Otago Spotlight Series

Cardiovascular Disease

Cardiovascular Disease in Perspective

Historical Aspects

Nutrition and Risk Reduction

Jim Mann

EDGAR DIABETES & OBESITY RESEARCH
A UNIVERSITY OF OTAGO RESEARCH CENTRE

World Health Organization Collaborating Centre

National SCIENCE Challenges
HEALTHIER LIVES
He Oranga Hauora

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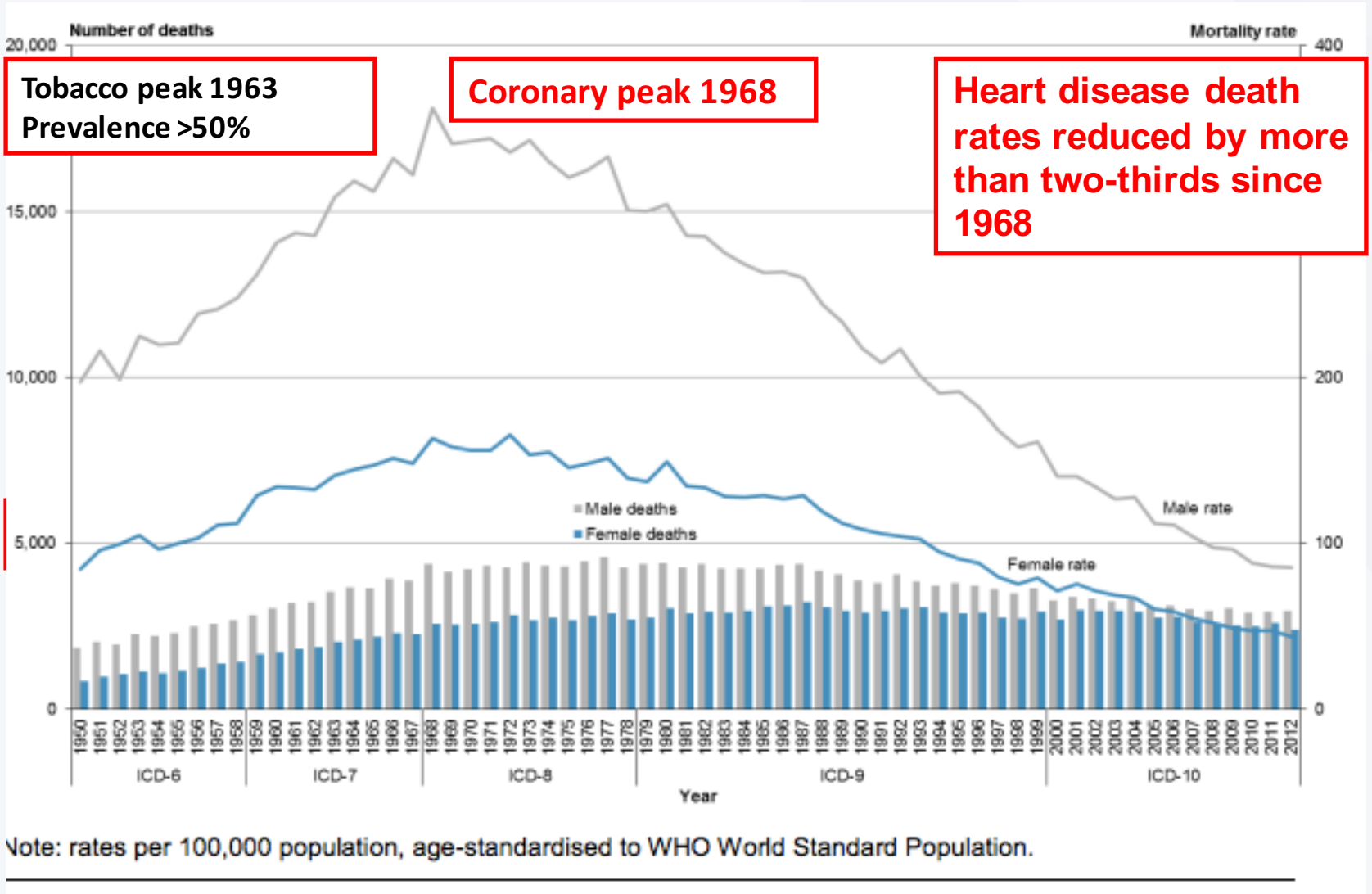
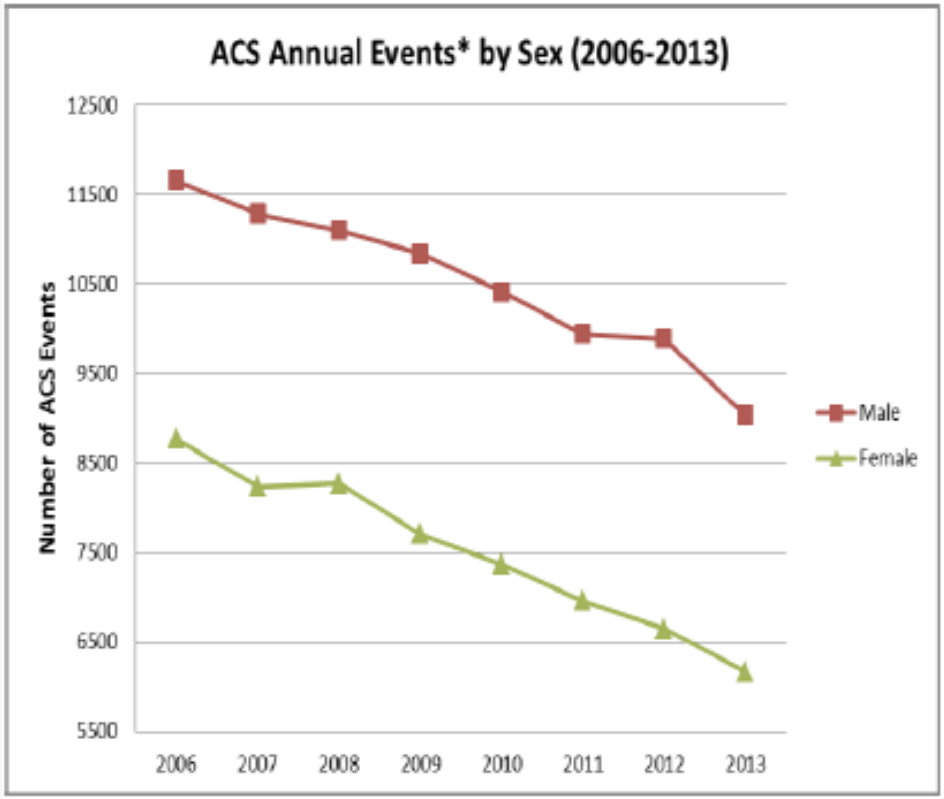
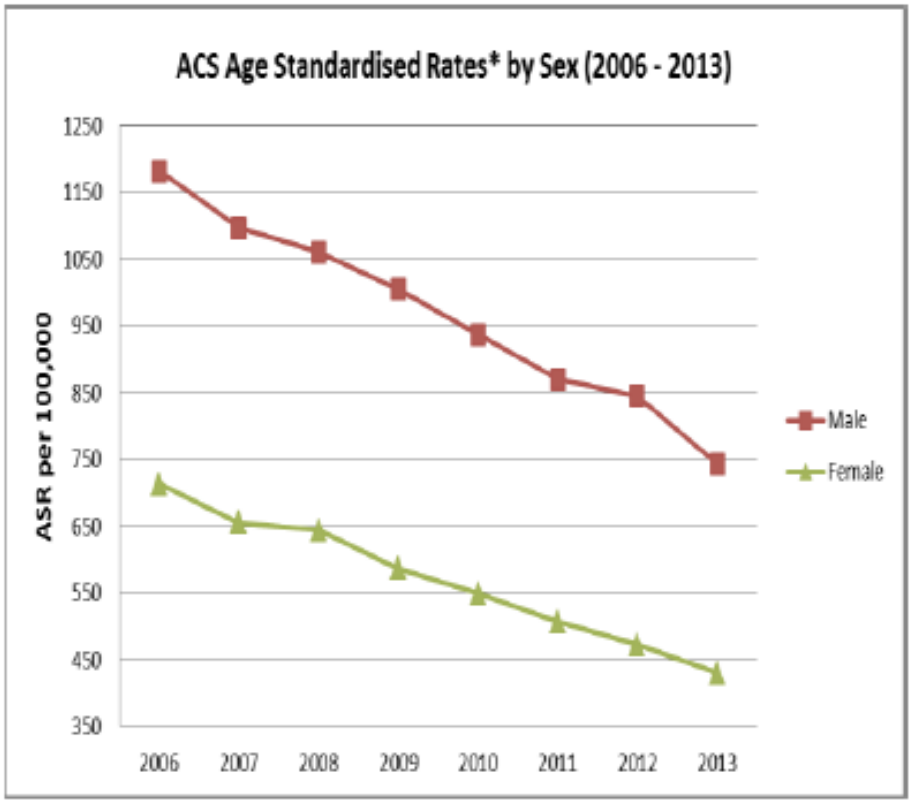
Numbers and age-standardised mortality rates from ischaemic heart disease, by sex, 1950–2012



Note: rates per 100,000 population, age-standardised to WHO World Standard Population.

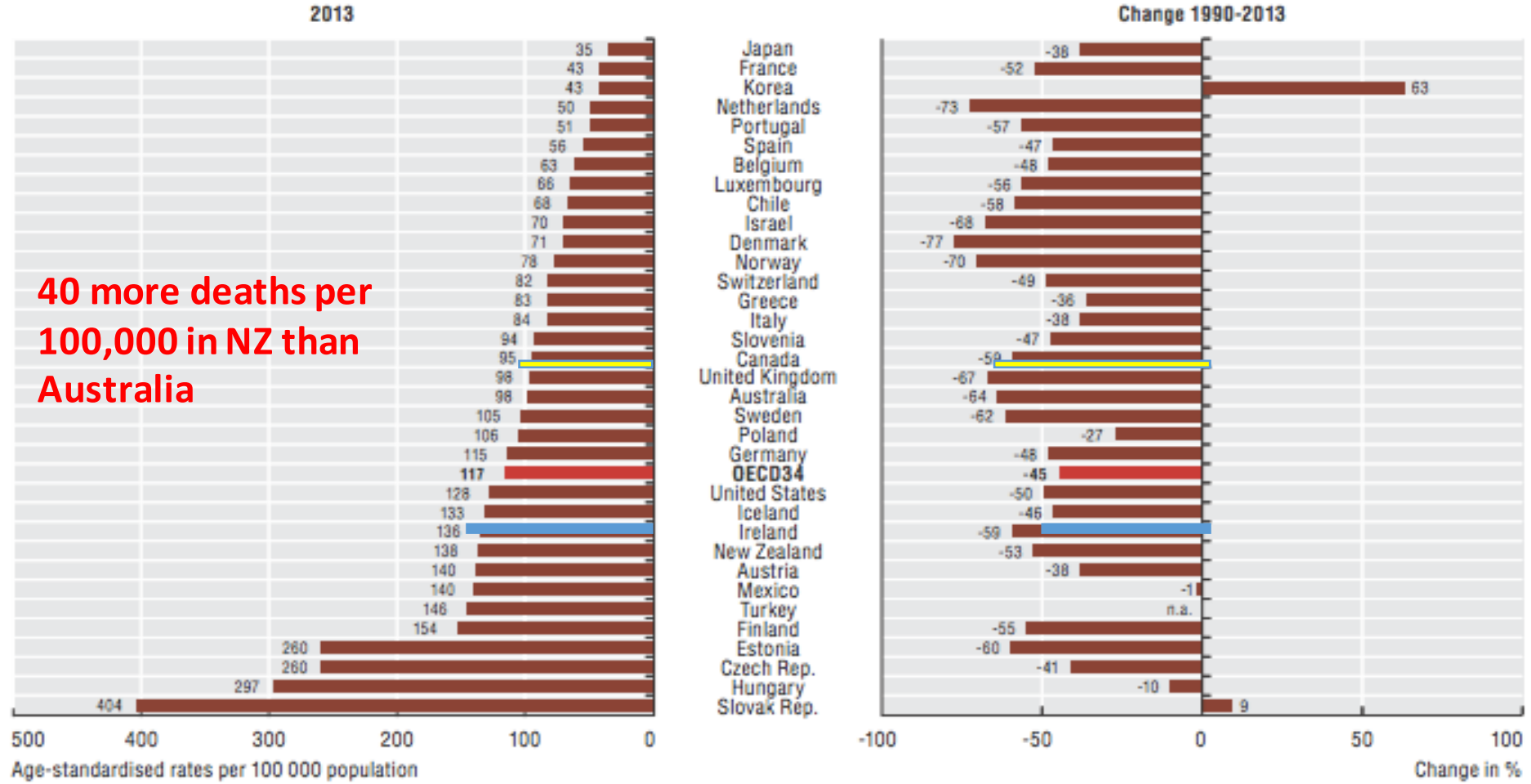
National ACS Incidence Rates (per 100,000 per year)





*standardised to European Standard Population 2013

IHD Mortality has reduced in NZ but !

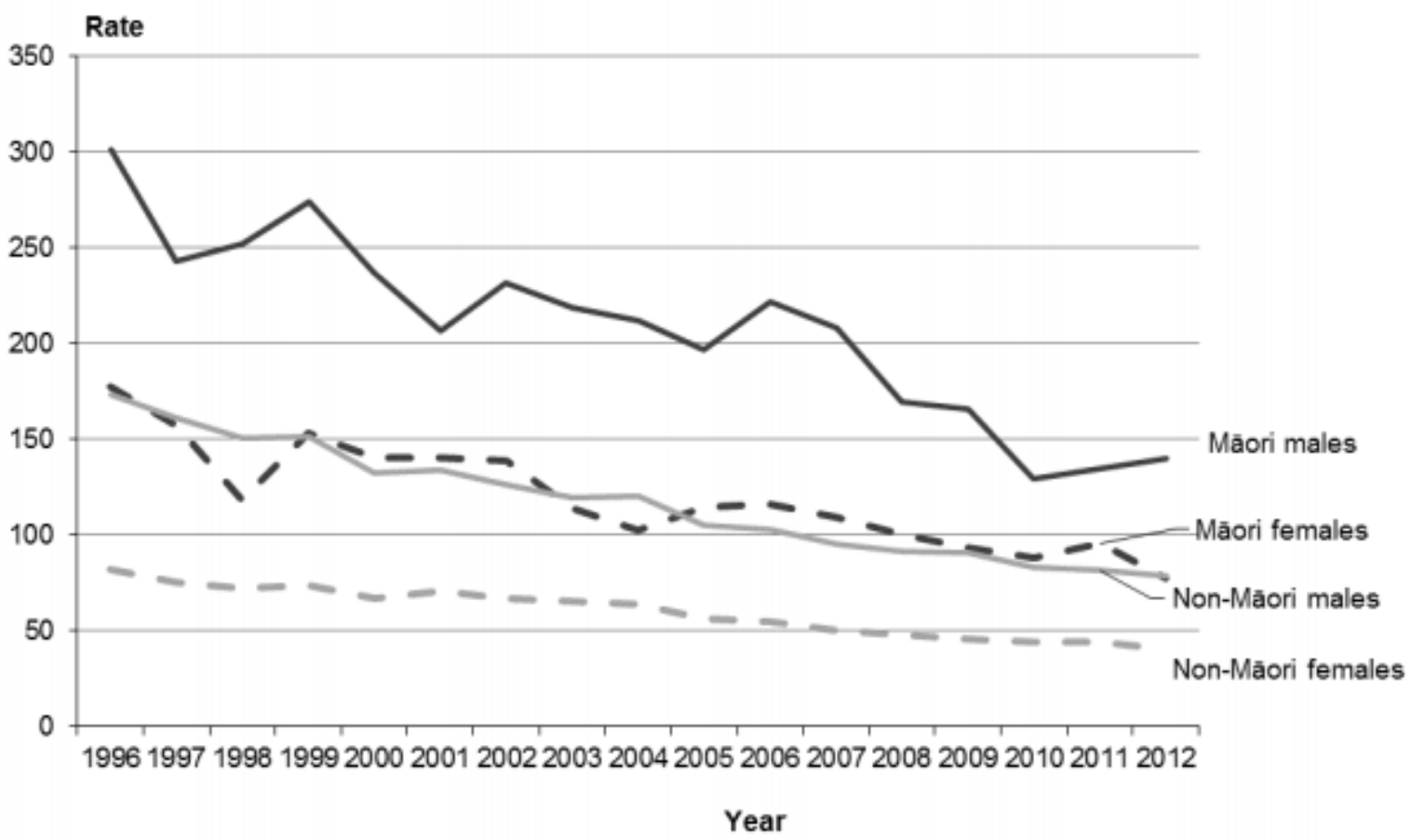


Source: OECD Health Statistics 2015, http://dx.doi.org/10.1787/health-data-en.

StatLink http://dx.doi.org/10.1787/888933280741

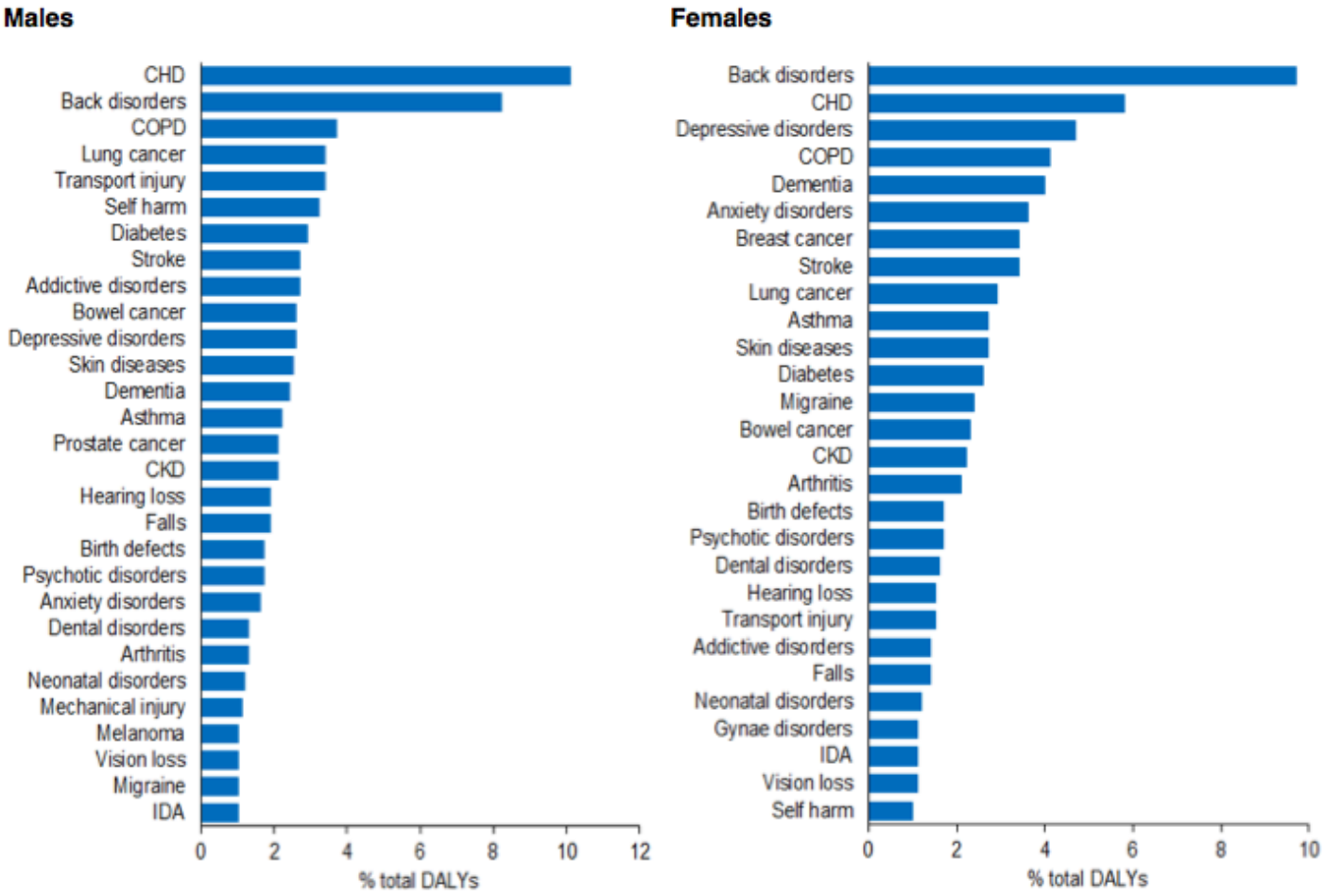
Mortality Rates from IHD in NZ by Sex and Ethnicity 1996-2012

Figure 24: Mortality rates from ischaemic heart disease, by sex and ethnicity, 1996–2012



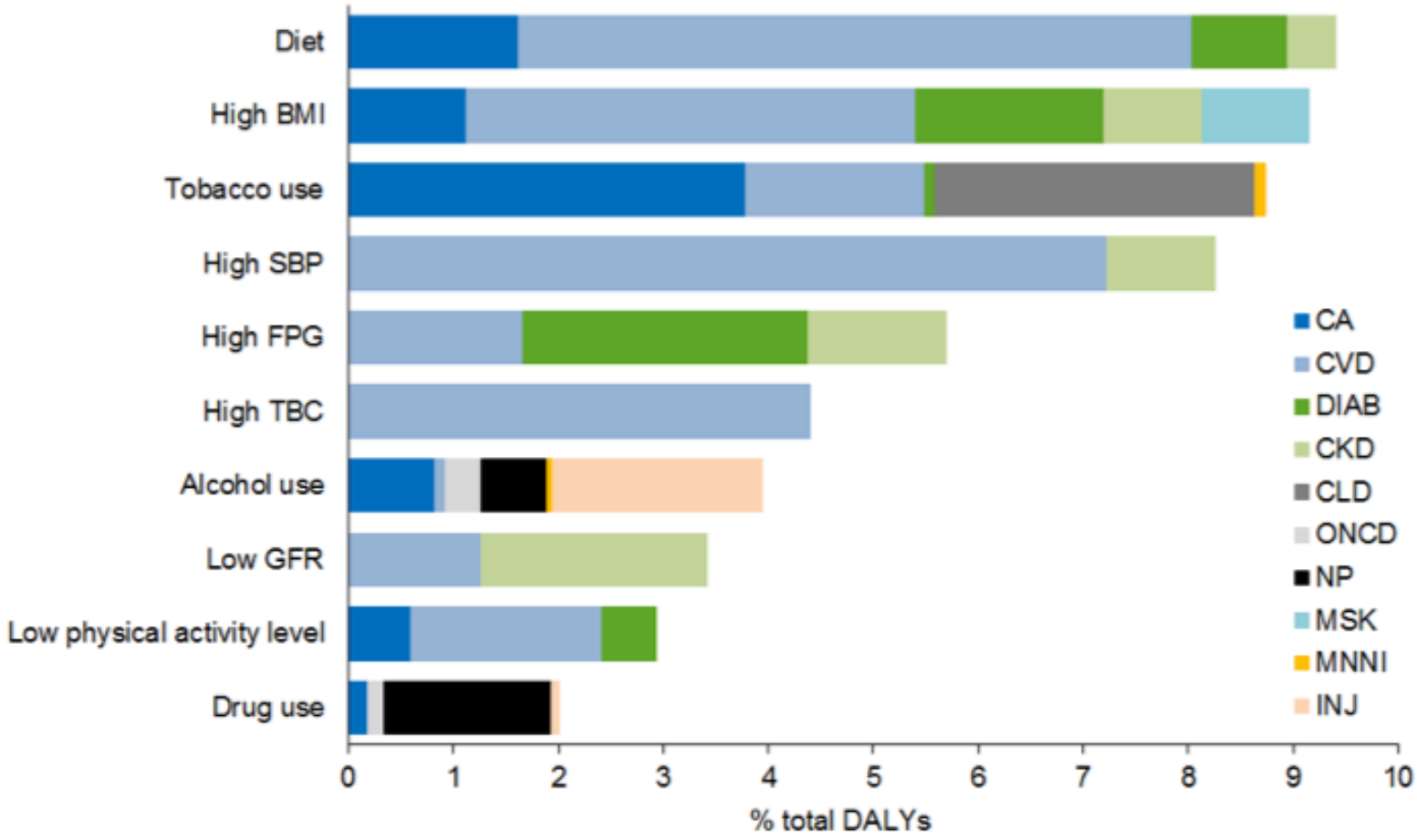
Note: rates per 100,000 population, age-standardised to WHO World Standard Population.

Figure 12: Contribution of leading major specific conditions to health loss (% total DALYs), by gender, 2013



Ministry of Health.2016. *Health Loss in NZ 1990 – 2013: A Report from the NZ Burden of Diseases, Injuries and Risk Factors Study,* Wellington: MoH

Figure 19: Health losses caused by selected risk factors (% total DALYs), 2013



Ministry of Health.2016. *Health Loss in NZ 1990 – 2013: A Report from the NZ Burden of Diseases, Injuries and Risk Factors Study,* Wellington: MoH

Munk's Roll : Volume IX : Frederick Horace (Sir) Smirk

Frederick Horace (Sir) Smirk

b.12 December 1902 d.18 May 1991
KBE(1958) MB ChB Manch(1925) MD(1927) MRCP(1928) FRCP(1940) FRACP(1940) Hon DSc Hahnemann(1961) Hon DSc Otago(1981)

- In 1939 he was appointed to the chair of medicine at the University of Otago, Dunedin, NZ, arriving there in 1940 with his wife Aileen, two small children, a mass of blood pressure data & samples of many different drugs among which he hoped to find some that would be clinically useful in lowering blood pressure

- He hypothesised that a raised blood pressure is followed in time by pathological changes in the blood vessels and that these lead, in a vicious circle, to further rises in pressure. He was convinced that high blood pressure itself is damaging

- During a period of sabbatical leave in London in 1949 he became interested in the discovery of the effects of hexamethonium

- In a series of papers in the early 1950s he reported that the left ventricular failure could be relieved by lowering the blood pressure without the use of digitalis or diuretics and that severe retinopathy could be made to regress

- By 1958 he was successful in developing, by selection and in-breeding, the first strain of genetically hypertensive rats

F O Simpson

Cholesterol and Coronary Disease*

By J. D. HUNTER, M.B., M.R.C.P., M.R.A.C.P.
(*Physician and Senior Lecturer in Medicine, Medical School, University of Otago.*)

TABLE I

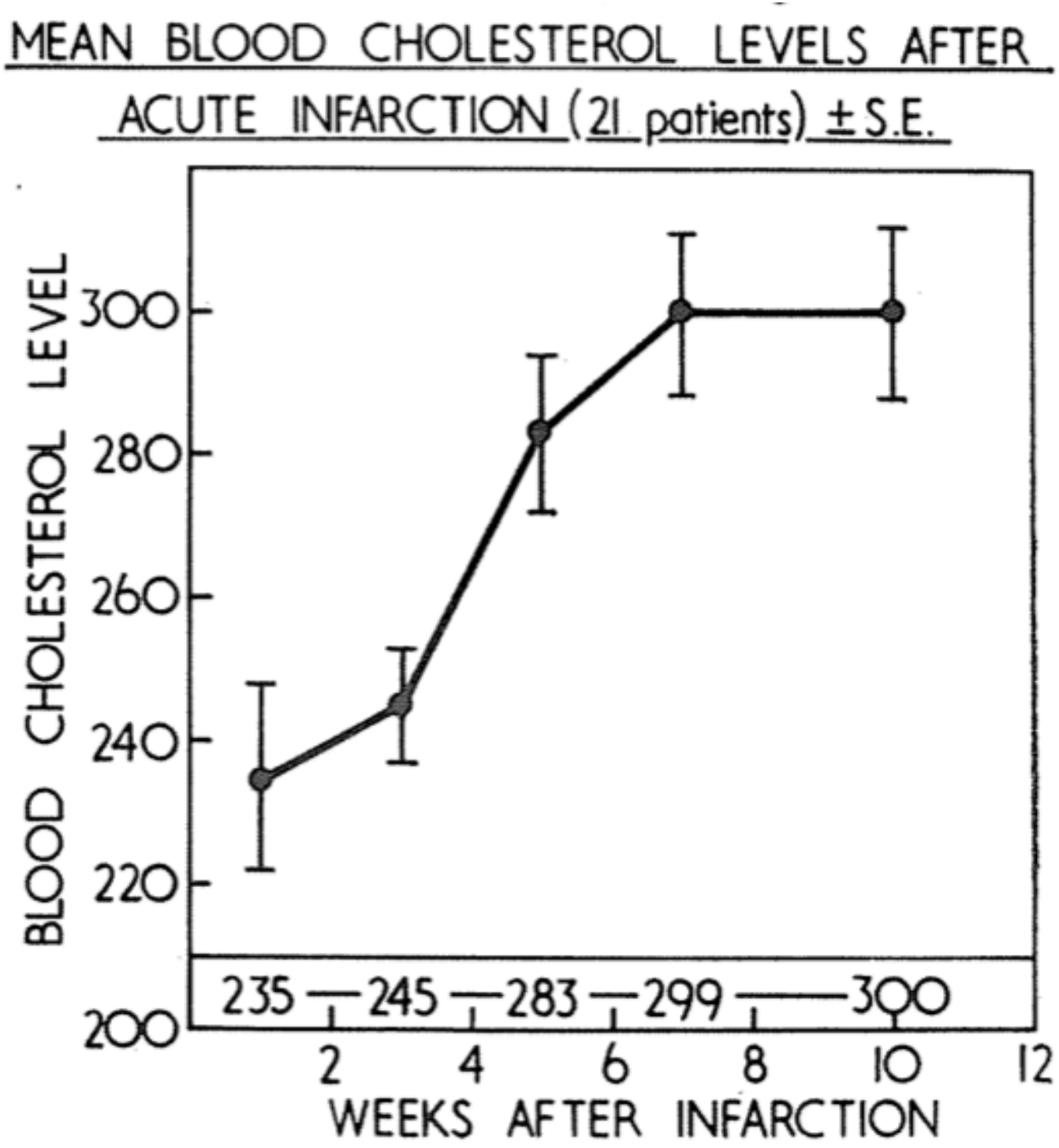
Age group	Coronary patients		Healthy subjects		Student's "t"
	No.	Mean plasma cholesterol levels mgm./100ml. ± S.E.	No.	Mean plasma cholesterol levels mgm./100 ml. ± S.E.	
30 - 39yrs.	7	320 ± 16.7	229	237 ± 2.4	*** P<0.001
40-49 "	36	313 ± 10.2	270	247 ± 2.3	*** P<0.001
50 - 59 "	35	295 ± 9.3	180	242 ± 2.5	*** P<0.001
60-69 "	16	271 ± 13.4	21	229 ± 8.4	** 0.001<P<0.01
Total	94	300 ± 6.0	700	242 ± 1.5	*** P<0.001

PLASMA CHOLESTEROL LEVELS IN CORONARY PATIENTS COMPARED WITH HEALTHY SUBJECTS.

Hunter, JD. NZ Medical Journal, June 1961

Fig 1.

Hunter, JD.
NZ Medical Journal,
June 1961



THE
NEW ZEALAND
MEDICAL JOURNAL

No. 613 JUNE 14, 1978 Volume 87

The Milton Survey: Part 1, General Methods, Height, Weight and 24-hour Excretion of Sodium, Potassium, Calcium, Magnesium and Creatinine

F. O. Simpson FRCPE FRACP, Professor in Medicine,
Wellcome Medical Research Institute,
E. R. Nye PhD FRACP, Associate Professor,
Department of Medicine,
P. Bolli MD, Senior Medical Research Officer,
Wellcome Medical Research Institute,
Hendrika J. Waal-Manning BMedSc MB ChB,
Senior Medical Research Officer,
Wellcome Medical Research Institute,
Ailsa W. Goulding BSc PhD, Research Officer,
Department of Medicine,

& many others

The Milton Survey

	Men		Women	
	Weight in kg	24hr urinary Na (mmol)	Weight in kg	24hr urinary Na (mmol)
40-49yrs	76.8	171	66.5	145
50-59yrs	75.3	183	68.5	145

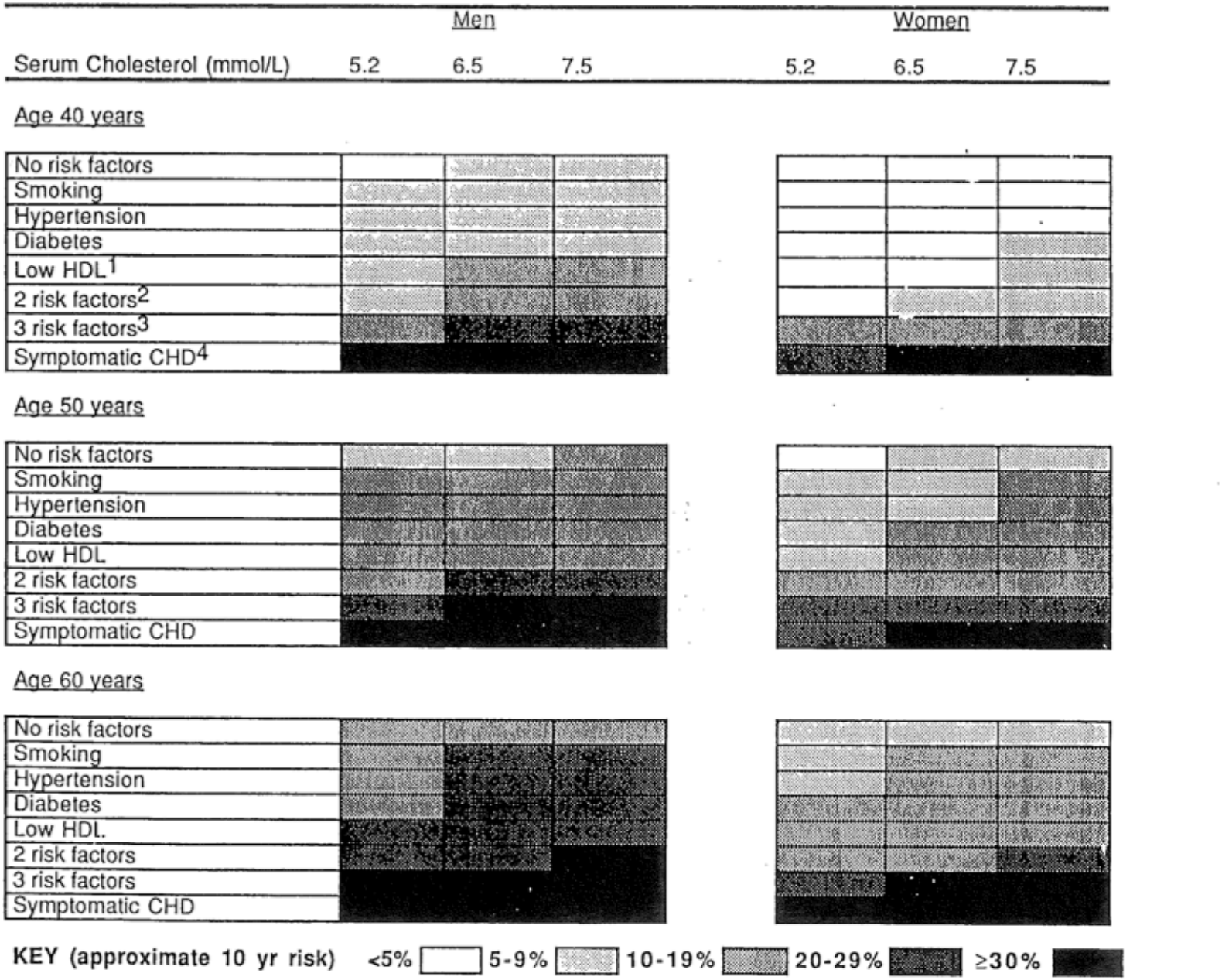
Simpson et al, NZMJ, 1978

Guidelines for detection and management of dyslipidaemia

J I Mann, PhD, DM, FRACP, Chairperson; M Crooke, PhD, FRCPA; H Fear, DipHSc, DipSci, NZRD; DR Hay, MD, FRCP, FRACP; R T Jackson, MMedSci, PhD, MCCMNZ; JM Neutze MD, FRACP; HD White, FRACP, FACC, FESC; on behalf of the Scientific Committee of the National Heart Foundation of New Zealand.

Reprinted from The New Zealand Medical Journal, 14 April 1993, Vol 106, No 953, Pages:- 133-41

Figure 1. – Approximate risk of a coronary event per 100 patients over 10 years according to risk factor profiles (based principally on the Framingham Study).



1. HDL cholesterol < 0.9mmol/L. 2. smoking and hypertension (>160/95 mmHg). 3. smoking, hypertension and low HDL.
4. angina, myocardial infarction (crude estimates based on a variety of studies which are irrespective of other risk factors).

NZMJ, 1993

IN PRACTICE

1996 National Heart Foundation clinical guidelines for the assessment and management of dyslipidaemia

Dyslipidaemia Advisory Group on behalf of the scientific committee of The National Heart Foundation of New Zealand.

NZ Med J 1996: 109: 224-32

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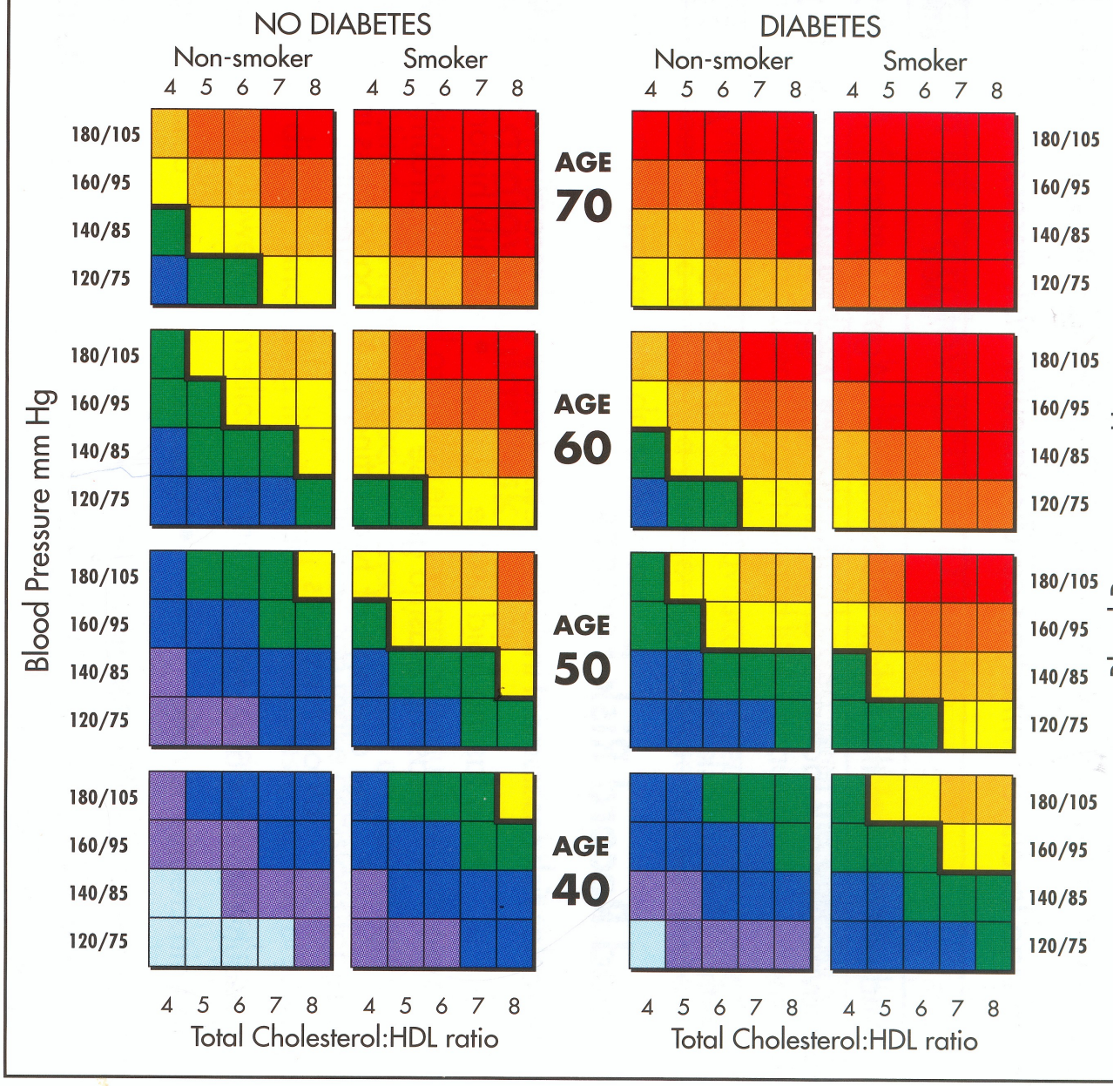
Risk level **men**



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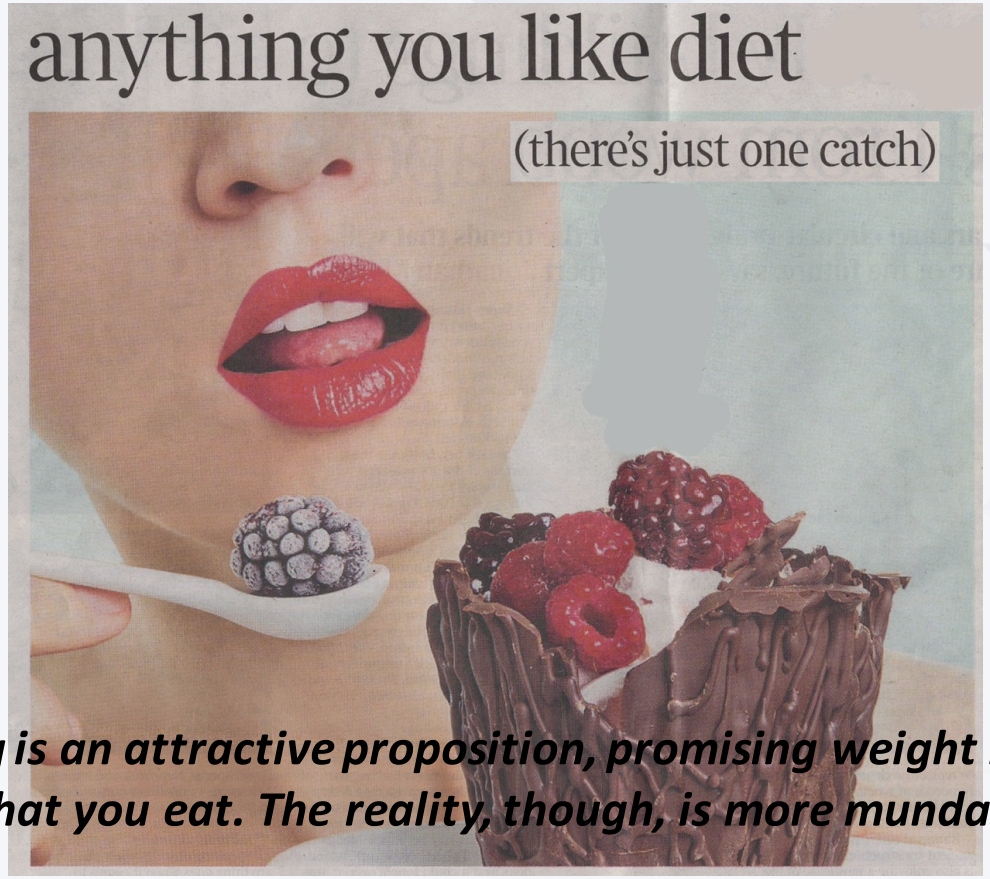


The Times, July 5 2016

Flexible dieting is an attractive proposition, promising weight loss without restricting what you eat. The reality, though, is more mundane……’

Butter is good but olive oil is better

Katie Gibbons

Butter may be good for you but swapping dairy fat for olive oil will help you to live longer, according to a 30-year study of eating habits.

People who have frequent servings of unsaturated fat, found in fish and vegetable oils, are about 20 per cent more likely to live longer, research involving 120,000 people found.

The results, published in the journal *Jama Internal Medicine*, add to the growing body of evidence supporting a traditional Mediterranean diet — rich in fish, vegetables, nuts and olive oil — over a low-fat, high-carbohydrate approach.

Experts are increasingly calling for unsaturated fats to be introduced as an integral part of national dietary guidelines, with their importance promoted in a similar way to protein, vegetables and wholegrain. The recommendation follows news that butter, which has been demonised by doctors and dieticians for decades, is neutral for health and may even protect against diabetes.

A large-scale pilot study involving people with type 2 diabetes, the results of which were revealed in *The Times*, found that a diet low in carbohydrates and rich in protein and unsaturated fat could reduce blood glucose levels in weeks.

The latest study of 126,233 people, carried out at Harvard University, found that an increase of only 2 per cent in trans fats, which are present in margarines and other "low-fat" spreads, resulted in a 16 per cent higher chance of premature death.

Similar results were seen in people who often ate cheese, fatty red meat and other foods high in saturated fat. When compared with the same number of calories from carbohydrate, every 5 per cent increase in saturated fat intake was associated with an 8 per cent higher risk of overall mortality.

However, those who consumed large amounts of olive and sunflower oil, nuts and oily fish lived between 11 and 19 per cent longer. Replacing only 5 per cent of total calorie intake from saturated fat (about 15g) with the same quantity of polyunsaturated fat was associated with a 27 per cent lower risk of premature death from heart disease, cancer and other causes.

"We need to focus on food-based guidelines to help the public, as opposed to singling out single nutrients," said Aseem Malhotra, a cardiologist at Frimley Health NHS Foundation and an active member of the Action on Sugar campaign group. "A diet high in vegetables, olive oil, oily fish and nuts is most beneficial for heart health.

"Reducing consumption of refined carbohydrates and sugar is particularly beneficial for those with and at risk of type 2 diabetes.

"As far as butter is concerned its cardiovascular effects are neutral, with some suggestion that full-fat dairy may protect against type 2 diabetes."

Nita Forouhi, of the Medical Research Council's epidemiology unit at the University of Cambridge, said: "In the currently controversial dietary fat research landscape, this large study provides robust observational evidence for the health benefits of swapping saturated fat with polyunsaturated fat.

"It is now timely and appropriate to put effort into giving clear guidance on the health benefits and harms of the food sources of fat, moving beyond the issue of types of fat, the macronutrient."

High in unsaturated fat

- Olive oil
- Canola oil
- Soybean oil
- Raw nuts
- Avocados
- Olives
- Salmon
- Herring and mackerel
- Raw pumpkin
- Sunflower and chia seeds

The New York Times http://nyti.ms/2cynH0S

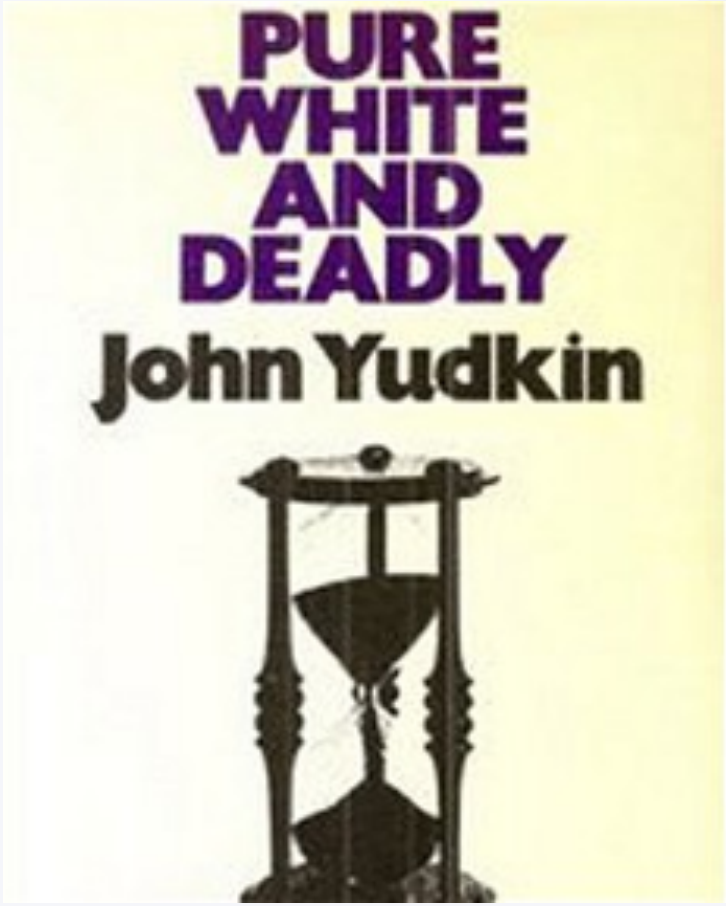
WELL EAT

How the Sugar Industry Shifted Blame to Fat

By ANAHAD O'CONNOR SEPT. 12, 2016

The sugar industry paid scientists in the 1960s to play down the link between sugar and heart disease and promote saturated fat as the culprit instead, newly released historical documents show.

The internal sugar industry documents, recently discovered by a researcher at the University of California, San Francisco, and published Monday in JAMA Internal Medicine, suggest that five decades of research into the role of nutrition and heart disease, including many of today's dietary recommendations, may have been largely shaped by the sugar industry.



Judkin, 1972

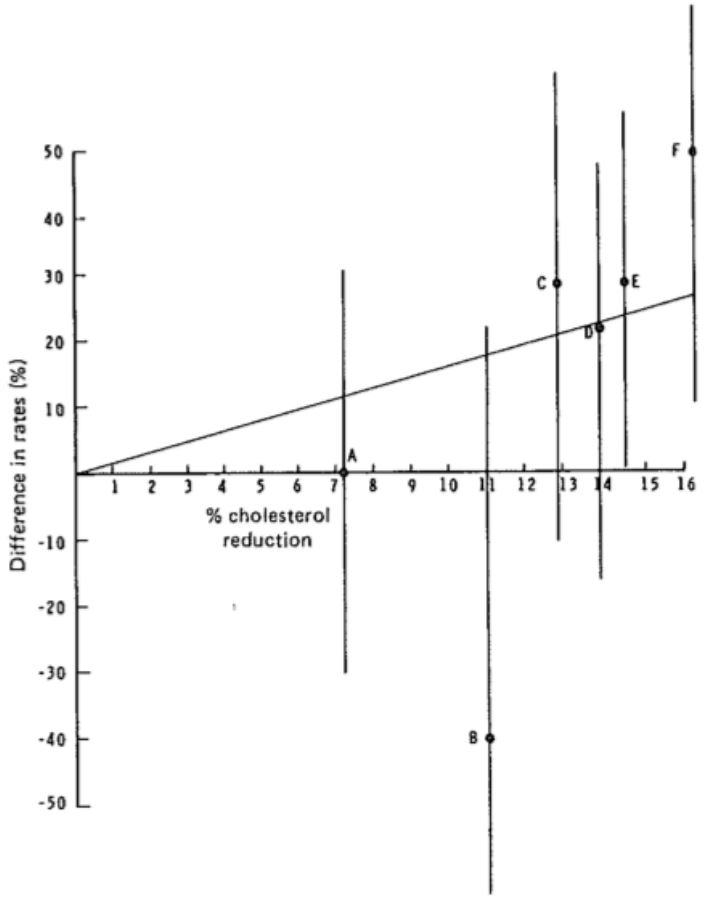


FIG. 39.1 The percentage difference in IHD rates (and confidence limits) between experimental and control groups in the randomised dietary studies of primary and secondary prevention. (The letters A–F on the figure represent references, as follows: A = 15, B = 16, C = 1, D = 17, E = 6, F = 3.)

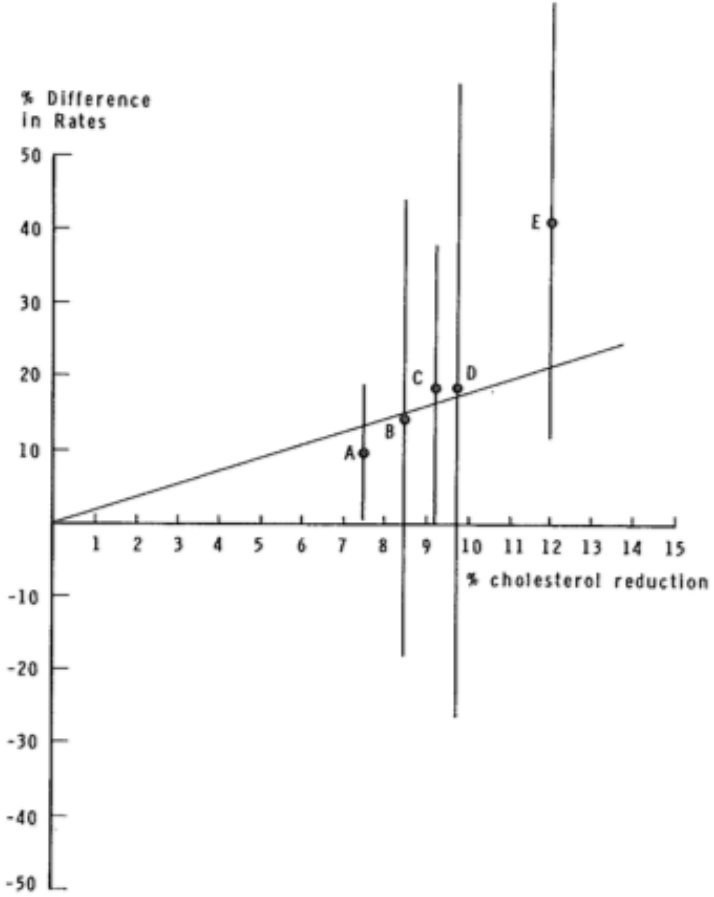


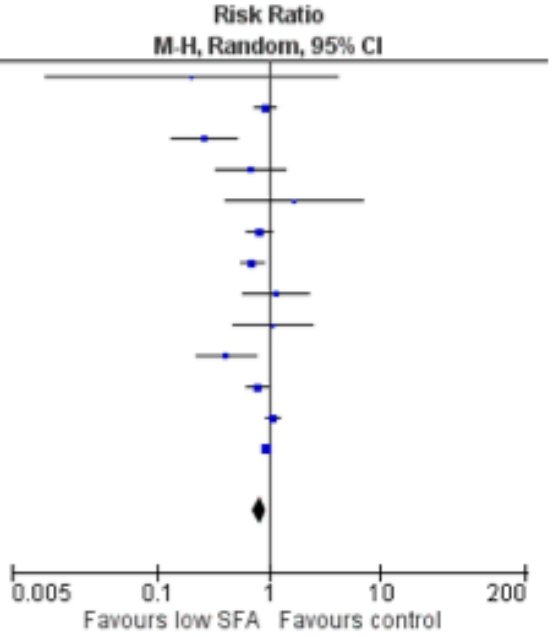
FIG. 39.2 The percentage difference in IHD rates (and confidence limits) between experimental and control groups in the randomised studies of primary and secondary prevention by drugs. (The letters A–E on the figure represent references, as follows: A = 18, B = 19, C = 11, D = 20, E = 19.)

Mann,J & Marr, J in Sleight, Vann Jones, *Scientific Foundations of Cardiology, 1983*

Figure 6. Forest plot of comparison: 1 SFA reduction vs usual diet - Primary outcomes, outcome: 1.3 Combined cardiovascular events.

Study or Subgroup	reduced SFA Events	Total	usual diet Events	Total	Weight	Risk Ratio M-H, Random, 95% CI
Black 1994	0	66	2	67	0.2%	0.20 [0.01, 4.15]
DART 1989	136	1018	147	1015	13.0%	0.92 [0.74, 1.15]
Houtsmuller 1979	8	51	30	51	3.7%	0.27 [0.14, 0.52]
Ley 2004	11	88	16	88	3.4%	0.69 [0.34, 1.40]
Moy 2001	5	117	3	118	1.0%	1.68 [0.41, 6.87]
MRC 1968	62	199	74	194	11.1%	0.82 [0.62, 1.07]
Oslo Diet-Heart 1966	64	206	90	206	11.7%	0.71 [0.55, 0.92]
Rose corn oil 1965	15	28	6	13	3.7%	1.16 [0.59, 2.29]
Rose olive 1965	11	26	5	13	2.7%	1.10 [0.48, 2.50]
STARS 1992	8	27	20	28	4.2%	0.41 [0.22, 0.78]
Veterans Admin 1969	97	424	122	422	12.5%	0.79 [0.63, 1.00]
WHI with CVD 2006	225	908	311	1369	15.3%	1.09 [0.94, 1.27]
WHI without CVD 2006	1132	18633	1777	27925	17.4%	0.95 [0.89, 1.03]
Total (95% CI)		**21791**		**31509**	**100.0%**	**0.83 [0.72, 0.96]**
Total events	1774		2603			

Heterogeneity: $Tau^2 = 0.03$; $Chi^2 = 34.25$, df = 12 (P = 0.0006); $I^2 = 65\%$
Test for overall effect: Z = 2.50 (P = 0.01)



Hooper et al, Cochrane Database Syst Rev 2015

Difference in lipid and lipoproteins on butter *vs* margarine in hypercholesterolaemic patients

	Change with margarine diet minus change with butter diet (*95% confidence interval*)	P value
Cholesterol	0.28 (0.07 to 0.49)	0.011
low density lipoprotein	0.32 (0.09 to 0.56)	0.009
high density lipoprotein	0.01 (-0.04 to 0.07)	0.482
Total triglyceride (mmol/l)	-0.10 (-0.38 to 0.16)	0.439
Apolipoprotein A I (mg/l)	1.55 (-7.66 to 11.076)	0.679
Apolipoprotein B 100 (mg/l)	8.57 (1.39 to 15.74)	0.006
Lp(a) lipoprotein (U/l)	NO CHANGE	0.605

Chisholm A, Mann J et al, BMJ 1996

TABLE 2. *Mean lipid, lipoprotein and apoprotein levels on the two experimental diets*

	High fat diet	Low fat diet	Difference*		95% CI for difference	
Total cholesterol (mmol/l)	6.4	6.0	0.4	**	0.1	0.7
Total triglyceride (mmol/l)	1.6	1.6	0.0		−0.1	0.2
LDL-cholesterol (mmol/l)	4.4	4.0	0.4	**	0.0	0.7
HDL-cholesterol (mmol/l)	1.4	1.3	0.1		0.0	0.2
ApoA1 (mg/dl)	147.4	140.8	7.3		3.2	11.3
ApoB (mg/dl)	97.8	96.8	1.0		−4.4	6.9

Chisholm A, Mann J at al, QJM, 1992

Comment

Dietary guidelines on trial: the charges are not evidence based

otago.ac.nz/cvd

Mann J, Te Morenga, L, McLean R et al, 2016 The Lancet

otago.ac.nz/cvd

CUT CARBS, QUIT SUGAR, FEEL FABULOUS

Sweet treats to help kick your cravings

PART THREE
by Karen Thomson

CUTTING back on carbs and quitting sugar should be as simple as emptying the kitchen of biscuits and cakes, and saying 'no' to that muffin with your morning coffee.

But unless you have incredibly steely willpower, there's every chance you will find yourself succumbing at some point to the charms of these sweet treats.

All this week in the Daily Mail we are serialising a fascinating new book by Karen Thomson, great-granddaughter of pioneering heart transplant surgeon, Dr Christiaan Barnard. In it, she lays out a foolproof plan for lowering your intake of carbohydrates and quitting sugar for ever — leaving you slimmer and feeling fabulous for summer.

You'll be amazed at the effect her healthy eating revolution can have on your health, your mood and your looks.

On Monday, we explained how the low-carb, healthy-fat (LCHF) diet works and gave tips for your first week's meal plan.

Yesterday, we showed how a few simple tweaks, and super-quick recipes, can help you eat healthily at every meal.

Today, we are able to reassure even those with a sweet tooth. You CAN kick your cravings with a few simple tricks and tips. And we'll give inspirational recipes for healthy desserts, cakes and biscuits that are actually good for you.

FIRST, FACE UP TO FACTS

WE ALL know sugar is bad for us. Completely devoid of nutrients and high in calories, it is causing our health to decline and our waistlines to expand.

But the buzz of pleasure given by hormones released after something sweet melts on your tongue makes sugar addictive and difficult to quit.

Taking steps to turn your back on sugar, while simultaneously increasing the healthy fats in your diet, is the best way to help keep you feeling full and satisfied (see diet plan and delicious recipes on the following pages).

But if you suspect sugar has a strong controlling hold on your life, you might need a little more ammunition if you are going to win your own war with it.

So many people — particularly women — find once they start eating sugar, it is nearly impossible to stop.

We commonly use sugar and carbohydrates to numb pain and soothe troubled feelings. Although we might tell ourselves we're only going to have one slice of bread or one small chocolate — before we know it, the whole loaf is gone and the box is finished.

Even if you suspect that your control over sugar is slight, it can be difficult to admit you might be addicted. Denial is a great form of self-defence and a means of protecting ourselves from the truth.

But if you are still craving dessert after a huge meal, if you can't eat a biscuit without polishing off most of the packet, or if you've ever hidden a chocolate wrapper — that's addictive behaviour. And, like any addiction, the best way out is to practise abstinence (quit sugar completely) and avoid all the foods, behaviours, thoughts and situations that could lead to temptation.

It's a tough call, but if sugar is your drug, you'll need to take it one day — or even one moment — at a time. The low-carb, healthy fat diet outlined in this series will help you retrain your taste buds and keep a lid on cravings, but you may also have to address the way you think and behave.

BE PREPARED

CLEAR out your fridge, freezer and cupboards and replace all the junk with healthy foods. Don't even try to keep sugary or starchy junk food in the house because sometimes no amount of willpower will stop you reaching for whatever foods you're craving.

So, get rid of biscuits, crackers, crisps, chocolates and sweets, bread, pasta and rice, processed foods, anything with ingredients you can't identify, anything with added sugar, foods labelled 'low-fat' or 'fat-free' (these are often packed with sugar to make them palatable), margarine, sugar, honey and syrups and fizzy drinks.

If you are serious about quitting sugar, you need to fill yourself with food that nourishes you.

Expect a degree of resistance from your partner and the rest of the family, but stick to your guns. Tomorrow's paper is packed with lots of advice for persuading your family to join you in your sugar-free quest.

Sugar is very bad for your health and your waistline — do you really want to be feeding this poison to the people you love?

KNOW YOUR SUGAR TRIGGERS

THINK about when, where and why you eat trigger foods. Sugar is so delicious and it's everywhere — you have to be really vigilant to avoid it.

Remember, you've had a lifetime to forge strong associations (tea = biscuits; toast = jam; dinner = pudding; filling station = chocolate bar) which can become deeply ingrained habits. These ensure a steady trickle of sugary treats to fuel your addiction.

The key to recovery is sitting down with a notepad and picking apart your day to identify your own personal triggers.

So much of our sugar and carb-guzzling behaviour is unconscious, but in identifying your weak points, you can take one big step forward to doing what you can to avoid them — and breaking your link with sugary food.

Aim to have at least three coping

TURN TO NEXT PAGE

Pictures: WILL HEAP

Daily Mail, July 6 2016

Nutrition 31 (2015)1 -13

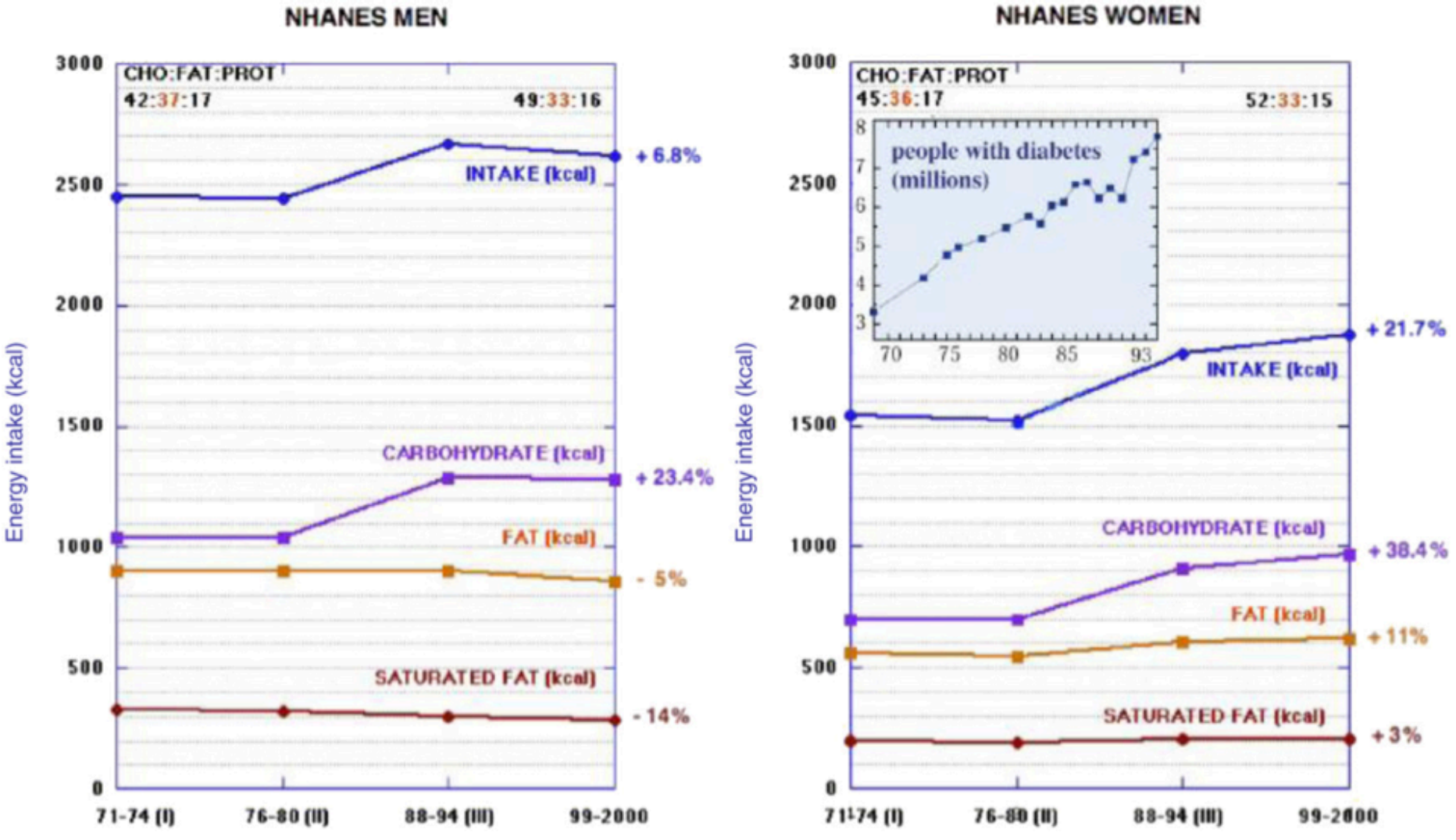
Critical Review

Dietary carbohydrate restriction as the first approach in diabetes management: Critical review and evidence base

Richard D. Feinman Ph.D.[a,*], Wendy K. Pogozelski Ph.D.[b], Arne Astrup M.D.[c], Richard K. Bernstein M.D.[d], Eugene J. Fine M.S., M.D.[e], Eric C. Westman M.D., M.H.S.[f], Anthony Accurso M.D.[g], Lynda Frassetto M.D.[h], Barbara A. Gower Ph.D.[i], Samy I. McFarlane M.D.[j], Jörgen Vesti Nielsen M.D.[k], Thure Krarup M.D.[l], Laura Saslow Ph.D.[m], Karl S. Roth M.D.[n], Mary C. Vernon M.D.[o], Jeff S. Volek R.D., Ph.D.[p], Gilbert B. Wilshire M.D.[q], Annika Dahlqvist M.D.[r], Ralf Sundberg M.D., Ph.D.[s], Ann Childers M.D.[t], Katharine Morrison M.R.C.G.P.[u], Anssi H. Manninen M.H.S.[v], Hussain M. Dashti M.D., Ph.D., F.A.C.S., F.I.C.S.[w], Richard J. Wood Ph.D.[x], Jay Wortman M.D.[y], Nicolai Worm Ph.D.[z]

Financial support from: Atkins Foundation & Low Carb Meal Replacement Company

Fig 2. Macronutrient consumption during the epidemic of obesity & type2 diabetes



Feinman et al, Nutrition, 2015

Nutr Metab Cardiovasc Dis (1994) 4:233–256

SUPPLEMENT

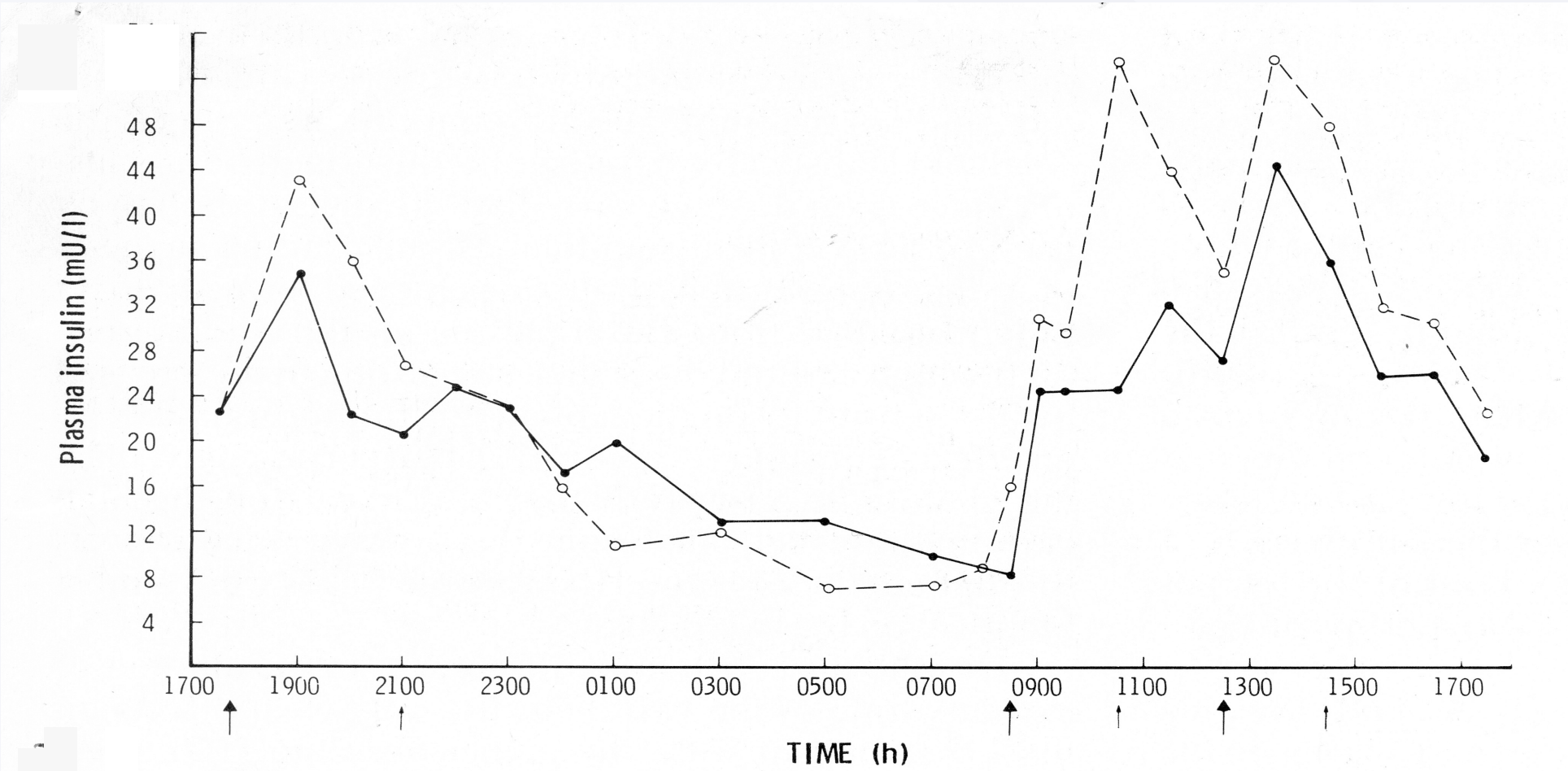
NMCD
Nutrition, Metabolism
and Cardiovascular Diseases

NEW AND CANDIDATE RISK FACTORS FOR CORONARY HEART DISEASE

A. Postiglione, S. Panico, B. Lewis (coordinators), S. Eisenberg, J. C. Fruchart, M. Hanefeld, D. D. Heistad, Y. A. Kesaniemi, J. I. Mann, A. G. Olsson, O. B. Paulson, J. P. Rossouw, D. Seidel, R. B. Singh for the Council on Arteriosclerosis of the International Society and Federation of Cardiology (ISFC)

High triglyceride, low HDL
Lp (a)
Inflammatory markers
Metabolic syndrome
Central adiposity
High insulin levels

Insulin levels during high CHO and low CHO 24 hr profiles



------- high CHO

——— low CHO

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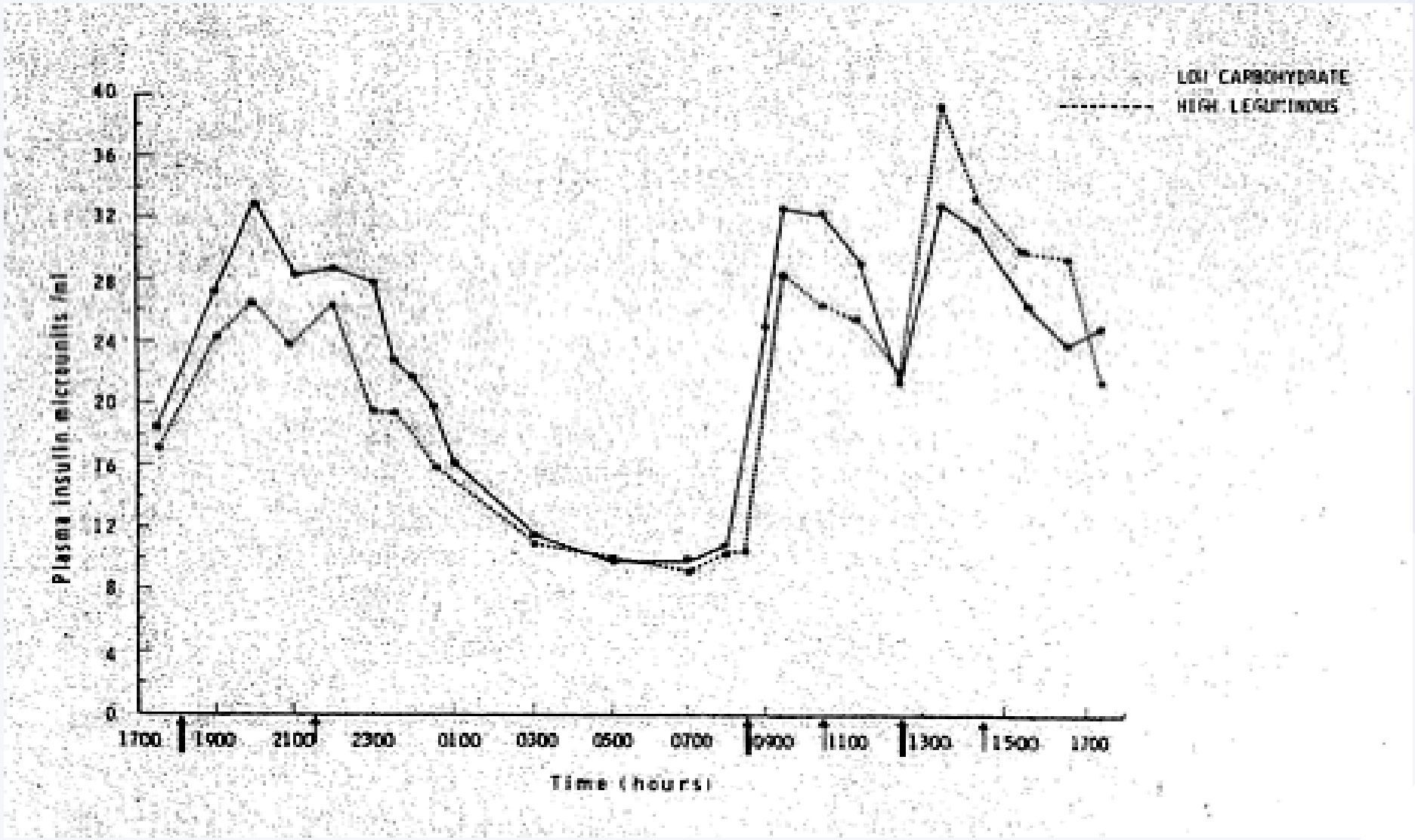
NEW ZEALAND

Plasma insulin values during 24 h profiles of type 2 patients



Comment

Low carbohydrate diets: going against the grain

Mann J, McLean R, Skeaff M et al, The Lancet, 2014

otago.ac.nz/cvd

Definition of Dietary fibre

Codex 2009

Carbohydrate polymers of ≥10 monomeric units not hydrolysed by endogenous enzymes in the small intestine

- Occur naturally in the food as consumed
- Extracted from food*
- Synthetic carbohydrate polymers*

*Where competent authorities recognise a health benefit based on generally accepted scientific evidence.

May or may not include oligosaccharides 3-9 units in length.


Works with Water
Water of life
a Rich Source of Fibre
Rhubarb & Strawberry
Natural Flavour Spring Water

Adding Fibre to Foods

✓	Low in fat
✓	High in fibre
✓	High in carbohydrate
✓	No artificial colours

Nutrition Information (Average)

Servings per package - 1
Average serving size - 90g (1 Slice†)

	Quantity Per Serving	Quantity Per 100g
Energy	1230 kJ	1360 kJ
Protein	6.1 g	6.8 g
Fat		
- Total	1.6 g	1.8 g
- Saturated	0.5 g	0.6 g
Carbohydrate		
- Total	60.5 g	67.2 g
- Sugars	29.2 g	32.4 g
Dietary Fibre	4.4 g	4.9 g
Sodium	135 mg	150 mg
Potassium	374mg	415 mg

† Weight of slice is approximate and is only to be used as a guide. If you have any specific dietary requirements please weigh your serving.