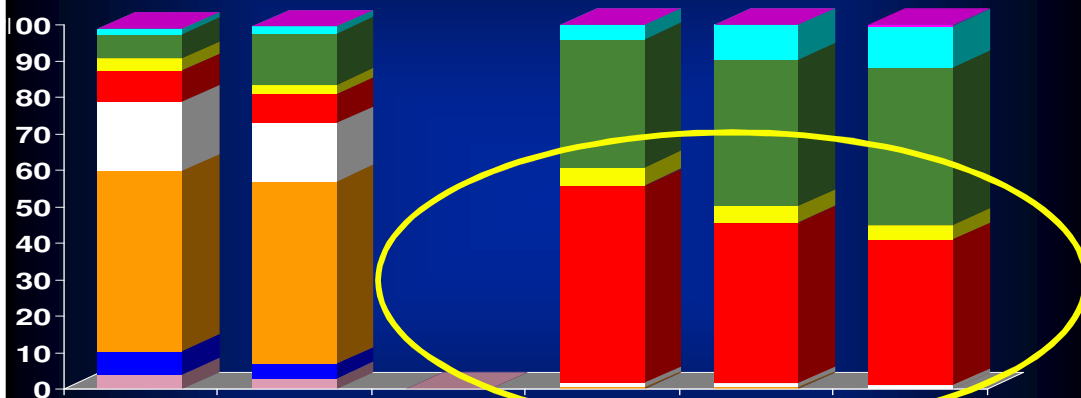


New Thinking on Saturated Fats

Pramod Khosla, PhD

Associate Professor,
Dept. of Nutrition & Food Science,
Wayne State University,
Detroit, MI 48202

Saturated fat → Increases LDL-C → Increases CHD risk.
...So Saturated fat → Increases CHD risk !



- Major saturated fatty acid in palm oil is palmitic acid

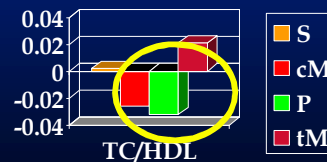
Effects of dietary fatty acid *classes* on serum cholesterol have been appreciated since the 1950s

- **KEYS (1957, 1965)**
 $\Delta\text{TC} = 2.7\Delta\text{S} - 1.35\Delta\text{P} + 1.5\Delta\text{C}^{1/2}$ (mg/1000 kcal)
- **HEGSTED (1965, 1986)**
 $\Delta\text{TC} = 2.16\Delta\text{S} - 1.65\Delta\text{P} + 0.10\Delta\text{C}$ (mg/1000 kcal)
- **MONOS and 18:0 CONSIDERED NEUTRAL**

So what are the effects of fatty acids classes on lipoprotein cholesterol?

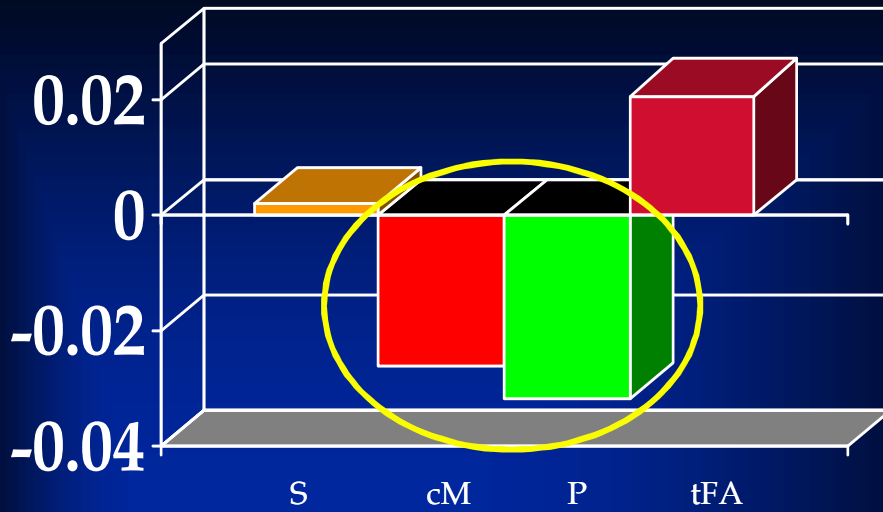


*MUFA & PUFA best.
Trans worse than SFA*



Changes shown in mmol/L for LDL and HDL. Adapted from Mensink et al Am J Clin Nutr (2003) 77: 1146-1155

Effects on the TC/HDL-C ratio

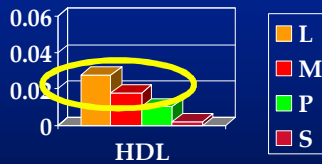
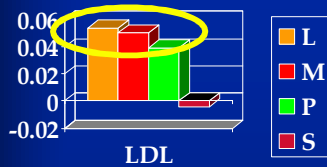


CHO → FA

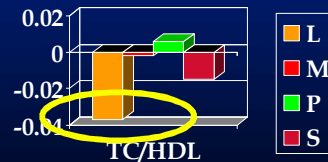
Am J Clin Nutr (2003) 77: 1146-1155

*MUFA & PUFA best.
Trans worse than SFA*

Effects of individual SFA on lipoprotein cholesterol



*14:0, 16:0 no effect
18:0, 12:0 beneficial*



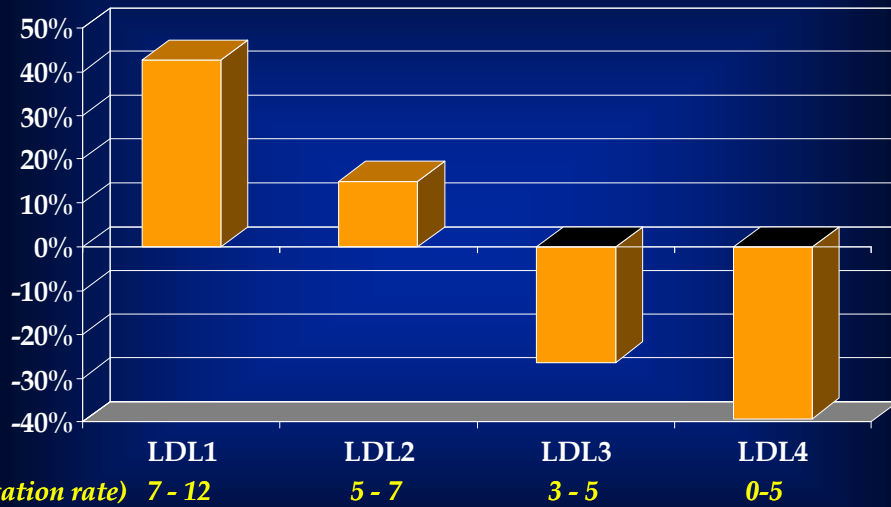
Changes shown in mmol/L for LDL and HDL. Adapted from Mensink et al Am J Clin Nutr (2003) 77: 1146-1155

Major saturated fatty acid in palm oil is palmitic acid

- Saturated fat → Increases LDL-C → Increases CHD risk
- Saturated fat → Increases CHD risk !

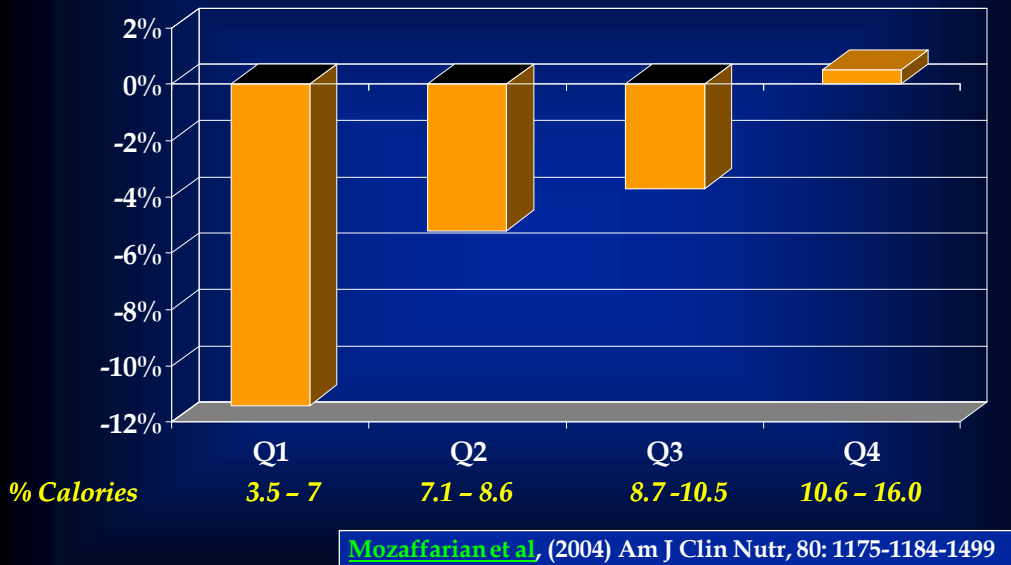
- Does it?? Some interesting bits of data.....

*Changes in LDL subfraction mass. Low → high fat diets
(24% cal → 45% cal: SFA 6% cal → 18% cal)*

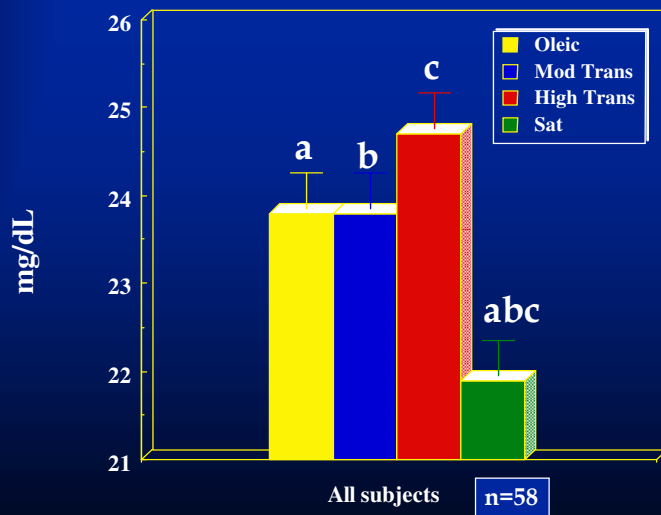


Dreon et al (1984) Am J Clin Nutr, 67: 828-836

Saturated fat intake and Changes in mean minimal Coronary Arterial Diameter in post-menopausal women



SFA lower Lp(a) concentrations ?



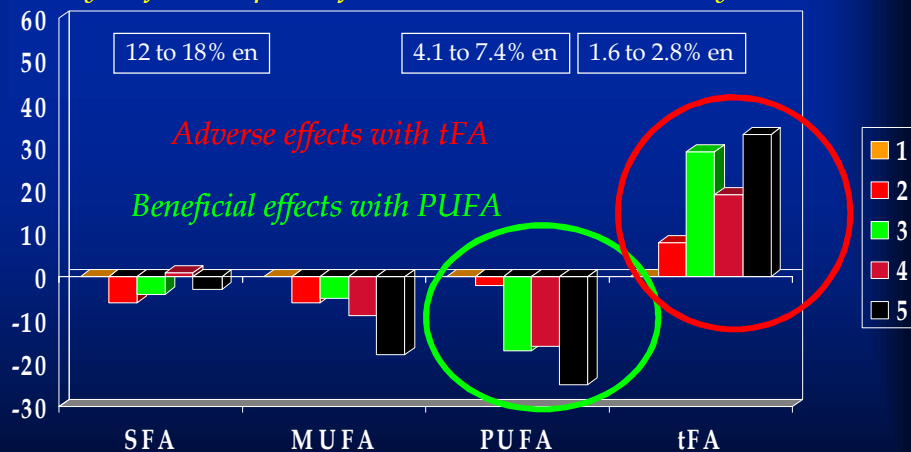
Clevidence et al, (1997) Arterioscler. Thromb. Vasc. Biol. 17, 1657-1661,

Major saturated fatty acid in palm oil is palmitic acid

- Saturated fat → Increases LDL-C → Increases CHD risk
- Saturated fat → Increases CHD risk !

- So what about CHD??

Relative risk of CHD based on quintiles of dietary fatty acid intake
(Multivariate analyses)
20 year follow-up data from the Nurses Health Study



from Oh et al (2005) Am J Epidemiol, 161: 672-679

If SFA decreased – what should be the replacement?

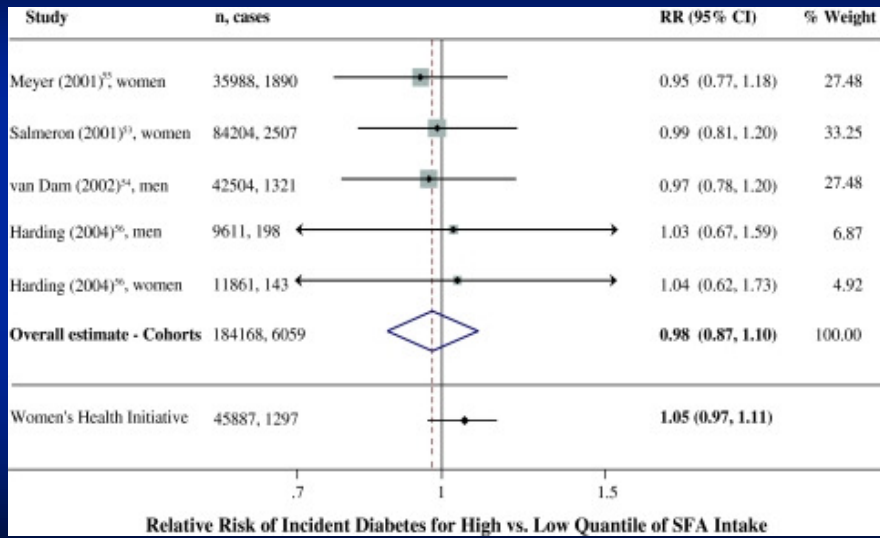
- Pooled analysis of 11 studies. 4-10 year follow-up
- Pooled RR evaluated in 344, 696 subjects (5, 249 coronary events , 2155 coronary deaths)
- Risk of coronary events decreased when 5% energy from SFA replaced with PUFA not MUFA or carbohydrates

Jakobsen et al , (2009) Am J Clin Nutr 89: 1425 - 1432

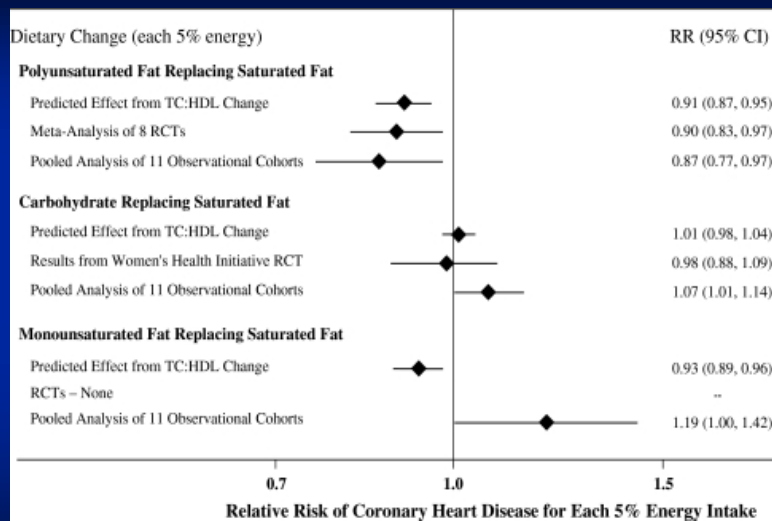
Additional meta-analysis showed no significant evidence for concluding SFA increase CHD risk

- 5-23 year follow-up
- Pooled RR evaluated in 347, 747 subjects (11, 006 developed CHD or stroke)
- Pooled RR for CHD - 1.07 (p=0.22)
- Pooled RR for Stroke - 0.81 (p=0.11)
- Pooled RR for CVD - 1.00 (p=0.89)

Siri-Tarino et al , (2010) Am J Clin Nutr 91: 535 - 546



Micha and Mozaffarian , (2010) Lipids 45: 893-905



Micha and Mozaffarian , (2010) Lipids 45: 893-905

... .. *practical aspects*

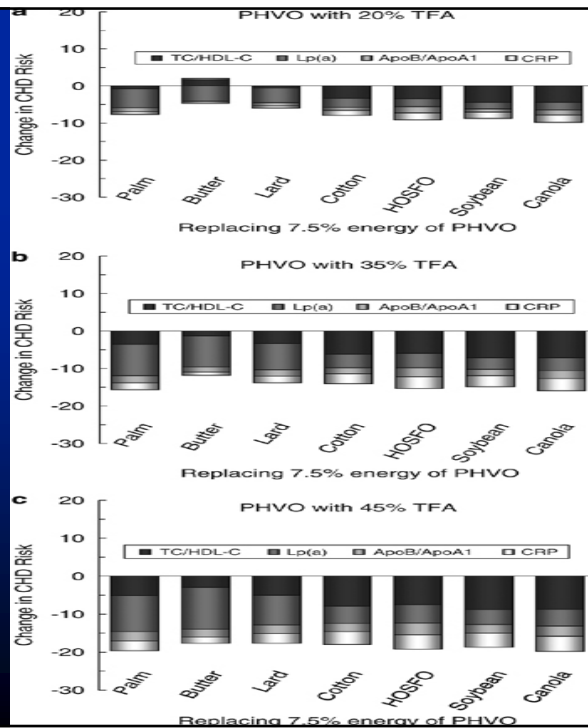
SFA vs tFA- not a realistic comparison

Look at specific fats/oils replacing PHVO containing tFA

CHD risk based not just on changes in plasma lipoproteins.

Report of [Mozaffarian and Clarke \(2009\)](#) is of interest

Also risk assessment papers ([Barraj et al 2008](#), [Mente et al 2009](#))



Summary

Palm Oil and its products – serve a multitude of nutritional needs

Adequate supply makes palm oil *the* important player on the global stage

Natural fatty acid profile of palm eliminates need for hydrogenation – so ideal for trans fat-free formulations.

Even if trans FA replaced exclusively with **SFA**, CHD risk improved

Vast array of products using palm oil blended with other oils already in the US

Current thinking that SFA – may not be the right focus.
Advising reductions in SFA → increased carbs