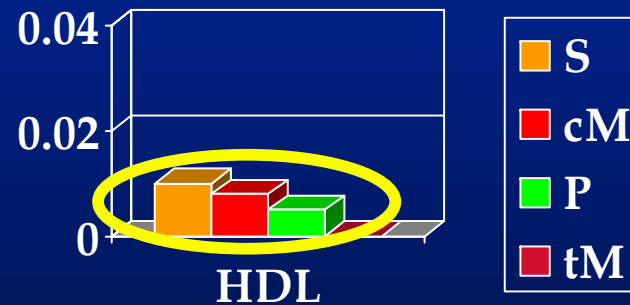
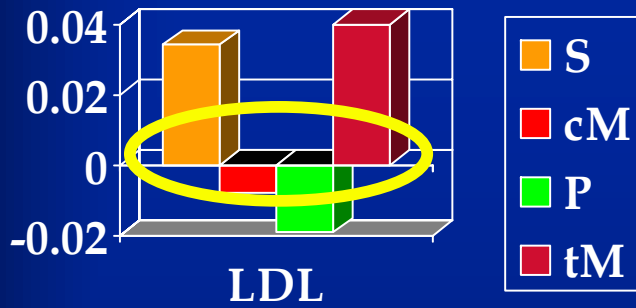


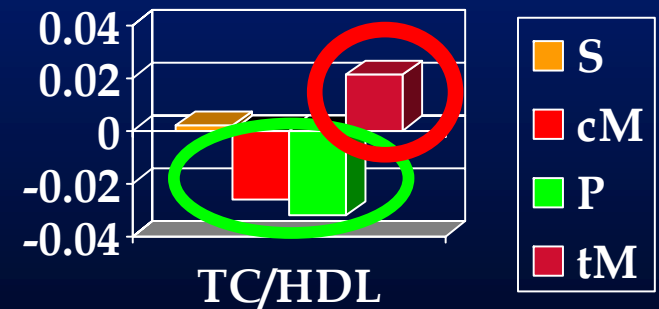
US Dietary Guidelines: Reconciling Health and Supply Issues of Dietary Fats in the Post-Trans Era

Pramod Khosla, PhD
Dept. of Nutrition & Food Science,
Wayne State University,
Detroit, MI 48202

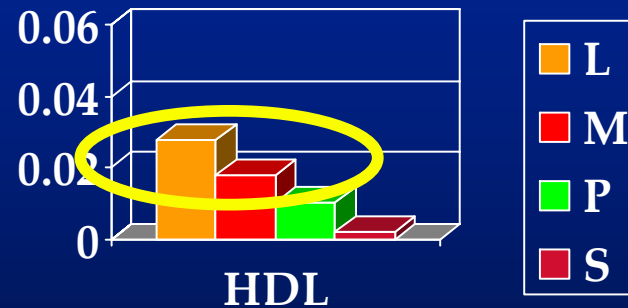
Current consensus on the effects of dietary fatty acids classes on lipoprotein cholesterol



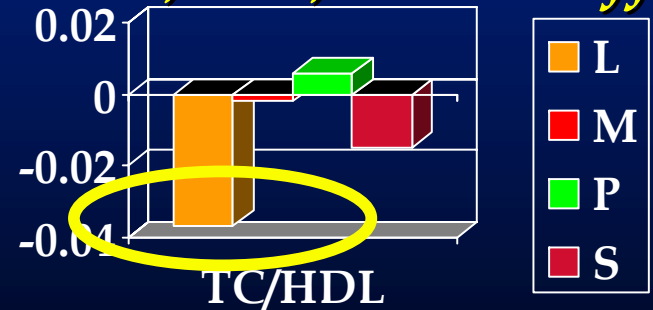
*MUFA & PUFA best.
SFA no effect
Trans worst*



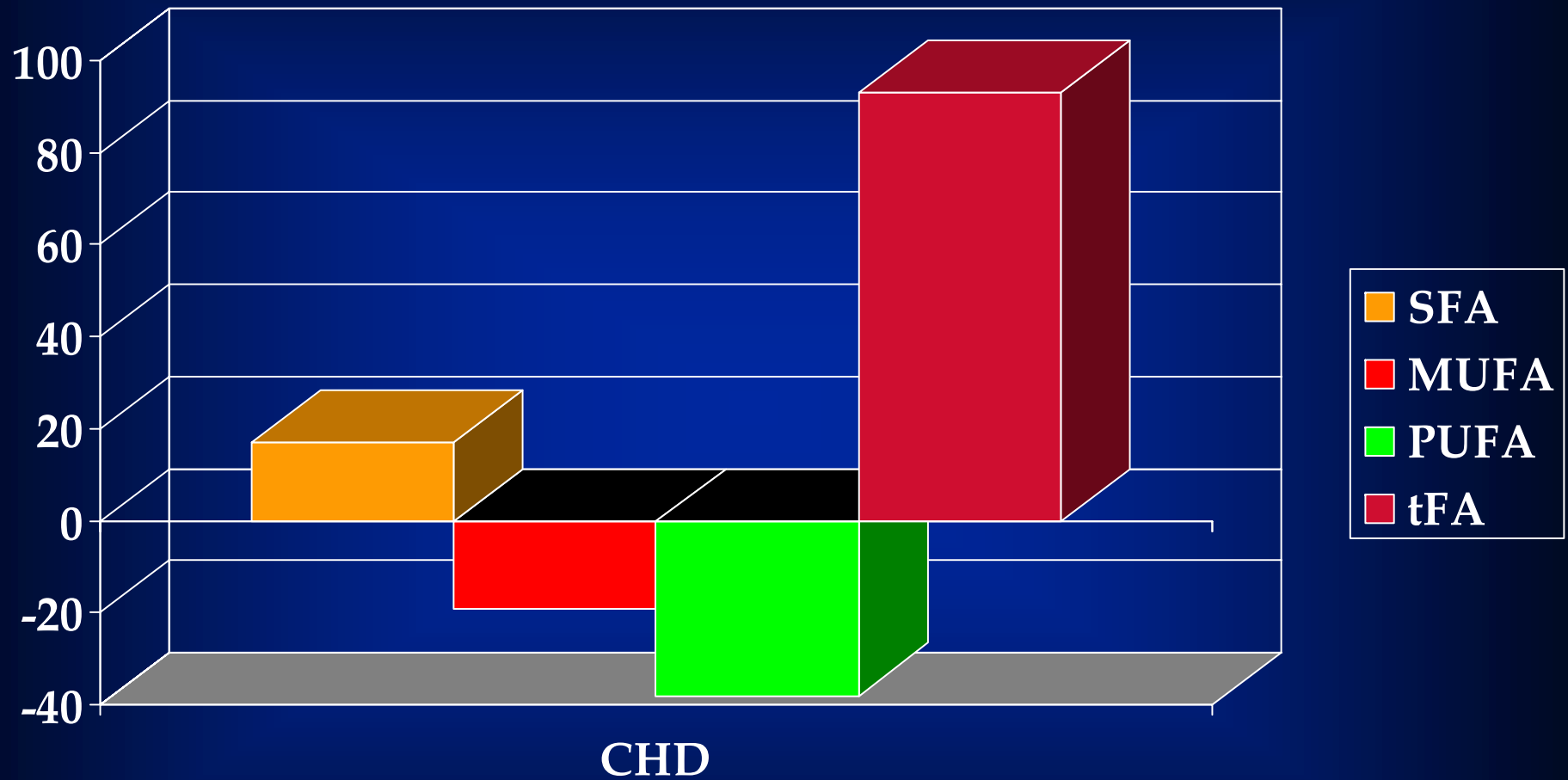
Effects of individual SFA on lipoprotein cholesterol



12:0 best
14:0, 16:0, 18:0 no effect



Dietary Fat intake and Risk of CHD in Women



Effects of replacing 5% en from carbohydrates with SFA, MUFA or PUFA: 2% en for trans fatty acids

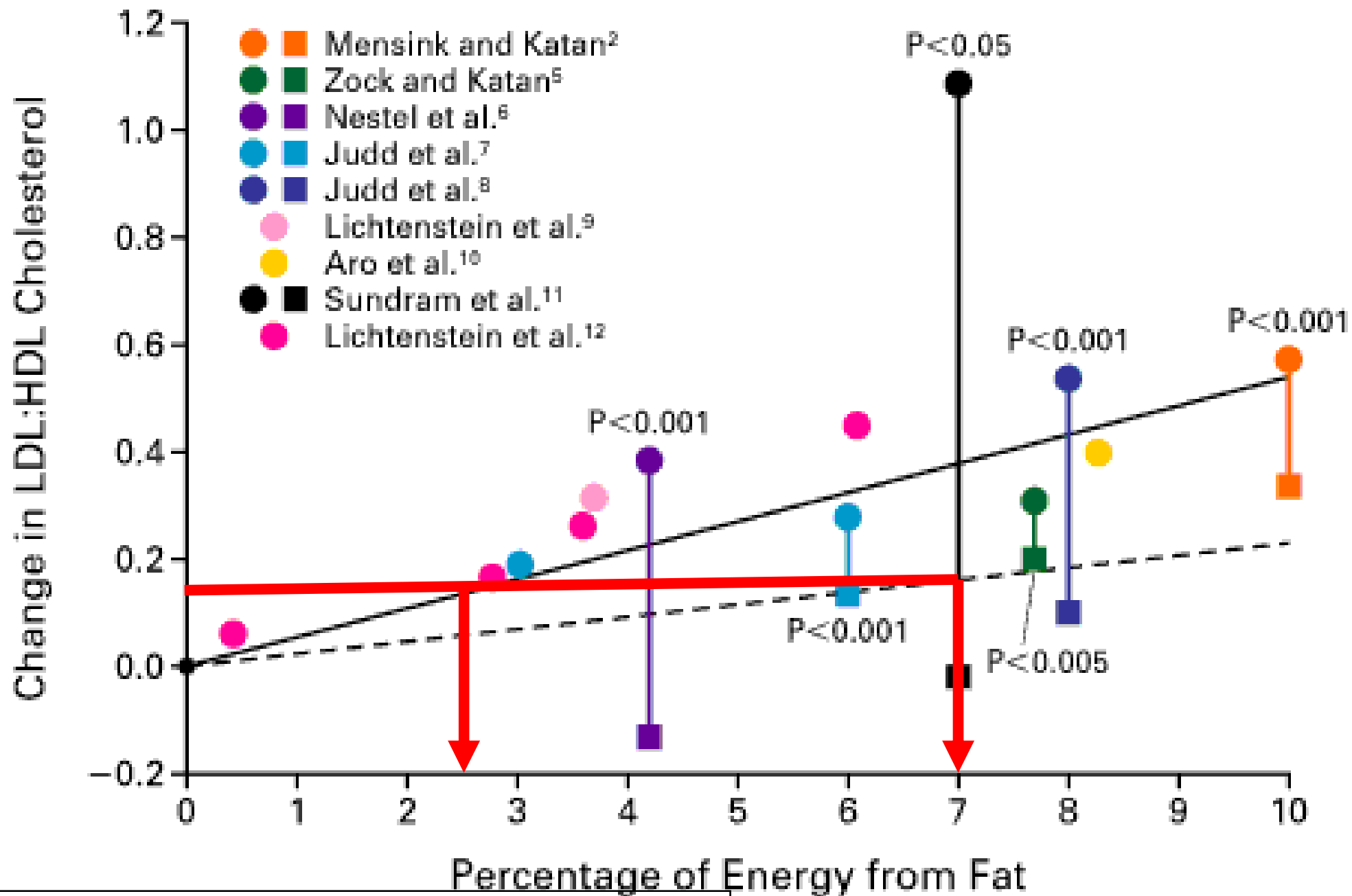
..based on this – current dietary guidelines advocate

- **USDA**

Total Fat: 20 – 35% calories: <10% calories from SFA: tFA as low as possible

- **AHA/NCEP**

Total Fat: 25 – 35% calories: <7% calories from SFA: tFA <1% calories



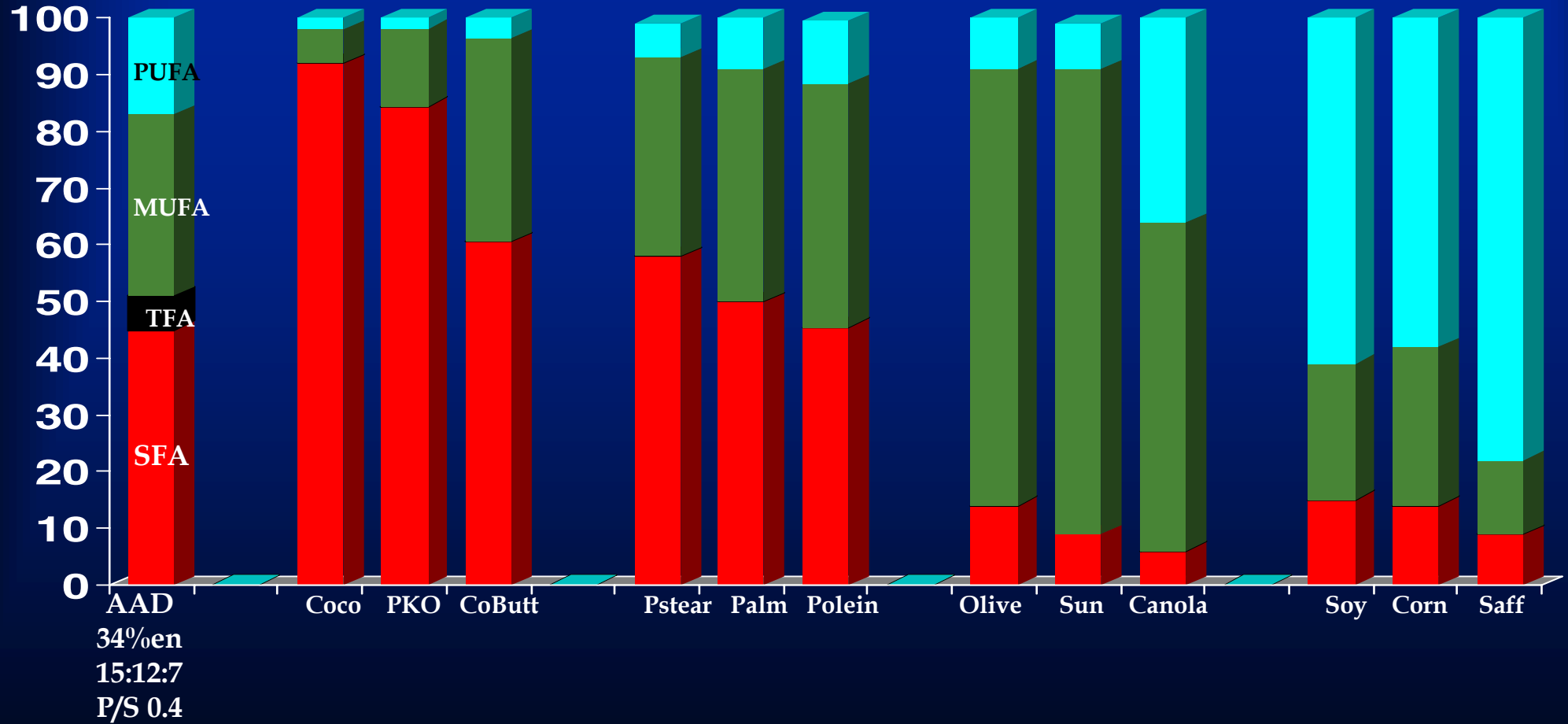
How much palm olein can be incorporated into the diet yet still satisfy guidelines for SFA?

% calories from SFA	% calories from total fat				
	20	25	30	35	40
5	54	43	36	31	27
6	65	52	43	37	32
7	76	61	51	43	38
8	87	69	58	49	43
9	97	78	65	56	49
10	100**	87	72	62	54

Khosla (2006) J Agro Food Ind. 17: 21-23

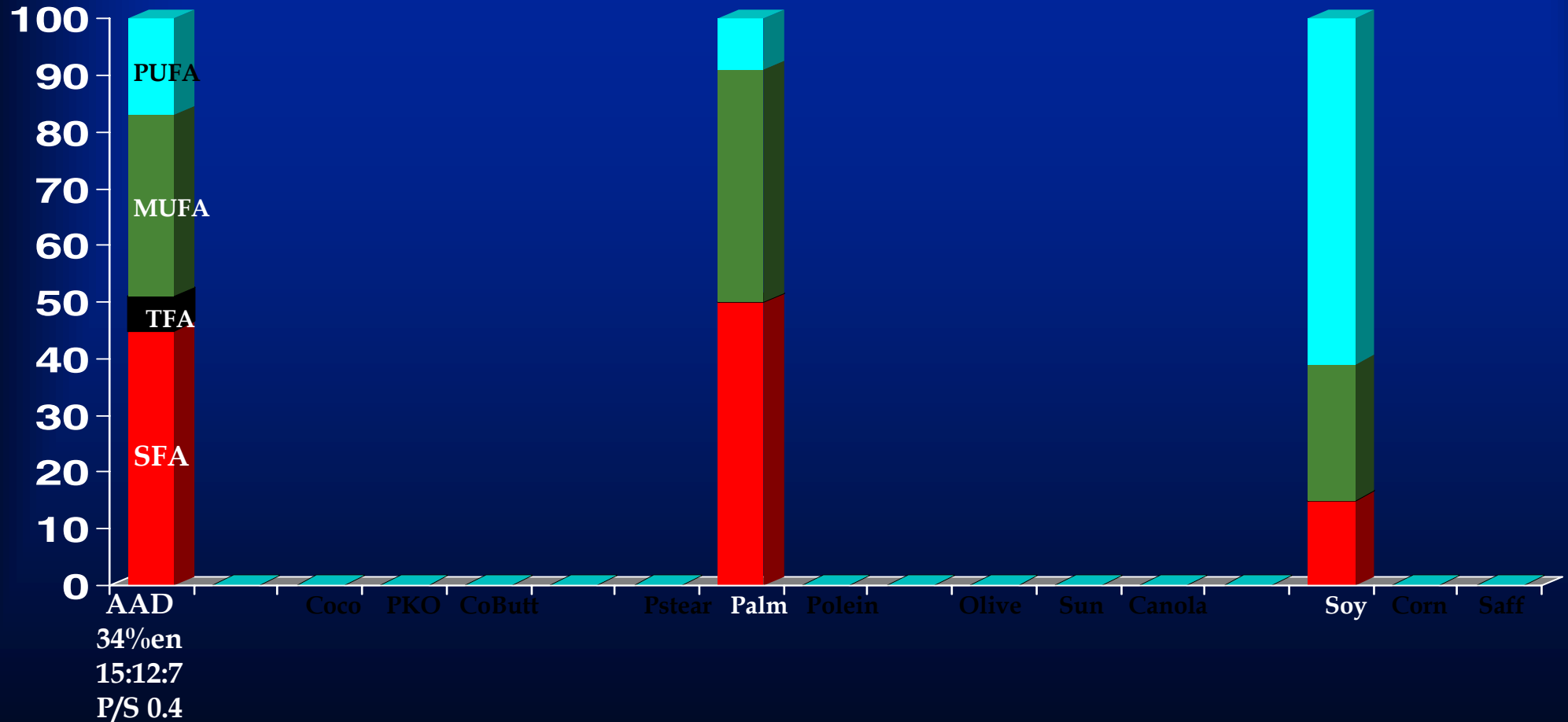
Hayes and Khosla, Eur J Lipid Sci Tech (2007) 109: 453-464

Dietary fat composition: by fatty acid classes



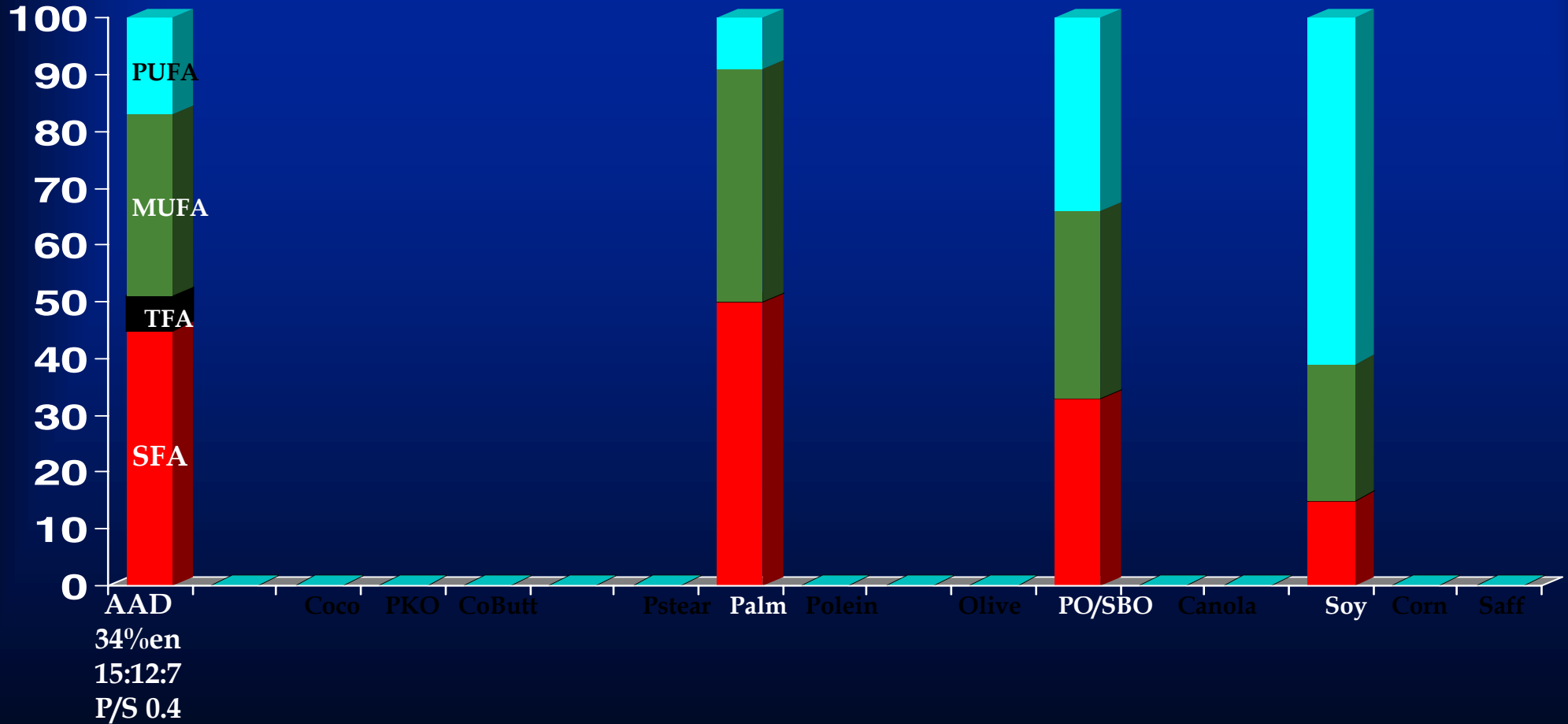
Dietary fat composition: by fatty acid classes

50% of the global supply

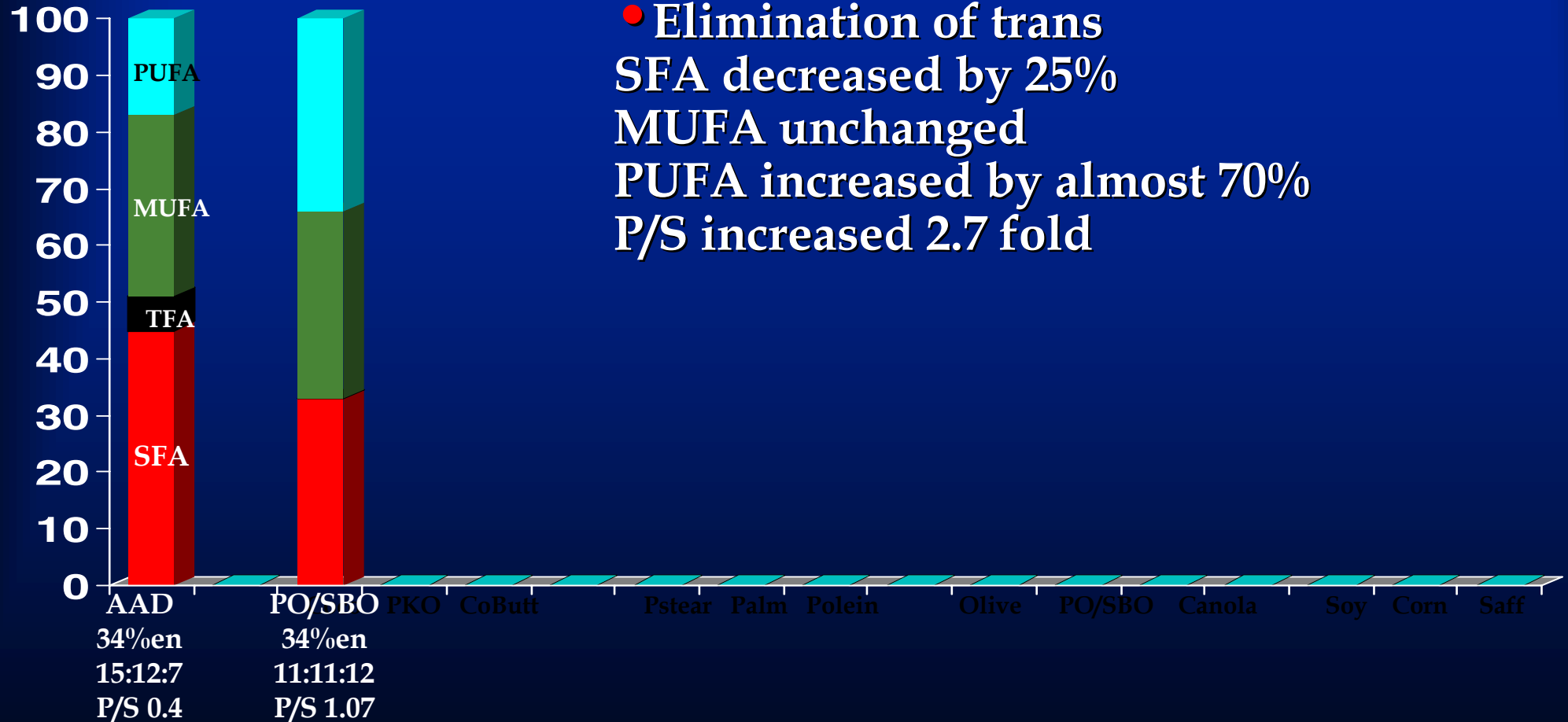


Dietary fat composition: by fatty acid classes

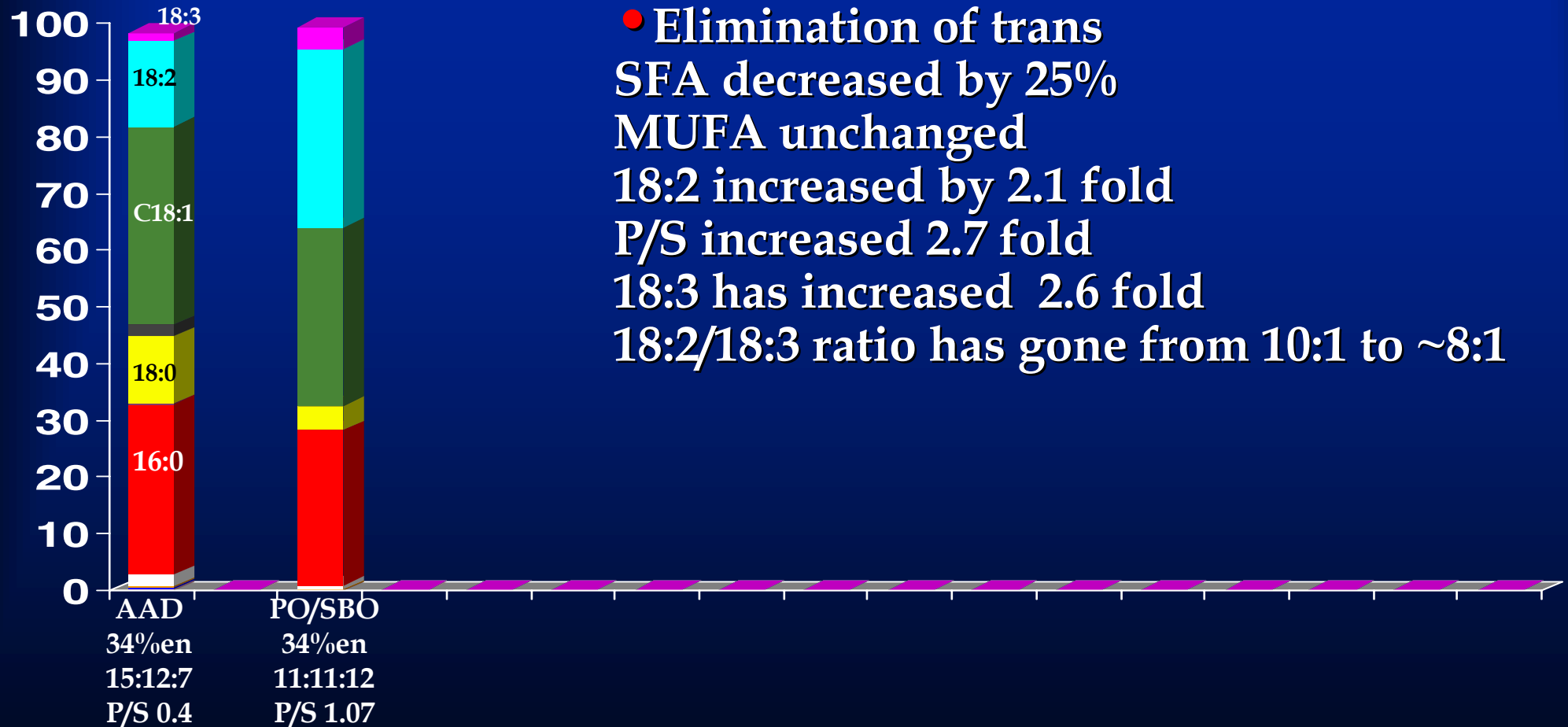
1:1 mix



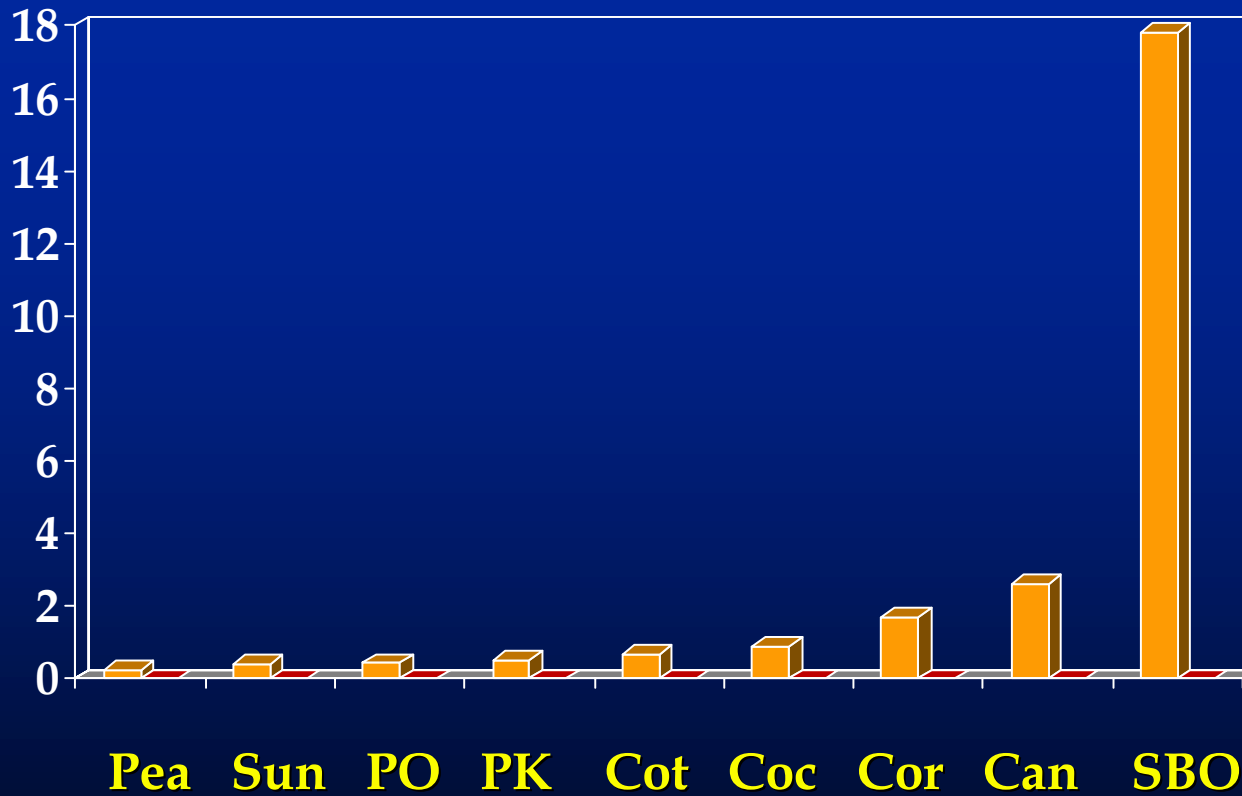
Dietary fat composition: by fatty acid classes



Dietary fat composition: by individual fatty acids



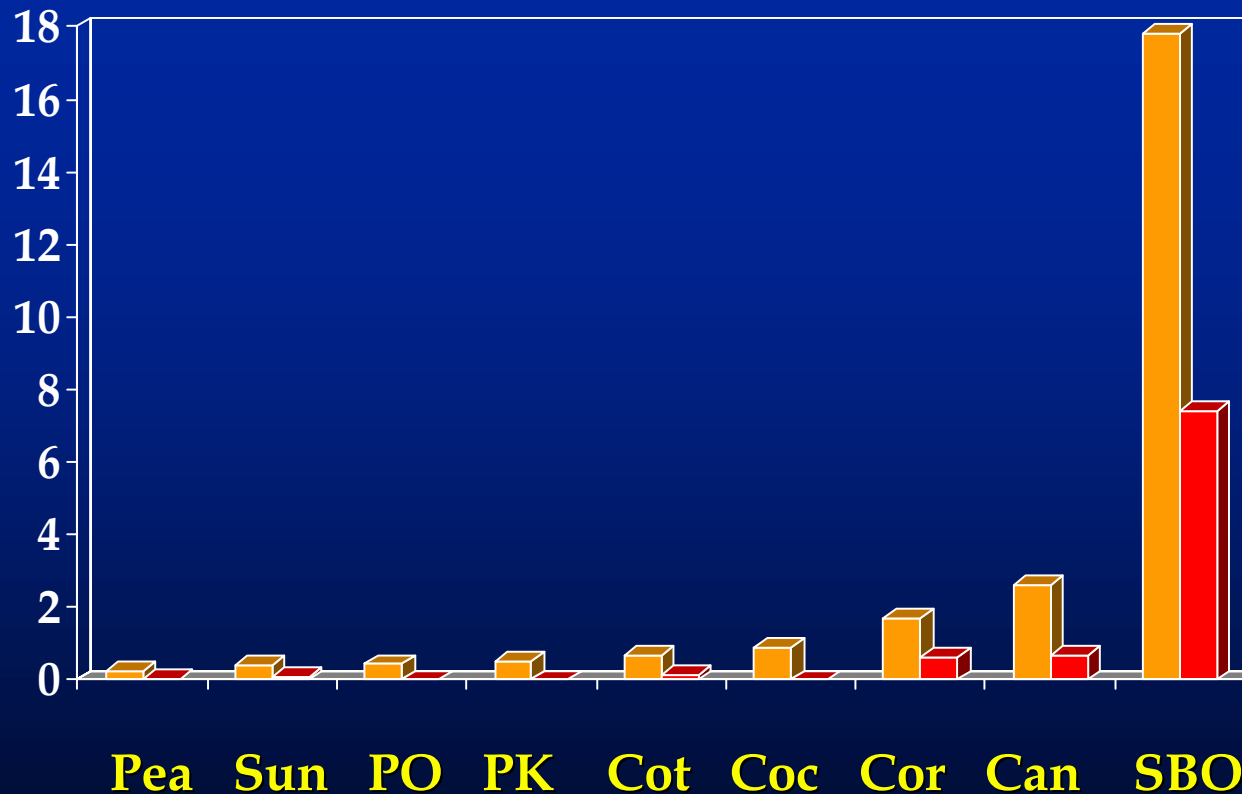
~25 billion lbs of oil consumed in the US in 2005



Circulation, (2007), 115, 2220-2235

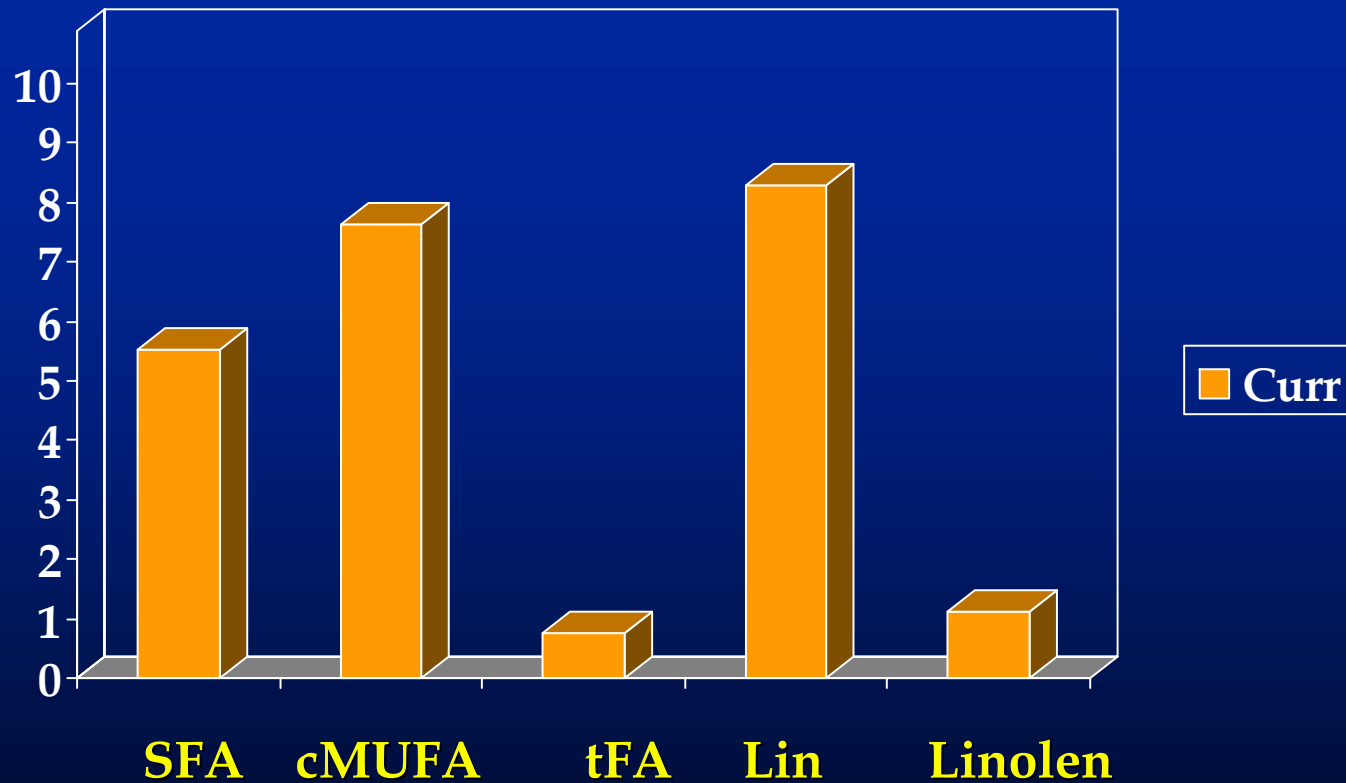
*9 billion lbs was partially hydrogenated out of the
~25 billion lbs consumed (36%)*

With almost 42% of SBO being partially hydrogenated



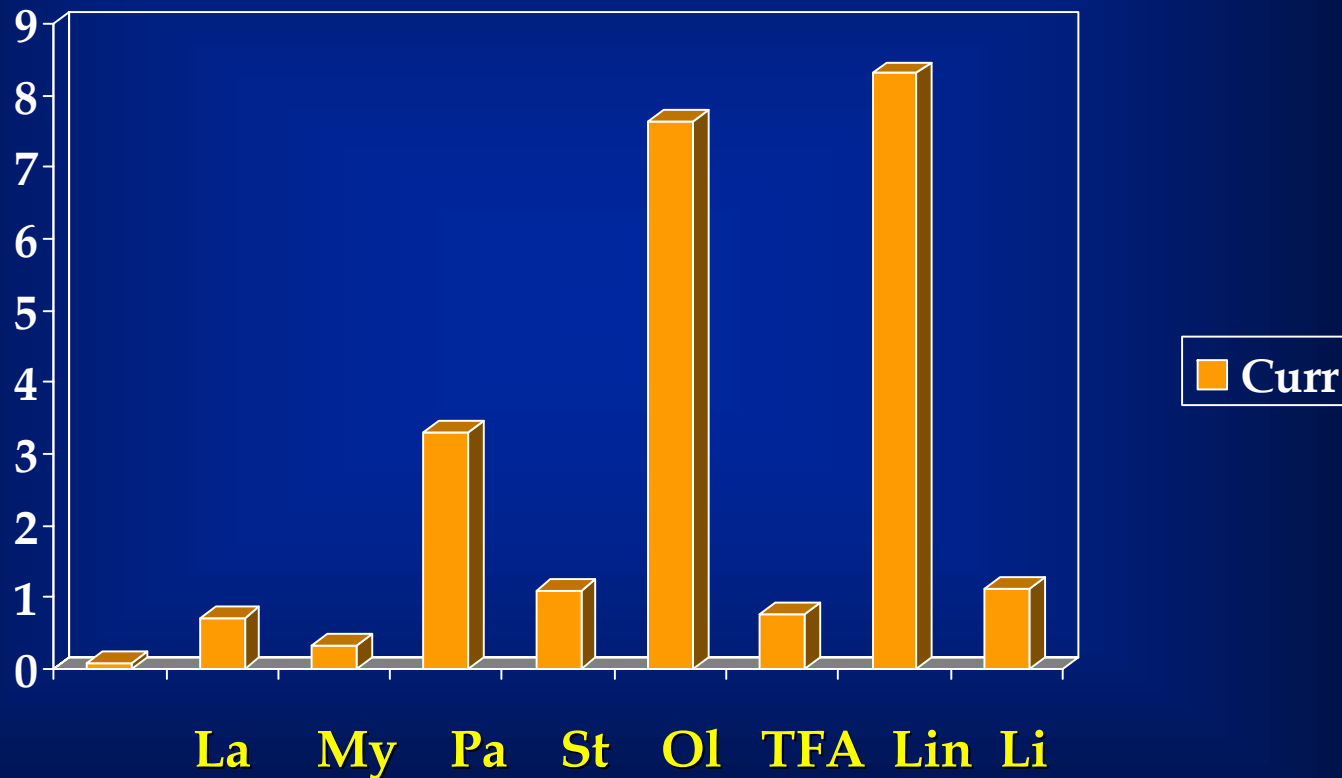
AHA Trans Fat Conference. Circulation, (2007), 115, 2220-2235

*Based on fatty acid composition of individual oils
can calculate US fatty Acid consumption....
(Total: ~25 billion lbs)*



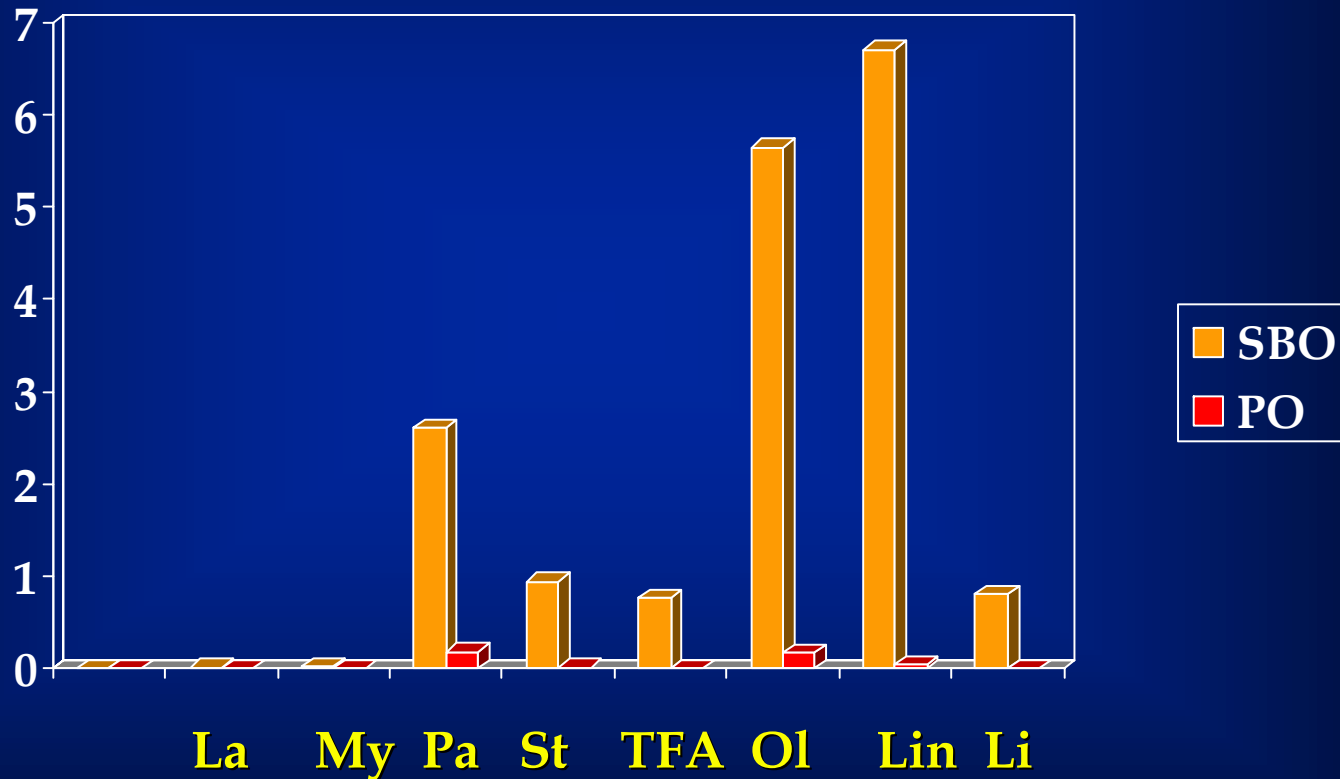
Circulation, (2007), 115, 2220-2235. Am. J. Clin. Nutr. (2006), 84, 497-504. Nutr. & Metab. (2007) 4, 3.

*... .. and also in terms of individual SFA... ..
(billions of lbs)*



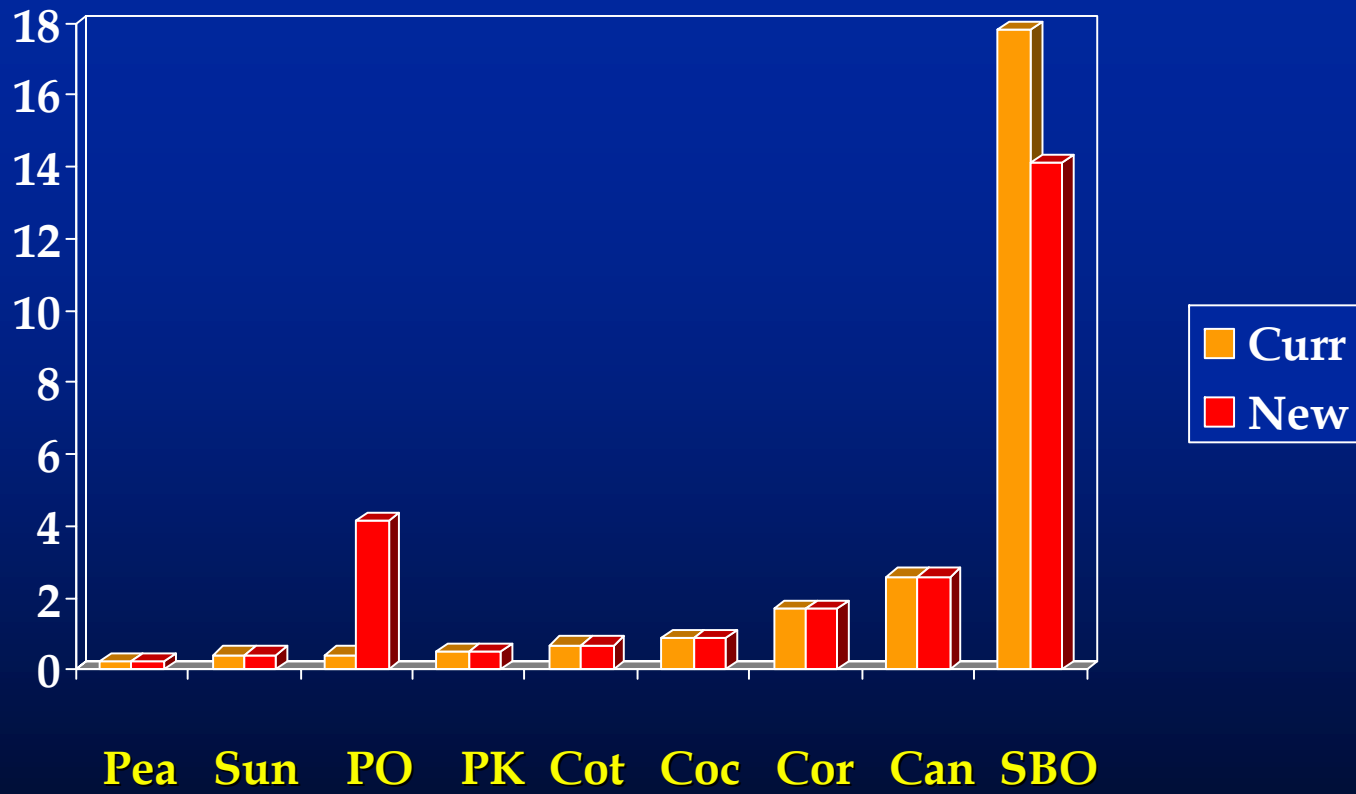
AHA Trans Fat Conference, *Circulation*, (2007), 115, 2220-2235. Lichtenstein et al, *Am. J. Clin. Nutr.* (2006), 84, 497-504. Sundram et al, *Nutr. & Metab.* (2007) 4, 3.

...but remember due to the sheer volume consumed, SBO is the largest contributor to SFA consumption [Total SBO (including PHSBO) vs PO - billion lbs]



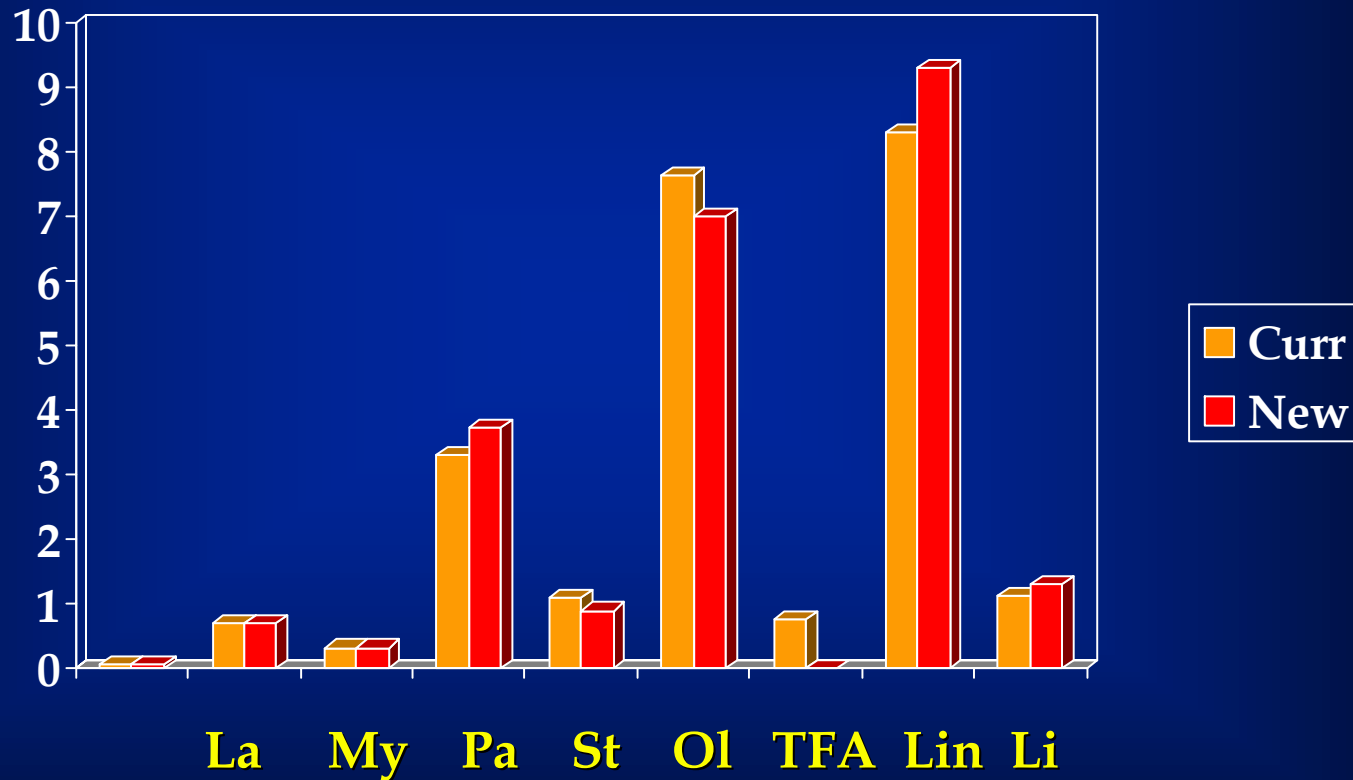
AHA Trans Fat Conference, *Circulation*, (2007), 115, 2220-2235. Lichtenstein et al, *Am. J. Clin. Nutr.* (2006), 84, 497-504. Sundram et al, *Nutr. & Metab.* (2007) 4, 3.

However by replacing PHSBO with an "equimix" of unhydrogenated SBO and Palm oil (billions of lbs)



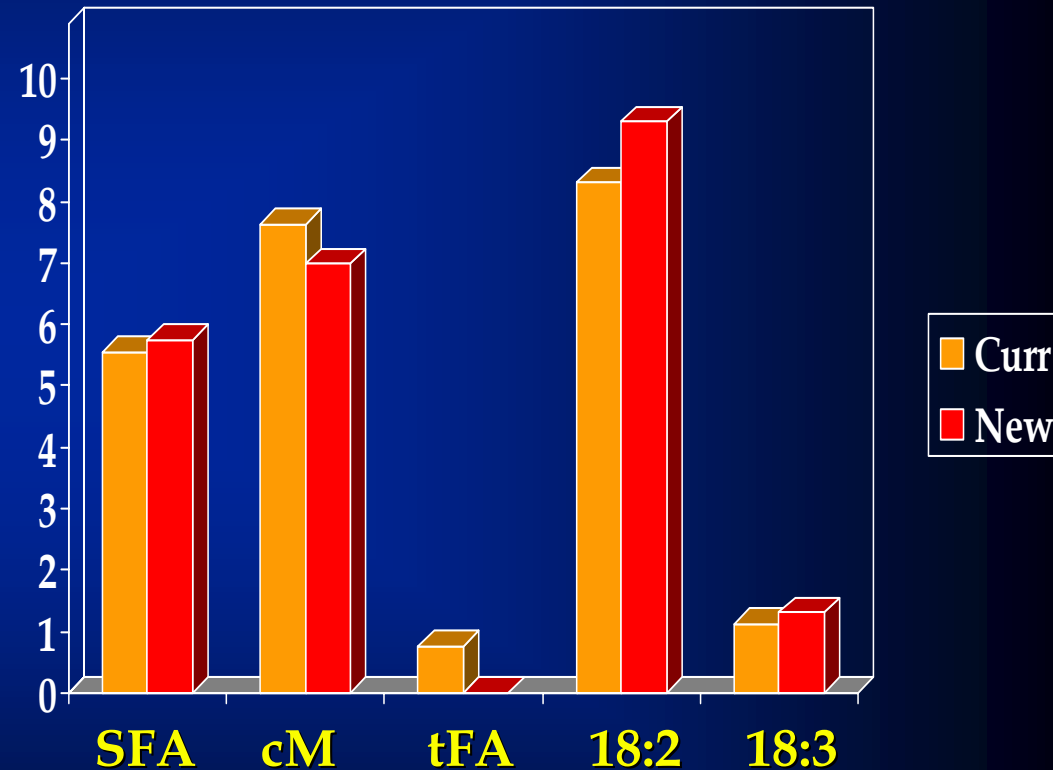
..which would free up ~3.7 billion lbs of SBO for other uses !

... trans Fatty acids would be eliminated...
(data in billions of lbs)



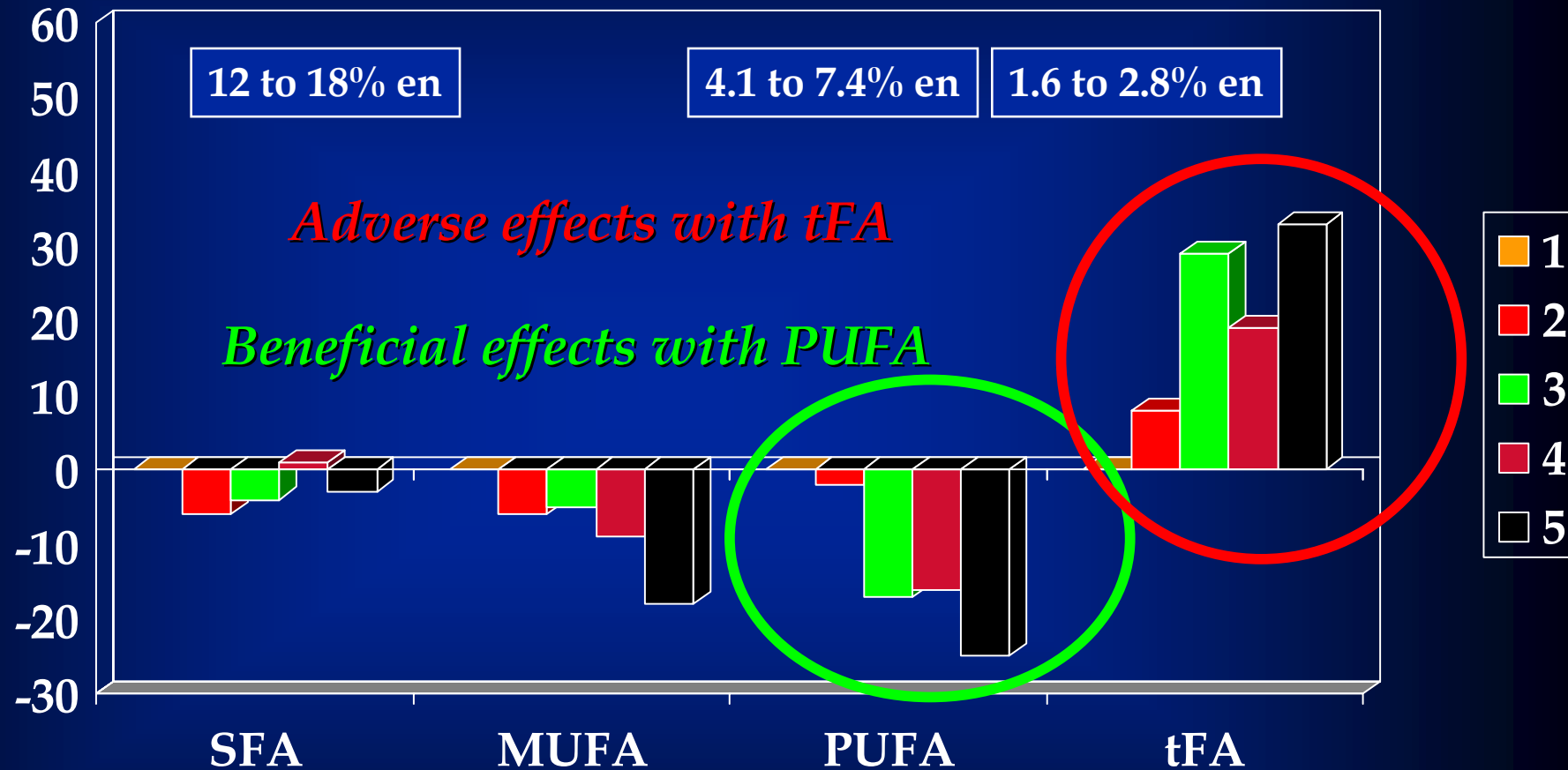
... trans Fatty acids would be eliminated...
 (data in billions of lbs)
without impacting the P/S ratio

	Current	New
SFA	5.54	5.74
cMUFA	7.64	6.99
tFA	0.76	0
18:2	8.30	9.29
18:3	1.125	1.306
TOT	23.37	23.33
P/S	1.70	1.85



P/S ratio:	Current	1.70	New	1.85
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RR of CHD based on quintiles of dietary fatty acid intake (Multi-variate analyses) 20 year follow-up data from the Nurses Health Study



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

Summary

- Dietary fatty acids differentially impact the TC/HDL-C ratio and CHD risk
- Dietary unsaturated fatty acids produce most favorable effects
- Distinct differences between individual SFA on TC, LDL-C, HDL-C
- When comparing SFA and trans FA, trans worse than SFA
- Dietary tFA intake low as possible – SFA less than 7-10% of total calories
- Palm olein can be readily incorporated into the diet while still satisfying guidelines for SFA intake
- A Population-wise model predicts that a 1:1 mix of palm and SBO can effectively eliminate trans but still keep SFA at the same level while increasing PUFA