LIPID OPTIMIZATION TOOL (LOT) DATABASE TO ACHIEVE LDL CONTROL IN A COMMUNITY CARDIOLOGY GROUP PRACTICE 2008 AUDIT

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PURPOSE:

Lipid optimization has the potential to reduce cardiovascular events significantly. Despite well-established benefits of lipid-lowering therapies, lipid targets are broadly underachieved. At the OCC we have developed a physician supervised, nurse managed lipid protocol applied via a flow chart based structured lipid optimization tool (LOT). We have audited our practice and developed a database capable of ongoing decision support and quality control audit.

METHODS:

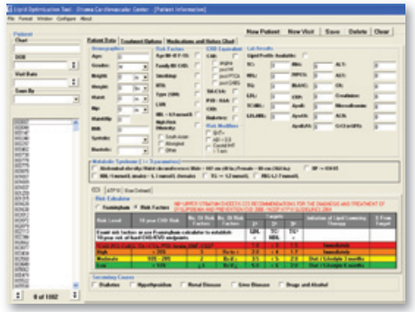
We have previously reported the use of the LOT to guide LDL control in patients at the OCC. A database version of the LOT was developed and refined for 2006 and subsequent practice audits. This database is designed to risk stratify, calculate LDL percent reductions to achieve to CCS, ATP III or user defined targets, provide therapeutic decision support and track sequential control rates to specified targets. Queries including risk factors, risk modifiers, coronary heart disease (CHD) equivalents and LDL control rates are generated automatically. For the 2008 audit parameters from 5193 sequential patients managed with the LOT by 13 OCC physicians were entered into the database.

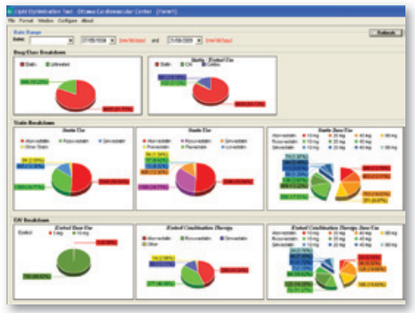
RESULTS:

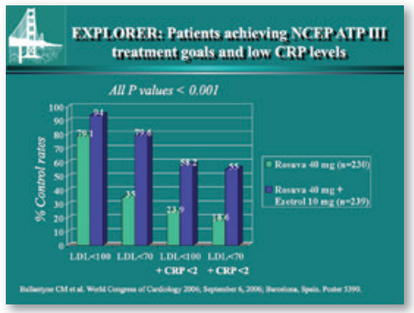
Of the 5193 patients audited in 2008 LDL control rates were 84% (4362/5193) to an LDL of 2.5 mmol/L, 64% (3324/5193) to an LDL of 2.0 mmol/L and 48% (2493/5193) to an LDL of 1.8 mmol/L. Eighty % (4149/5193) of patients were high or very high risk for cardiovascular events and 87% (3596/4149) of these were on a statin. Control rates in statin treated patients were 89% (3200/3596) to an LDL of 2.5 mmol/L, 68 % (2445/3596) to an LDL of 2.0 mmol/L and 51% (1833/3596) to an LDL of 1.8 mmol/L. Fourteen percent of patients were on combination therapy with statin + ezetimibe. Optimal target achievement rates are 79% to an LDL of 2.5 with statin monotherapy, 94% to an LDL target of 2.5 mmol/L with combination statin + ezetimibe therapy and 80% to an LDL target of 1.8 with combination statin + ezetimibe therapy (EXPLORER study).

CONCLUSION:

LDL control rates at the OCC utilizing the LOT are among the best reported in the world literature but could be improved further through increased use of combination therapy. Further testing of this hypothesis in real time clinical practice using the LOT database and protocol prospectively is underway.







1) RT Yan et al. Guideline Oriented Approach in Lipid Lowering (GOALL) registry data presented at CCC Symposium Oct 2005.
2) MH Davidson et al. Results of the National Cholesterol Education (NCEP) Program Evaluation Project Utilizing Novel e-Technology (NEPTUNE) II Survey and Implications for Treatment Under the Recent NCEP Writing Group Recommendations. Am J Cardiol 2005 Aug 15;96(4):556-63.
3) A Langer et al. Targeted Dosing of Atorvastatin Achieves Cholesterol Targets Quickly in Subjects with Diabetes or the Metabolic Syndrome (The ACTFAST Studies). Can J Cardiol 2005; Vol 21 Suppl C: Abstract 826, 253C.
4) C Bourgault et al. Stain Therapy in Canadian Patients with Hypercholesterolemia: The Canadian Lipid Study – Observational (CALIPSO). Can J Cardiol 2005; 21(13):1187-1193.
5) Yan et al. Contemporary Management of Dyslipidemia in High Risk Patients: Targets Still Not Met. Am J Med 2006; 119: 676-683.

Lipid Optimization Tool

Continuing Medical Implementation
Bridging the Care Gap

Lipid Optimization Tool

Patient: _____ Pharmacy: _____

Responsible for Lipid Management: m Family Physician m Cardiologist m Endocrinologist

LIPID FLOW SHEET[1] – Use the following Table to Guide Intervention: **NB*: UPPER STRATUM**

Exceeds CCS Recommendations for the Dx & Tx of Dyslipidemia and Prevention CVD 2006 / NCEP ATP III Guidelines 2004

Risk Level	10 year CHD Risk	No. Of Risk Factors		Targets 1° LDL <	Targets 2° TC/HDL	Targets 3° TG* <	Initiation of Lipid Lowering Therapy
Count risk factors or use **Framingham** tables/European **SCORECARD** to calculate 10-year risk of hard CHD/CVD endpoints.							
* CAD, PCI, CABG, TIA/CVA, PVD/bruits, DM[2], CKD[3]				1.8	< 3	1.5	Immediately
High	> 20%	3	Rx to <	2.0	< 4	1.7	Immediately
Moderate	10-20%	2	Rx if ≥	3.5	< 5	2	Diet/Lifestyle 3 months
Low	< 10%	≤1	Rx if ≥	5.0	< 6	2	Diet/Lifestyle 6 months

1) **Count Risk Factors:**
❍ Age M > 45 F > 55 ❍ Family Hx CAD ❍ Smoking ❍ HPT ❍ DM ❍ LVH ❍ HDL < 0.9 mmol/l
2) **Identify Metabolic Syndrome (> 3 parameters):**
❍ Abdominal obesity (Waist circumference: Male >102 cm (40 in.) / Female > 88 cm (34.6 in.) ❍ TG > 1.7 mmol/L
❍ HDL < 1 mmol/L (male)/< 1. 3 mmol/L (female) ❍ BP > 130/85 ❍ FBG 6.2-7 mmol/L
3) **Identify secondary causes:** ❍ Diabetes ❍ Hypothyroidism ❍ Renal disease ❍ Liver disease ❍ Drugs & Alcohol
4) **Record Indication:** ❍ Risk Factors ❍ CAD: _ angina, _ post MI, _ post PTCA, _ post CABG ❍ TIA ❍ CVA ❍ PVD/AAA

Date	TC	TG	HDL	LDL	TC/HDL	ALT	CK	Medication Rx Adjustment Addition	Next Test	Req. Sent ✓	Patient Called (Initial)

1 Monitor lipid profile, ALT and CK at baseline, 2 months then every 6 to 12 months
2 Diabetes carries the same CV risk as manifest CAD. DM+CAD impart much higher risk for subsequent CV events.
3 Chronic Kidney Disease

Secondary Prevention: % LDL (mmol/L) change to reach LDL target by risk category.

ATP III Very High Risk			CCS High Risk			Moderate Risk		
Initial	Target	% Change	Initial	Target	% Change	Initial	Target	% Change
LDL	LDL <	LDL	LDL	LDL <	Min. ↓ 50%	LDL	LDL <	Min. ↓ 40%
5.00	1.8	-64%	5.0	2.0	-60%	5.00	3.0	-40%
4.80	1.8	-63%	4.8	2.0	-58%	4.80	2.9	-40%
4.60	1.8	-61%	4.6	2.0	-57%	4.60	2.8	-40%
4.40	1.8	-59%	4.4	2.0	-55%	4.40	2.6	-40%
4.20	1.8	-57%	4.2	2.0	-52%	4.20	2.5	-40%
4.00	1.8	-55%	4.0	2.0	-50%	4.00	2.4	-40%
3.80	1.8	-53%	3.8	1.9	-50%	3.80	2.3	-40%
3.60	1.8	-50%	3.6	1.8	-50%	3.60	2.2	-40%
3.40	1.8	-47%	3.4	1.7	-50%	3.40	2.0	-40%
3.20	1.8	-44%	3.2	1.6	-50%	3.20	1.9	-40%
3.00	1.8	-40%	3.0	1.5	-50%	3.00	1.8	-40%

Dose response to Medication (statins & fibrates) % LDL Reduction

Drug mg.	5	10	20	40	80	200	400	900
Lovastatin			24-28%	28-34%	39-42%			
Pravastatin		18-25%	21-28%	27-33%				
Simvastatin	23-30%	27-32%	30-40%	36-43%	45-47%			
Fluvastatin	13%	13%	19%	29%	36%			
Atorvastatin		38-41%	44-46%	50-51%	54-61%			
Rosuvastatin	42-46%	52%	55%	63%				
Gemfibrozil	† Avoid in patients with renal impairment							12-16%
Fenofibrate	† Avoid in patients with renal impairment					21-32%		
Bezafibrate	† Avoid in patients with renal impairment						2-15%	
Ezetimibe		19%	(Co-administration with statin yields incremental 21% LDL reduction)					

Protocol: Initiate lipid lowering immediately in high-risk patients (concomitant with dietary/therapeutic lifestyle modification).
1) Target initial medication dose to ↓LDL by 40% for Moderate Risk or ↓LDL by 50% to minimum < 2.0 mmol/L for High Risk. Consider target LDL < 1.8 mmol/L for ATP III Very High Risk patients. Initiate therapy with dose required to achieve target LDL.
   - NB: Initiate rosuvastatin at 10-20 mg (5 mg in Asians/CKD). *40 mg. contraindicted in Asian population.
   - NB: Caution with simvastatin 80 mg. A to Z Trial and max dose statin in populations at risk for myositis.
2) Ifi nitial LDL at target, raise HDL and lower triglycerides to target values with appropriate intervention: diet, exercise, weight loss, refined carbohydrate restriction, moderate alcohol intake or medication: fibrate, Niaspan® or salmon oil/omega-3 supplements (1gm OD-TID).
3) If LDL and triglycerides high and HDL-C low, consider combination therapy (fibrate or Niaspan®).
4) If unable to raise HDL sufficiently, lower LDL to achieve TC/HDL< 4 and/or LDL/HDL< 3.
5) Ifi nitial lipid profile normal look at other risk factors (LPa, homocysteine, apo-B and hs-CRP).
6) Follow Total cholesterol, LDL, HDL, triglycerides, CK and ALT in 2 months then every 6 months.
7) If LDL not at target increase statin dose to achieve target or switch to more potent statin. If LDL target not achievable on monotherapy add cholesterol absorption inhibitor (ezetimibe) or bile acid sequestrant (cholestyramine or colesevelam). Doubling statin dose adds ~ 6 % LDL reduction. See Statin Cost Efficacy Grid.
8) Feedback results to patent to improve compliance.

Continuing Medical Implementation
Bridging the Care Gap

Statin Cost Efficacy

The **Statin Cost Efficacy Grid** details the cost and LDL lowering efficacy of all currently available statins. Statins and doses are highlighted based on evidence or cost efficacy. The green column highlights the minimum therapeutic bar for treatment of low and moderate risk patients. The orange column highlights the minimum therapeutic bar to halt atherosclerotic progression. The pink column highlights the minimum therapeutic bar for treatment of high risk patients or patients with atherosclerotic risk equivalents. The bright orange column highlights the minimum therapeutic bar to induce atherosclerotic regression. See the **Lipid Optimization Tool** for the therapeutic protocol.

STATIN	Dose	Cost/tab$	%LDL Red [1]	%LDL Red Law [7]	%LDL Red Stellar [8]	%LDL Reduction 30%	35%	40%	45%	50%	55%	60%
Lovastatin	20mg	1.30	26	29								
(generic)	40mg	2.40	31	37		2.40						
Pravastatin	10mg	1.05	22	20	20							
(generic)	20mg	1.25	24	24	24							
	40mg	1.50	30	29	30	1.50						
Simvastatin	5mg	0.45	27	23								
(generic)	10mg	0.89	30	27	28	0.89						
	20mg	1.10	35	32	35		1.10					
	40mg	1.10	40	37	39			1.10				
	80mg	1.10	46 [2]	42	46				1.10			
Fluvastatin	20mg	0.75	19	21								
(generic)	40mg	1.05	29	27		1.05						
	XL 80mg	1.30	36	33			1.30					
Atorvastatin	10mg	1.66	40 [3]	37	37			1.66				
	20mg	2.08	45	43	43				2.08			
	40mg	2.24	51	49	48					2.24		
	80mg	2.24	58 [4]	55	51						2.24	
Rosuvastatin	5mg	1.29	42 [5]	38				1.29				
	10mg	1.36	52	43	46				1.36			
	20mg	1.70	55	48	52					1.70		
	40mg	1.99	63 [6]	53	55						1.99	

* Average % reduction: Use to estimate initial statin dose. Actual response varies by patient and subgroup (age and gender).
Cost based on Ontario ODB pricing-updated February 2007. For cost to patient, add 10% plus prescribing fee.

Select Statin based on efficacy, safety, evidence and cost. Revised February 2007

EVIDENCE

COST

HPS/ASCOT/CARDS | **REVERSAL** | **PROVE-IT/TNT/IDEAL/AtoZ/SPARCL** | **ASTEROID**

[1] Ann Intern Med. 1996;125:990-1000.
[2] Am J Card;1998;82:311-316.
[3] Arterioscler Thromb Vasc Biol. 1995;15:678-682.
[4] Am J Card 1998;81: 582-587.
[5] Am J Cardiol 2003;91:33-41
[6] EHJ 2002, 4, (August) Abstract Supplement: Abs 212, page 19.
[7] BMJ 326 9740;65-1423.
[8] JACC 2003 (suppl):315A-316A, Abs 876-2.