

- Gustafsson I, Vessby B, Karlstrom B, Boberg J, Boberg M, and Lithell H. Effects on the serum lipoprotein concentrations by lipid-lowering diets with different fatty acid compositions. *J Am College Nutr* 1985; 4:241-248.
- Hage B, Wahlqvist M L, Oliver G, and Powles J. Changes in food intake pattern in adult ethnic Chinese: A choice of rice or bread? *The Melbourne Chinese Health Study [Abs] Proceedings of the 6th Asian Congress of Nutrition, Kuala Lumpur, Malaysia. 1991; 185.*
- Harris W S, Connor W E, and McMurray M P. The comparative reductions of the plasma lipids and lipoproteins by dietary polyunsaturated fats: salmon oil versus vegetable oils. *Metabolism* 1983; 32:179-184.
- Hartung G H, Foreyt J P, Mitchell R E, Mitchell J G, Reeves R S and Gotto A M Jr. Effect of alcohol intake on high-density lipoprotein cholesterol levels in runners and inactive men. *J Am Med Assoc* 1983; 249:747-750.
- Hashim S A, Argeaga A, and Van Itallie T B. Effect of a saturated medium-chain triglyceride on serum-lipids in man. *Lancet* 1960; 1:1105-1108.
- Hayes K C, Khosla P, Pronczuk A, and Lindsey S. Dietary fatty acids and the regulation of the plasma lipoprotein profile. Abstracts—6th Asian Congress of Nutrition, Kuala Lumpur, Malaysia, 1991a.
- Hayes K C, Pronczuk A, Lindsey S, and Diersen-Schade D. Dietary saturated fatty acids (12:0, 14:0, 16:0) differ in their impact on plasma cholesterol and lipoproteins in non-human primates. *Amer J Clin Nutr* 1991b; 53:491-8.
- Hegsted D M, McGrandy R B, Myers M L, and Stare F J. Quantitative effects of dietary fat on serum cholesterol in man. *Am J Clin Nutr* 1965; 17:281-295.
- Hegsted D M. Serum-cholesterol response to dietary cholesterol: a re-evaluation. *Am. J. Clin. Nutr.* 1986; 44:299-305.
- Hjermann I, Velve Byre K, Holme I, and Leren P. Effect of diet and smoking intervention on the incidence of coronary heart disease. Report from the Oslo Study Group of a randomised trial in healthy men. *Lancet* 1981; 2:1303-1310.
- Igarashi K and Inagaki K. Effects of the Major Anthocyanin of Wild Grape (*Vitis coignetiae*) on Serum Lipid Levels in Rats. *Agric Biol Chem*, 1991; 55(1):285-287.
- Igarashi K, Shinobu A and Satoh J. Effects of Atsumi-kabu (Red Turnip, *Brassica campestris* L.) Anthocyanin on Serum Cholesterol Levels in Cholesterol-fed Rats. *Agric Biol Chem*, 1990; 54(1):171-175.
- Illingworth D R, Harris W S, and Connor W E. Inhibition of low density lipoprotein synthesis by dietary omega-3 fatty acids in humans. *Arteriosclerosis* 1984; 4:270-275.
- Jenkins D J A, Rainey-Macdonald C G, Jenkins A L and Benn G. Fiber in the treatment of hyperlipidemia. Pp. 327-344 in G A Spiller, ed. *CRC Handbook of Dietary Fiber in Human Nutrition*. CRC Press, Boca Raton, Fla., 1986.
- Jenkins D J A, Reynolds D, Leeds A R, Waller A L, and Cummings H H. Hypocholesterolemic action of dietary fiber unrelated to fecal bulking effect. *Am J Clin Nutr* 1979; 32:2430-2435.
- Katan M B, Berns M A, Glatz J F, Knuiman J T, Nobels A, and de Vries J H. Congruence of individual responsiveness to dietary cholesterol and to saturated fat in humans. *J Lipid Res* 1988; 29:883-892.
- Keys A, Anderson J T, and Grande F. 'Essential' fatty acids, degree of unsaturation, and effect of corn (maize) oil on the serum-cholesterol level in man. *Lancet* 1957a; 1:66-68.
- Keys A, Anderson J T, and Grande F. Diet-type (fats constant) and blood lipids in man. *J Nutr* 1960; 70 - 257-266.
- Keys A, Anderson J T, and Grande F. Prediction of serum-cholesterol responses of man to changes in fats in the diet. *Lancet* 1957b; 2:959-966.
- Keys A, Anderson J T, and Grande F. Serum cholesterol in man: diet fat and intrinsic responsiveness. *Circulation* 1959; 19:201-214.
- Keys A, Anderson J T, and Grande F. Serum cholesterol response to changes in the diet III. Differences among individuals. *Metabolism* 1965b; 14:766-775.
- Keys A, Anderson J T, and Grande F. Serum cholesterol response to changes in the diet IV. Particular saturated fatty acids in the diet. *Metabolism* 1965a; 14:776-787.
- Kinsell L W, Partridge J, Boling L, Margen S, and Michaels G. Dietary modification of serum cholesterol and phospholipid levels. *J Clin Endocrinol* 1952; 12:909-913.
- Kritchevsky D. The effect of dietary garlic on the development of cardiovascular disease. *Trends in Food Science and Technology* June 1991; pp141-144.
- Kromhout D, Bosschieter E B, and de Lezenne Coulander C. Dietary fibre and 10 year mortality for coronary heart disease, cancer and all causes. *Lancet* 1984; 2, 518-521.

- Kromhout D, Bosschieter EB, and de Lezenne Coulander C. The inverse relation between fish consumption and 20 year mortality from coronary heart disease. *N Engl J Med* 1985; 312:1205-1209.
- Kushi L, Lew R A, Stare FJ, Ellison C R, Lozy M E, Bourke G, Daly L, Graham I, Hickey N, Mulcahy R, and Kevaney J. Diet and 20 year mortality from coronary heart disease. The Ireland-Boston Diet-Heart Study. *New Engl J Med* 1985; 312, 811-818.
- Lapidus L and Bengtsson C. Socioeconomic factors and physical acitivity in relation to cardiovascular disease and health. A 12 year follow up of participants in a population study of women in Gothenburg, Sweden. *Br Heart J*. 1986; 55, 295-301.
- Leren P. The oslo dietheartstudy: 11 year report. *Circulation* 1970; 42: 935-42
- Lieber C S, Jones D P, Mendelson J, and DeCarli L M. Fatty liver, hyperlipemia, and hyperuricemia produced by prolonged alcohol consumption, despite adequate dietary intake. *Trans Assoc Am Physicians* 1963; 76:289-300.
- Lipid Research Clinics Program. The Lipid Research Clinics Coronary Primary Prevention Trial results. I. Reduction in incidence of coronary heart disease. *J Am Med Assoc* 1984a; 251:351-364.
- Lipid Research Clinics Program. The Lipid Research Clinics Coronary Primary Prevention Trial results. II. The relationship of reduction in incidence of coronary heart disease to cholesterol lowering. *J Am Med Assoc*. 1984b; 251:365-374.
- LSRO (Life Sciences Research Office). 1987. *Physiological Effects and Health Consequences of Dietary Fiber*. Federation of American Societies for Experimental Biology, Bethesda, Md. 236 pp.
- MacDonald I. Interrelationship between the influences of dietary carbohydrates and fats on fasting serum lipids. *Am J Clin Nutr* 1967; 20:345-51.
- Malmros H, and Wigand G. The effect on serum-cholesterol of diets containing different fats. *Lancet* 1957; 2:1-7.
- Mattson F H, and Grundy S M. Comparison of effects of dietary saturated, monounsaturated, and polyunsaturated fatty acids on plasma lipids and lipoproteins in man. *J Lipid Res*. 1985; 26:194-202.
- McLennan R, Ward M, MacRae F, Wahlqvist M, Goulston K, Ngu M, Battistutta D, and Gratten H, for the the Australian Polyp Prevention Project (APPP) Research Team. Effect of fat fibre and beta-carotene intake on the occurrence of colorectal adenomas after 24 months. *Gastronterology* 1991; 100: A382.
- Mensink R P, and Katan M B. Effect of dietary trans fatty acids on high-density and low-density lipoprotein cholesterol levels in healthy subjects. *N Engl J Med* 1990, 323 pp 439-445.
- Mensink R P, and Katan M B. Effect of monounsaturated fatty acids versus complex carbohydrates on high-density lipoproteins in healthy men and women. *Lancet* 1987; 1: 122-125.
- Miettinen M, Turpeinen O, Karvanon M J, Elosuo R, and Paavilainen E. Effect of cholesterol-lowering diet on mortality from coronary heart-disease and other causes. A twelve year clinical trial in men and women. *Lancet* 1972; 2:835-838.
- Miettinen T A. Impact of apo E phenotype on the regulation of cholesterol metabolism. *Ann Med* 1991; 23: 181 6
- Morris J N, Marr J W, and Clayton D G. Diet and heart: a postscript. *Br Med J*. 1977; 2, 1307-1314.
- Morrison L M. A nutritional program for prolongation of life in coronary atherosclerosis. *JAMA* 1955; 159: 1425
- MRFIT (Multiple Risk Factor Intervention Trial) Research Group. Multiple Risk Factor Intervention Trial: risk factor changes and mortality results. *J Am Med Assoc*. 1982; 248:1465-1477.
- National Heart Foundation of Australia. *Risk Factor Prevalence Survey No.2* 1983. Canberra: National Heart Foundation of Australia, 1985
- Nestel P J. Nutritional Control of Cardiovascular risk factors. Cardiovascular risk factors. *Lipidology* 1991; 1 (5): 259-264.
- Oakenfull D, and Sidhu G S. Could saponins be a useful treatment for hypercholesterolaemia? *Eur J Clin Nut* (1990) 44:79-88.
- Ornish D, Brown S E, Scherwitz L W, Billings J H, Armstrong W T, Ports T A, McLanahan S M, Kirkeeide R L, Brand R S, and Gould K L. Can lifestyle changes reverse coronary heart disease? The Lifestyle Heart Trial. *Lancet* 1990; 336:129-33.
- Qureshi A A, Qureshi N, Hasler-Rapacz J O, Weber F E, Chaudhary V, Crenshaw T D, Gapor A, Ong A S H, Chong Y H, Peterson D, and Rapacz J. Dietary tocotrienols reduce

- concentrations of plasma cholesterol, apolipoprotein B, thromboxane B₂, and platelet factor 4 in pigs with inherited hyperlipidaemias. *Amer J Clin Nutr* 1991; (Supp) 53:1042S-6S.
- Qureshi A A, Qureshi N, Wright J J K, Shen Z, Kramer G, Gapor A, Chong Y H, DeWitt G, Ong A S H, Peterson D M, and Bradlow B A. Lowering of serum cholesterol in hypercholesterolemic humans by tocotrienols (Palmvitee). *Amer J Clin Nutr* 1991; (Supp) 53:1021S-6S.
- Research Committee to the Medical Research Council. Controlled trial of soya-bean oil in myocardial infarction. *Lancet* 1968; 2:693-700.
- Research Committee to the Medical Research Council. Low fat diet in Myocardial infarction—a controlled trial. *Lancet* 1965; 2:501-504.
- Riemersma R A, Wood D A, MacIntyre C C A, Elton R A, Gey K F and Oliver M F. Risk of angina pectoris and plasma concentrations of vitamins A, C and E and carotene.
- Risk factor Prevalence Study Management Committee. *Risk Factor Prevalence Survey No.3 1989*. Canberra: National Heart Foundation of Australia and Australian Institute of Health, 1990.
- Rogers A E, Connor B, Boulanger C, and Lee S. Mammary tumorigenesis in rats fed diets high in lard. *Lipids* 1986; 21:275-280.
- Rose G, Thompson W B, and Williams R T. Corn oil in treatment of ischaemic heart disease. *Br Med J* 1965; 1: 1531-3.
- Savolainen M J, Pantala M, Kervinen K, Jarvi L, Savanto K, and Rankla T. Magnitude of dietary effects on plasma cholesterol concentration: role of sex and apolipoprotein E phenotype. *Atherosclerosis* 1991; 86: 145-52.
- Shao F C. (1982): Study of synthetic calicin on the prevention and treatment of atherosclerosis. *Acta Nutr Sinica* 4, 109-116.
- Shekelle R B, and Stamler J. Dietary cholesterol and ischaemic heart disease. *Lancet*, 1989, i:1177-1179.
- Sirtori C R, Gatti E, Mantero O, Cinti F, Agradi E, Tremoli E, Sirtori M, Fraterrigo L, Tavazzi L, and Kritchevsky D. Clinical experience with the soybean protein diet in the treatment of hypercholesterolemia. *Am J Clin Nutr*. 1979; 32:1645-1658.
- Sirtori C R, Zucchi-Dentone C, Sirtori M, Gatti E, Descovich G C, Gaddi A, Cattin L, Da Col P G, Senin U, Mannarino E, Avellone G, Colobo L, Fragiaco C, Nosedà G, and Lenzi S. Cholesterol-lowering and HDL-raising properties of lecithinated soy proteins in type II hyperlipidemic patients. *Ann Nutr Metab* 1985; 29:348-357.
- Strandberg T E, Salomaa V V, Naukkarinen V A, Vanhanen H T, Samma S J, and Miettinen T A. Long-term mortality after 5 year multifactorial prevention of cardiovascular diseases in middle-aged men. *JAMA* 1991; 266: 1225-9.
- Thuesen L, Nielsen T T, Thomassen A, Bagger J P, and Henningsen P. Beneficial effect of a low-fat low-calorie diet on myocardial energy metabolism in patients with angina pectoris. *Lancet* 1984; 2: 59-62.
- Tilvis R S, and Miettinen T A. Serum plant sterols and their relation to cholesterol absorption. *Am J Clin Nutr* 1986 43; 1:92-7.
- Van Raaij J M A, Katan M B, and Hautvast G A J. Casein, Soya protein, serum-cholesterol. *Lancet* 1979; 2:958.
- Vandongen R, Codde J P, Mori T A, Stanton K G, and Masarei J R L. Hypercholesterolaemic effect of fish oil in insulin-dependent diabetics. *Med J Aust* 148, 1988; 141-143.
- Wahlqvist M L, Hage B, Powles J, and Oliver G. Food variety is protective against cardiovascular risk: A case study of adult Chinese women. *The Melbourne Chinese Health Study [Abs] Proceedings of the 6th Asian Congress of Nutrition, Kuala Lumpur, Malaysia*. 1991; 159.
- WHO (World Health Organization) European Collaborative Group. Multifactorial trial in the prevention of coronary heart disease: 3. Incidence and mortality results. *Eur. Heart J*. 1983; 4:141-147.
- Wilcox G, Wahlqvist M L, Burger H G, and Medley G. Oestrogenic effects of plant foods in postmenopausal women. *Br Med J* 1990; 301:905-6.
- Wolfe B M, Taves E H, and Giovannetti P M. Low protein diet decreases serum cholesterol in healthy human subjects. *Clin Invest Med*. 1986; 9:A43.
- Wood D A, Butler S, Riemersma R A, Thomson M, and Oliver M F. Adipose tissue and platelet fatty acids and coronary heart disease in Scottish men. *Lancet* 1984; ii: 117-21.
- Wood D A, Riemersma R A, Butler S, Thompson M, Macintyre C, and Elton R A. Linoleic and eicosapentaenoic acids in adipose tissue and platelets and risk of coronary heart disease. *Lancet* 1987; i:177-83.
- Woodhill J M, Palmer A J, Leelarthapin B, McGilchrist C, and Blacket R B. Low fat low cholesterol diet in secondary prevention of coronary heart disease. *Adv Exp Med Biol* 1978; 109: 317-31.

Yano K, Rhoads G G, Kagan A and Tillotson J. Dietary intake and risk of coronary heart disease in Japanese men living in Hawaii. *Am J Clin Nutr.* 1978; 31:1270-1279.

Zock P L, Katan M B, Merkus M P, van Dusseldorp M V, and Hrryvan J L. Effect of a lipid rich-fraction from boiled coffee on serum cholesterol. *Lancet* 1990; 335: 1235-7.

Table 1

Studies of dietary intervention aiming for a reduction in cardiovascular mortality or incidence.

Study/ Author	Study Design	Study Population	Diet	Cholesterol Reduction	Major Findings
Primary Prevention Trials					
Los Angeles Veterans Administration Study Dayton et al 1969	Randomised	846 male aged 55 to 89	High P/S ratio	13%	31% reduction in all cardiovascular events. No reduction in total mortality
Finnish Mental Hospital Study Miettinen et al 1972	Cross-over		High P/S ratio (1.42-1.78)		Reduced mortality from CHD. No reduction in total mortality
Secondary Prevention Trials					
Morrison Not randomised	2 groups aged 40-79	100 subjects	Low fat	29%	Reduced mortality
Rose et al	Randomised	80 subjects <70yo studied for 2 years	Low fat added corn and olive oils	Corn oil 20% Olive oil no change	No differences in morbidity or mortality between the two groups.
MRC 1965	Randomised	252 subjects <65yo studied	Low fat	17%	No reduction in morbidity or mortality years
MRC 1968	Randomised	393 subjects <60yo studied for 2-6 years	High P/S ratio soya-bean oil	17% at 3 years	Reduced relapse rate No reduction in cardiovascular mortality.
Leren 1970	Randomised	412 subjects 30-64yo studied for	High P/S ratio. (2.4) years	18%	Reduced mortality due to myocardial infarction. No difference in total mortality
Bierenbaum et al 1973	Not randomised but matched controls.	200 subjects aged 30-60yo studied for 10 years.	High P/S ratio. (2.6)	10%	Reduced mortality from myocardial infarction. And reduced total mortality
Woodhill et al 1978	Randomised	458 subjects aged 30-59 studied for years	High P/S ratio. (1.5)	Intervention 11%. Controls 7%.	No difference in mortality
Burr et al	Randomised	2033 men studied for years	Low fat, high fibre, or increased fish intake		29% reduction in all cause mortality in those on the increased fish intake

Chairman: Thank you very much, Mark. We have five minutes for burning questions, and we are going to recognise the consensus panel first because of the nature of this conference. I would just like to remind people that there will be at least 15 minutes for questions at the end of this morning's session. So, to begin with, can I ask those on the consensus panel for their questions for Mark Wahlqvist. Professor Beilin.

Professor Beilin: Thank you very much, Mark. I wonder if I can now pin you down to some specifics. If you have a patient with hyperlipidaemia, let's say a man with a cholesterol of 8.5, and you are starting with dietary therapy, how would you monitor that dietary therapy, and what would be the evidence that would constitute whether the therapy was successful or not? Tell us how you deal with that.

Professor Wahlqvist: Well, firstly, from what I have said, the effects of diet of importance to the patient in respect of both cardiovascular and other end points are ones that have to do with more than simply the lipoprotein pattern—the cholesterol of eight or so. So, we have no choice but to monitor the diet itself as an end point. We would be looking for a diversification of the diet: variety, which presumably would generate a wide range of nutrients and non-nutrients of potential value; a lower intake of saturated fat; an increased intake of plant food; and, in the cultural settings that we see in Australia with low consumption of fish, an encouragement to eat more fish—maybe two or three serves a week, at least. These are worthy end points in their own right.

The other thing, of course, is to look at changes in body composition. Most of the dietary changes will facilitate a reduction in body fatness—total and abdominal. These weight–height relationships and a more direct assessment of fatness, like abdominal circumference, are important.

Finally, in relation to lipoproteins, one cannot adequately assess them without total cholesterol, HDL and triglycerides, and possibly Lp (a). But that is still a way to consider what diet might do in a favourable sense to lipoproteins. In the longer term we will be looking at non-invasive end points for monitoring vascular disease, as well as looking at lipoproteins.