- Obesity exacerbates dyslipidemia.
- If no evidence of macrovascular disease; weight loss, increased activity, limiting alcohol, and controlling glucose can help.

Lifestyle Therapies for Dyslipidemia

1. Improved BG control

- Most beneficial for those with type 1 diabetes
- Will help with hypertriglyceridemia
- May decrease LDL-cholesterol up to 15%

2. Fat restriction

- Total fat: 20-35% of total calories
- Saturated fat: < 7% of total calories
- Trans fat: minimize intake
- Polyunsaturated fat: up to 10% of total calories
- Monounsaturated fat: up to 20% of total calories
- Dietary cholesterol: < 200 mg/day

3. Increase fiber

- Total Fiber: 14 grams per 1000 calories
- Soluble fiber: 10-25 grams/day
- Plant stanols/sterols (found in margarines Benecol®, Take Control® and other foods): 2 grams/day

4. Modest weight loss

- 5-10% weight loss from current body weight

5. Increased physical activity

- Goal for adults: minimum of 150 min/week of moderate intensity aerobic activity (50-70% of max HR)
- Resistance training is recommended in those without contraindications up to 3 times per week.
- Goal for children: 60 minutes most days of the week

6. Smoking cessation

- Will lead to improvements in lipid profile.

Treatment of Dyslipidemia in Adults with Diabetes (order of priorities)

Statin therapy should be added to lifestyle therapy (regardless of baseline lipid levels) for the following persons with diabetes:

- Those with overt cardiovascular disease (CVD)
- Those without CVD who are > 40 yrs with 1 or more CVD risk factors (smoking, high blood pressure)
- Consider use in those without overt CVD or under age 40 if LDL is >100 or has multiple CVD risk factors

1. LDL-cholesterol lowering

- 1st Choice: HMG CoA Reductase Inhibitors (statins)
- 2nd Choice: Bile Acid Binding Resins (resins) or Fibric Acid Derivatives (fibrates)

2. HDL-cholesterol raising

- 1st Choice: increase physical activity (see lifestyle therapies above)
- 2nd Choice: Nicotinic acid (with caution due to BG raising) or fibrates

3. Triglyceride lowering

- 1st priority: BG control
- 1st Choice: fibrates
- Statins are moderately effective in those with elevated LDL also.
- Fish oil supplementation with omega-3 fatty acids may help lower triglycerides that are not responding to medication.

4. Combined hyperlipidemia

- 1st Choice: Lifestyle intervention plus a statin
- 2nd Choice: Lifestyle intervention plus a fibrate
- 3rd Choice: Lifestyle intervention plus a resin and a fibrate OR lifestyle intervention plus a statin and nicotinic acid (must monitor BG carefully)

Treatment of Diabetic Dyslipidemia in Children

1. Lifestyle intervention (see above) for LDL-cholesterol of 100-129 mg/dl

2. Consider pharmacological intervention for LDL cholesterol 130-159 mg/dl
 - Maximize lifestyle intervention
 - Base decision on complete CVD risk profile, including assessment of blood pressure, family history and smoking status.

3. Pharmacological intervention for LDL cholesterol 160 mg/dl
 - Bile acid sequestrants (resins) are often recommended as first choice in this age group.
 - Statins can be used with caution. Initiate at lowest available dose and increase based on LDL levels and side effects, and monitor LFTs.
 - Statins should be discontinued if there is complaint of significant muscle pain or soreness.

4. Elevated triglycerides
 - Maximize lifestyle intervention
 - If levels > 1000 mg/dl, treatment is necessary. Consider fibrate.
 - Fish oil supplementation with omega-3 fatty acids may help lower triglycerides that are not responding to medication.

Resources:

American Diabetes Association (2008). Clinical Practice Recommendations. *Diabetes Care*. Vol 31 (1).

American Diabetes Association (2003). Management of Dyslipidemia in Children and Adolescents with Diabetes. *Diabetes Care* 26:2194-2197.

American Heart Association (2006). Dietary and Lifestyle Recommendations. June 19 Rapid Access issue of *Circulation*.