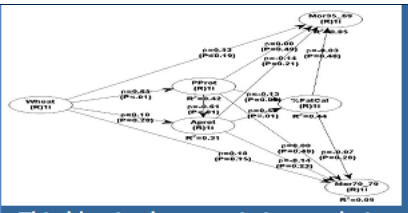


Health Correlator

This blog is about statistics, evolution, nutrition, lifestyle, and health issues. A combination of these issues. The focus is on quantitative researc applied in practice. But you may see other types of posts here (e.g., recipes, ideas, concepts, theories) from time to time.

Links to specific topics

(See also under "Labels" at the bottom-right area of this blog)

[-HealthCorrelator for Excel (HCE)-] [-HCE posts-] [-WarpPLS-] [-WarpPLS posts-] [-Journal of Evolution and Health-] [-My transformation-] [-Compensatory adaptation-] [-The China Study-] [-My experience-] [-Book reviews-] [-Research reviews-] [-Evolution-] [-Statistics-] [-Recipes-] [-Interesting links-] [-See your doctor-]

*** Annual PLS Applications Symposium ***

Friday, March 22, 2019

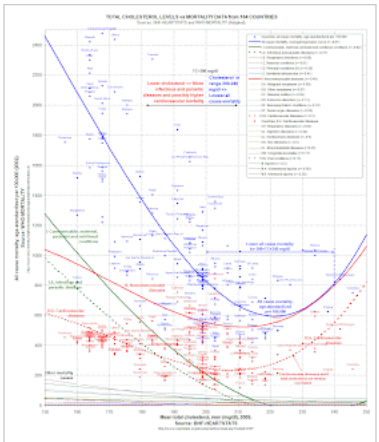
Total cholesterol and cardiovascular disease: A U-curve relationship

The hypothesis that blood cholesterol levels are positively correlated with heart disease (the lipid hypothesis) dates back to Rudolph Virchow in the mid-1800s.

One famous study that supported this hypothesis was Ancel Keys's Seven Countries Study, conducted between the 1950s and 1970s. This study eventually served as the foundation on which much of the advice that we receive today from doctors is based, even though several other studies have been published since that provide little support for the lipid hypothesis.

The graph below (from O Primitivo) shows the results of one study, involving many more countries than Key's Seven Countries Study, that actually suggests a NEGATIVE linear correlation between total cholesterol and cardiovascular disease.

Now, most relationships in nature are nonlinear, with quite a few following a pattern that looks like a U-curve (plain or inverted); sometimes called a J-curve pattern. The graph below (also from O Primitivo) shows the U-curve relationship between total cholesterol and mortality, with cardiovascular disease mortality indicated through a dotted red line at the bottom.



This graph has been obtained through a nonlinear analysis, and I think it provides a better picture of the relationship between total cholesterol (TC) and mortality. Based on this graph, the best range of TC that one can be at is somewhere between 210, where cardiovascular disease mortality is minimized; and 220, where total mortality is minimized.

The total mortality curve is the one indicated through the full blue line at the top. In fact, it suggests that mortality increases sharply as TC decreases below 200.

Ned Kock

About Me

I strongly believe that lifestyle, nutrition and exercise habits that are compatible with our evolutionary past are the key to optimal health. On the other hand, I do not believe that closely mimicking life in the Paleolithic is optimal for health, or even viable. I am a researcher, software developer, consultant, and college professor. Two of my main areas of research are nonlinear variance-based structural equation modeling, and evolutionary biology as it applies to the study of human-technology interaction. My degrees are in engineering (B.E.E.), computer science (M.S.), and business (Ph.D.). I am interested in the application of science, statistics, and technology to the understanding of human health and behavior. I blog about evolution, health, statistics, and technology. My personal web site contains links to my contact information and freely available articles related to the topics of my blogs: nedkock.com.

Ned Kock on the Web

NedKock.com, Facebook, LinkedIn, Twitter

Books by Ned Kock

Evolutionary Psychology and Information Systems Research: A New Approach to Studying the Effects of Modern Technologies on Human Behavior (Amazon, Springer)

Now, these graphs relate TC with disease and mortality, and say nothing about LDL cholesterol (LDL). In my own experience, and that of many people I know, a TC of about 200 will typically be associated with a slightly elevated LDL (e.g., 110 to 150), even if one has a high HDL cholesterol (i.e., greater than 60).

Yet, most people who have a LDL greater than 100 will be told by their doctors, usually with the best of the intentions, to take statins, so that they can "keep their LDL under control". (LDL levels are usually calculated, not measured directly, which itself creates a whole new set of problems.)

Alas, reducing LDL to 100 or less will typically reduce TC below 200. If we go by the graphs above, especially the one showing the U-curves, these folks' risk for cardiovascular disease and mortality will go up - exactly the opposite effect that they and their doctors expected. And that will cost them financially as well, as statin drugs are expensive, in part to pay for all those TV ads.

Posted by Ned Kock at 5:19 AM

Labels: cardiovascular disease, cholesterol, J curve, research, U curve

11 comments:

deadsunrise said...

Hi Ned, I posted a spanish translation of this article on http://deadsunrise.net/2010/colesterol_y_enfermedad_cardiovascular.html

Hope you don't mind. I state the source with a link at the beginning of the article.

Thanks for the whole blog, it's fascinating.

July 24, 2010 at 8:35 AM

Ned Kock said...

Hi Deadsunrise.

Sure, no problem. Thanks.

July 24, 2010 at 12:53 PM

. said...

Cholesterol, longevity, intelligence, and health. - http://raypeat.com/articles/articles/cholesterol-longevity.shtml

December 11, 2010 at 9:31 PM

Vivek Rau said...

My guess is that one would have to correct this data for smoking and alcohol consumption (at least) before drawing conclusions about cholesterol vs cardiovascular disease. Observe some Islamic countries like Bangladesh and Saudi Arabia on the left of the graph, i.e. lower cholesterol than the U.S. but higher heart disease. The prohibition of alcohol in those countries will definitely have an impact on heart disease rates. Many of the less developed countries have higher rates of smoking and less advanced cardiac care than the U.S., so that will also affect mortality from cardiovascular disease.

January 9, 2011 at 9:48 AM

. said...

Hi Ned. Just to clarify that both those graphs were extracted from my Excel database on cholesterol mortality - http://www.canibaisereis.com/2009/09/19/low-cholesterol-certainly-not-healthy/

January 14, 2011 at 8:22 AM

Ned Kock said...

Thanks Ricardo. I have edited the post, now indicating the original source. As always, thanks much!

January 14, 2011 at 12:33 PM

Viagra Online said...

for a simple lack of information about this a person could save their own life, a father of my best friend die about a year ago, this men needed a normal bypass surgery, but during the operation doctors found that really need a triple baypass, some hours later he die.

April 1, 2011 at 10:59 AM

Ned Clack said...

These data are mainly gathered in populations that eat modern diets. From time to time I read low-carbers talking about trying to get their TC up beyond 200 but does anybody know where the bottom of the U is for people with paleolithic habits?

Compensatory Adaptation: Understanding How Obstacles Can Lead to Success (Amazon, BuyBooksOnTheWeb)

Links to other books by Ned Kock

Books cited in posts

Biochemistry and Molecular Biology

Biological Anthropology

Biology for Bodybuilders

Dawn of Art

Designing Resistance Training Programs

Eve Spoke

Evolution and Human Behavior

Evolutionary Genetics

Exercise Physiology

Ending Aging

Genes in Conflict

Genome

Good Calories, Bad Calories

Grooming, Gossip, and the Evolution of Language

How the Mind Works

Human Universals

Mathematical Models of Social Evolution

Nutrition and Physical Degeneration

On the Origin of Species

Perfect Health Diet

Personality

Physiology of Sport and Exercise

Population Genetics

Population Genetics, Molecular Evolution, and the Neutral Theory

Principles of Population Genetics

Science and Practice of Strength Training

Sugar Nation

The Descent of Man, and Selection in Relation to Sex

The Evolutionary Synthesis

The Genetical Theory of Natural Selection

The God Gene

The Evolution of Desire

The Mating Mind

The Paleo Diet

The Primal Blueprint

The Selfish Gene

Yanomamo

Blogs and sites where Ned comments

Many thanks for your work Ned

June 28, 2011 at 1:43 PM

Matt Stone said...

Sorry I didn't find this earlier. This is awesome Ned!

December 9, 2011 at 2:16 PM

Anonymous said...

Hello,
I wanted to cite the figures you have here in a discussion r.e. cholesterol levels and mortality, but the links you include seem no longer to work, and I can't find the graphs. If you have any suggestions on how to track them down, it would be much appreciated. I don't feel comfortable citing untraceable data.

June 4, 2012 at 8:52 PM

Ned Kock said...

This post is a revised version of a previous post. The original comments are preserved here. More comments welcome, but no spam please!

March 22, 2019 at 5:20 AM

Post a Comment

Newer Post Home Older Post

Subscribe to: Post Comments (Atom)

Animal Pharm

Cooling Inflammation

Evolutionary Psychiatry

Fat Head

Free the Animal

Gnolls

Hunt, Gather, Love

Hyperlipid

Low-Carb for You

Mark's Daily Apple

Michael Barker's Type 2 Ketosis Prone Diabetes

My Carb Sane-Asylum

PaleoHacks

Perfect Health Diet

Primal Wisdom

Protein Power

Ramblings of a Carnivore

Raw Food SOS

That Paleo Guy

The Daily Lipid

The Healthy Skeptic

theNNT

Whole Health Source

Copyright

Acknowledgement

Ned Kock gratefully acknowledges that he regularly consults with the most interesting man in the world, especially in connection with complex scientific matters.

Subscribe to my podcast

Subscribe to my podcast on Odiogo.

Blog Archive

Labels

simmering (1) simple living (1) simplicity (1) skin pigmentation (1) skinny-fat (1) sleep (1) slow-cooking (5) smelts (2) smoking (3) soccer (1) sodium (2) South Korea (1) spirituality (1) standard deviation (2) starch (1) starvation (1) statistics (36) strength training (14) stress (10) stroke (3) sudden cardiac arrest (2) sugars (9) sunbathing (1) supercompensation (5) supernaturalism (1) survival (3) sweet potato (2) telomere (1) tenderloin (1) testosterone (1) The War of the End of the World (1) thermogenesis (3) tired pancreas theory (2) tooth decay (3) tooth decay reversal (1) top sirloin (1) training (4) trans-fats (1) travel (1) triglyceride (6) tripe (1) Trivers (1) tumor necrosis factor-alpha (6) U curve (3) unfiltered coffee (1) UVA (2) UVB (2) VAP test (5) vegetarian (1) very-low-calorie dieting (1) Vilhjalmur Stefansson (1) viral diabetes (1) visceral fat (3) vitamin A (2) vitamin C (1) vitamin D (9) vitamin E (1) vitamin K2 (2) VLCD (1) VLDL (7) waist circumference (1) waist-to-weight ratio (6) Wallace (1) War of Canudos (1) warppls (23) Washington (1) weight loss (3) Weight Watchers (1) wheat (7) white coat hypertension (1) Williams (1) Wilson (1) wireless router (1) Wright (1) X-ray tests (1) Zahavi (1) Zahavian traits (5) Zone (1)