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Letter on Corpulence: One Actuary's Attempt at Carbocide & an Underwriter's View

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27 November 2017

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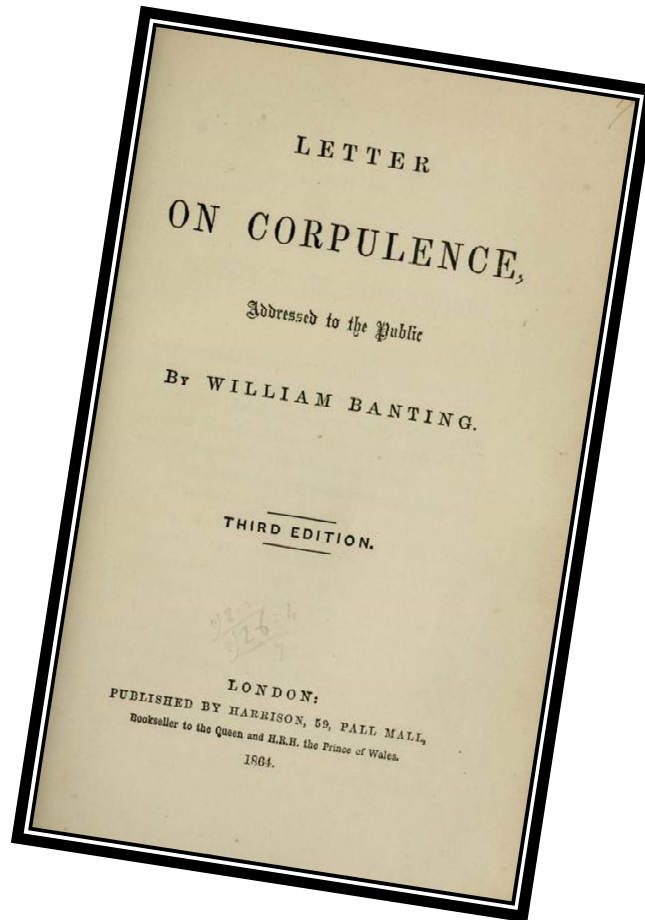
Source: fotolia.com



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“... about 5 feet 5 inches in stature, and, in August last, weighed 202 lbs ... I now weigh 167 lbs, showing a diminution of something like 1 lb, per week since August, ...”

BMI: 33.6 → 27.8

Source: <https://archive.org/details/letteroncorpulen00bant>



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Nutritional Advice Today

27 November 2017

General Wisdom – Last 50 Years



Saturated Fats (butter, lard, milk red meat, coconut oil)



Cholesterol (eggs, poultry, beef, etc.)



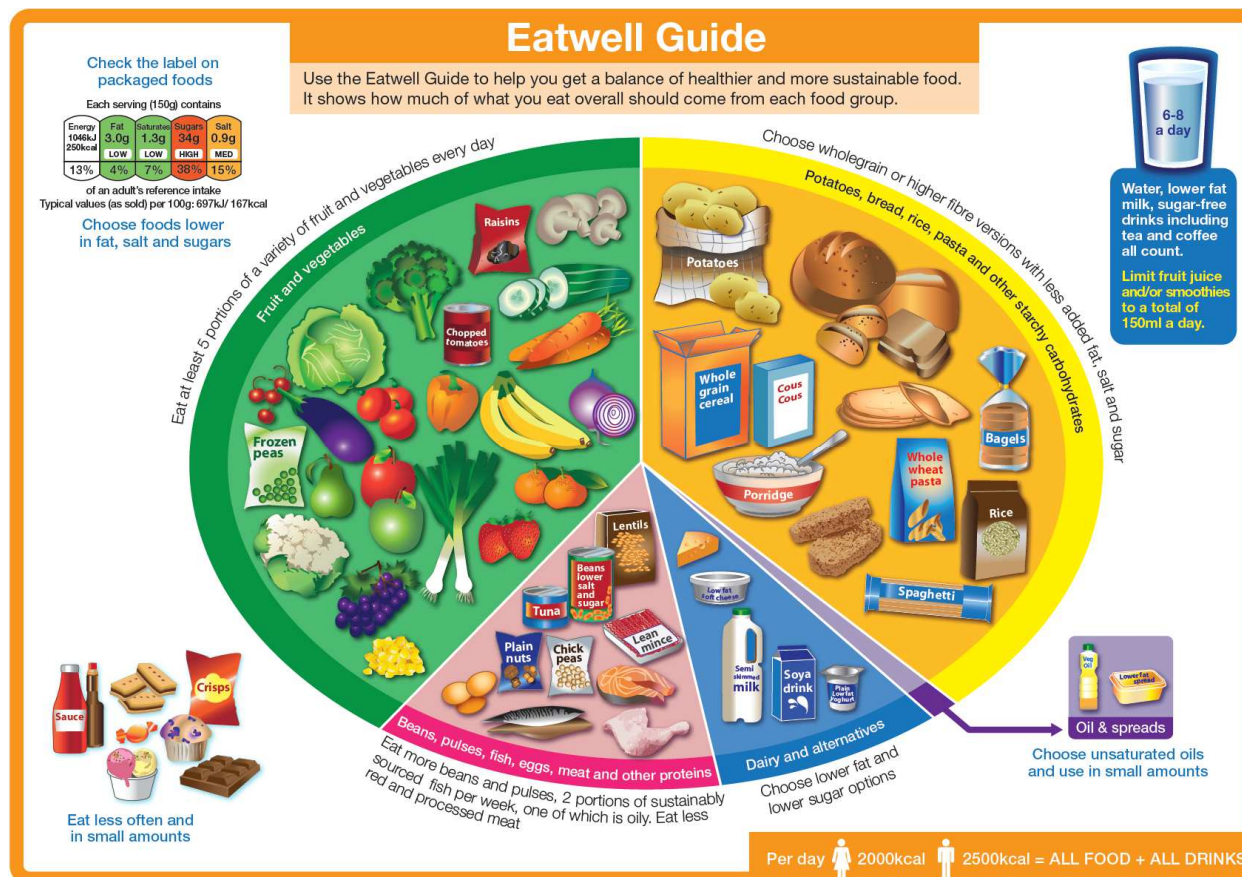
Polyunsaturated Fats (soybean, sunflower, corn, cottonseed oils)



Carbohydrates (pasta, bread, sugar etc.)



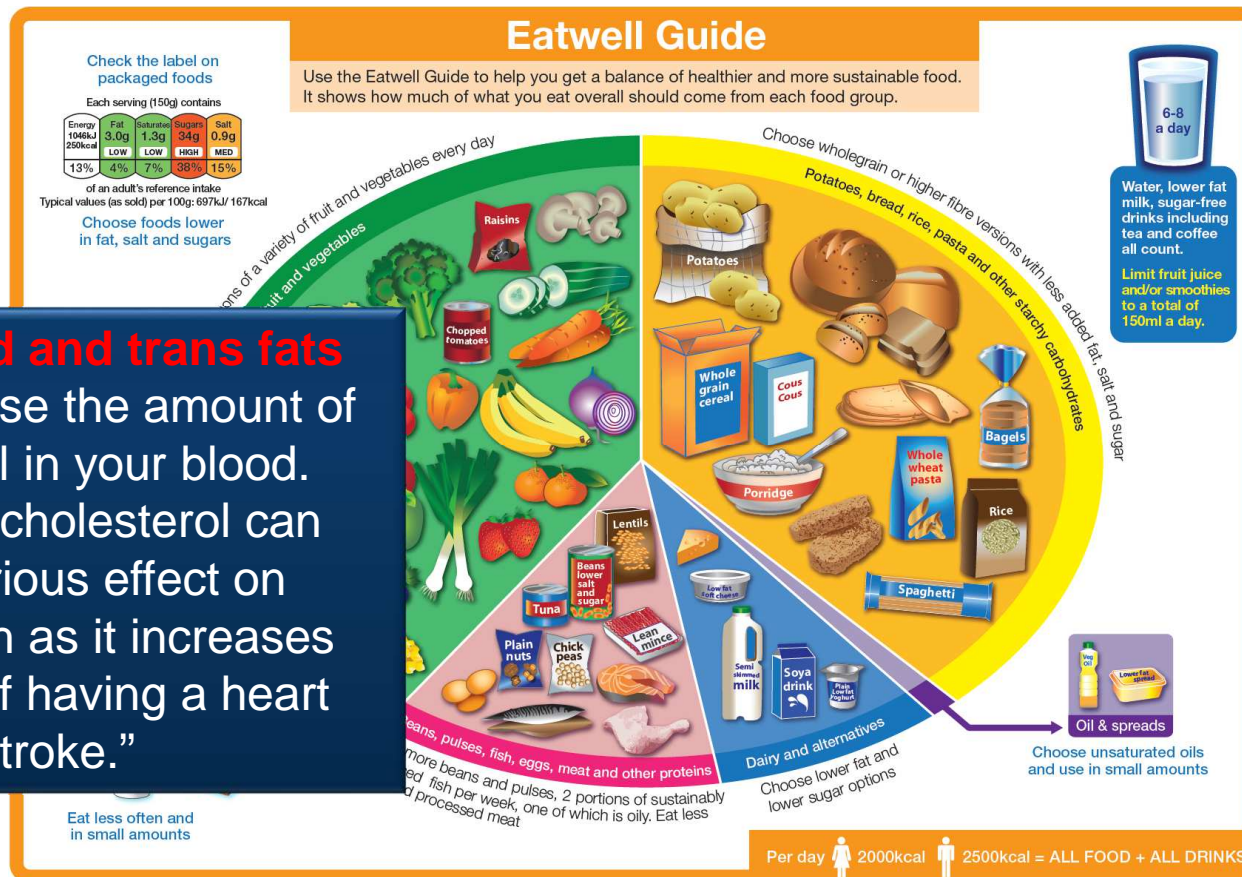
Source: fotolia.com



Source: Public Health England in association with the Welsh Government, Food Standards Scotland and the Food Standards Agency in Northern Ireland



“Saturated and trans fats can increase the amount of cholesterol in your blood. Too much cholesterol can have a serious effect on your health as it increases your risk of having a heart attack or stroke.”



Source: Public Health England in association with the Welsh Government, Food Standards Scotland and the Food Standards Agency in Northern Ireland



Follow a healthy eating pattern over time to help support a healthy body weight and reduce the risk of chronic disease.

A Healthy Eating Pattern Includes:



A Healthy Eating Pattern Limits:



“Consume less than 10 percent of calories per day from **saturated fats**”

Source: Dietary Guidelines for Americans 2015-2020



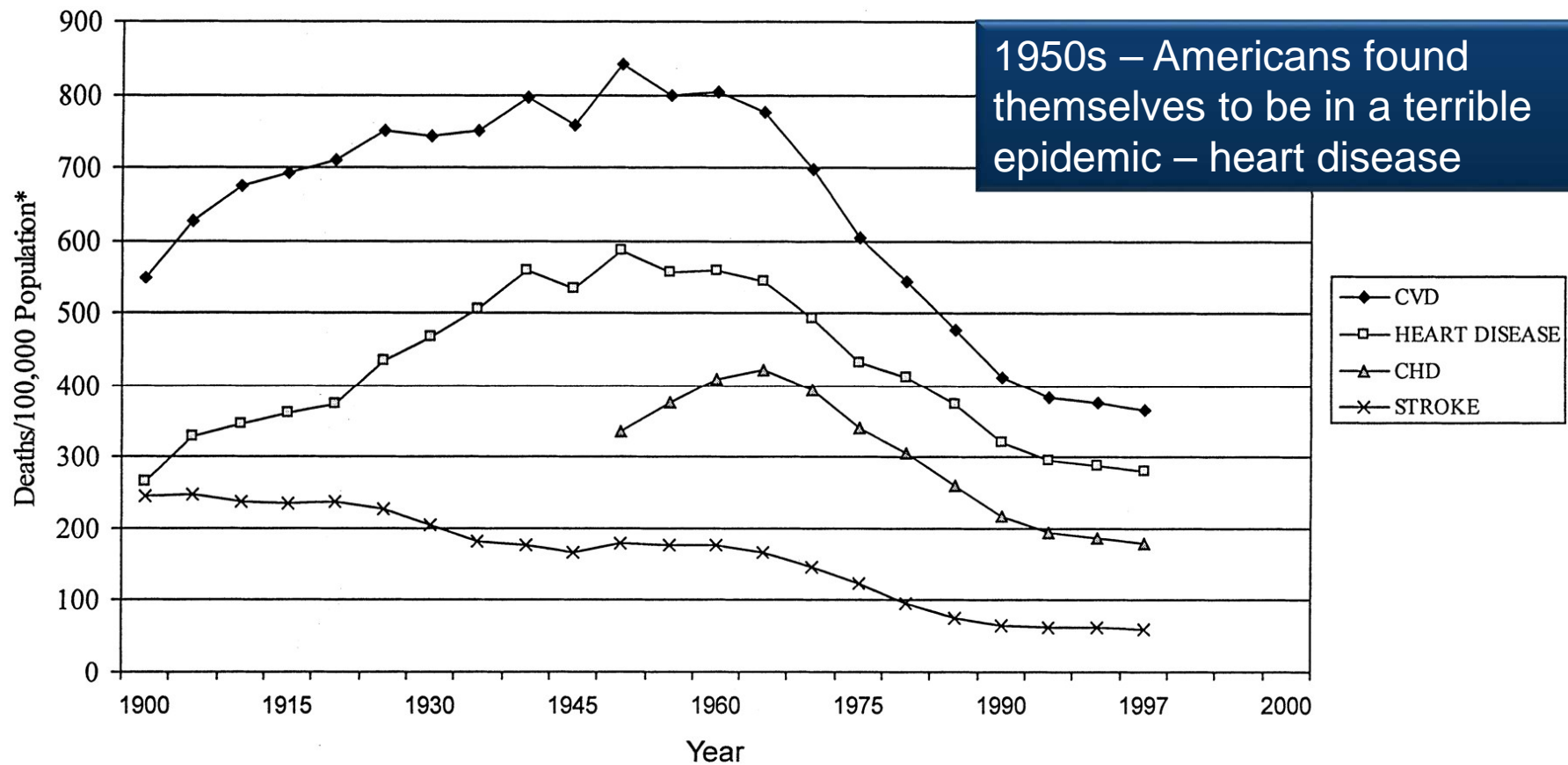
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Why we think Saturated Fat is Unhealthy

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Source: <https://doi.org/10.1161/01.CIR.102.25.3137> Circulation. 2000;102:3137-3147

* Rates are age-adjusted to 2000 standard

Cholesterol

Vital component of every cell membrane, controlling what goes in and out of the cell.

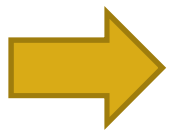
Responsible for the metabolism of sex hormones and is found at its highest concentration in the brain.

Cholesterol

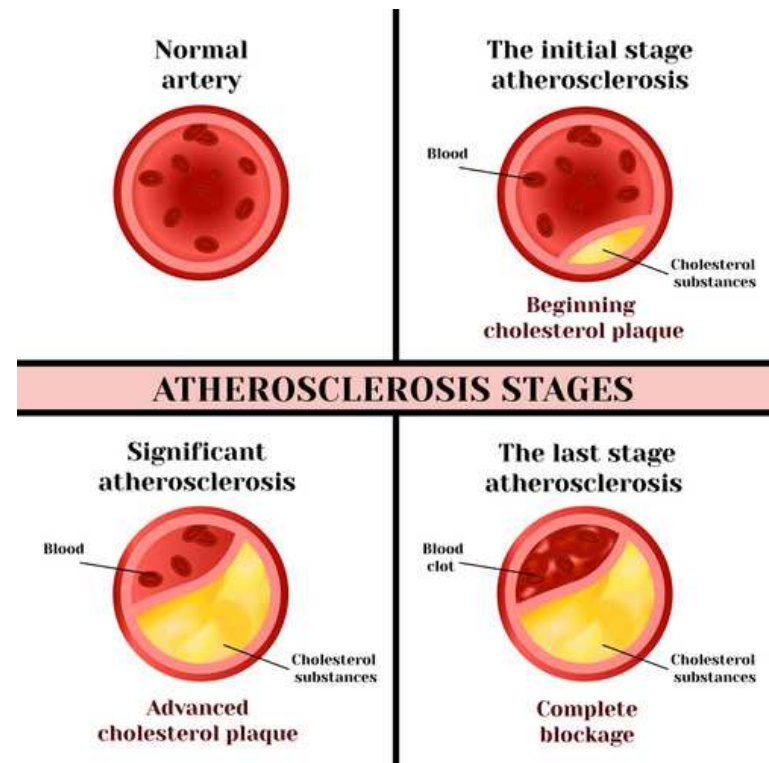
Vital component of every cell membrane, controlling what goes in and out of the cell.

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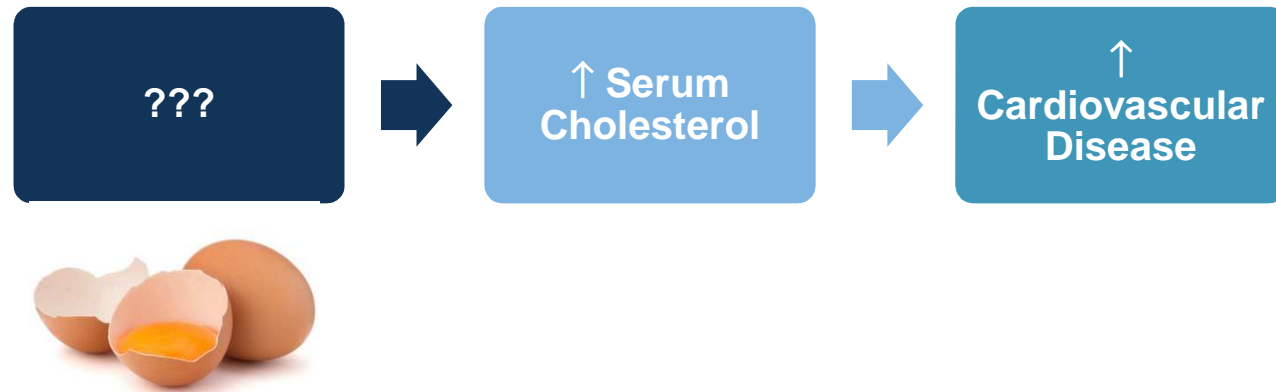
A primary component of atherosclerotic plaques.



A main culprit in the development of coronary disease?



Diet Heart Hypothesis



Source: fotolia.com

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Ancel Benjamin Keys, a physiologist at the University of Minnesota

Inventor of K-Rations and the man who revolutionized the study of heart disease

Synonymous with the Diet Heart Hypothesis and the 7 countries study

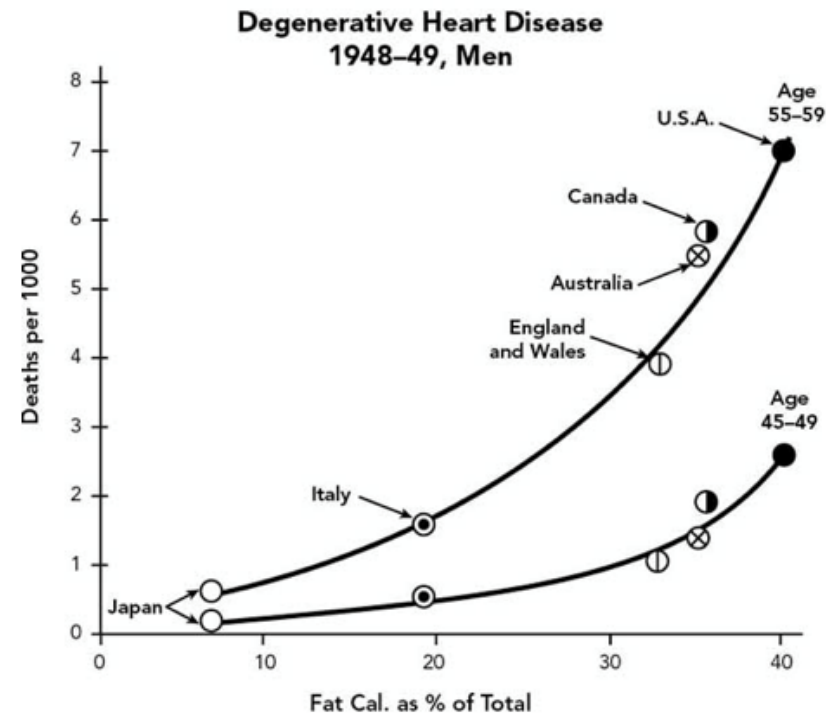
Source: <http://content.time.com/time/covers/0,16641,19610113,00.html>



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The Evidence

Keys's 1952 Chart: Fat Calories vs. Deaths from Degenerative Heart Disease

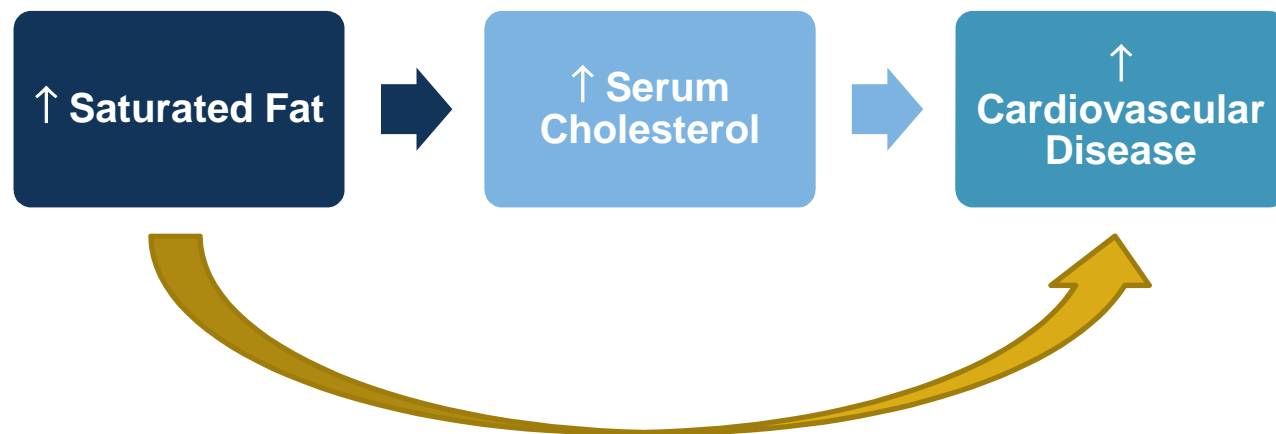


Source: Keys A. Atherosclerosis: a problem in newer public health. J. Mt. Sinai Hosp. N. Y. 1953;20(2):118-39



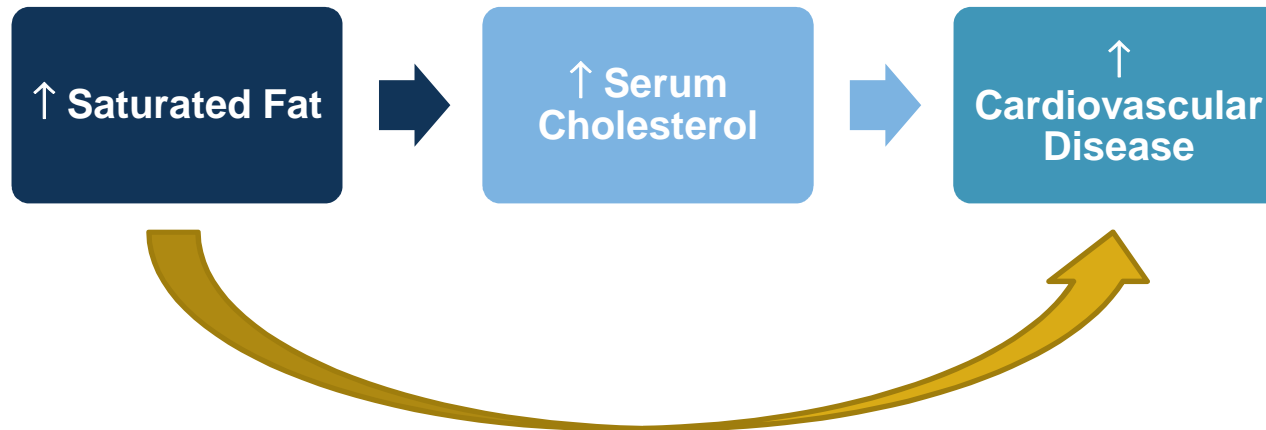
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Diet Heart Hypothesis



Diet Heart Hypothesis

$$\Delta \text{Serum Cholesterol (mmol/l)} \\ = 0.031(2D_{sf} - D_{puf}) + 1.5\sqrt{D_{ch}}$$



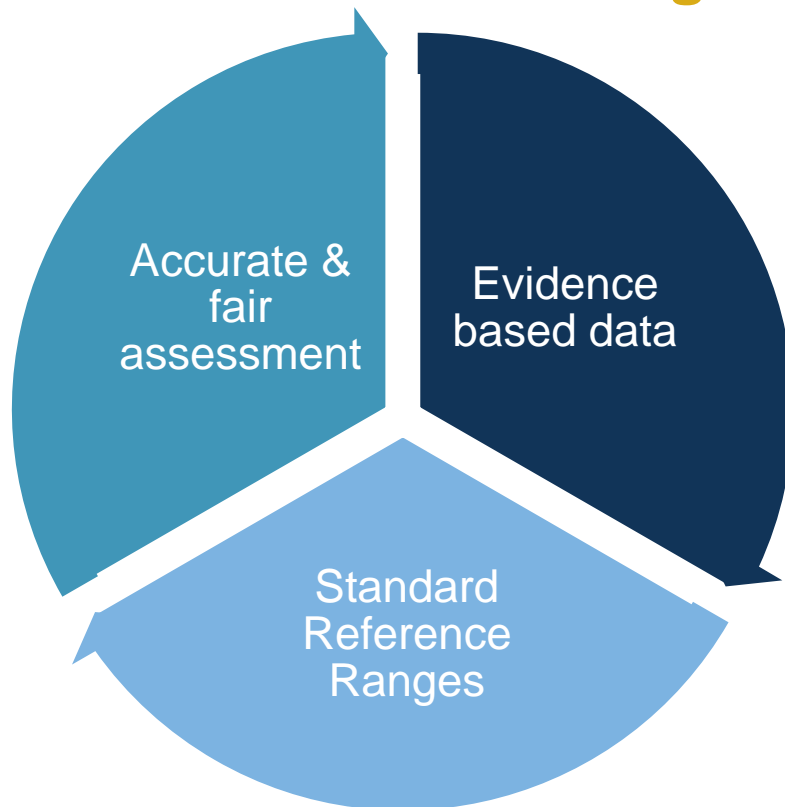


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View of the Insurance Industry

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Medical Underwriting



Cholesterol “Normal” Limits

Total Cholesterol @ <5 mmol/L (<4)

LDL – C @ <3 mmol/L (<2)

HDL – C @ >1 mmol/L

Triglycerides @ <1.7 mmol/L



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The Framingham Study

High total cholesterol was a reliable **predictor for heart disease**.

Solved a problem that had **plagued heart disease research from the start**, namely, that investigators needed **something they could measure to assess heart attack** risk before death.

“blood cholesterol is somehow intimately related to coronary atherosclerosis is no longer subject to reasonable doubt.”



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More Complex

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Fat



Mono-
unsaturated Fats

Poly-unsaturated
Omega-3

Poly-unsaturated
Omega-6



Saturated
Fats

Trans
Fats

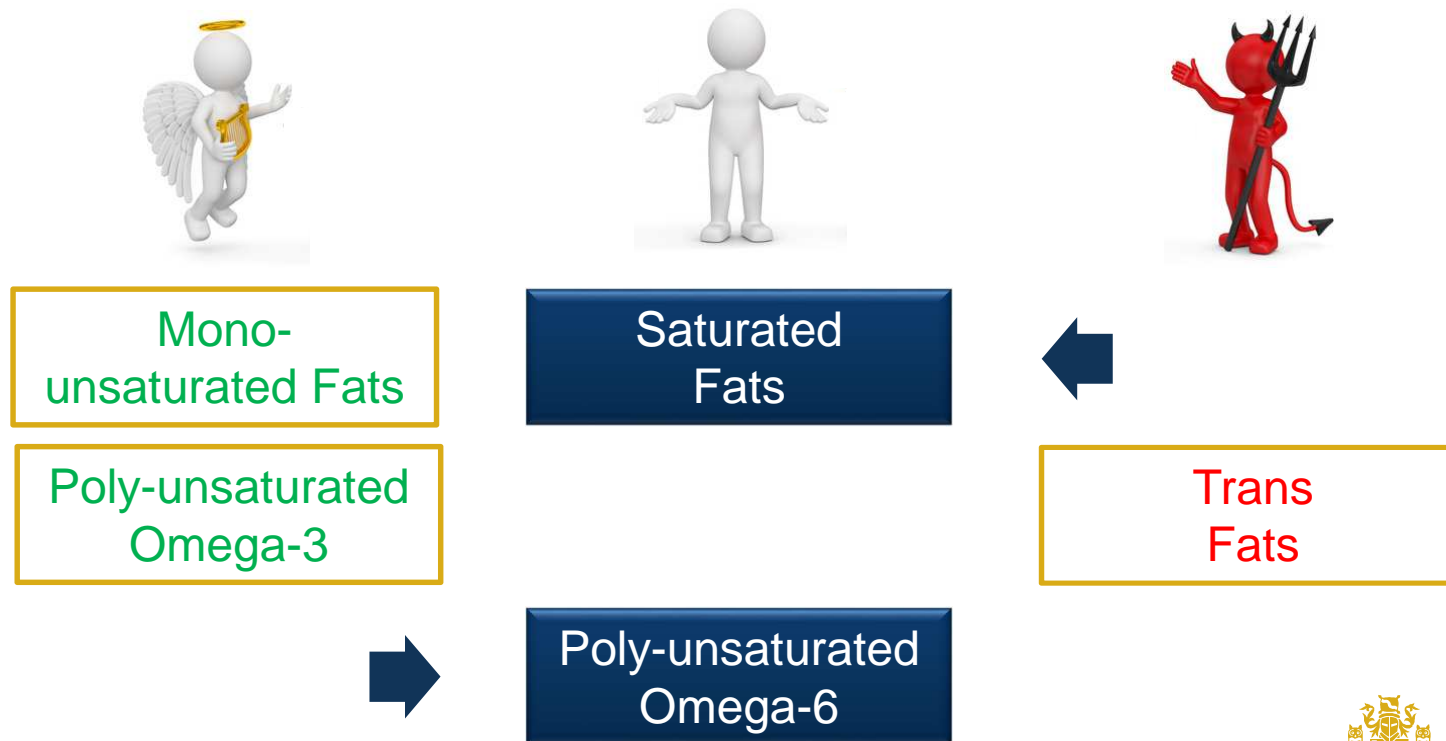
Source: fotolia.com

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Fat



Source: fotolia.com



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Cholesterol



HDL



LDL

High Density Lipoproteins (HDL – C)

High concentrations of blood cholesterol causes CVD
and
Dietary saturated fats cause the raised concentrations of blood cholesterol

Low Density Lipoproteins (LDL – C)

Source: fotolia.com

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Cholesterol



TG /
HDL

Total /
HDL



Size of
LDL
particles



VS



Source: <https://www.medicalnewstoday.com/articles/318712.php>

Insulin Resistance (IR)

Is a pathological condition in which **cells fail to respond normally to** the hormone **insulin....**

When the body produces insulin under conditions of insulin resistance, the **cells are resistant to the insulin** and are unable to use it as effectively, leading to **high blood sugar**.



“INSULIN RESISTANCE SYNDROME”

Source: fotolia.com



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Latest Research

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LDL Research

- 2009 – 137,000 adults with **heart attacks – 75% had low LDL**
- 2016 – *British Medical Journal* – **inverse relationship** between **high LDL and mortality**
- 2017 – *Evidence Based Medicine*, patients with CAD **reduced LDL by 37%, with no reduction in mortality**
- *Fourier* study – **reducing LDL by 60% did not increase life span**

The Framingham Study – follow up

Predictive power of total cholesterol was **not nearly as strong** as study leaders had originally thought

Data also failed to show that **lowering one's cholesterol** over time was even remotely helpful

Cholesterol sub-fractions, which could now be measured and whose predictive powers **showed more promise**

“In Framingham, Mass, **the more saturated fat one ate . . . the lower the person's serum cholesterol . . . and [they] weighed the least,**”

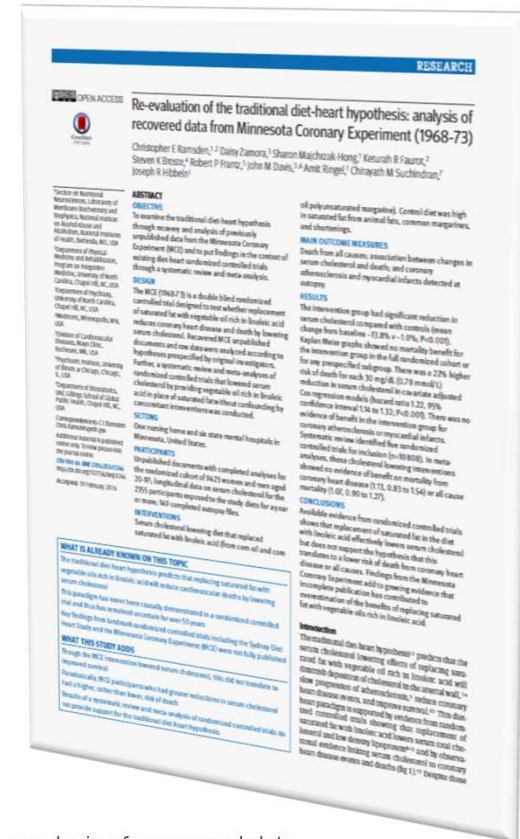


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Minnesota Coronary Experiment

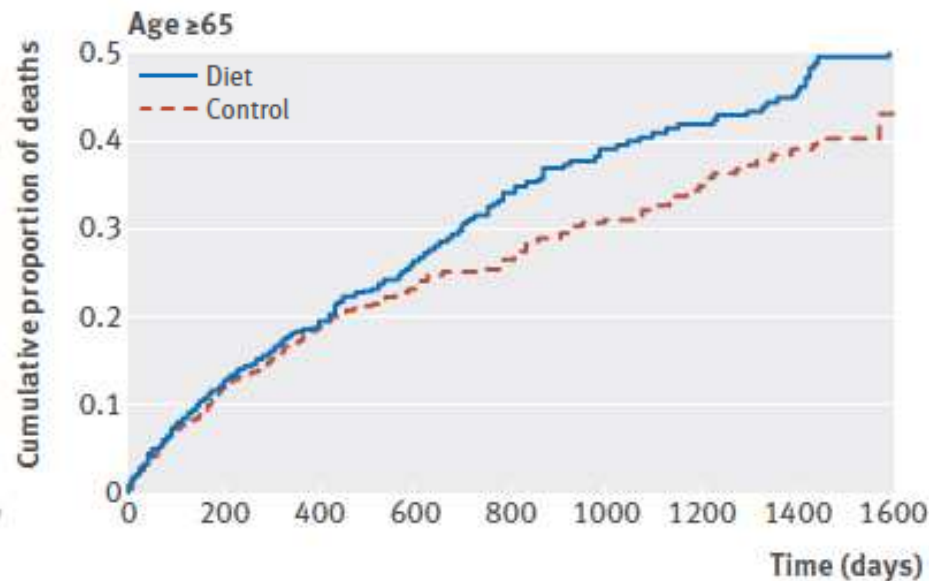
Double blind RCT to test whether replacement of saturated fat with vegetable oil rich in linoleic acid reduces coronary heart disease and death

Trial ran from 1968-1973, but unpublished documents and raw data were recovered in 2016



Source: Ramsden CE, Zamora D, Mutchlak-Hong S, et al. Re-evaluation of the traditional diet-heart hypothesis: analysis of recovered data from Minnesota Coronary Experiment (1968–73). BMJ 2016;353: i1246

Minnesota Coronary Experiment



“Though the MCE intervention **lowered serum cholesterol**, this **did not translate to improved survival**”

“Paradoxically, MCE participants who had **greater reductions in serum cholesterol** had a **higher**, rather than lower, **risk of death**”

Source: Ramsden CE, Zamora D, Majchrzak-Hong S, et al. Re-evaluation of the traditional diet-heart hypothesis: analysis of recovered data from Minnesota Coronary Experiment (1968–73). *BMJ* 2016;353: i1246

Pure Study – Nov 2017

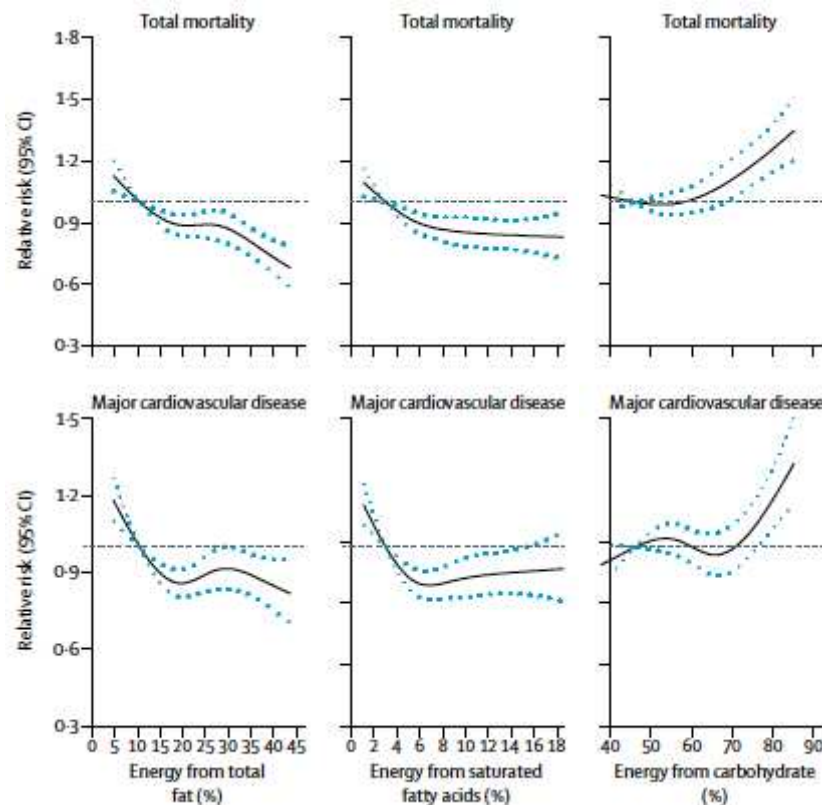
Large epidemiological cohort study of individuals aged 35-70 years over 18 countries

Dietary intake of 135,335 individuals recorded using validated food frequency questionnaires

Assessed associations between consumption of carbohydrate, total fat, and each type of fat with cardiovascular disease and total mortality



Source: The Lancet - Volume 390, No. 10107, p2050–2062, 4 November 2017



“... a **high carbohydrate intake** was associated with an **adverse impact on total mortality**, whereas **fats** including **saturated and unsaturated** fatty acids were associated with **lower risk** of total mortality and stroke.”

“We did not observe any detrimental effect of fat intakes on cardiovascular disease events”

“Global dietary guidelines should be reconsidered ...”

Source: The Lancet - Volume 390, No. 10107, p2050–2062, 4 November 2017

What should the industry be doing?

- Watch this space.....
- Educate the consumer and.....
- Medically assess applicants differently
- New products

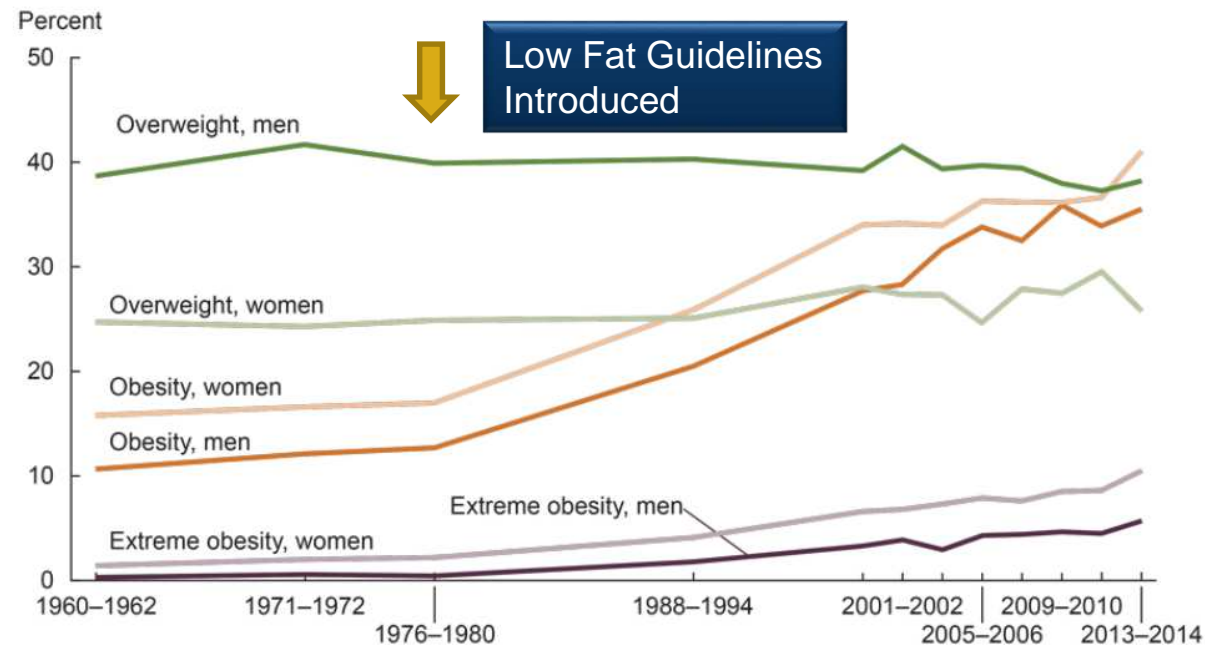


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Personal Carbocide

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Figure. Trends in adult overweight, obesity, and extreme obesity among men and women aged 20–74: United States, 1960–1962 through 2013–2014



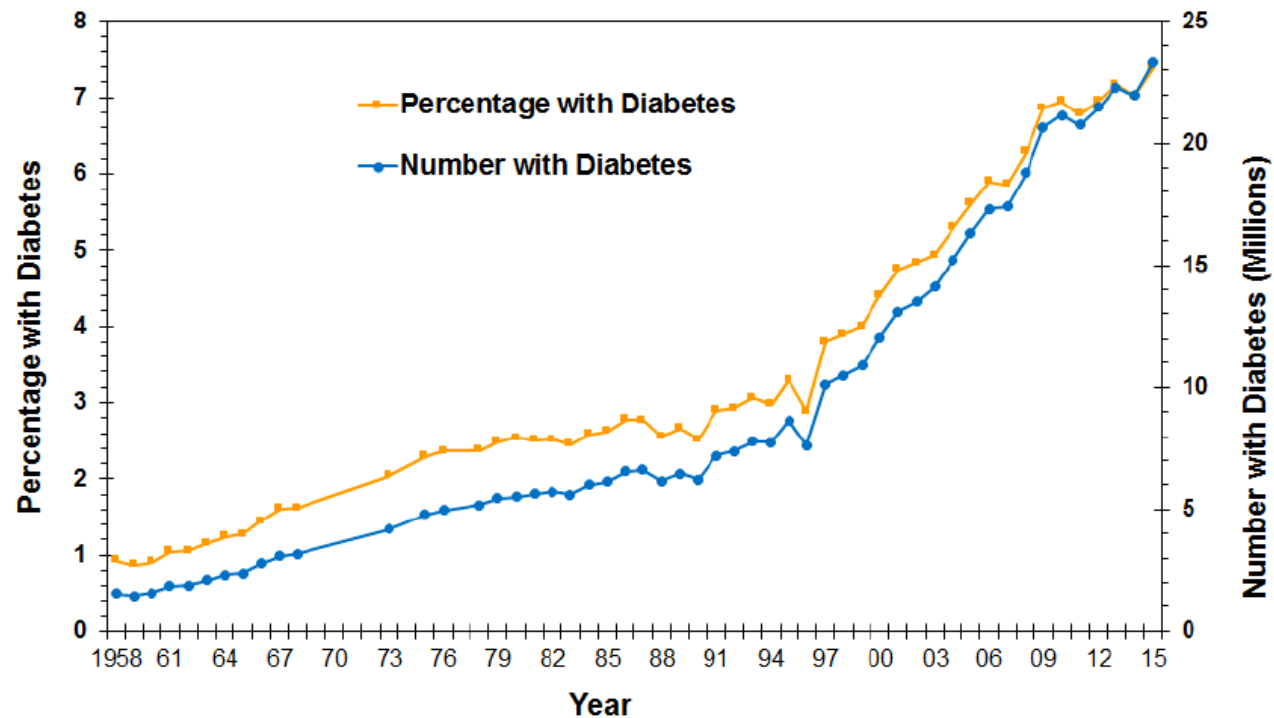
NOTES: Age-adjusted by the direct method to the year 2000 U.S. Census Bureau estimates using age groups 20–39, 40–59, and 60–74. Overweight is body mass index (BMI) of 25 kg/m² or greater but less than 30 kg/m²; obesity is BMI greater than or equal to 30; and extreme obesity is BMI greater than or equal to 40. Pregnant females were excluded from the analysis.
SOURCES: NCHS, National Health Examination Survey and National Health and Nutrition Examination Surveys.

Source: https://www.cdc.gov/nchs/data/hestat/obesity_adult_13_14/obesity_adult_13_14.pdf



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Number and Percentage of U.S. Population with Diagnosed Diabetes, 1958-2015



Source: <http://www.cdc.gov/diabetes/data>



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Banting

Animal protein	Dairy	Fats	Nuts and seeds	Vegetables
Eggs	Cottage cheese	Olive oil	Almonds	All green leafy vegetables, cruciferous vegetables or above ground vegetables
Meats	Cream	Avocados	Flaxseeds	
Poultry	Full-cream	Coconut oil	Macadamia	
Game	Greek Yogurt	Macadamia nut oil	Pecan	
Seafood	Cheeses		Pine nuts	

Source: Noakes TD., Windt J. Evidence that supports the prescription of low-carbohydrate high-fat diets: a narrative review, Br J Sport Med 2016; 51:133-139.

Before and After

May 2011



Dec 2015

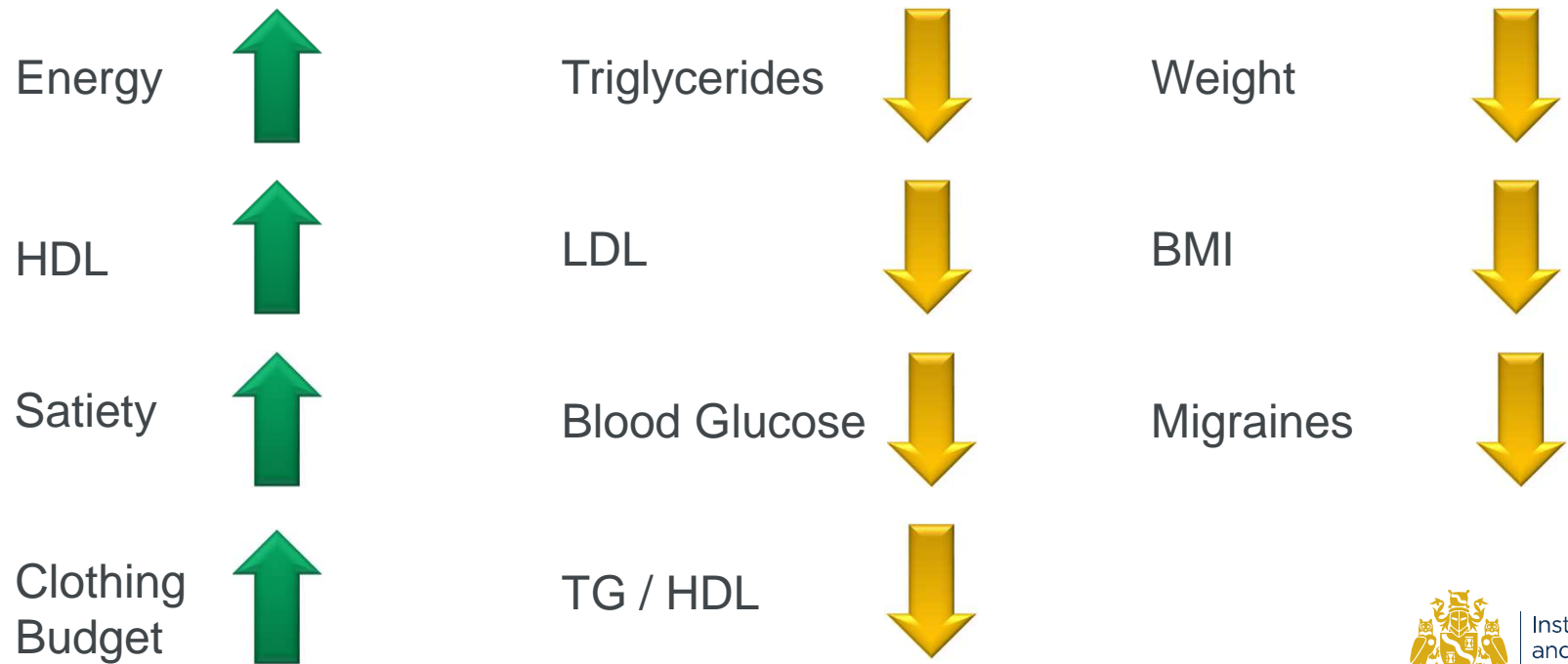


Source: PartnerRe

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Measures

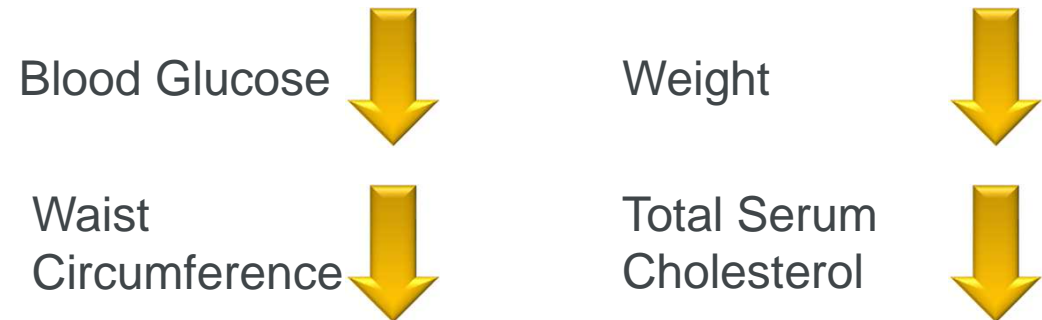


Diabetes Treatment



Dr. David Unwin – Norwood Surgery
Southport

Pilot study exploring the results of a low
carbohydrate diet of 19 type 2 diabetics over
an 8 month period



Source: Practical Diabetes 2014; 31(2): 76–79

View of British Heart Foundation

Saturated fat claims are misleading

26 April 2017 BHF Press Office

Category: **BHF Comment**

Claims made about saturated fat in a recent editorial are unhelpful and misleading.

Clinicians, published in the *British Journal of Sports Medicine*, claimed that the common belief that 'saturated fats clog up arteries' is wrong.

However, the consensus among world-leading researchers is that too much saturated fat can increase the amount of cholesterol in your blood, which can increase your risk of developing **coronary heart disease**.



“... I’m afraid the claims about saturated fat made in this opinion piece are unhelpful and misleading.

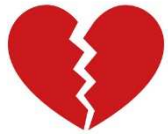
Decades of research have **proved** that a **diet rich in saturated fat** increases ‘bad’ LDL cholesterol in your blood, which **puts you at greater risk of a heart attack or stroke**”

Source: <https://www.bhf.org.uk>
(accessed 30th Oct 2017)



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Final Thoughts



The diet heart hypothesis has **never been proved**

Final Thoughts



The diet heart hypothesis has **never been proved**



Saturated
fats may
increase LDL

Saturated
fats raise
HDL

Final Thoughts



The diet heart hypothesis has **never been proved**



Saturated
fats may
increase LDL

Saturated
fats raise
HDL



No such thing as “good” and “bad” cholesterol.

Size of LDL
particles
matters



Small dense LDL
particles associated
with greater risk

Source: fotolia.com



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Final Thoughts



The diet heart hypothesis has **never been proved**



Saturated
fats may
increase LDL

Saturated
fats raise
HDL

Shifts LDL-C from
small, dense to
large LDL



No such thing as “good” and “bad” cholesterol.

Size of LDL
particles
matters



Small dense LDL
particles associated
with greater risk

Source: fotolia.com



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VERY Final Thought

Homonyms are problematic:

Eat **FAT** so that
you don't get **FAT**

*"The important thing is not to stop questioning.
Curiosity has its own reason for existing"*

Albert Einstein



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Questions

Comments

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Appendix

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Terminology

EPI Epidemiological / Observation Studies

A group of subjects is profiled and investigators watch them over a period of time. Outcomes are then correlated to the variables originally measured. These studies can demonstrate **associations** but **not causations**.

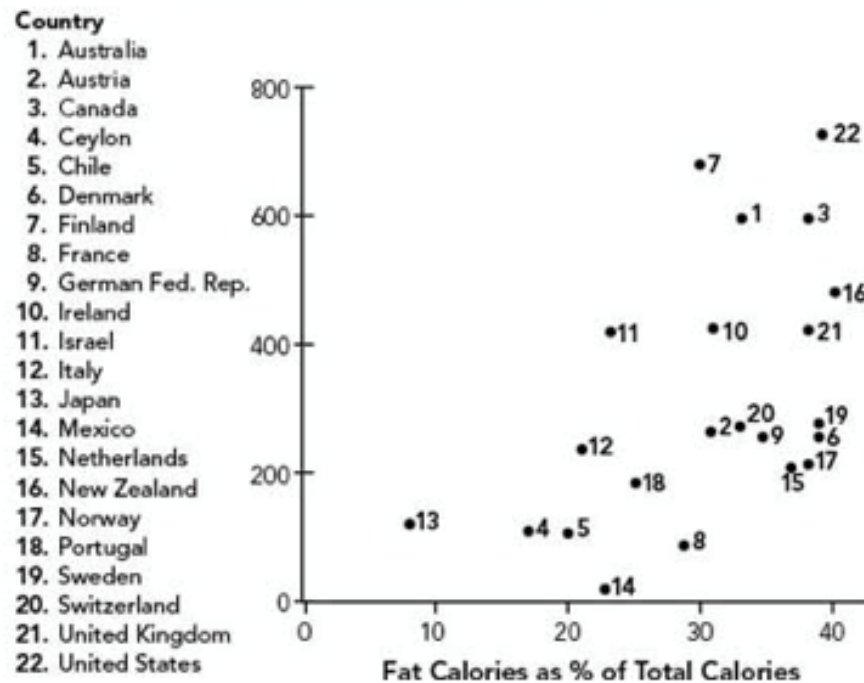
RCT Randomized Control Trial

A study in which the participants are assigned by chance to separate groups; neither the researchers nor the participants can choose which group. The **gold standard** for establishing causal conclusions. Ideally conducted they ensure that the treatment 'causes' the outcome in the experiment.

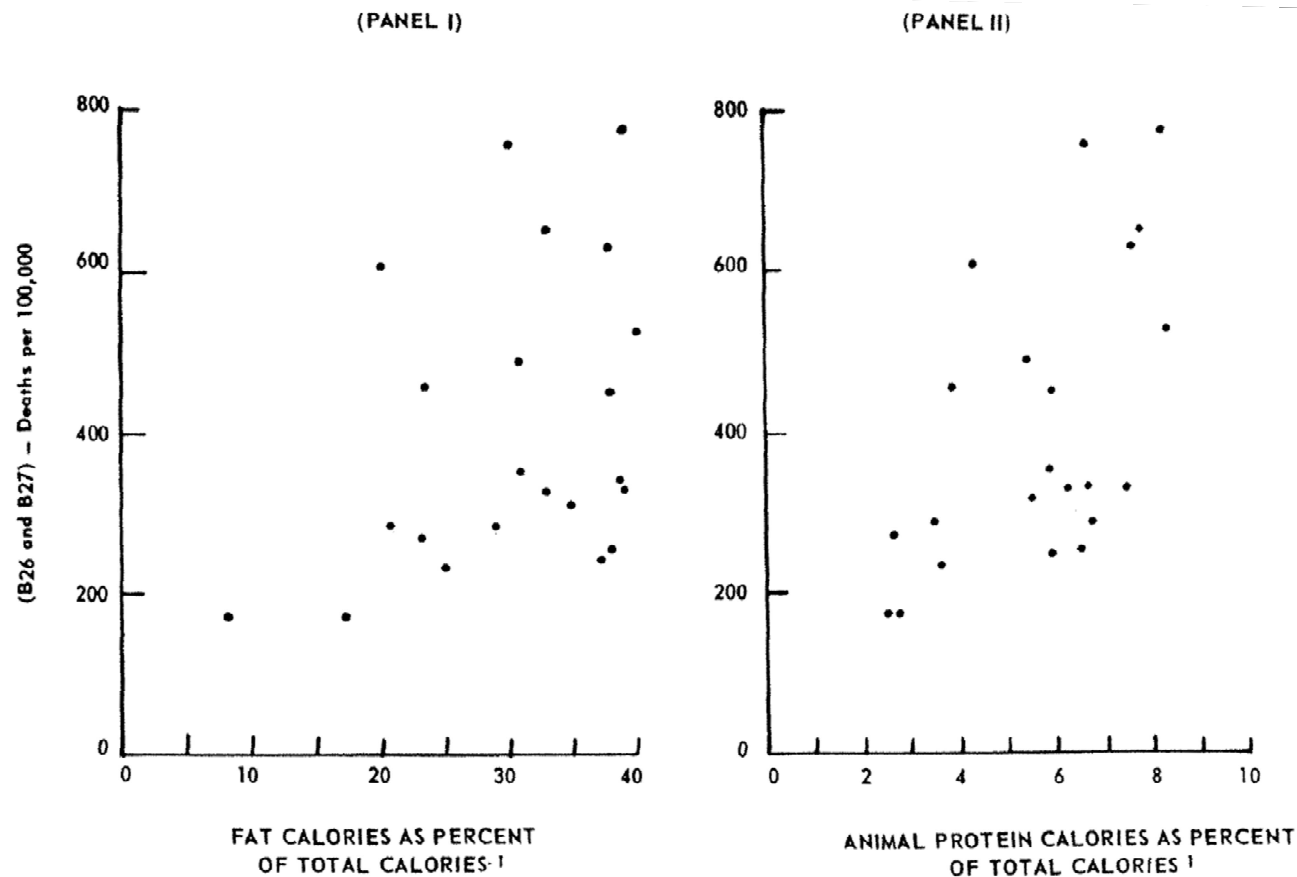


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Mortality from Arteriosclerotic and Degenerative Heart Disease and Percent of Total Calories from Fat – Males age 55–59, 1950



Source: Yerushalmy, J. and Hilleboe, H.E. (1957) Fat in the Diet and Mortality from Heart Disease. A Methodologic Note. New York State Journal of Medicine, 57, 2343-2354.



“... suggested association between national death rates from heart disease and percentage of fat in the diet available for consumption **cannot** at the present time be accepted as valid.”

Source: Yerushalmy, J. and Hilleboe, H.E. (1957) Fat in the Diet and Mortality from Heart Disease. A Methodologic Note. New York State Journal of Medicine, 57, 2343-2354.