INTRODUCTION
Alprenolol, a nonselective beta-adrenoreceptor blocker with intrinsic sympathomimetic activity, is used for treatment of hypertension and angina pectoris and has been investigated (in a Danish multicenter study) for secondary prevention in patients who have had myocardial infarction [1]. This was the only secondary prevention trial in which there was no age limit. Alprenolol is the only beta-blocker found to be associated with increased mortality in elderly postmyocardial infarction. This effect has been attributed to the intrinsic sympathomimetic activity of the drug, which may result in inappropriate slowing of heart rate in the elderly. Therefore, we recommend that, until further data are available, alprenolol should not be prescribed for elderly patients with ischemic heart disease.

PHARMACOLOGIC PROPERTIES
Alprenolol is a nonselective beta-blocker. Its beta-blocking potency is somewhat less than that of propranolol. Alprenolol posesses intrinsic sympathomimetic activity, and it is a highly lipophilic agent. This determines some of its pharmacologic properties and adverse effects (especially central nervous system adverse effects in the elderly).

HEMODYNAMIC EFFECTS
Alprenolol slows heart rate in normal human subjects and in patients with various cardiovascular disease. In postmyocardial infarction, the patient's
heart rate is decreased by about 10% (with the doses used). Alprenolol lowers systolic and diastolic arterial pressures, mainly in hypertensive patients [2]. Alprenolol has no effect on myocardial contractility in patients with preserved myocardial function as evident by the absence of effect on stroke volume at rest. Stroke volume increases during exercise. The effect on cardiac output was variable in a group of hypertensive patients with significant impairment of myocardial function in whom alprenolol did not significantly alter cardiac output at rest or during exercise. In these patients, total peripheral resistance was not significantly altered and leg vascular resistance increased by about 30% at rest but not at exercise during prolonged treatment. Pulmonary artery pressure and femoral venous pressure were not affected by alprenolol [2]. In other studies, alprenolol administered by bolus injection or orally for long periods reduced cardiac output at rest and during exercise in hypertensive patients.

SECONDARY PREVENTION AFTER MYOCARDIAL INFARCTION

The effect of early intervention with alprenolol on mortality in patients after acute myocardial infarction was investigated in a double-blind placebo-controlled study. In patients under 65 years of age, there was a significant reduction in mortality in the alprenolol group, compared with placebo [3]. In patients older than 65 years of age, mortality was higher in the alprenolol group than in the placebo group. Recruitment of patients over the age of 65 years was stopped and the difference in mortality was not statistically significant. The mortality of patients in this study, both in the alprenolol group and placebo group, was higher than that in other secondary prevention studies with timolol and metoprolol.

The inclusion of patients with poor prognosis might have spuriously influenced the results of the alprenolol study. It was also suggested that the crucial effect of beta-blockers in reducing mortality is the decrease in heart rate. Alprenolol possesses intrinsic sympathomimetic activity and therefore may decrease heart rate in elderly patients, who are usually inactive, to a lesser extent than beta-blockers without intrinsic sympathomimetic activity. This could also be responsible for the poor results in elderly patients.

Alprenolol should not be given to elderly patients after acute myocardial infarction. The fact that beta-blockers did not produce such deleterious effects in all age groups studied should probably limit the use of alprenolol for secondary prevention even at younger ages. Two points should be emphasized, however, while interpreting the results of the alprenolol study: 1) There was no upper age limit in this trial and some unconscious patients were included, and 2) There was an imbalance in baseline risk factors in favor of the placebo group before initiation of treatment in the elderly.

HYPERTENSION

Alprenolol significantly lowers systolic and diastolic arterial pressures, both at rest and during exercise, in patients with mild to moderate essential