

Epidemiological basis of health messages: methods and terms, potentials and restrictions

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Addressing Controversies in Lipid Nutrition and Heart Health

Nutrition research is unique!

The challenge of nutrition research:

- Dietary variables are complex
 - Continuous nature: mostly everyone exposed
 - Intercorrelations
 - Gradual changes over time: eating patterns evolve over the years
- Individuals have limited awareness of their dietary habits
 - measurement of dietary intake is the crucial issue, and often a limitation

Lipid Nutrition and Heart Health

Lipid nutrition



Effects of fatty acids



ENERGY

Fatty acids in the diet

Consequences of changing fats in the diet:

1. Replacement by carbohydrates or proteins
2. Replacement by other fatty acids
3. Weight loss
4. Combination of the above options

Meta-analysis of prospective cohort studies evaluating the association of saturated fat with cardiovascular disease¹⁻⁵

Patty W Siri-Tarino, Qi Sun, Frank B Hu, and Ronald M Krauss

ABSTRACT

Background: A reduction in dietary saturated fat has generally been thought to improve cardiovascular health.

Objective: The objective of this meta-analysis was to summarize the evidence related to the association of dietary saturated fat with risk of coronary heart disease (CHD), stroke, and cardiovascular disease (CVD; CHD inclusive of stroke) in prospective epidemiologic studies.

fat to saturated fat (P:S), a hypothesis supported by a recent pooling analysis conducted by Jakobsen et al (24).

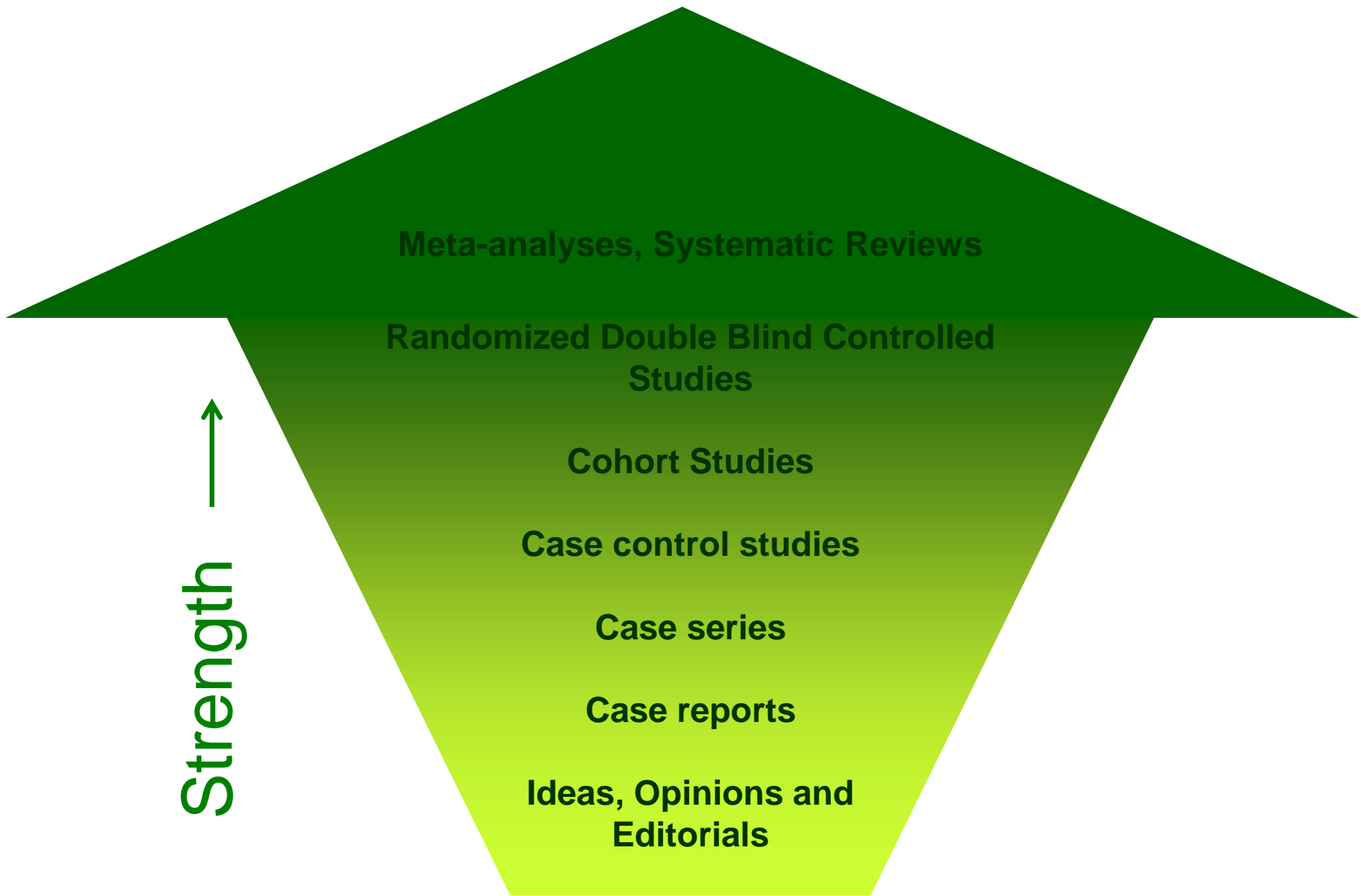
The goal of this study was to conduct a meta-analysis of well-designed prospective epidemiologic studies to estimate the risk of CHD and stroke and a composite risk score for both CHD and stroke, or total cardiovascular disease (CVD), that was associated with increased dietary intakes of saturated fat. Large prospective cohort studies can provide statistical power to adjust for cova-

Conclusions: A meta-analysis of prospective epidemiologic studies showed that there is no significant evidence for concluding that dietary saturated fat is associated with an increased risk of CHD or CVD. More data are needed to elucidate whether CVD risks are likely to be influenced by the specific nutrients used to replace saturated fat. *Am J Clin Nutr* 2010;91:535–46.

The Amc



HIERARCHY OF METHODS



Meta-analyses, Systematic Reviews

Randomized Double Blind Controlled Studies

Cohort Studies

Case control studies

Case series

Case reports

Ideas, Opinions and Editorials

Strength ↑

Pooled and meta-analyses

Combine results of studies:
Pooled estimate



POWER ↑

Pooled versus meta-analysis

Pooled analysis: Combination of individual data of all subjects in all studies

Meta-analysis: Combination of outcomes of studies

Pooled versus meta-analysis

Pooled analysis:

- + Individual data
- + Same statistical procedures
- + Unpublished data may be included
- Not all authors may agree to share data
- Not all outcome measurements similar

Meta-analysis:

- + Summary data from each study
- + Weighing factor
- + /- Published data
- Not all data will fit analysis
- Not all outcome measurements similar

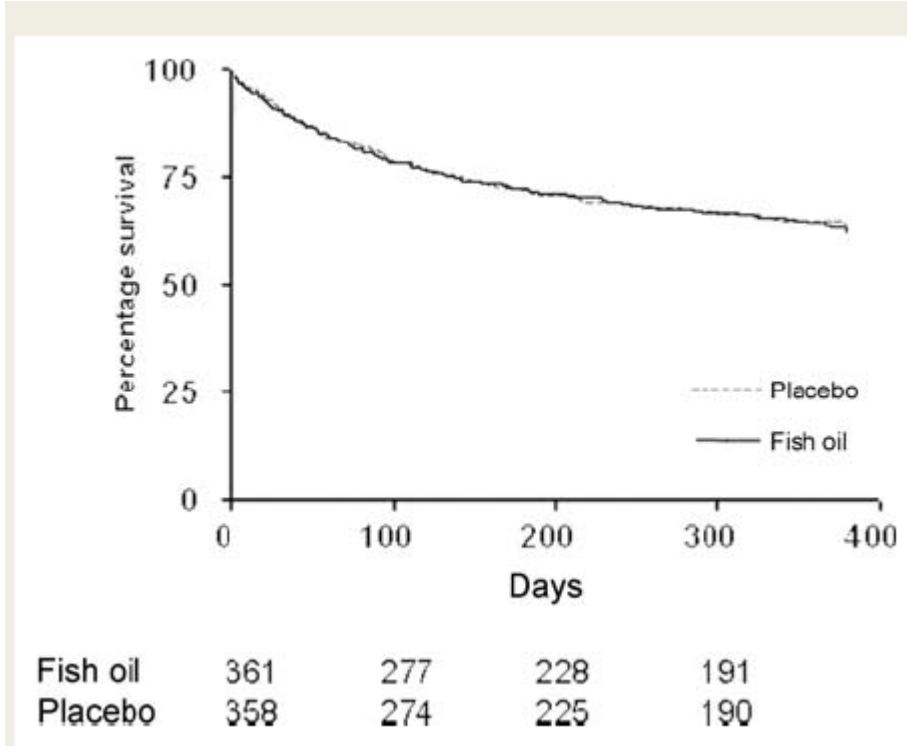
Effect of fish oil on ventricular tachyarrhythmia in three studies in patients with implantable cardioverter defibrillators

Ingeborg A. Brouwer^{1,2*}, Merritt H. Raitt³, Carla Dullemeijer^{1,4}, Dale F. Kraemer^{5,6,7}, Peter L. Zock⁸, Cynthia Morris^{5,6}, Martijn B. Katan², William E. Connor⁹, John A. Camm¹⁰, Evert G. Schouten^{1,4}, and John McAnulty¹¹

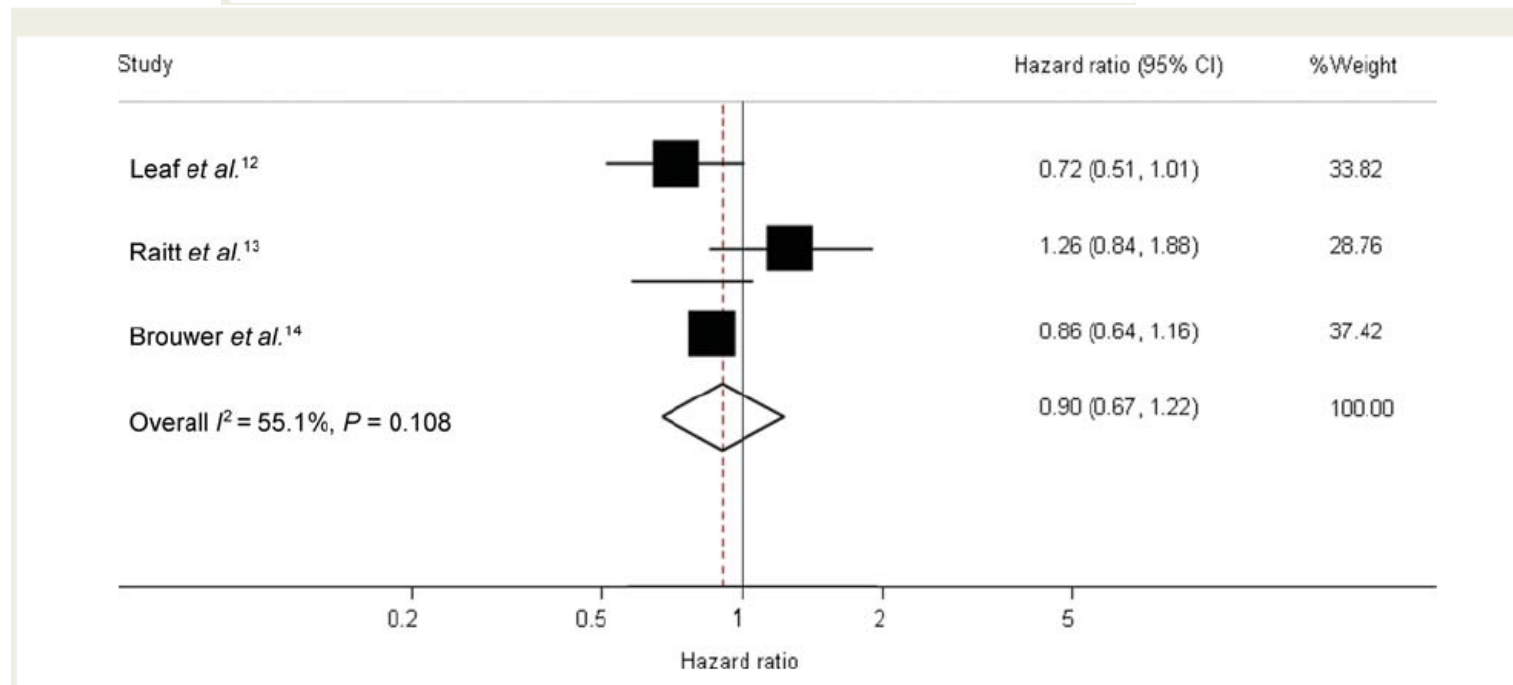
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Pooled:



Meta:

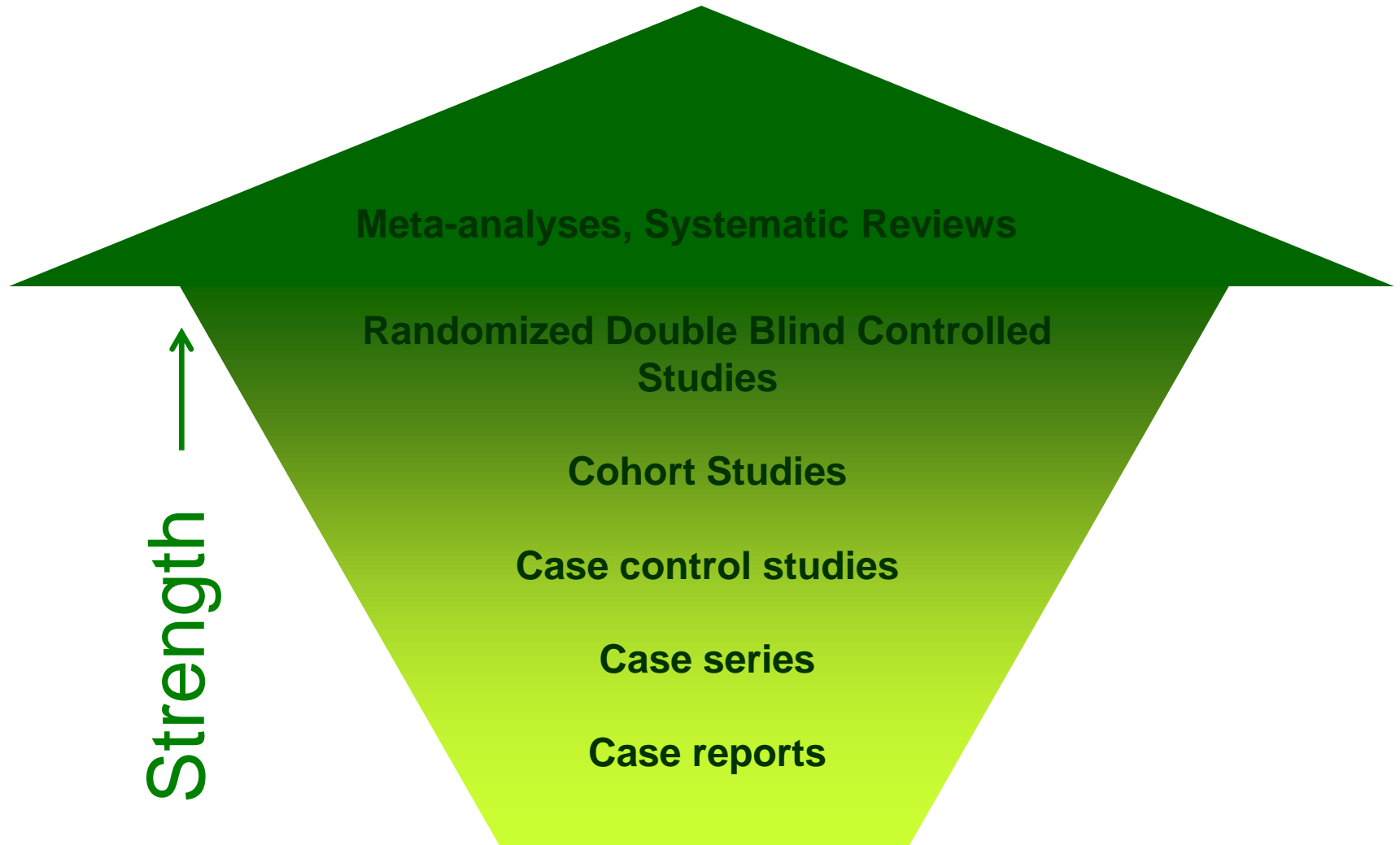


Observation versus Intervention

Observational research: A method of data collection in which the situation of interest is watched and the relevant facts, actions and behaviors are recorded.

Intervention: A comparison of the outcome between two or more groups of patients that are deliberately subjected to different regimes to test a hypothesis

Observation versus Intervention



Observation versus Intervention

Observation:

- + Real life, natural environment
- + Long term
- + Large study groups
- Complex
- No control

Intervention:

- + Actual effect of treatment vs placebo
- + Control
- Shorter term
- No real life / compliance
- Smaller study group

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EFFECT OF DIETARY TRANS FATTY ACIDS ON HIGH-DENSITY AND LOW-DENSITY LIPOPROTEIN CHOLESTEROL LEVELS IN HEALTHY SUBJECTS

RONALD P. MENSINK, PH.D., AND MARTIJN B. KATAN, PH.D.

Abstract. *Background.* Fatty acids that contain a trans double bond are consumed in large amounts as hydrogenated oils, but their effects on serum lipoprotein levels are unknown.

Methods. We placed 34 women (mean age, 26 years) and 25 men (mean age, 25 years) on three mixed natural diets of identical nutrient composition, except that 10 percent of the daily energy intake was provided as oleic acid (which contains one cis double bond), trans isomers of oleic acid, or saturated fatty acids. The three

cholesterol level was 0.17 mmol per liter (7 mg per deciliter) lower than the mean value on the diet high in oleic acid ($P < 0.0001$; 95 percent confidence interval, 0.13 to 0.20 mmol per liter). The HDL cholesterol level on the saturated-fat diet was the same as on the oleic acid diet. The LDL cholesterol level was 0.37 mmol per liter (14 mg per deciliter) higher on the trans-fatty-acid diet than on the oleic acid diet ($P < 0.0001$; 95 percent confidence interval, 0.28 to 0.45 mmol per liter) and 0.47 mmol per liter (18 mg per deciliter) higher on the saturated-fat diet ($P < 0.0001$; 95 percent confidence interval, 0.39 to 0.55 mmol per liter).



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Intake of Fatty Acids and Risk of Coronary Heart Disease in a Cohort of Finnish Men

The Alpha-Tocopherol, Beta-Carotene Cancer Prevention Study

supplement group, several coronary risk factors, total energy, and fiber intake, the authors observed a significant positive association between the intake of *trans*-fatty acids and the risk of coronary death. For men in the top quintile of *trans*-fatty acid intake (median = 6.2 g/day), the multivariate relative risk of coronary death was 1.39 (95% confidence interval (CI) 1.09–1.78) (p for trend = 0.004) as compared with men in the lowest quintile of intake (median = 1.3 g/day). The intake of omega-3 fatty acids from fish was also directly related

Other issues

Intermediate versus hard endpoints

Disease-specific or total mortality

Fatal or non-fatal disease endpoints

Use of composite endpoints

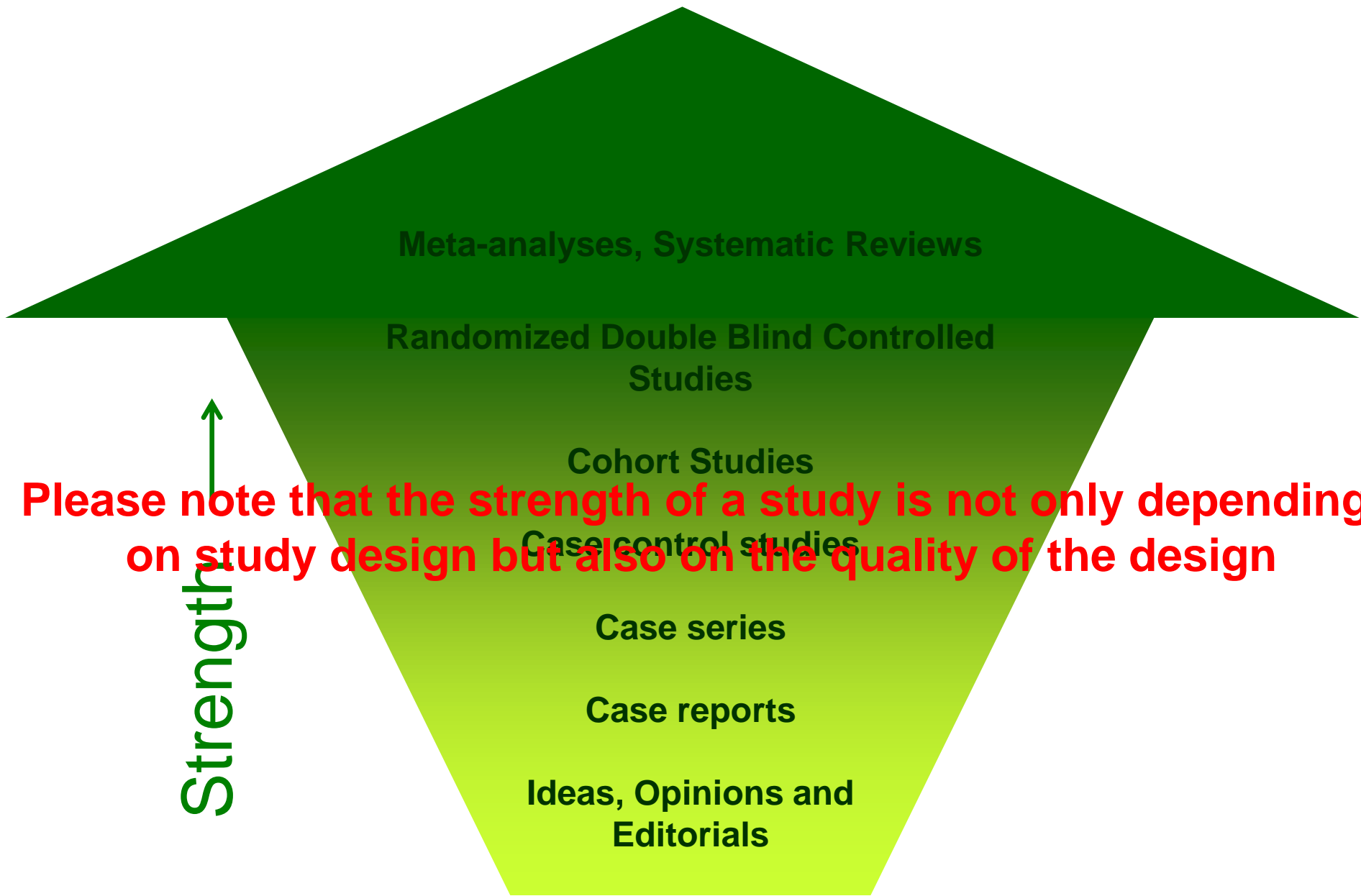
Research

Risks and benefits of omega 3 fats for mortality, cardiovascular disease, and cancer: systematic review

Lee Hooper, Rachel L Thompson, Roger A Harrison, Carolyn D Summerbell, Andy R Ness, Helen J Moore, Helen V Worthington, Paul N Durrington, Julian P T Higgins, Nigel E Capps, Rudolph A Riemersma, Shah B J Ebrahim, George Davey Smith

Conclusion Long chain and shorter chain omega 3 fats do not have a clear effect on total mortality, combined cardiovascular events, or cancer.

1. Use of composite endpoints:
Fatal and non-fatal cardiovascular events were pooled
2. Heterogeneity of the studies:
Different types of (patient) populations were pooled
3. Problems with dietary intake data:
 - Alpha-linolenic acid and omega-3 from fish were pooled
 - Is long-chain omega-3 intake a surrogate marker for fish intake?



Meta-analyses, Systematic Reviews

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Ideas, Opinions and Editorials

Strength ↑

Please note that the strength of a study is not only depending on study design but also on the quality of the design

Thank you