

## Kansas City Quality Improvement Consortium

### Management of Hyperlipidemia in Children and Adolescents 2-18 years of age

The following guidelines apply to management of patients in the ambulatory setting.

Population	Physician / Patient	Recommendation and Level of Evidence			
Children and Adolescents Age 2 to 18  <b>Please note that meds are not recommended for children under the age of 8 to 10. Other treatments and Cholesterols levels follow the National Cholesterol Education Program's Expert Panel on Blood Cholesterol in Children and Adolescents</b>	Initial Assessment	1) Height, weight, use BMI in conjunction with Age Growth Chart 2) Cholesterol screening should be done if <ol style="list-style-type: none"> <li>a) Parent or grandparent has had documented premature coronary artery disease (CAD)<sup>1</sup> or coronary heart disease (CHD)<sup>1</sup> (such as myocardial infarction, angina, peripheral vascular disease or cerebrovascular disease, coronary bypass, angioplasty or sudden cardiac death at age 55 or younger.)</li> <li>b) Parent with documented blood cholesterol level of 240 mg/dl or above (About 90 % of children with high cholesterol have a parent who has high cholesterol.)</li> <li>c) If lipid abnormalities are in the family history</li> <li>d) If child has a medical condition that predisposes to coronary heart disease, such as severe obesity, physical inactivity, smoking, diabetes, or other related risk factors</li> <li>e) Family history unavailable or unknown</li> <li>f) Presence of any of the following risk factors: 1. Heredity; 2. Diet high in fat; 3. Obesity treatment; 4. Major risk factors and/or presence of coronary artery disease (CAD) or coronary heart disease (CHD) or equivalent</li> </ol>			
	Cholesterol levels in ages 2-18 years	Cholesterol	Acceptable	Borderline	High
		Total Cholesterol	< 170 mg/dL	170 to 199 mg/dL	200 mg/dL or more
		LDL Cholesterol	< 110 mg/ dL	110 to 129 mg/dL	130 mg/dL or more
	Patient education and non-pharmacologic interventions	Interventions: Therapeutic Lifestyle Changes (TLC) <sup>2</sup>	<ul style="list-style-type: none"> <li>● General dietary guidelines</li> </ul>	<ul style="list-style-type: none"> <li>● General dietary guidelines</li> <li>● Prevention of weight gain as child grows taller</li> </ul>	<ul style="list-style-type: none"> <li>● General dietary and nutrition guidelines</li> <li>● Reducing caloric intake</li> <li>● Increased activity</li> <li>● Parental involvement in modifying behavior</li> </ul>
	Pharmacotherapy Intervention *#(See page 2 for additional information)	PRAVASTATIN (FDA approved 10/1991)	Indicated for the treatment of patients <b>8 to 18</b> years of age with heterozygous familial hypercholesterolemia		
		LOVASTATIN (FDA approved 8/1987)	Indicated for the treatment of patients <b>10 to 17</b> years of age with heterozygous familial hypercholesterolemia		
		SIMVASTATIN <sup>3</sup> (FDA approved 12/1991)	Indicated for the treatment of patients <b>10 to 17</b> years of age with heterozygous familial hypercholesterolemia		
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Education and risk factor modification	1) Educate patient/family regarding Therapeutic Lifestyle Changes (TLC) <sup>2</sup> : 2) Reduce saturated fats and cholesterol, increase plant stanols/sterols to 28 g/day (e.g.; cholesterol-lowering margarines), increase viscous soluble fiber to 10 – 25 g/day (e.g.; oats, barley, lentils, beans, etc.). 3) Decrease weight and increase exercise to moderate level of activity for 30 minutes, most days of the week [A]. 4) Avoidance of tobacco use				

<sup>1</sup>CHD/CAD includes history of myocardial infarction, unstable angina, stable angina, coronary artery procedures (angioplasty or bypass surgery), or evidence of clinical significant myocardial ischemia.

<sup>2</sup>Therapeutic Lifestyle Changes (TLC) is an essential modality in clinical management. TLC has the potential to reduce cardiovascular risk though several mechanisms beyond LDL lowering.

<sup>3</sup>The minimum goal of treatment in pediatric and adolescent patients is to achieve a mean LDL-C <130 mg/dL. The optimal age at which to initiate lipid-lowering therapy to decrease the risk of symptomatic adulthood CAD/CHD has not been determined.

#Rosuvastatin, Zetia, Vytorin, Nicotinic Acid (Niacin), Fibrac Acids, and Omega-3 Fatty acids (Fish Oil is not recommended for Children and Adolescents at this time)

References: American Heart Association (2005). Cholesterol in Children. <http://www.americanheart.org/persenter.jhtml?identifier=556>,

[www.pdr.net](http://www.pdr.net), information for Atorvastatin (Lipitor); Lovastatin (Mevacor); Pravastatin (Pravachol); Simvastatin (Zocor)

Drug Facts and Comparisons (2007) at <http://www.factsandcomparisons.com/>

Levels of Evidence for the most significant recommendations: A = randomized controlled trials; B = controlled trials, no randomizations; C = observational studies; D = opinion of expert panel.

This guideline represents steps to for the usual treatment of children and adolescents with Hyperlipidemia. Individual patient considerations and advances in medical science may supersede or modify these recommendations.

Revised and approved by KCQIC 3/2007

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***THERAPEUTIC LIFESTYLE CHANGES (TLC)***

**Therapeutic Lifestyle Changes (TLC)**

**Will help to lower high blood cholesterol that is too high and reduce the chance of developing heart disease.**

TLC steps to take to lower cholesterol and keep it low:

- Be more active
- Loose weight if you are over weight
- Follow a low saturated fat, low-cholesterol diet.
- Therapeutic Lifestyle Changes (TLC) diet recommendations:
  - Less than 7% of the day's total calories from saturated fat
  - 25-35 percent or less of the day's total calories from fat
  - Less than 200 milligrams of dietary cholesterol a day
  - Limit sodium intake to 2400 milligrams a day
  - Just enough calories to achieve or maintain a healthy weight and reduce blood cholesterol level. Provide a reasonable calorie level for the patient and refer to registered dietitian as needed.

Because the TLC Diet may include changes to individual's current eating plan, referral to a registered dietitian (RD) who can help the patient and family make these changes.

If blood cholesterol is not lowered enough on the TLC Diet, first intensify the TLC diet by increasing the amount of **soluble fiber** and/or adding cholesterol-lowering food products to the diet. These products include such items as margarines and salad dressings that contain plant sterol esters or plant stanol esters. If your LDL is still not lowered enough, your doctor may prescribe **cholesterol lowering medication** along with the TLC diet.

**Additional information can be found at the National Institute of Health website under Therapeutic Lifestyle Changes:  
<http://www.nhlbi.nih.gov/chd/lifestyles.htm>**

*Pharmacotherapy should not be used as a routine treatment. Is should only be used when risk factors indicate that addition measures may be warranted and may be indicated as an adjunct to Therapeutic Lifestyle Changes in children and adolescents 8 to 18 years of age.*

Atorvastatin	Safety and effectiveness in patients 10 to 17 years of age with heterozygous familial hypercholesterolemia (heFH) has been evaluated in controlled clinical trials. Doses greater than 20mg have not been studied. Doses should be individualized according to the recommended goal of therapy. Adjustments should be made at 4 or more week intervals.
Lovastatin	Dose range 10 to 40mg/day. Maximum recommended dose is 40mg/day. Doses should be individualized according to recommended therapy goals. Pts. Requiring reductions in LDL-C of 20% or more to achieve their goal should be started on 20mg/day of lovastatin. A starting dose of 10 mg maybe considered for patients require smaller reductions. Adjustment should be made at 4 week intervals if necessary. Safety and effectiveness in patients 10-17 years of age with heFH have been evaluated in controlled clinical trials of 48 weeks duration in adolescent boys and controlled clinical trials of 24 weeks duration in girls who were at least 1 year post-menarche. Patients treated with lovastatin had an adverse experience profile generally similar to that of patients treated with placebo.
Pravastatin	Safety and effectiveness of in children and adolescents from 8-18 years of age has been evaluated in a placebo-controlled study of two years duration.
Simvastatin	Indicated as an adjunct to diet to reduce total-C, LDL-C, and apolipoprotein (Apo) B levels in adolescent boys and girls who are at least one year post-menarche, 10-17 years of age, with heterozygous familial hypercholesterolemia, if after an adequate trial of diet therapy the following findings are present: <ul style="list-style-type: none"> <li>▪ LDL cholesterol remains <math>\geq</math> 190 mg/dL; or Cholesterol remains <math>\geq</math> 160 mg/dL and</li> <li>▪ There is a positive family history of premature cardiovascular disease (CVD) or</li> <li>▪ Two or more other CVD risk factors are present in the adolescent patient</li> </ul>

References:

2001 National Cholesterol Education Program (NCEP) Expert Panel Report on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment NCEP Report (2004). Implications of recent clinical trials for the national cholesterol Education Program Adult Treatment Panel III Guidelines. *Circulation*, 110, 227-239.

American Heart Association (2005). Cholesterol in Children. <http://www.americanheart.org/persenter.jhtml?identifier=556>

National Institute of Health (2005). How to lower your cholesterol at <http://www.nhlbi.nih.gov/chd/lifestyles.htm>

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