Dr. Jim Painter PhD, RD

University of Texas –Houston, School of Public Health

@DrJimPainter

Speaker Disclosure

Board Member/Advisory Panel/Consultant

- **Present**
  - Chick-fil-A, Sun-Maid Raisins, National Dairy Council, Tree Top Apples, Bush's Beans, United Sorghum Checkoff Board.
- **Past**
  - American Heart Association Eat Well Task Force, California Raisin Marketing Board, Wonderful Pistachios, White Wave Foods, Davidson's Safest Choi [illegible]
- **Honoraria**
  - Honorarium underwritten by American Dairy Association –Indiana
  - Dietitians of Canada, Exxon Mobil, Frito Lay, Midwest Dairy Council, Pennsylvania Nutrition Network, California Raisin Marketing Board, Alaska Tanker Company, Dairy Max, Texas AND, California AND, Florida AND, MINK, NY AND, South Carolina AND, Iowa AND, Nebraska AND, Manitoba Dairy Farmers, Dairy Farmers of Canada, Davidsons Safest Choice Eggs, National Dairy Council, New Products Conference, the Flavor Experience, BNP Media, and Cooper Vision.

Speaker Credentials

Take Home Messages for Heart Health

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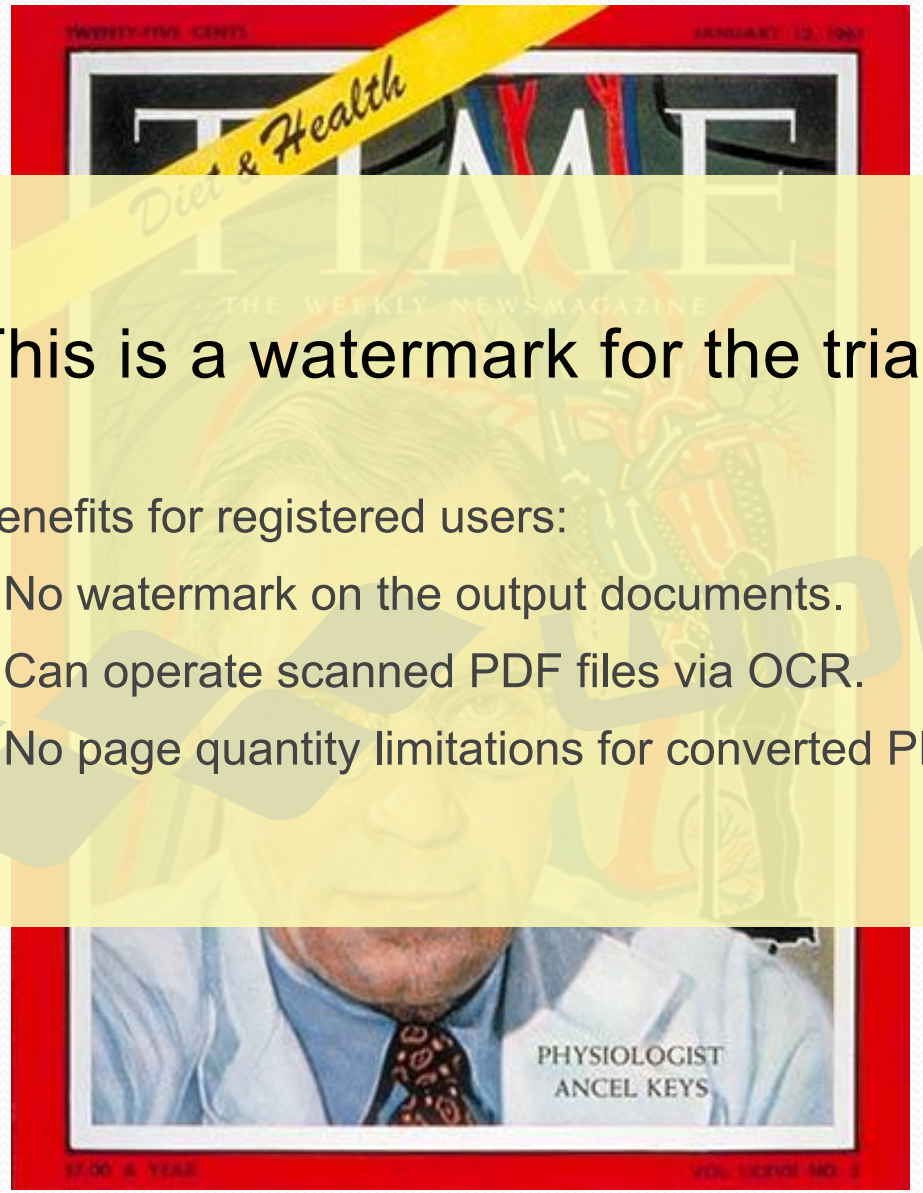
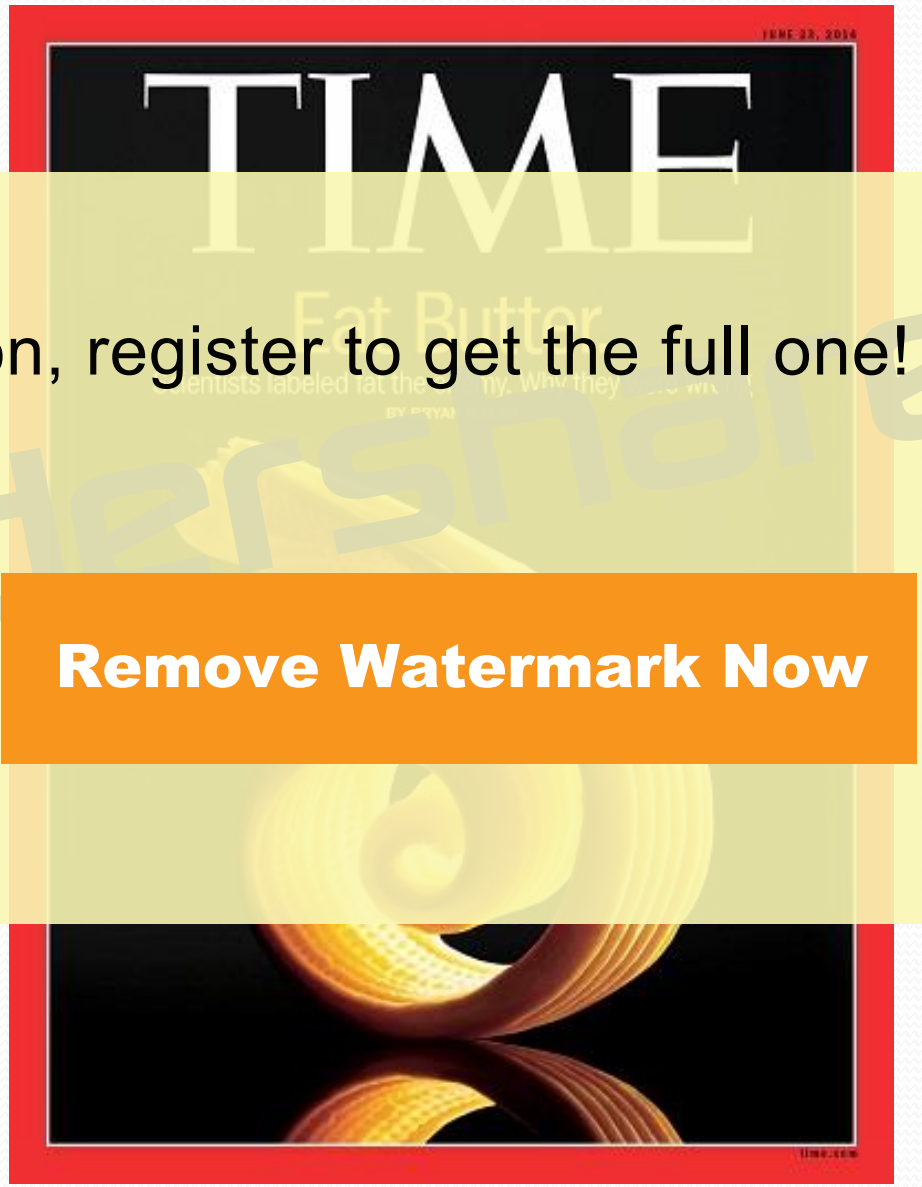
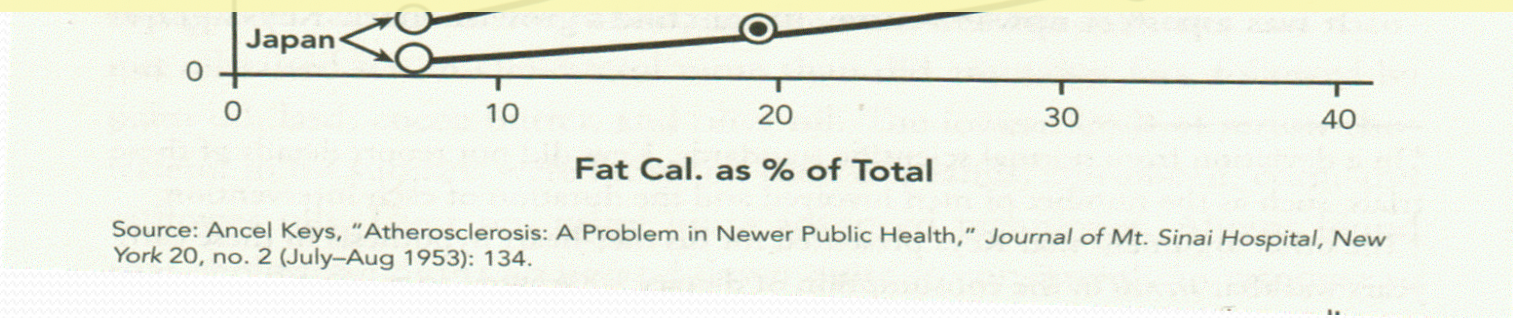


January 1963



June 2014

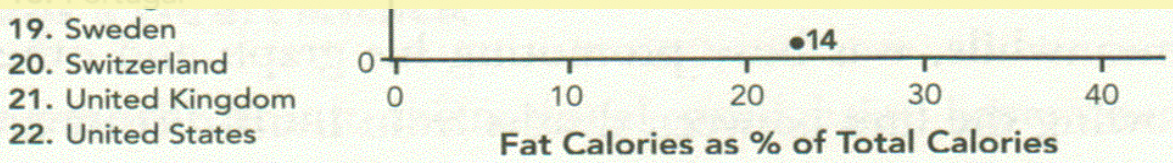
Keys's 1952 Chart:
Fat Calories vs. Deaths from Degenerative Heart Disease



Source: Ancel Keys, "Atherosclerosis: A Problem in Newer Public Health," *Journal of Mt. Sinai Hospital, New York* 20, no. 2 (July–Aug 1953): 134.

Yerushalmy and Hilleboe: Data from Twenty-Two Countries

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



Source: Yerushalmy, J. and Herman E. Hilleboe, "Fat in the Diet and Mortality from Heart Disease: A Methodologic Note," *New York State Journal of Medicine* 57, no. 14 (July 1957): 2346.

The Seven Countries Study is the cornerstone of current cholesterol and fat recommendations and official government policies

Key data was taken from countries--- the focus on countries that supported his hypothesis

Bowden, J., & Sinatra, S. (2012). *The Great Cholesterol Myth*. Beverly, MA: Fair Winds Press.

British physician Malcolm Kendrick used same data available to Keys and discovered that by choosing different countries you can prove an inverse relationship

What we know about dietary fat has changed

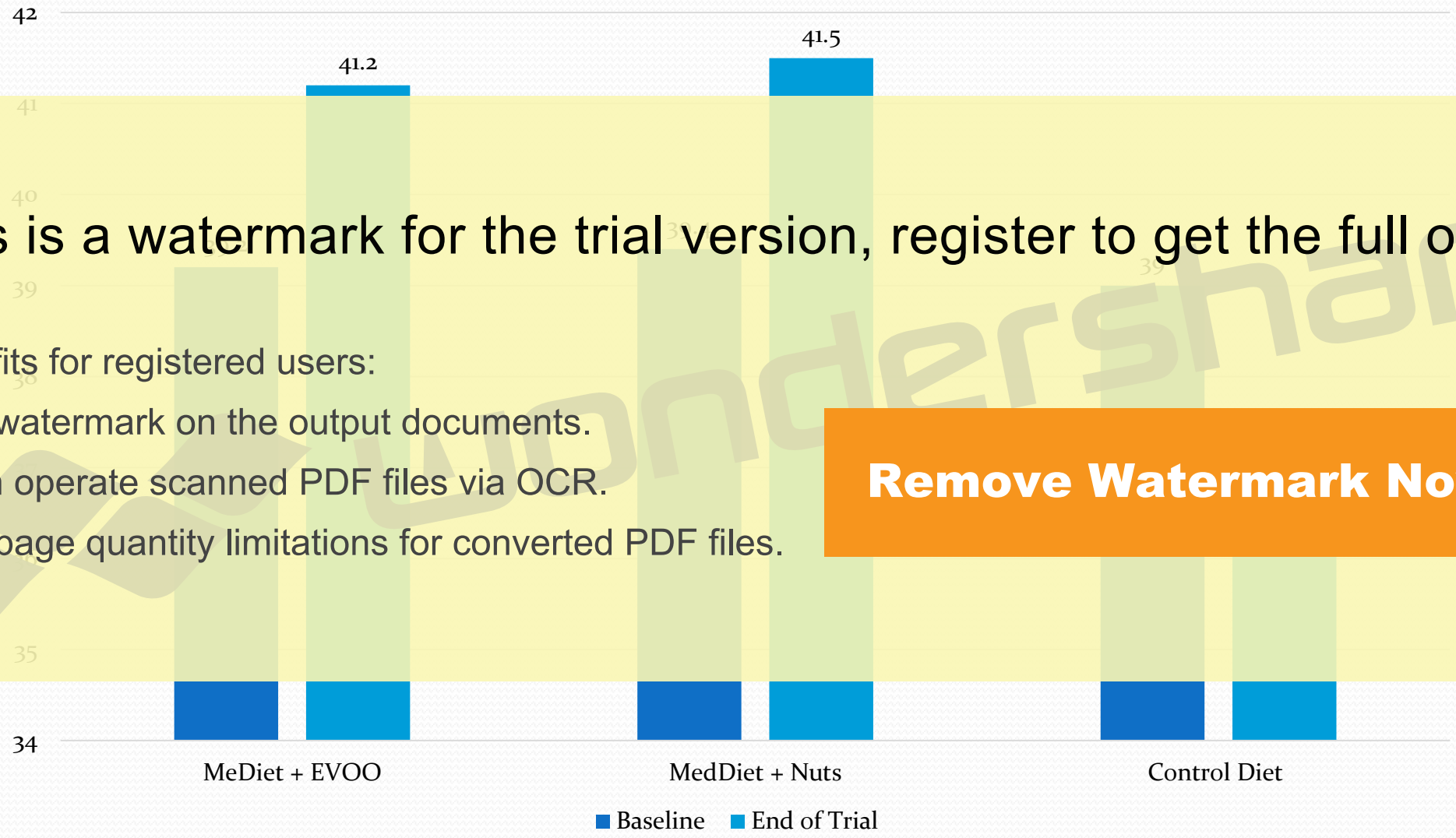
The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 APRIL 4, 2013

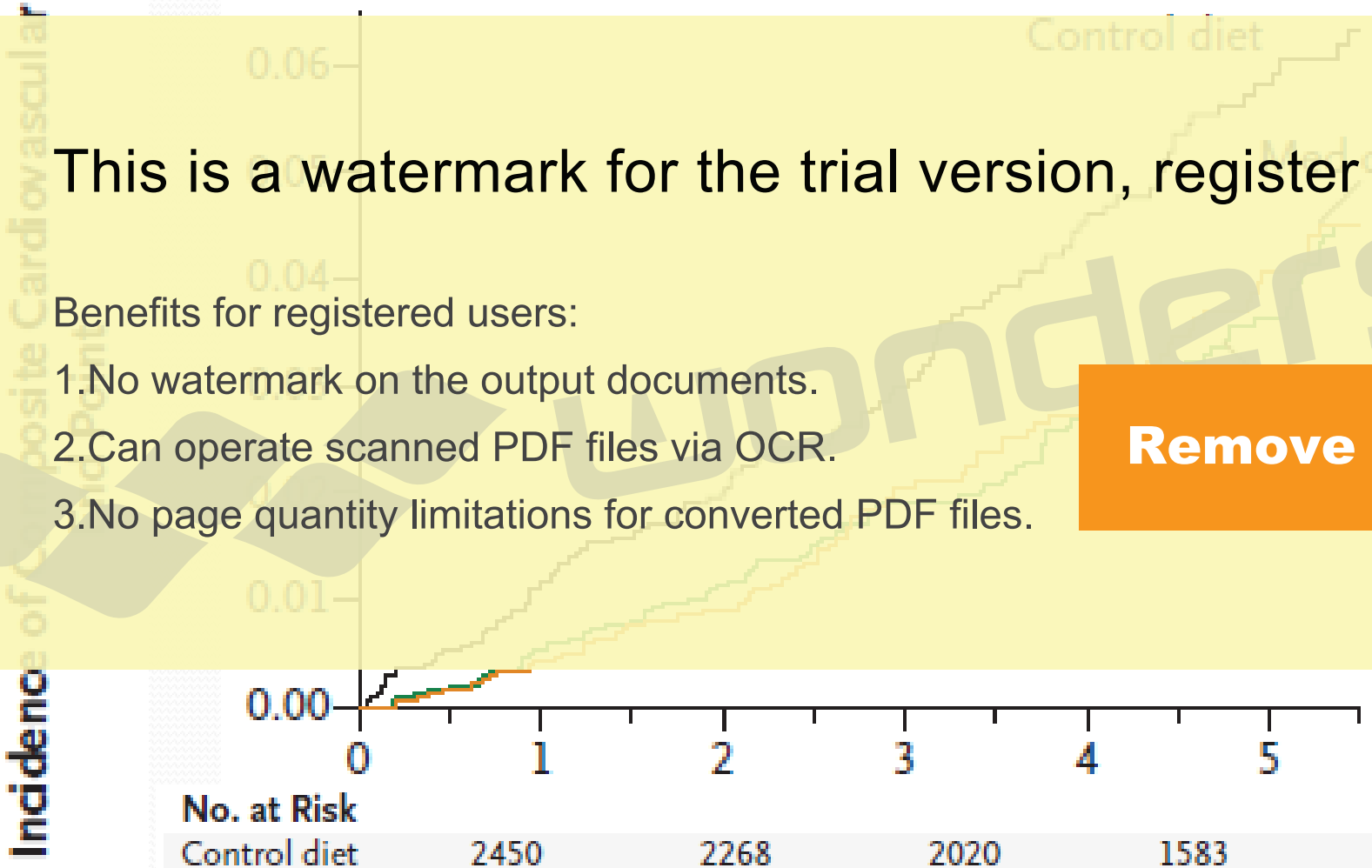
Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

Ramón Estruch, M.D., Ph.D., Emilio Ros, M.D., Ph.D., Jordi Salas-Salvadó, M.D., Ph.D., Maria-Isabel Covas, D.Pharm., Ph.D., Dolores Corella, D.Pharm., Ph.D., Fernando Arós, M.D., Ph.D., Enrique Gómez-Gracia, M.D., Ph.D., Valentina Ruiz-Gutiérrez, Ph.D., Miquel Fiol, M.D., Ph.D., José Lapetra, M.D., Ph.D., Rosa Maria Lamuela-Raventos, D.Pharm., Ph.D., Lluís Serra-Majem, M.D., Ph.D., Xavier Pintó, M.D., Ph.D., Josep Basora, M.D., Ph.D., Miguel Angel Muñoz, M.D., Ph.D., José V. Sorlí, M.D., Ph.D., José Alfredo Martínez, D.Pharm., M.D., Ph.D., and Miguel Angel Martínez-González, M.D., Ph.D., for the PREDIMED Study Investigators*

Intake of Energy



Primary End Point (Acute Myocardial Infarction, Stroke, or Death from Cardiovascular Causes)



No. at Risk						
Control diet	2450	2268	2020	1583	1268	946
Med diet, EVOO	2543	2486	2320	1987	1687	1310
Med diet, nuts	2454	2343	2093	1657	1389	1031

Review | Journal of INTERNAL MEDICINE

doi: 10.1111/j.1365-2796.2012.02553.x

Dietary fats and coronary heart disease

W. C. Willett

From the Department of Nutrition, Harvard School of Public Health, Boston, MA, USA

Abstract Willett WC (Harvard School of Public Health, Boston, MA, USA) Dietary fats and coronary heart disease (Review) *J Intern Med* 2012; **272**: 13–24

There is a large body of evidence indicating that specific dietary fatty acids play important roles in the cause and the prevention of CHD, but total fat as a percent of energy is unimportant. *Trans* fatty acids from partially hydrogenated vegetable oils have clear adverse effects and should be eliminated. Modest reductions in CHD rates by further decreases in saturated fat are possible if saturated fat is replaced by a combination of poly- and monounsaturated fat. However, little or no benefit is apparent if saturated fat is replaced by carbohydrates such as plasma glucose and triglyceride concentrations are not useful and can be misleading. In practice, reducing red meat and dairy products in a food supply and increasing intakes of nuts, fish, soy products and nonhydrogenated vegetable oils will improve the mix of fatty acids and have a markedly beneficial effect on rates of CHD.

Keywords: coronary heart disease, trans fat, saturated fat, polyunsaturated fat, monounsaturated fat, blood cholesterol.

The Snackwell Phenomenon

Food companies rushed to create low-fat versions of all foods and market it as "heart healthy"

Butter was replaced with margarine which is high in trans fat!

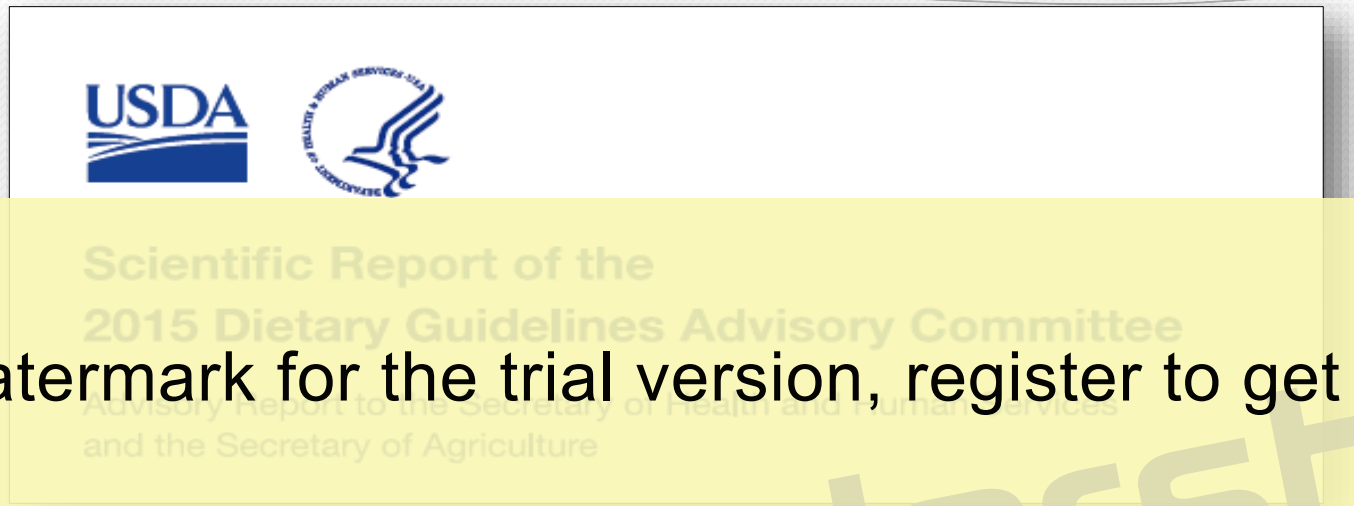
Vegetable oils were aggressively promoted as a healthy alternative to saturated fat most vegetable oils are highly processed, pro-inflammatory, and easily damaged when reheated repeatedly

Bowden, J., & Sinatra, S. (2012). *The Great Cholesterol Myth*. Beverly, MA: Fair Winds Press.

II.) Dietary Cholesterol

- Relatively unimportant

- Don't focus here



Cholesterol. Previously, the Dietary Guidelines for Americans recommended that cholesterol intake be limited to no more than 300 mg/day. The 2015 DGAC will not bring forward this recommendation because available evidence shows no appreciable relationship between consumption of dietary cholesterol and serum cholesterol, consistent with the conclusions of the AHA/ACC report.[2, 35] Cholesterol is not a nutrient of concern for overconsumption.

2015-2020 DGAs for Americans

Style Eating Pattern contains approximately 100 to 300 mg of cholesterol across the 12 calorie levels. Current average intake of dietary cholesterol among those 1 year and older in the United States is approximately 270 mg per day.

Dietary Reference Intakes (DRIs): Additional Macronutrient Recommendations

Food and Nutrition Board, Institute of Medicine, National Academies

Macronutrient	Recommendation
Dietary cholesterol	As low as possible while consuming a nutritionally adequate diet
Trans fatty acids	As low as possible while consuming a nutritionally adequate diet
Saturated fatty acids	As low as possible while consuming a nutritionally adequate diet
[illegible]	[illegible]

SOURCE: *Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids* (2002/2005).

Where did the Cholesterol Recommendations come from?

Studies did not take into account other risk factors

Based on animal studies

Studies provided excessive [illegible]C

Cholesterol Recommendations

In 1912 Anichkov discovered that feeding cholesterol to rabbits led to atherosclerosis.

* Rabbits are herbivores- metabolize cholesterol

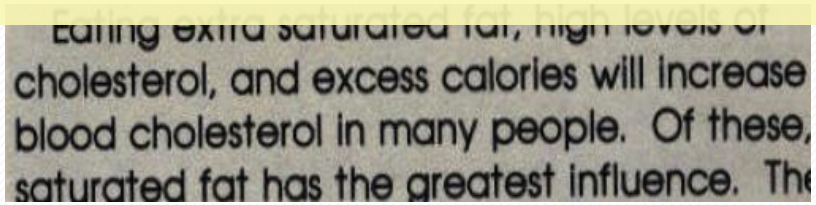
Konstantinov, I., Mejevoi, N., & Anichkov, N. (2006). Nikolai N. Anichkov and his theory of atherosclerosis. *Texas Heart Institute Journal*, *33*(4), 417-423.

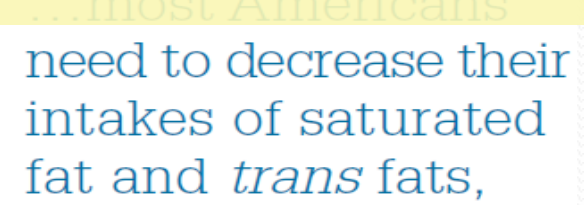
FIGURE 5.5 In the stomach of the rabbit ingested food is located in the pyloric part (left), which contains digestive glands. Reingested fecal pellets are located in the large fundus (right), where they remain separate from the food material while fermentation continues. [Haeder 1949; Grassé 1955]

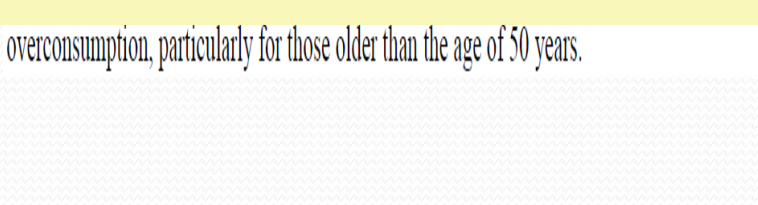
III.) Saturated Fat:

- The mix of fatty acids is relevant
- But don't focus here

History of Saturated Fat Guidelines







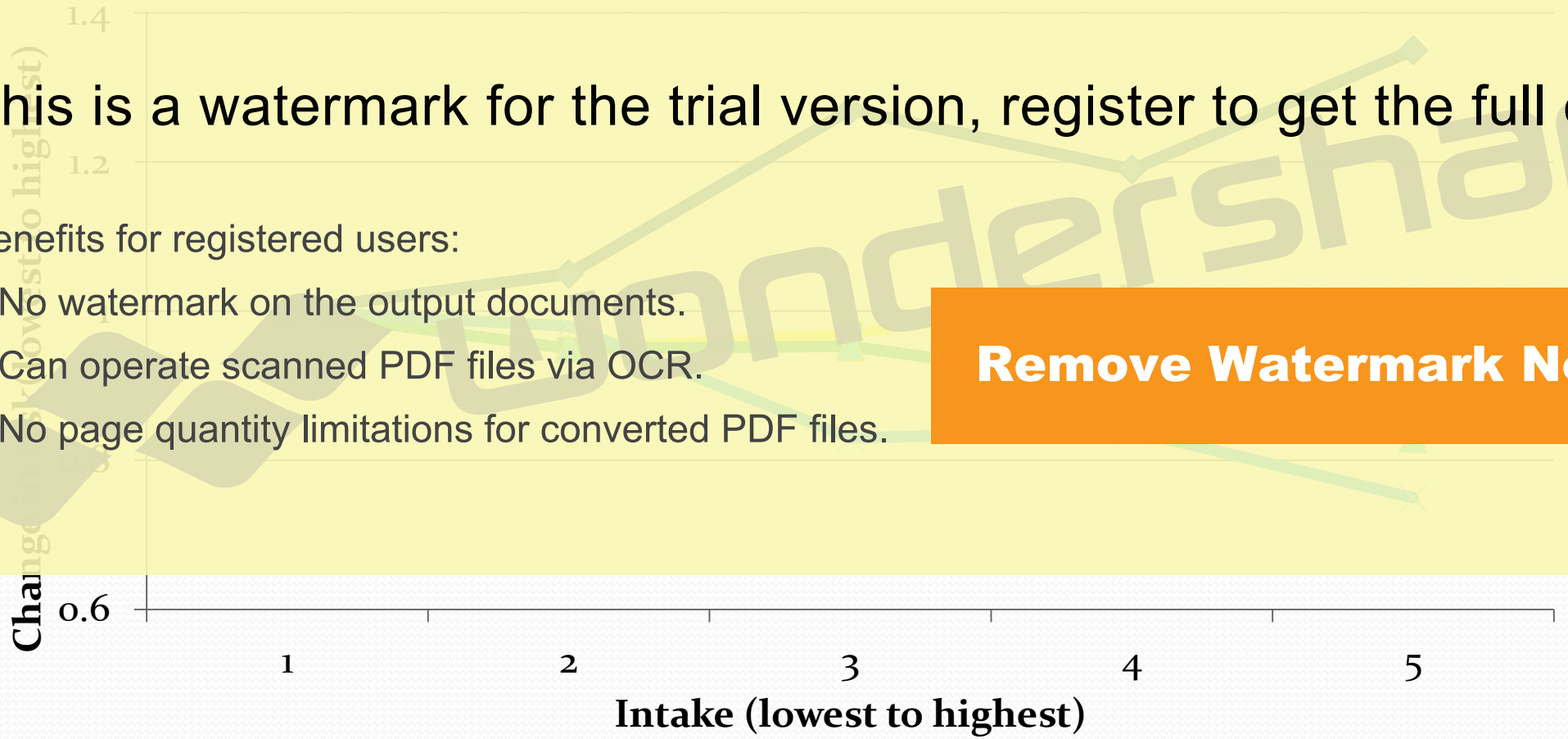
American Journal of Epidemiology

Vol. 161, No. 7
Printed in U.S.A.
DOI: 10.1093/aje/kwi085

[4] Division of Preventive Medicine, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA.

Received for publication July 16, 2004; accepted for publication November 10, 2004.

Nurses Health Study



Change in:

Bad Cholesterol: LDL Good Cholesterol: HDL

Total : HDL Cholesterol Change

Saturated fatty acids
cis Polyunsaturated fatty acids
cis Monounsaturated fatty acids
trans Monounsaturated fatty acids

Lipids (2010) 45:893–905
DOI 10.1007/s11745-010-3393-4

REVIEW

Saturated Fat and Cardiometabolic Risk Factors, Coronary Heart Disease, Stroke, and Diabetes: a Fresh Look at the Evidence

Renata Micha · Dariush Mozaffarian

Received: 3 December 2009 / Accepted: 27 January 2010 / Published online: 31 March 2010

Changes in Total Cholesterol: HDL-C Ratio for Consumption of SFA, MUFA, PUFA, and TFA

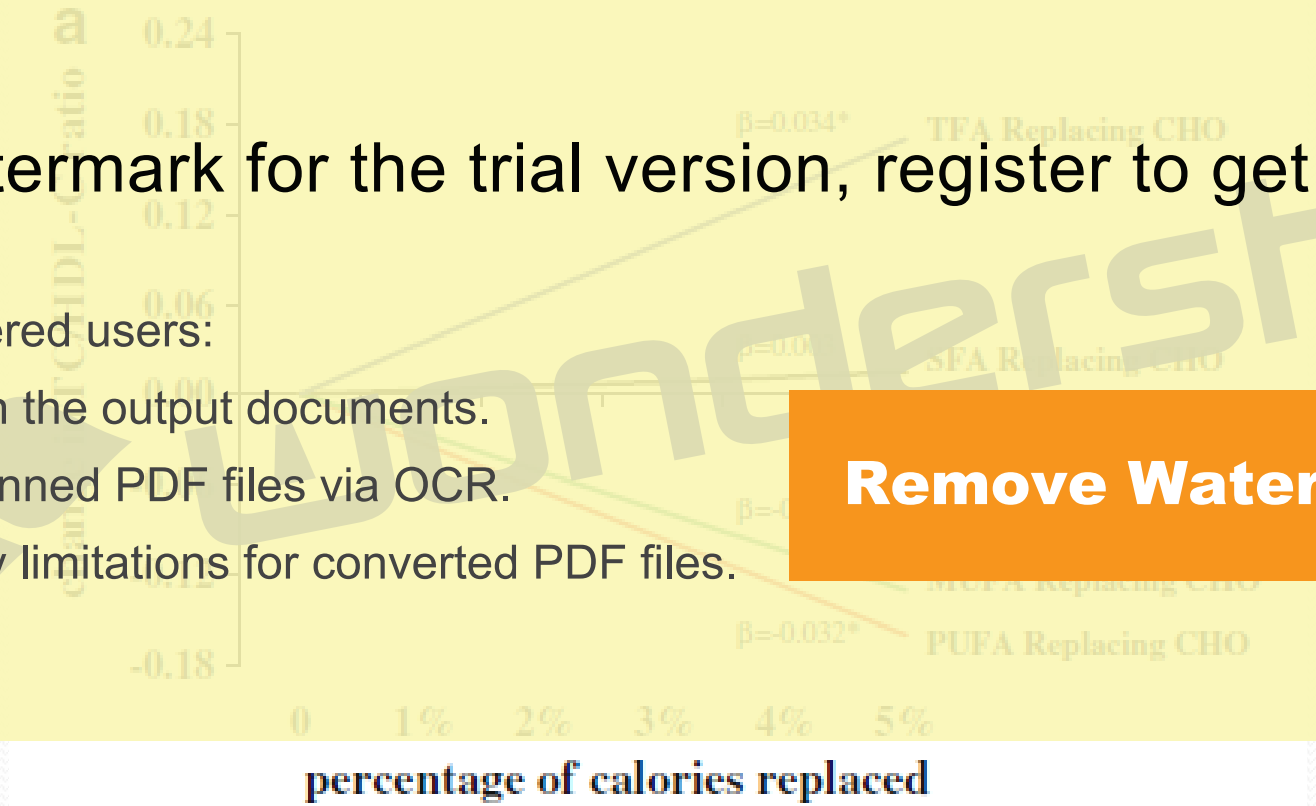


Fig. 2 Changes in blood lipid levels for consumption of saturated fatty acids (SFA), monounsaturated fatty acids (MUFA), polyunsaturated fatty acids (PUFA), or trans fatty acids (TFA) as an isocaloric replacement for carbohydrate (CHO) as a reference, based on two meta-analyses of randomized controlled feeding trials [5, 6]. β reflects the change for each 1% energy isocaloric replacement; $^{*}P < 0.05$

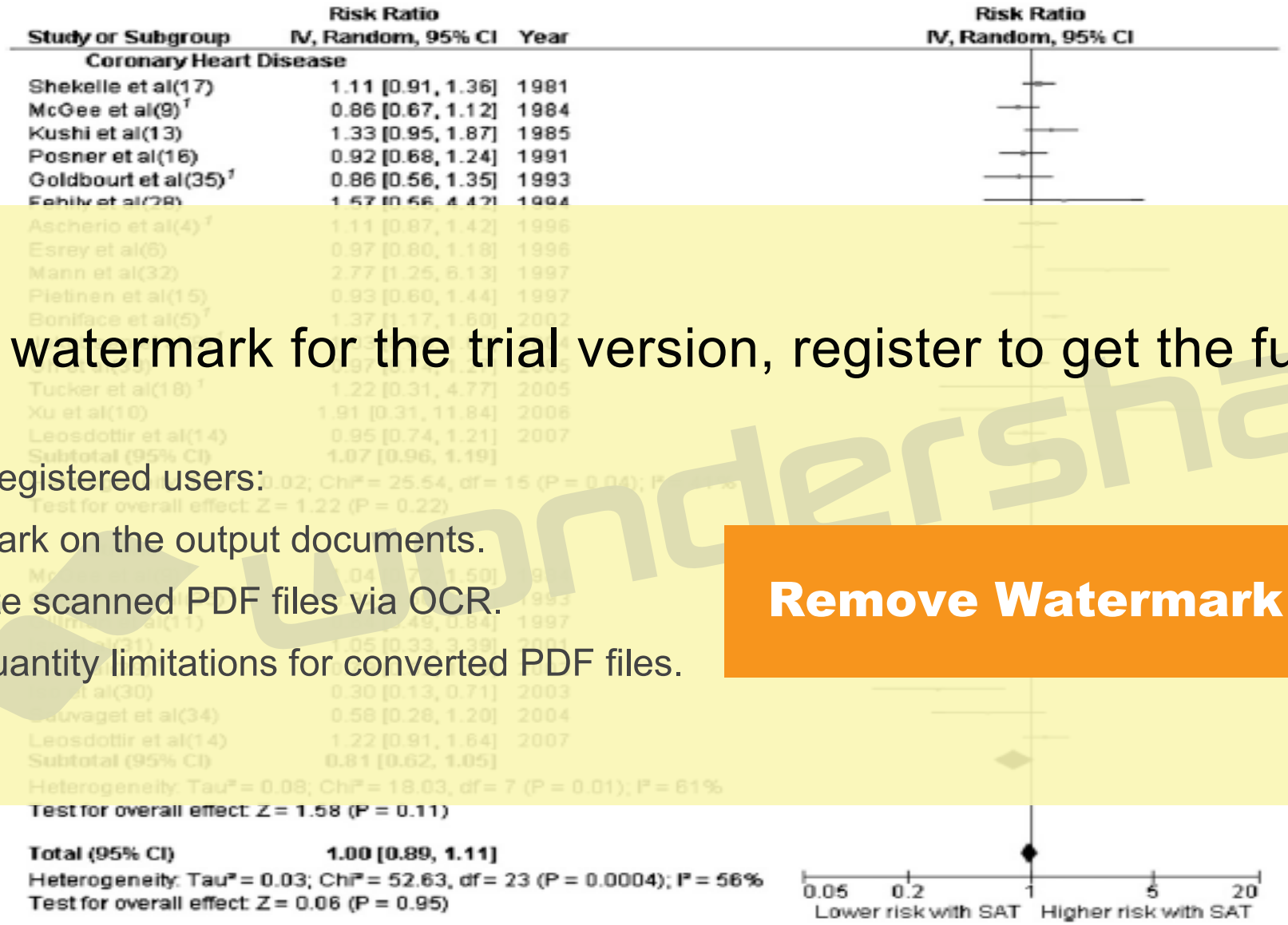
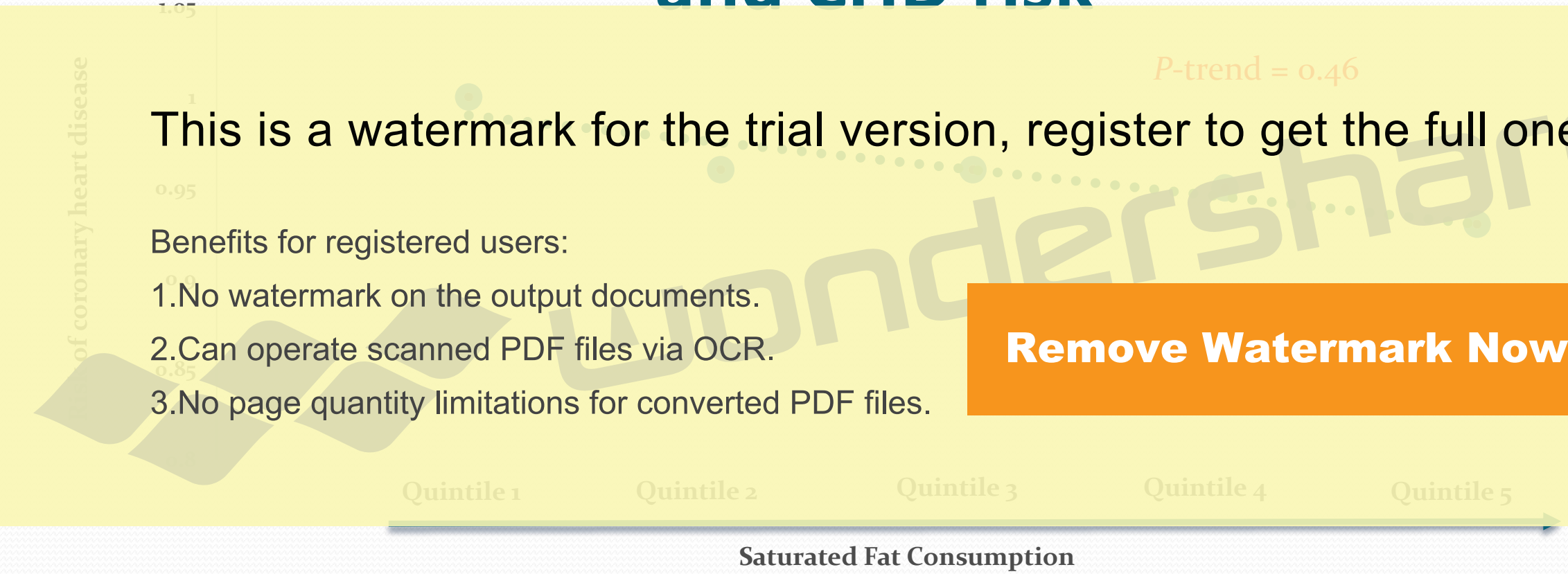


FIGURE 2. Risk ratios and 95% CIs for fully adjusted random-effects models examining associations between saturated fat intake in relation to coronary heart disease and stroke. [1]Updated data were provided by respective investigators (4, 5, 8, 18, 29, 35) or derived from a provided data set (9, 36). SAT, saturated fat intake; IV, inverse variance.

WHO meta-analysis: No association between saturated fat intake and CVD, CHD, Stroke, T2D

de Souza et al *BMJ* 2015

No association between saturated fat intake and CHD risk



NHS (n = 84,628)
HPFS (n = 42,908)

LI et al Am JAAC 2015

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association.

Dietary Linoleic Acid and Risk of Coronary Heart Disease: A Systematic Review and Meta-Analysis of Prospective Cohort Studies

Maryam S. Farvid, Ming Ding, An Pan, Qi Sun, Stephanie E. Chiuve, Lyn M. Steffen, Walter C. Willett, and Frank B. Hu

Circulation. 2014;130:1568-1578; originally published online August 26, 2014;
doi: 10.1161/CIRCULATIONAHA.114.010236
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

Print ISSN: 0009-7322. Online ISSN: 1524-4539

Dietary intake of Linoleic Acid and:

Total CHD Events

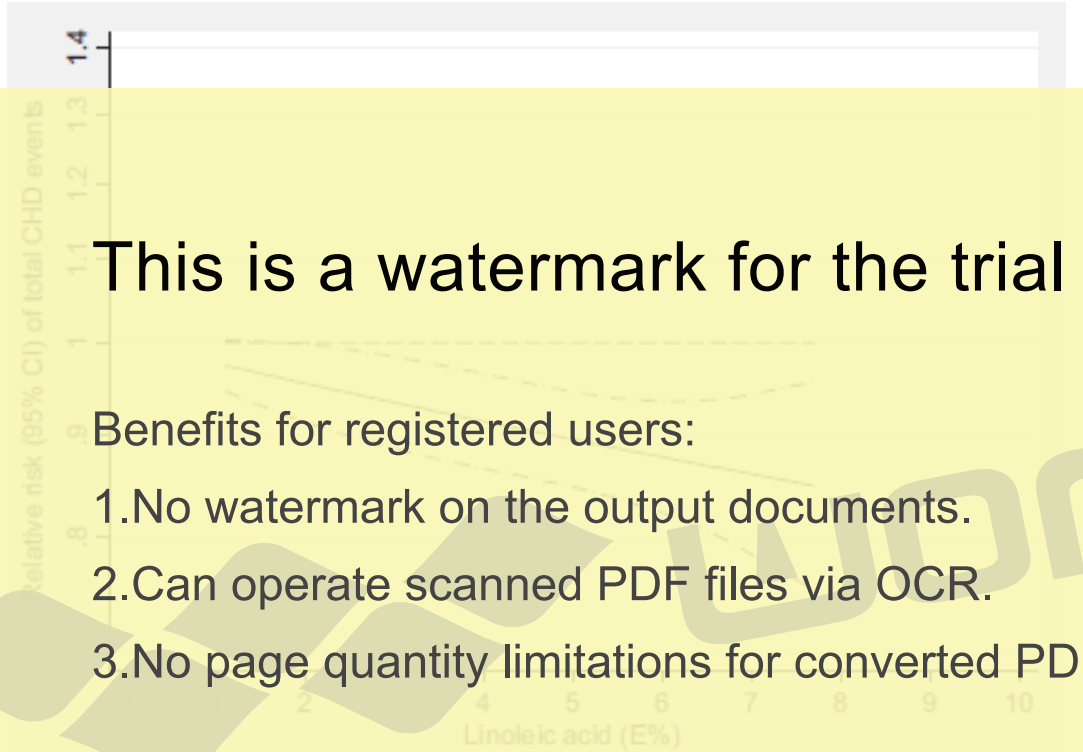


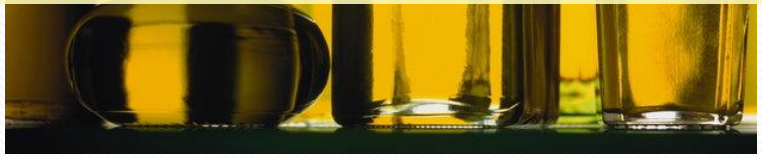
Figure 4. Dose–response analysis for the curvilinear association between dietary intake of linoleic acid and total coronary heart disease events. *P*=0.91 for nonlinearity relationship, indicating a linear relationship. %E indicates percent of energy.

CHD Deaths

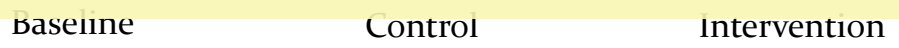
Figure 5. Dose–response analysis for the curvilinear association between dietary intake of linoleic acid and coronary heart disease deaths. *P*=0.72 for nonlinearity relationship, indicating a linear relationship. %E indicates percent of energy.

Re-evaluation of the traditional diet-heart hypothesis: analysis of recovered data from Minnesota Coronary Experiment (1968-73)

Christopher E Ramsden[1,2], Daisy Zamora[3], Sharon Majchrzak-Hong[1], Keturah R Faurot[3], Steven R Broste[4], Robert P Frantz[5], John M Davis[6], Anne N Ringel[7], Kristan J Suchindran[8], Joseph R Hibbeln[1]



Linoleic Acid and Saturated Fat Composition of MCE Control and Intervention Group Diets



‡Percent change in serum cholesterol concentration calculated for each individual in cohort that received diet for one year or more. P values from paired *t* test comparing concentrations before and after randomization.

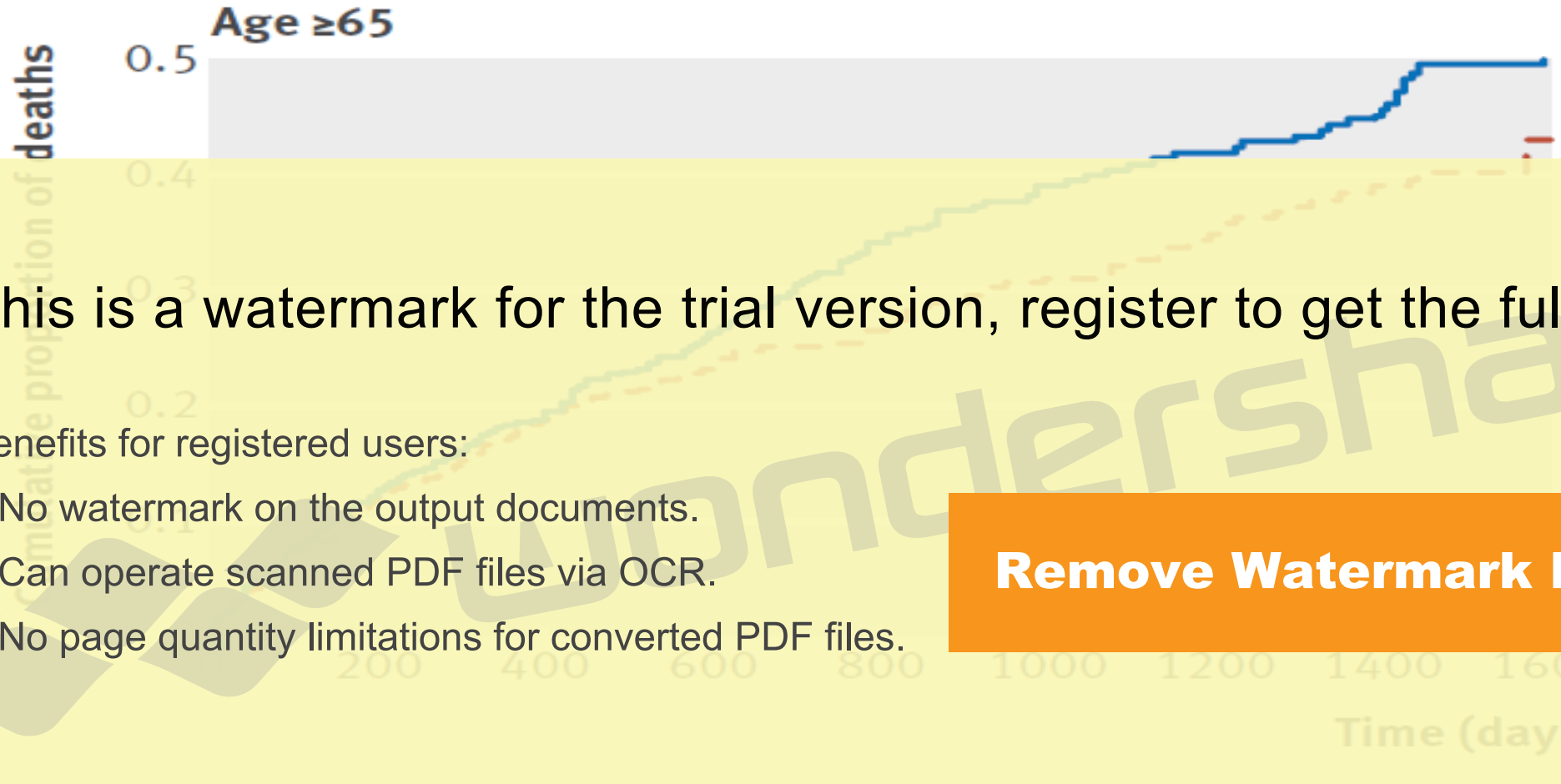
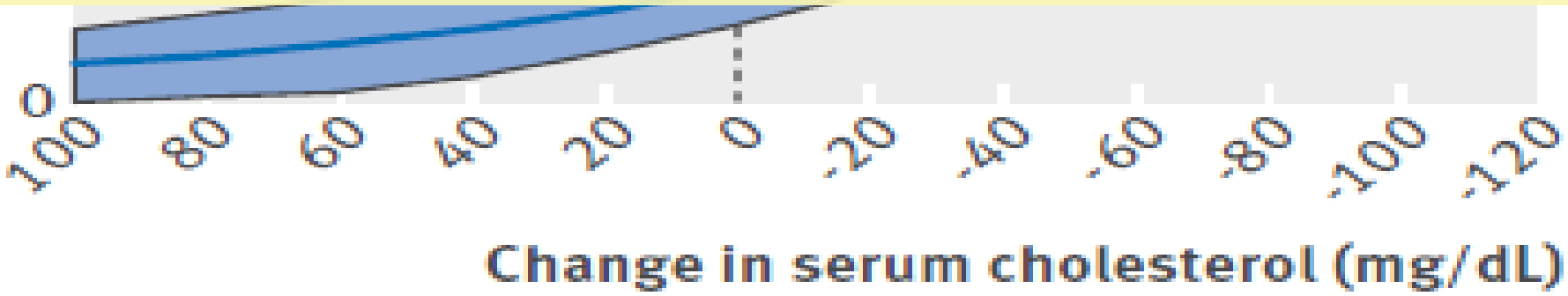


Fig 5 | Risk of death from any cause by diet assignment in full MCE cohort and prespecified subgroups (Kaplan Meier life table graphs of cumulative mortality). Graphical depiction of cumulative mortality in full MCE cohort (n=9423) and prespecified subgroups in 1981 Broste thesis[7] showed no indication of benefit and suggested possibility of unfavorable effects of serum cholesterol lowering intervention among participants aged ≥65. Patient level data needed to repeat this analysis were not recovered

Change in Serum Cholesterol and Probability of Death



Here is the answer

- When someone asks if ____ is good for me to eat.

Dairy Foods and Milk Fat on Heart Disease

Eur J Nutr (2009) 48:191–203
DOI 10.1007/s00394-009-0002-5

REVIEW

2009

A reappraisal of the impact of dairy foods and milk fat on cardiovascular disease risk

J. Bruce German · Robert A. Gibson · Ronald M. Krauss · Paul Nestel · ... van Staveren · Jan M. Steijns · Lisette C. P. G. M. de Groot · Adam L. Lock · Frédéric Destaillats

... 2008 / Accepted: 20 January 2009 / Published online: 4 March 2009

Abstract

Background This review provides a reappraisal of the potential effects of dairy foods, including dairy fats, on cardiovascular disease (CVD)/coronary heart disease (CHD) risk. Commodities and foods containing saturated fats are of particular focus as current public dietary recommendations are directed toward reducing the intake of saturated fats as a means to improve the overall health of the population. A conference of scientists from different perspectives of dietary fat and health was convened in order to consider the scientific basis for these recommendations.

Aims This review and summary of the conference focus on four key areas related to the biology of dairy foods and fats and their potential impact on human health: (a) the effect of dairy foods on CVD in prospective cohort studies;

W. A. van Staveren · L. C. P. G. M. de Groot
Wageningen University and Research Centre, Wageningen,
The Netherlands

Dairy Fat and Heart Disease

with caution.

Biomarkers of milk fat and the risk of myocardial infarction in men and women: a prospective, matched case-control study[1–3]

2010

Eva Warensjö, Jan-Håkan Jansson, Tommy Cederholm, Kurt Boman, Mats Eliasson, Göran Hallmans, Ingegerd Johansson, and Per Sjögren

ABSTRACT

Background: High intakes of saturated fat have been associated with cardi… Objective… ciation be… (15:0), he… a first my… Design: … nested wi… in the stu… matched … Clinical, anthropometric, biomarker fatty acid, physical activity, and dietary data were collected. The odds of a first MI were … by using conditional logistic regression. **Results:** … phospholipids … in … odds … in women … adjustment for confounders, the inverse association remained in both sexes and was significant in women. In agreement with biomarker data, quartiles of reported intake of cheese (men and women) and fermented milk products (men) were inversely related to a first MI (*P* for trend < 0.05 for all).

Conclusions: Milk fat biomarkers were associated with a lower risk of developing a first MI, especially in women. This was partly confirmed in analysis of fermented milk and cheese intake. Components of metabolic syndrome were observed as potential intermediates for the risk relations. *Am J Clin Nutr* 2010;92:194–202.

such as myocardial infarction (MI). In the CARDIA (Coronary Artery Risk Development in Young Adults) study, frequent … 70% de… y (6), but … weight … me … ption … and dys… protein, and … part of … cluding … vice for … vascular … The absence of clear evidence linking dairy consumption to cardiovascular events may be explained by the content of health-promoting components in dairy products (2, 10), but the exact mechanisms remain uncertain. To overcome the bias associated with dietary assessment, especially for fatty food, biomarkers may be used. Dairy fat contains the ruminant-specific fatty acids pentadecanoic acid (15:0) and heptadecanoic acid (17:0), and the presence of these fatty acids in serum lipids can be used as objective biomarkers of milk fat intake (12–14). This was recently validated in the survey population from which the present

[1] From the Department of Public Health and Caring Sciences, Clinical Nutrition and Metabolism, Uppsala University, Uppsala, Sweden (EW, TC,

Milk and dairy consumption and incidence of cardiovascular diseases and all-cause mortality: dose-response meta-analysis of prospective cohort studies[1–3]

2011

(I-squared = 0.0%, p = 0.502)
Note: Weights are from random effects analysis

FIGURE 2. Relation between milk consumption (200 mL/d) and cardiovascular disease; dose-response meta-analysis of 4 prospective cohort studies (n = 13,518; number of cases = 2283). Reproduced with permission from reference 24. Ref, reference.

these findings are based on limited numbers. *Am J Clin Nutr* 2011;93:158–71.

products (27). Whether these effects on blood pressure can be specifically addressed by low-fat dairy products is not clear from

Dairy Fat Inversely Associated with Metabolic Syndrome

with metabolic syndrome in middle-aged and older adults, associations that seem to be mediated by dairy saturated fatty acids. Dietary recommendations to avoid full-fat dairy intake are not supported by our findings.

Background: Growing evidence suggests that dairy products may have beneficial cardiometabolic effects. The current guidelines, however, limit the intake of full-fat dairy products.

Objective: We investigated the association of dairy consumption, types of dairy products, and dairy fat content with metabolic syndrome (MetSyn).

Saturated Fats Versus Polyunsaturated Fats Versus Carbohydrates for Cardiovascular Disease Prevention and Treatment

Annu. Rev. Nutr. 2015. 35:517–43

The *Annual Review of Nutrition* is online at nutr.annualreviews.org

This article's doi:
10.1146/annurev-nutr-071714-034449

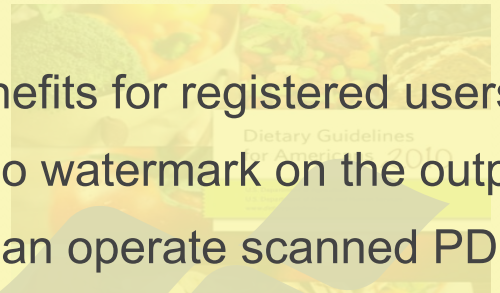
Keywords

atherogenic dyslipidemia, lipids, diet, sugar, metabolism

Abstract

The effects of saturated fatty acids (SFAs) on cardiovascular disease (CVD) risk are modulated by the nutrients that replace them and their food matrices. Replacement of SFAs with polyunsaturated fatty acids has been associated with reduced CVD risk, although there is heterogeneity in both fatty acid

Dairy's role in cardiovascular and metabolic health recognized by Dietary Guidelines for Americans Advisory Committees 2010 and 2015



"Moderate evidence also indicates that intake of milk and milk products is associated with a reduced risk of cardiovascular disease and type 2 diabetes and with lower blood pressure in adults."

-2010 Dietary Guidelines Advisory Committee Report

"Consumption of dairy foods provides numerous health benefits, including lower risk of diabetes, metabolic syndrome, cardiovascular disease and obesity."

-2015 Dietary Guidelines Advisory Committee Report

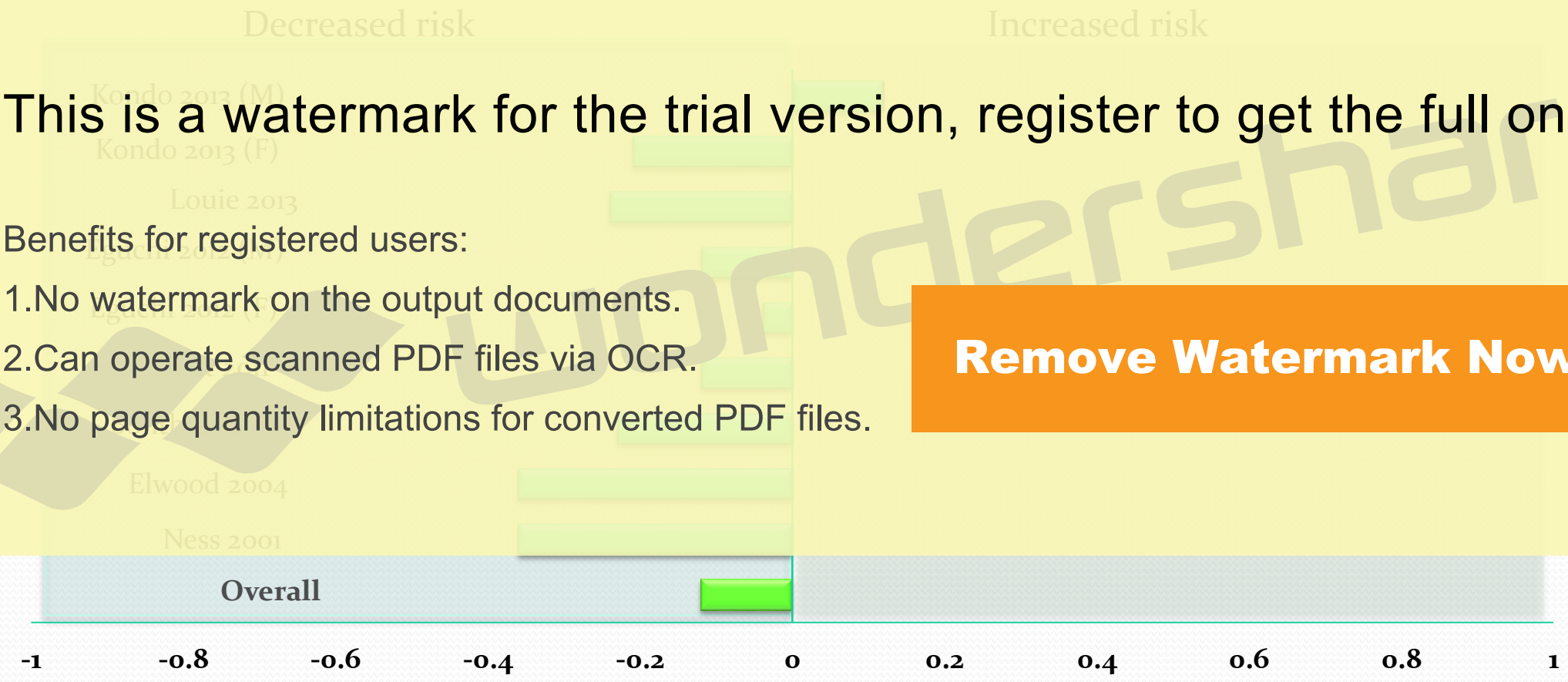
Original Article

Dairy consumption and risk of cardiovascular disease: an updated meta-analysis of prospective cohort studies

Li-Qiang Qin PhD[1], Jia-Ying Xu PhD[2], Shu-Fen Han PhD[1], Zeng-Li Zhang PhD[3], You-You Zhao PhD[4], Ignatius MY Szeto PhD[4]

[1]Department of Nutrition and Food Hygiene, School of Public Health, Soochow University, Suzhou, China
[2]Key Laboratory of Modern Toxicology of Ministry of Education, School of Radiological and Interdisciplinary Sciences, Soochow University, Suzhou, China
[3]Department of Occupational and Environmental Health, School of Public Health, Soochow University, Suzhou, China
[4]Nestlé Research Centre Beijing, China

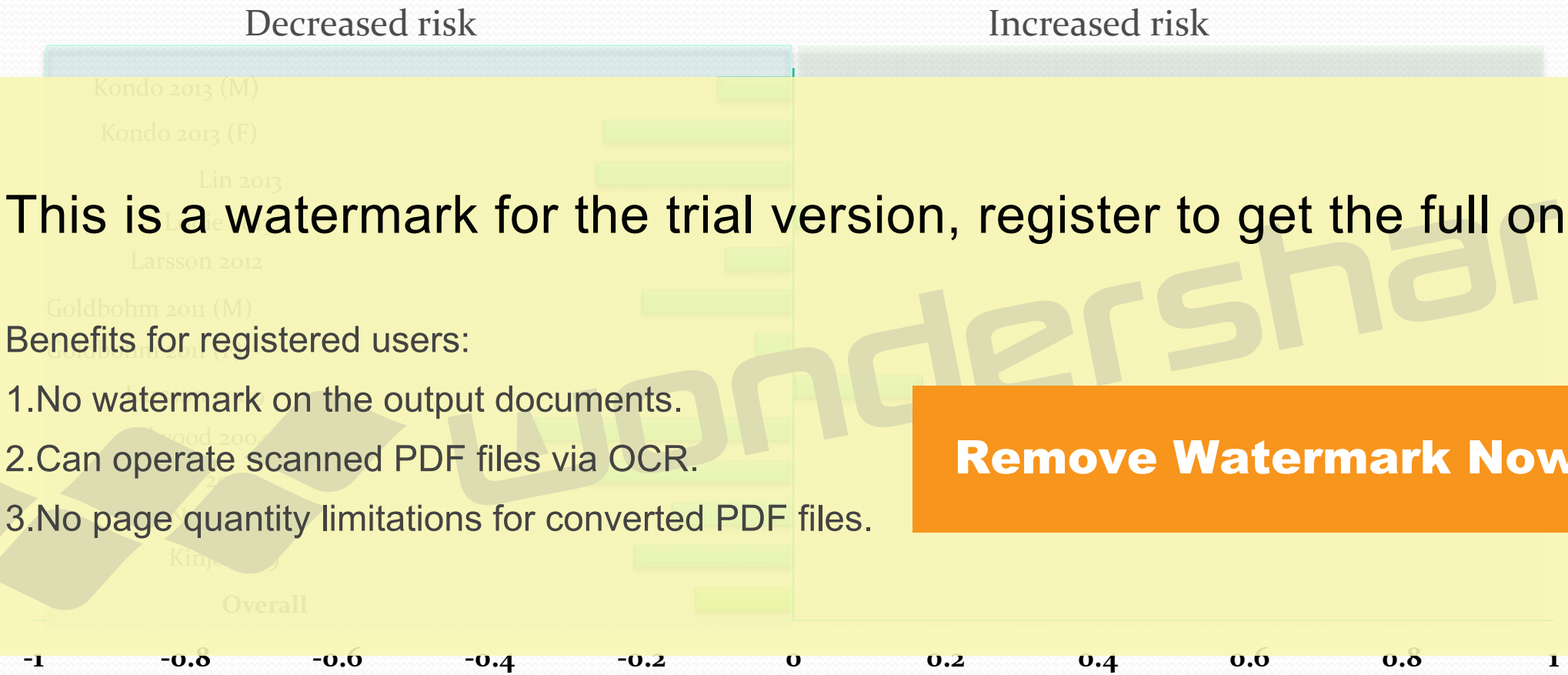
Meta-analysis: Total dairy reduces risk for cardiovascular disease



12% reduced risk for cardiovascular disease overall

Qin et al. Asia Pac J Clin Nutr 2015

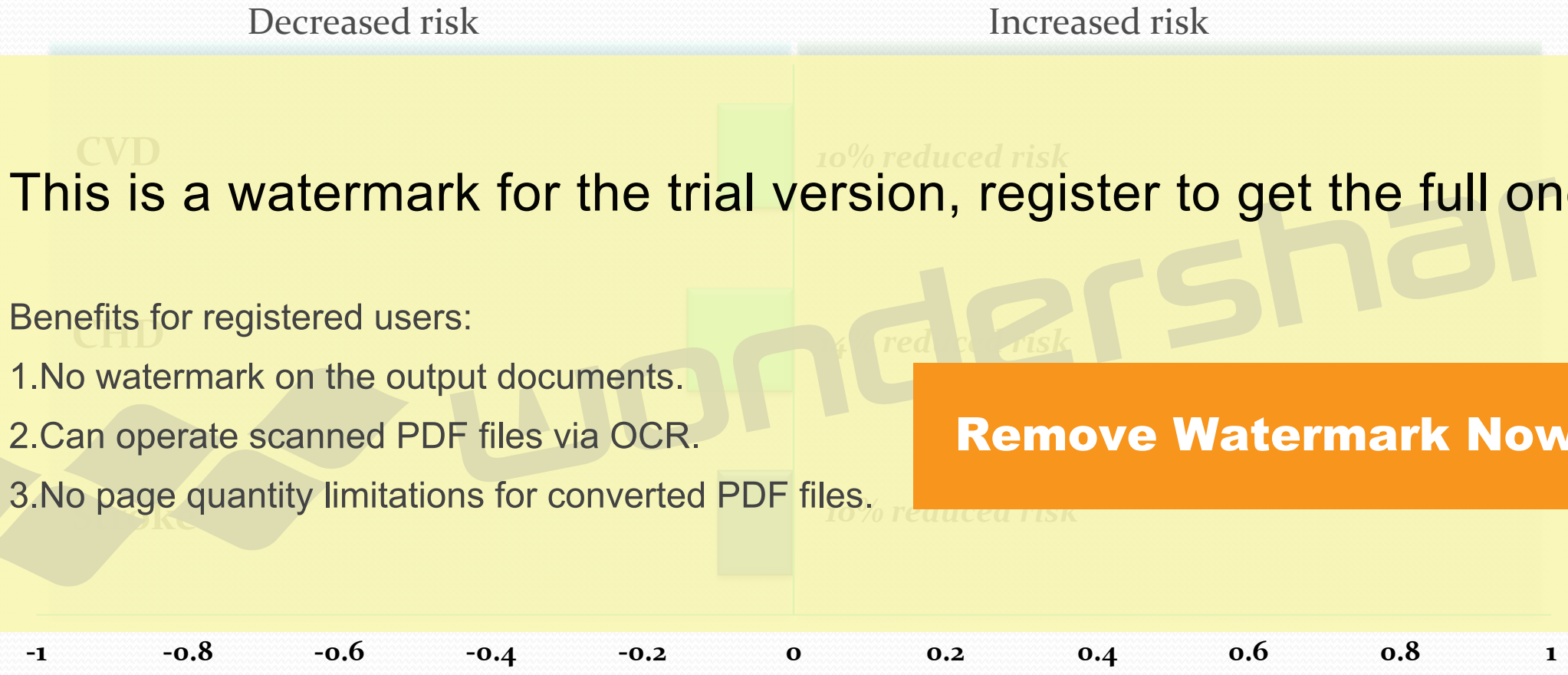
Meta-analysis: Total dairy reduces risk for stroke



13% reduced risk for stroke overall

Qin et al. Asia Pac J Clin Nutr 2015

Meta-analysis: Cheese consumption is associated with reduced CVD risk



Chen et al. *Eur J Nutr* 2016

Why isn’t dairy fat a risk factor for heart disease when it’s high in saturated fat?

Original Articles

Biomarkers of dairy fat intake and risk of cardiovascular disease: a systematic review and meta analysis of prospective studies

Jingjing Liang , BS, Quan Zhou , M.D., Ph.D, Amakye William Kwame , BS, Yixiang Su , M.D., M.S & Zheqing Zhang , M.D., Ph.D

Page 00 | Received 28 Jun 2016, Accepted 25 Sep 2016, Accepted author version posted online: 21 Dec 2016

Download citation http://dx.doi.org/10.1080/10408398.2016.1242114 Check for updates

"Higher dairy fat exposure is not associate with an increased risk of CVD."

Pooled RRs of CVD for top third vs. bottom third

Comprehensive Review of the Impact of Dairy Foods and Dairy Fat on Cardiometabolic Risk

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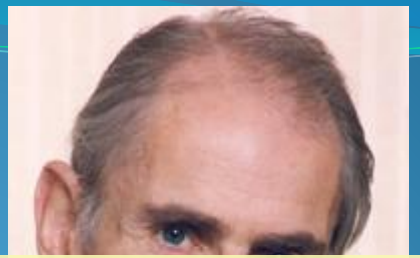
Adv Nutr 2016

"This suggests that the purported detrimental effects of SFAs on cardiometabolic health may in fact be nullified when they are consumed as part of complex food matrices such as those in cheese and other dairy foods. Thus, the focus on low-fat dairy products in current guidelines apparently is not entirely supported by the existing literature ..."

food & nutrition research

"OCFA [Odd chain fatty acids] biomarkers are overall not linked to cardiovascular disease risk, but a possible beneficial role of dairy foods in diabetes prevention warrant further study"



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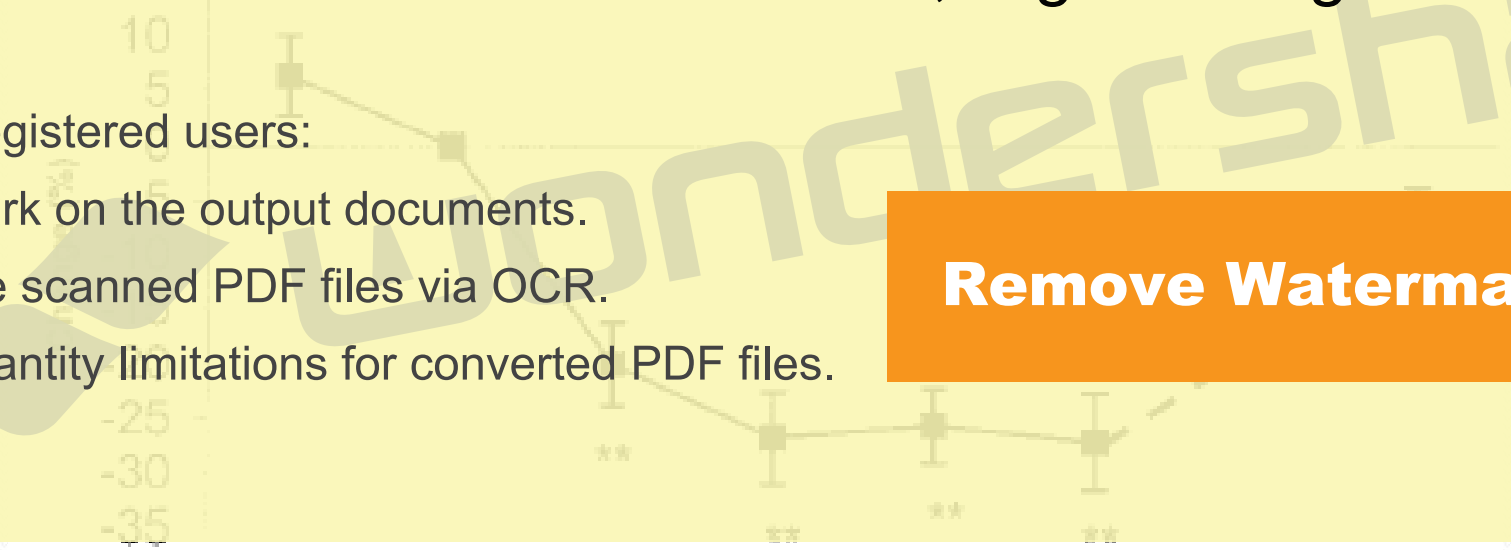
A Dietary Portfolio Approach to Cholesterol Reduction: Combined Effects of Plant Sterols, Vegetable Proteins, and Viscous Fibers in Hypercholesterolemia

David J.A. Jenkins, Cyril W.C. Kendall, Dorothea Faulkner, Edward Vidgen, Elke A. Trautwein, Tina L. Parker, Augustine Marchie, George Koumbridis, Karen G. Lapsley, Robert G. Josse, Lawrence A. Leiter, and Philip W. Connelly

g/1,000 kcal), almonds (28g/day) and viscous fibers (9g/1,000 kcal).

Percent change from baseline in the ratio of LDL:HDL on the combination diet (n = 13).



Week	-1	0	1	2	3	4	Runout

Research

Original Investigation

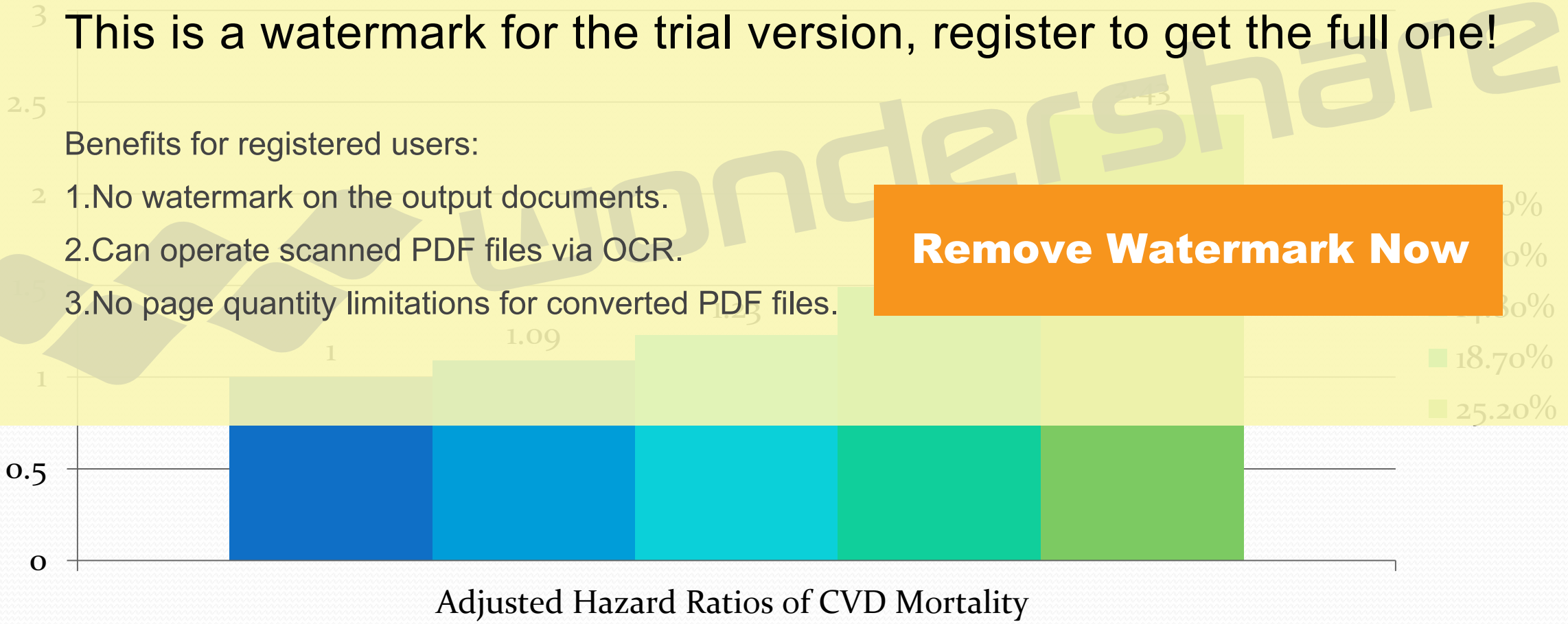
Added Sugar Intake and Cardiovascular Disease Mortality Among US Adults

Invited Commentary pag

IMPORTANCE Epidemiologic studies have suggested that higher intake of added sugar is associated with cardiovascular disease (CVD) risk factors. Few prospective studies have examined the association of added sugar intake with CVD mortality.

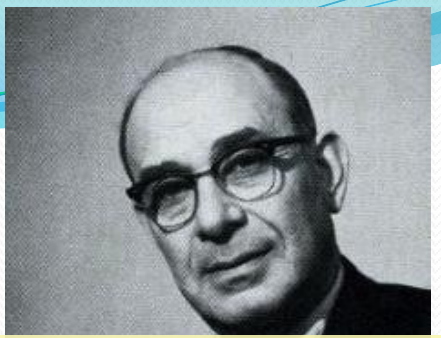
Supplemental content at jamainternalmedicine.cor

Hazard Ratios of CVD Mortality According to Usual % of Calories from Added Sugar

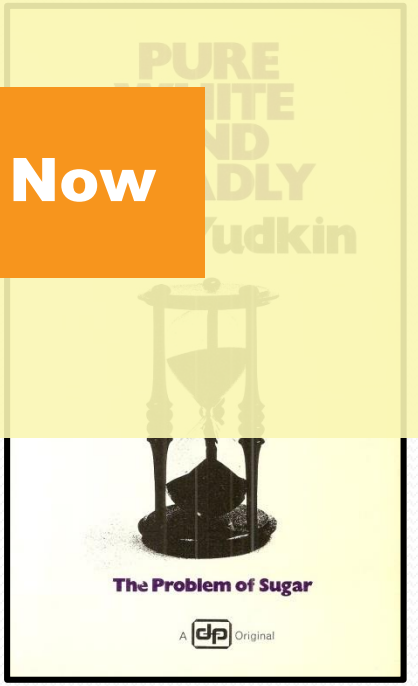


"recommendations should support the eating of whole foods (e.g. foods from living botanical plants) and the avoidance of ultra-processed foods"

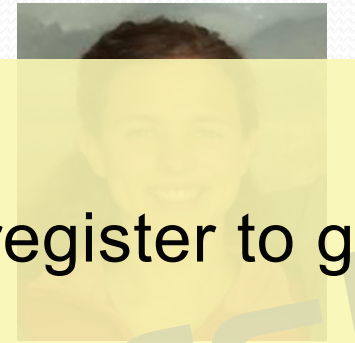
1964: Yudkin suggested that sugar was the



main causative factor in ischemic heart disease, more so than fat; "National levels of consumption of fat and of sugar are closely similar. Statistics relating fat intake to ischaemic heart disease or diabetes in different populations may therefore express only as indirect relationship, and the causal relationship may be with sugar (Yudkin, 1964).



Thank You!



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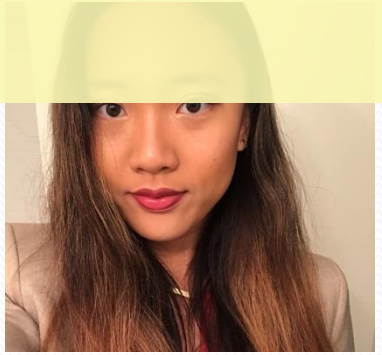

Take Home Messages for heart health