tween physical activity or fitness and serum CRP levels adjusted for BMI or waist girth (1,2), these measures of body fat are relatively imprecise, and residual confounding is possible. In the current study, the more precise DEXA scanning method was used to measure body fat and trunk fat. These DEXA measures correlated more strongly than BMI with both CRP levels and physical fitness. A limitation of the current study was variability in serum CRP levels. This variability reduced the statistical power of the study and, therefore, a small effect of improved physical fitness on CRP levels, independent of changes in body fat, cannot be excluded. Few previous studies have reported the effects of exercise training on CRP levels. Mattusch et al. (7) found a significant reduction in CRP levels after nine months of marathon training in 12 athletes. Smith et al. (8) reported a trend toward lower CRP levels in 43 volunteers after six months of exercise training. These studies did not include a control group and did not measure body fat. In conclusion, our findings suggest that the association between greater physical fitness and lower serum CRP levels is explained, at least in part, by long-term regular exercise reducing body fat.

Acknowledgments
The authors thank Roy The, BSc, for CRP analysis, Teena West, MSc, for statistical input, Charlene Nell for secretarial assistance, and Anna Breckon, ELS, for editorial assistance.

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Gender as a Risk Factor in Young, Not in Old, Women Undergoing Coronary Artery Bypass Grafting

To the Editor: Women have a higher early mortality after coronary artery bypass grafting (CABG) compared with men in most studies (1,2). The influence of gender and age on early mortality and age- and gender-dependent risk factors have only been analyzed in a single U.S. study (1). Because demographic variables and therapeutic strategies may be different in the U.S. and Europe, analyses from European countries also are needed.

Patients undergoing CABG are increasingly older, and women undergoing CABG are older than men. The risk for myocardial infarction (MI) differs in women and men, as well as the pattern of coronary artery disease and myocardial remodeling. Acute MI has a worse prognosis, especially in younger women (3). Similar risk factors may influence mortality after MI and CABG.

We therefore analyzed in our large patient cohort whether early outcome after CABG was worse in women, whether the interaction between female gender and mortality was age dependent, and which preoperative parameters acted in a gender-specific manner. Using on quality control database, we analyzed 17,528 consecutive patients (4,278 women and 13,250 men) who underwent CABG in the Deutsches Herzzentrum Berlin from 1993 to 2001. Standard statistical procedures, including multivariate testing, receiver-operated command analysis, and the Breslow-Day test, were used (1,4).

The percentage of women who underwent CABG increased with age, from 14% in the cohort younger than 50 years to 49% in that cohort older than 80 years (Fig. 1). In the mean, women had better left ventricular ejection fraction (LVEF) than men (55% women vs. 53% men); previous MI and previous CABG were less frequent (55% vs. 59% and 20% vs. 22%, respectively), and hypertension and diabetes (77% vs. 67% and 39% vs. 27%, respectively) were more frequent. In contrast, nonelective surgery was more frequent in women than in men (31% vs. 27%; p < 0.001 for all).

Mortality in women was significantly higher than in men, with the greatest differences in the youngest and no differences in the older age groups (Fig. 2). Female gender was an independent risk factor for mortality (hazard ratio 1.236; 95% confidence interval 1.008 to 1.56). In addition, age, impaired LVEF, and number of diseased vessels were independent predictors of early mortality in women. In men, priority of surgery and renal dysfunction were significant predictors of outcome.

The optimal cutoff value for age as a predictor of mortality was calculated as 70.5 years by receiver-operated command analysis. In the younger cohort, gender, age, number of affected vessels, LVEF, priority of surgery, and renal dysfunction were predictors of outcome. Previous MI was a significant risk factor in younger...
women but not in men. In the cohort older than 70.5 years, gender and age were no longer independent risk factors. Only LVEF remained as an independent risk factor in women and the combination of LVEF and priority of surgery in men.

For the first time, we have provided a detailed analysis in a large European cohort on the interaction of gender and age in early mortality after CABG. The best cutoff point for prediction of mortality by age in our patients was 70.5 years. In the younger cohort, there was a significant impact of age and gender on mortality that was not present in the older cohort. Risk factors differed in the various age and gender groups.

Selection bias and delayed referral of women might contribute to their higher mortality. In our study, women had better cardiac function, a lower number of diseased vessels, fewer previous infarctions, and fewer previous CABG surgeries than men, which suggest that they did not have a worse coronary history than men. A history of hypertension and diabetes was found more frequently in women but did not adversely affect the in-hospital mortality. However, women underwent surgery more frequently as emergency cases, which was a prominent risk factor in all age groups analyzed. The high need for emergency surgery may suggest that coronary artery disease is underestimated for a longer time in women than in men.

In the older cohort (>70.5 years), adjustment for preoperative variables eliminated the effect of gender on mortality, suggesting that in this group co-morbidity overrides the role of gender for outcome. However, in the younger cohort, gender remained an independent predictor of outcome. It may be speculated that women undergoing CABG at relatively young age do represent a group that possess a number of yet-undetected high-risk factors. Higher early mortality in women younger than the age of 70 years is only explained partially by the preoperative variables available in quality control databases. The interaction between gender and age in influencing mortality remained significant after adjustment for conventional risk factors, indicating that some unknown risk factors contributed to mortality in young women. Hormones that affect the coagulation system, lipid levels, and inflammatory mechanisms, as well as psychological factors or psychosocial stress have been proposed (5). In addition, genetic risk factors may be of special relevance. Women also have smaller coronary arteries than men (6), and this has been negatively correlated with long-term outcome (7). However, coronary artery size would not have a larger impact in younger than in older women and, therefore, would not explain the interaction between gender and age.

Acknowledgments
The authors appreciate the contribution of Dagmar Kemper for statistical analysis and thank Anne Gale for editorial assistance.

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Please note: this study was supported by an unrestricted grant from Novartis and Schwarz Pharma and the Competence Network Heart Failure.

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