To make the situation even more confusing, if you shift LDL particles from undesirably small to healthier large by some change in diet—a good thing—the calculated LDL value will often appear to go *up*, while the real value is actually going *down*. While you achieved a genuinely beneficial change by reducing small LDL, your doctor tries to persuade you to take a statin drug for the *appearance* of high LDL cholesterol. (That's why I call LDL cholesterol "fictitious LDL," a criticism that has not stopped the ever-enterprising pharmaceutical industry from deriving $27 billion in annual revenues from sales of statin drugs. Maybe you benefit, maybe you don't; calculated LDL cholesterol might not tell you, even though that is the FDA-approved indication: high *calculated* LDL cholesterol.)

The only way for you and your doctor to truly know where you stand is to actually measure LDL particles in some way, such as LDL particle number (by a laboratory method called nuclear magnetic resonance, or NMR, lipoprotein analysis) or apoprotein B. (Because there is one apoprotein B

LDL cholesterol = total cholesterol - HDL cholesterol - (triglycerides ÷ 5)

The three values on the right side of the equation—total cholesterol, HDL cholesterol, and triglycerides—are indeed measured. Only LDL cholesterol is calculated.

The problem is that this equation was developed by making several assumptions. For this equation to work and yield reliable LDL cholesterol values, for instance, HDL must be 40 mg/dl or greater, triglycerides 100 mg/dl or less. Any deviation from these values and the calculated LDL value will be thrown off.[13,14] Diabetes, in particular, throws off the accuracy of the calculation, often to an extreme degree; 50 percent inaccuracy is not uncommon. Genetic variants can also throw the calculation off (e.g., apo E variants).

Another problem: If LDL particles are small, calculated LDL will *underestimate* real LDL. Conversely, if LDL particles are large, calculated LDL will *overestimate* real LDL.