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**International Task Force for Prevention  
Of Coronary Heart Disease**



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*Coronary heart disease and stroke:  
Risk factors and global risk*

*Slide Kit 3*

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PROCAM  
(Prospective Cardiovascular Münster Heart Study)

**Lipoprotein (a) and risk  
of cardiovascular disease**

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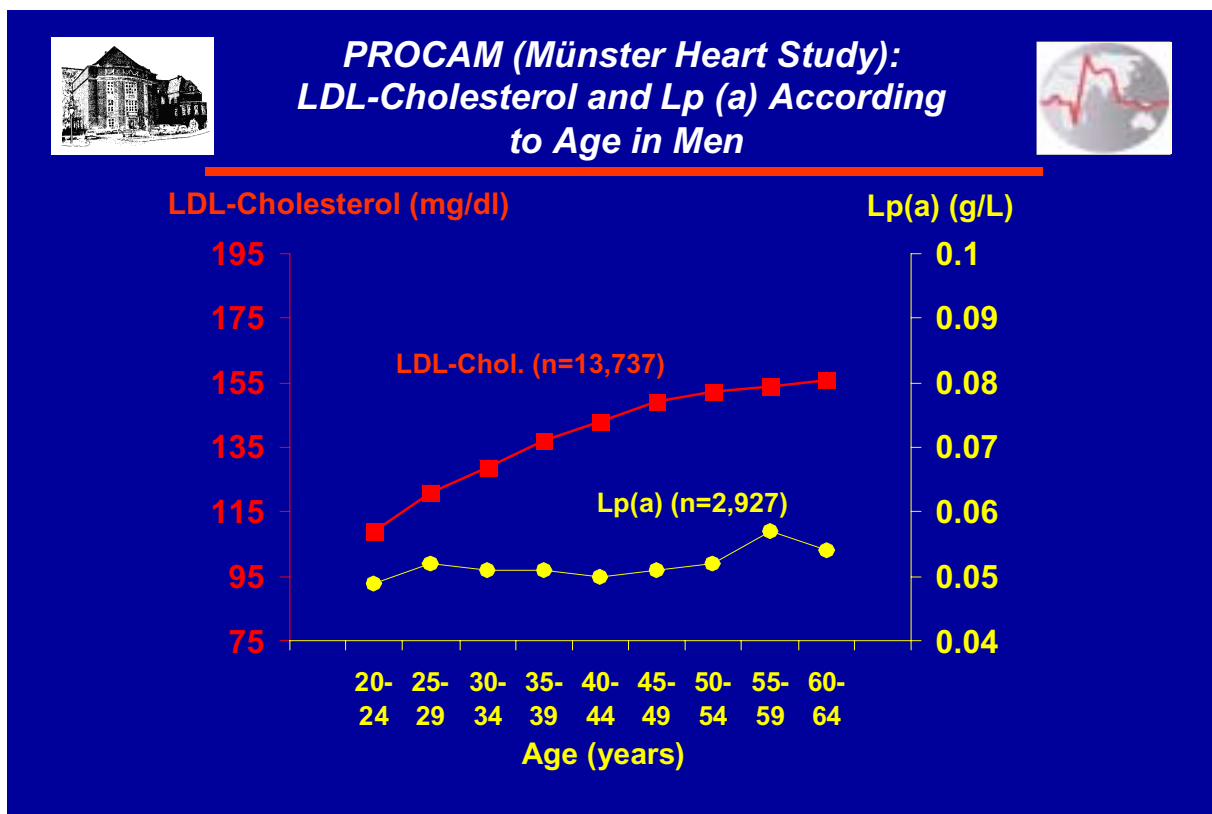
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Slide 1:

## PROCAM (Münster Heart Study):

### Relation between LDL cholesterol, Lp(a) and age in men in the PROCAM study

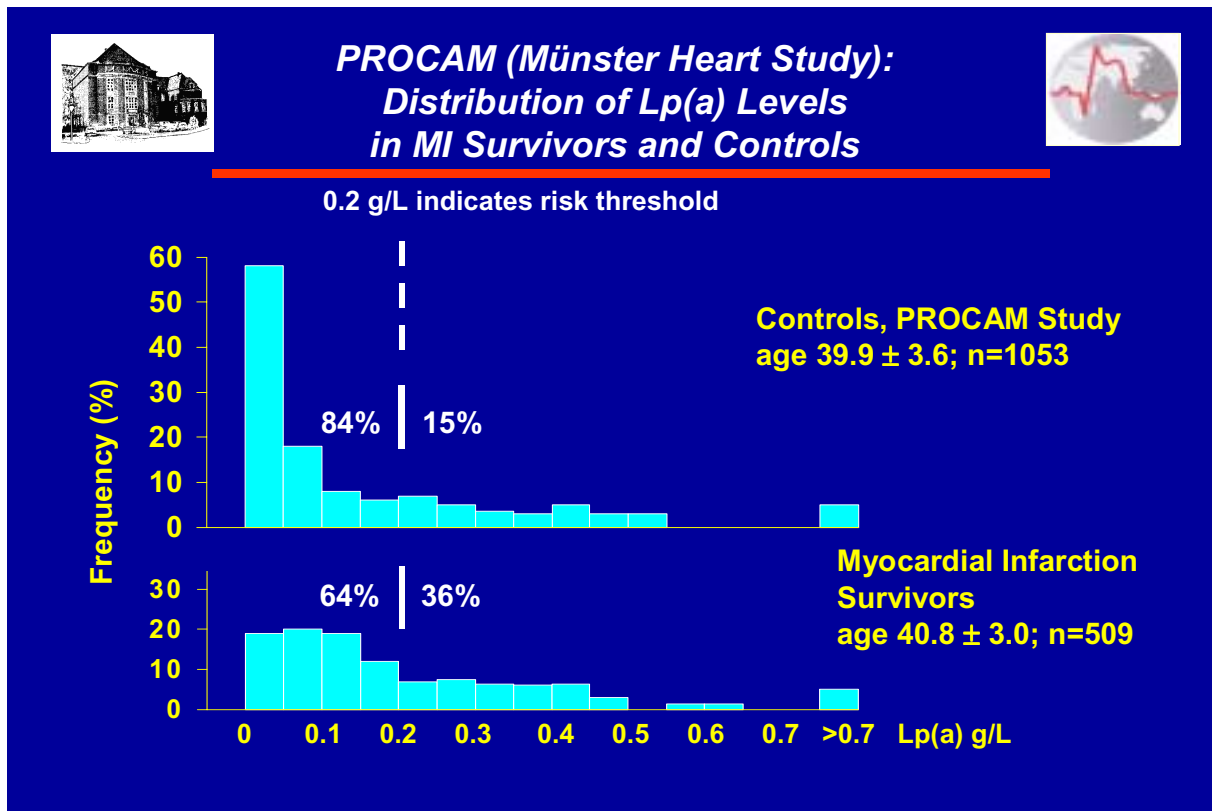


#### Relation between LDL cholesterol, Lp(a) and age in men in the PROCAM study.

In the PROCAM study, the LDL cholesterol level was determined in a subgroup of 13,737 men who displayed triglyceride levels of below 400 mg/dL. Lp(a) was measured in a subset of 2,297 men. Mean LDL cholesterol rose from 105 mg/dL in the 20-24 year-old men to 155 mg/dL in the cohort of men aged 60-64 years. By contrast, in men Lp(a) remained constant at approximately 0.05 g/L across all age groups.

Slide 2:

**PROCAM (Münster Heart Study):  
Distribution of Lp(a) levels in survivors of myocardial infarction and controls  
from the PROCAM study.**

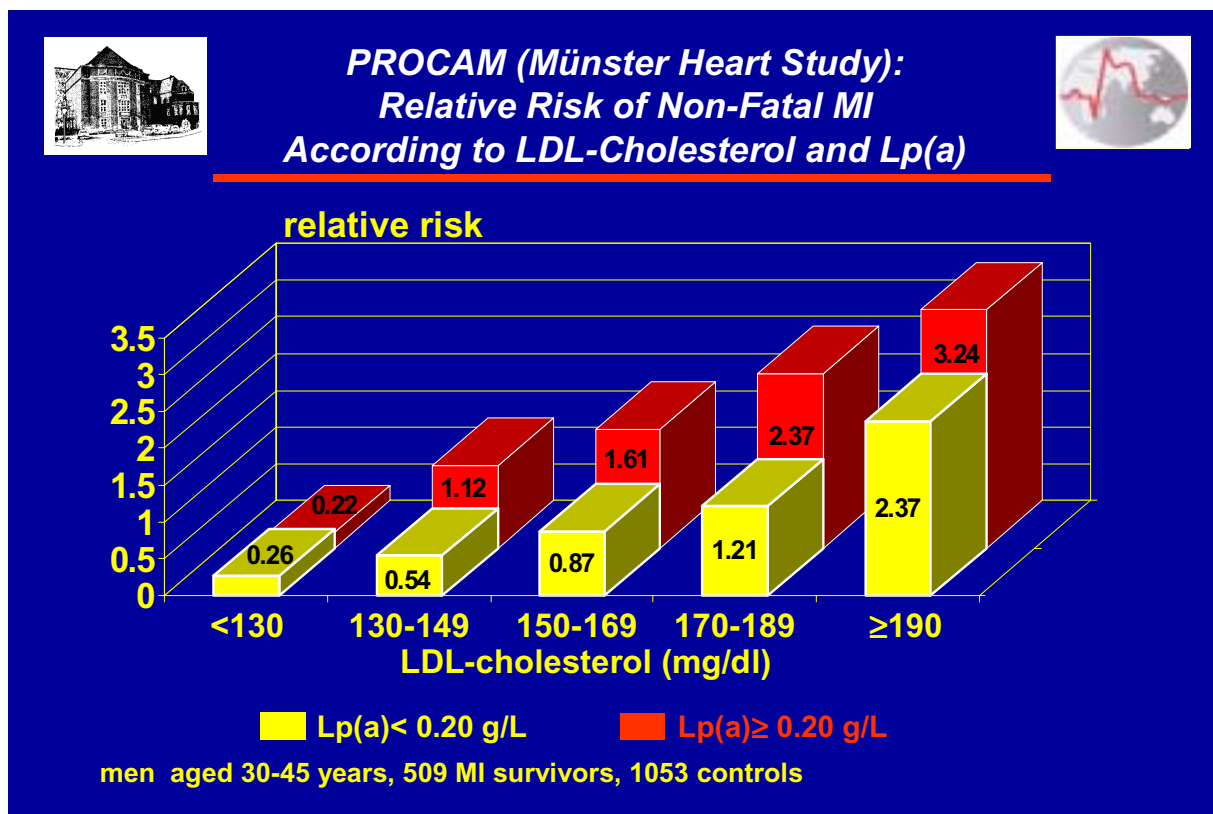


**Distribution of Lp(a) levels in survivors of myocardial infarction and controls from the PROCAM study.**

In general, 0.2 g/L is the level of Lp(a) above which cardiovascular risk is thought to be increased. Only 15% of the PROCAM controls, but 36% of the age and sex-matched MI survivors had levels of Lp(a) above 0.2 g/L at recruitment.

Slide 3:

**PROCAM (Münster Heart Study):  
Relation between LDL cholesterol, Lp(a) and risk of nonfatal myocardial  
infarction in men.**



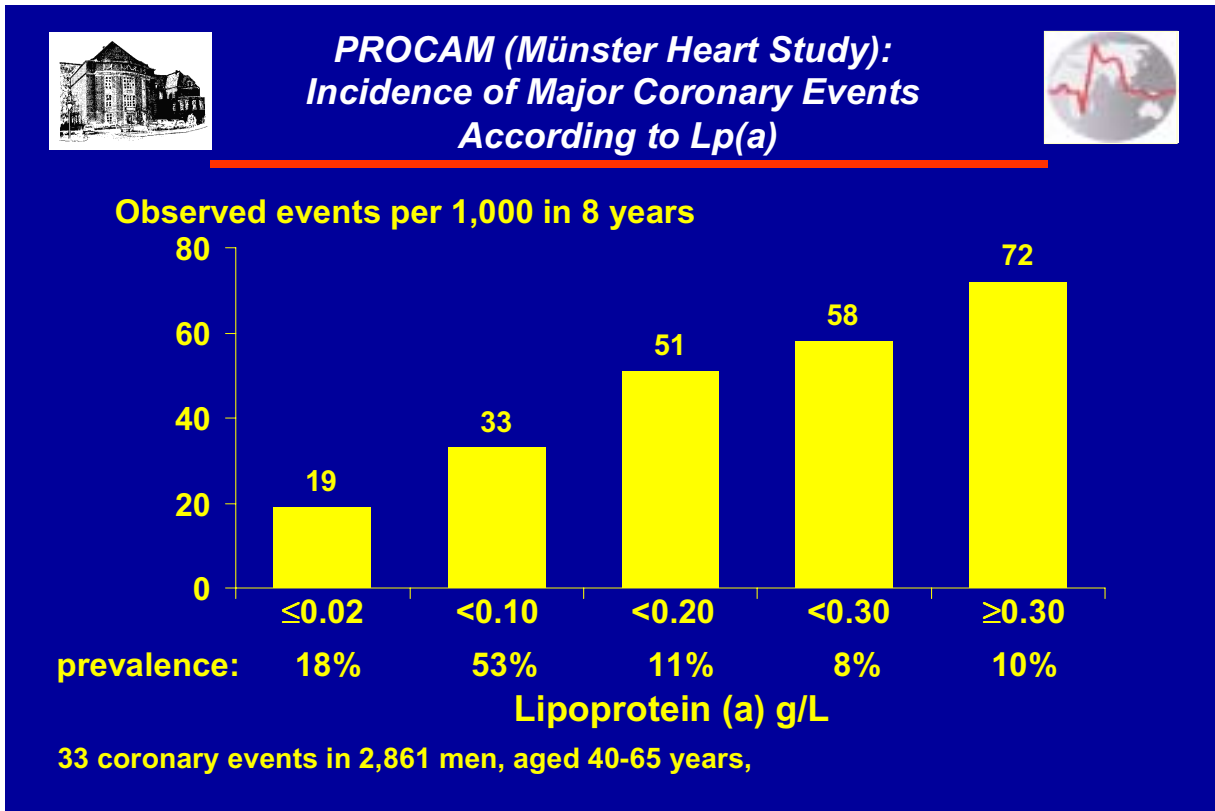
**Relation between LDL cholesterol, Lp(a) and risk of nonfatal myocardial infarction in men.**

Both increased levels of LDL cholesterol and increased levels of Lp(a) are associated with increased risk of nonfatal myocardial infarction. This slide shows that LDL cholesterol and Lp(a) interact in increasing the risk of nonfatal myocardial infarction in men across all LDL cholesterol levels above 130 mg/dL. These data indicate that Lp(a) does not increase risk at LDL cholesterol levels below 130 mg/dL. This may suggest that in individuals with raised Lp(a), LDL cholesterol should be lowered to below 130 mg/dL.

Slide 4:

**PROCAM (Münster Heart Study):**

**Incidence of major coronary events at various Lp(a) levels in middle-aged men in the PROCAM study.**

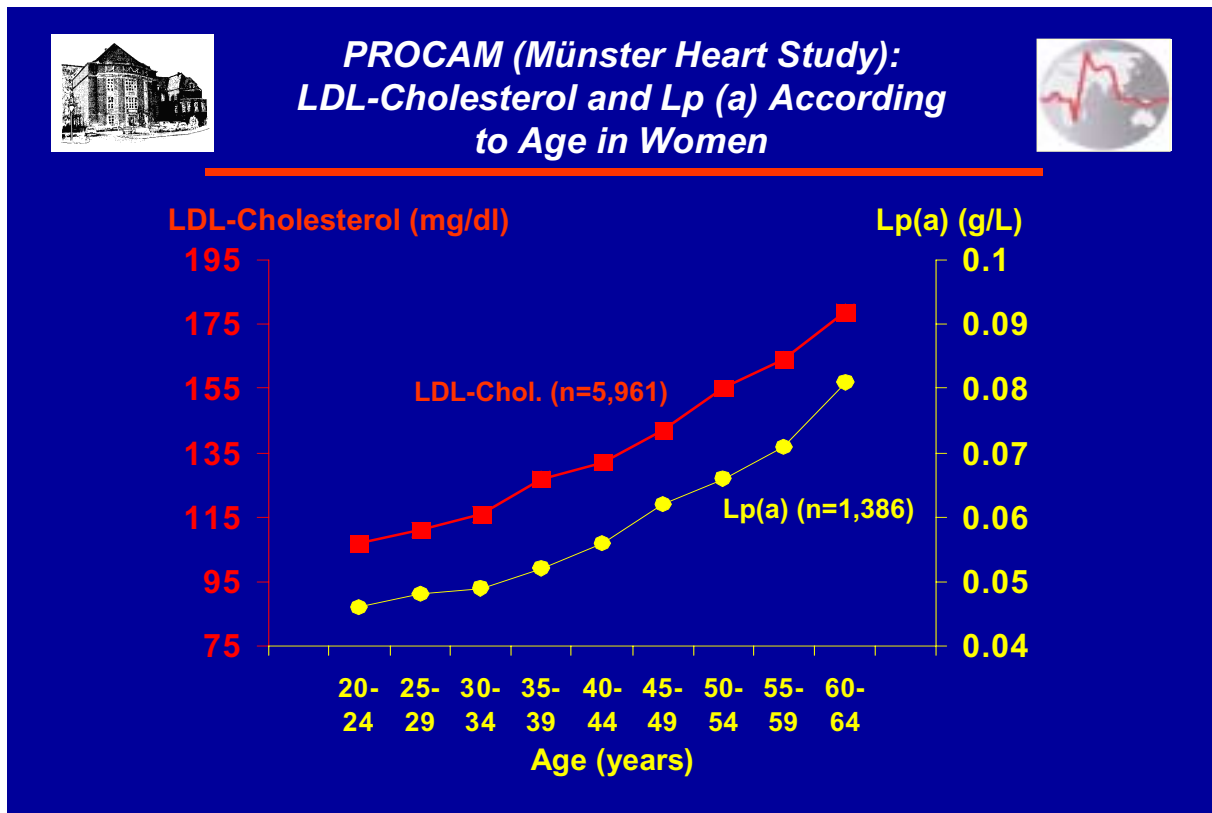


**Incidence of major coronary events at various Lp(a) levels in middle-aged men in the PROCAM study.**

This slide shows that there is a continuous gradient of risk of major coronary events (fatal or nonfatal myocardial infarction, sudden coronary death) across a wide range of Lp(a) levels in middle-aged men in the PROCAM study. The risk of a major coronary event increases nearly four-fold from 19 per 1000 in 8 years in men with an Lp (a) level at recruitment into the PROCAM study of below 0.02 g/L to 72 per 1000 in 8 years in men with an Lp(a) level above 0.3 g/L at recruitment.

Slide 5:

**PROCAM (Münster Heart Study):  
Relation between LDL cholesterol, Lp(a) and age in women in the  
PROCAM study.**

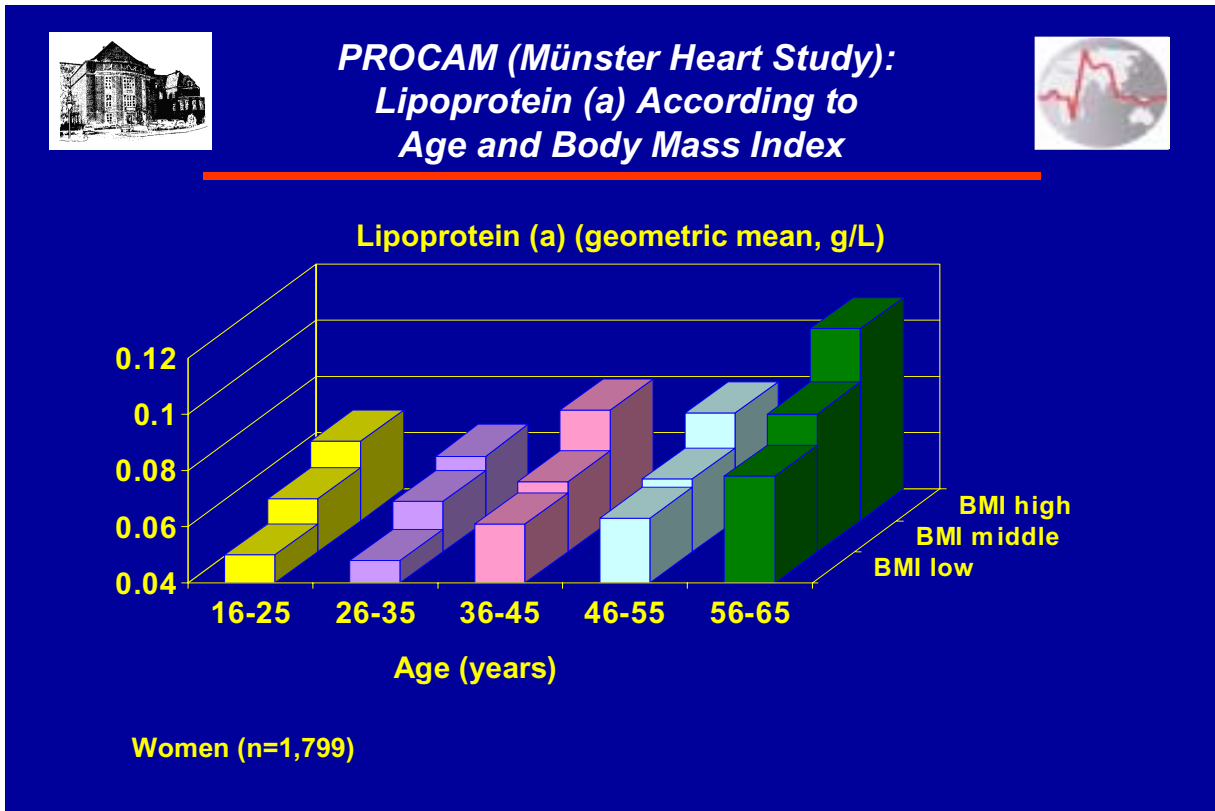


**Relation between LDL cholesterol, Lp(a) and age in women in the PROCAM study.**

In the PROCAM study, the LDL cholesterol level was determined in a subgroup of 5,961 women who displayed triglyceride levels of below 400 mg/dL. Lp(a) was measured in a subset of 1,386 women. As in men, mean LDL cholesterol increased with age in women, rising from 100 mg/dL in the 20-24 year-old women to 175 mg/dL in the cohort of women aged 60-64 years. By contrast to the finding in men, however, (see slide 1 of kit 3), Lp(a) levels in women also increased across all age groups, rising smoothly from 0.045 g/L in 20-24 year-old women to 0.080 g/L in women aged 60-64 years (all values measured at recruitment into the PROCAM study). Oestrogen treatment frequently leads to lower Lp(a) levels (see slide 10 in kit 3).

Slide 6:

**PROCAM (Münster Heart Study):  
Relation between Lp(a), age and body mass index in women in the  
PROCAM study.**

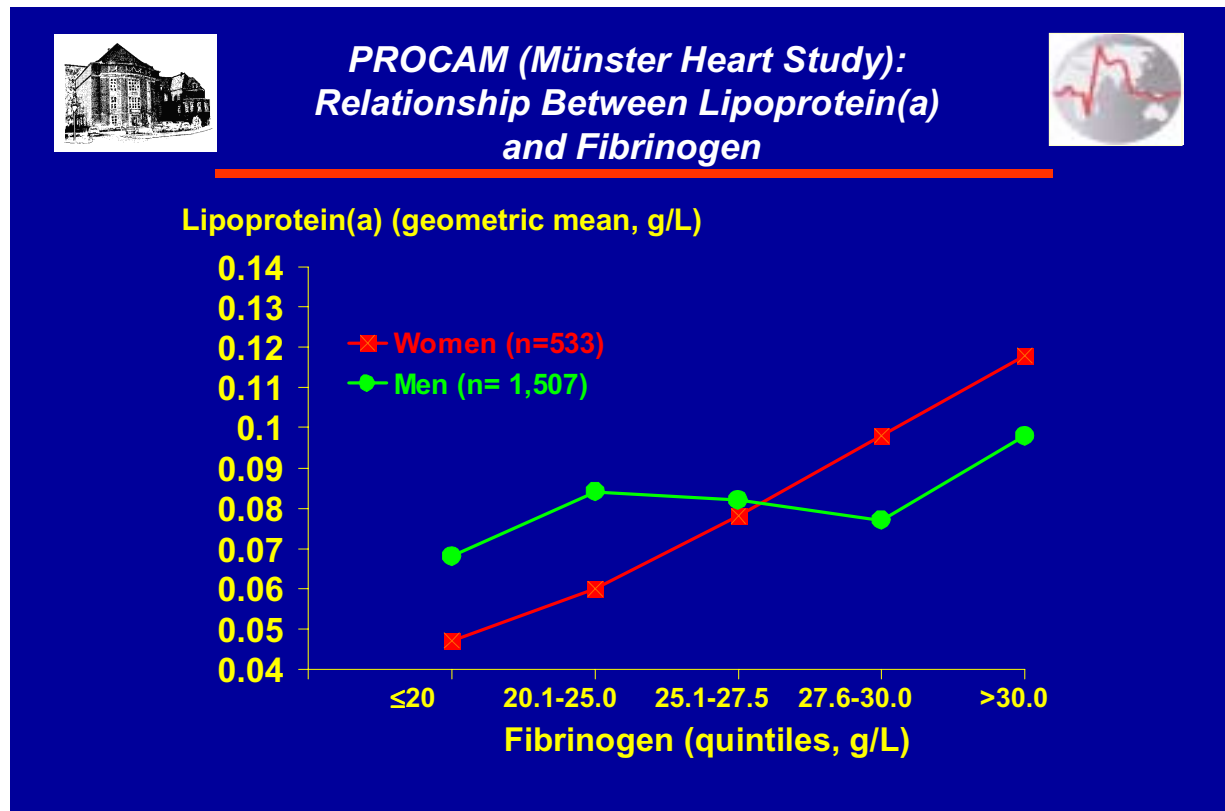


**Relation between Lp(a), age and body mass index in women in the  
PROCAM study.**

As shown in slide 5 of kit 3, Lp(a) increases with age in women. However, Lp(a) also increases with body mass index (BMI) in women in all age groups. In men, by contrast, there is no relationship between age and BMI (not shown, all values measured at recruitment into the PROCAM study).

Slide 7:

**PROCAM (Münster Heart Study):  
Relation between Lp(a) and fibrinogen in men and women in the  
PROCAM study.**



**Relation between Lp(a) and fibrinogen in men and women in the  
PROCAM study.**

Among the 1,507 men in whom both Lp(a) and fibrinogen were measured in blood samples taken at recruitment, Lp(a) levels did not vary with fibrinogen levels. By contrast, in the 533 women in whom both of these variables were measured Lp(a) showed a steady increase from 0.045 g/L at fibrinogen levels below 20 g/L to 0.12 g/L at fibrinogen levels above 30 g/L.

