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Methods. The Blue Mountains Eye Study (BMES) is a population-based cohort study with methods previously reported. During 1992 to 1994, 3654 participants 49 years or older were examined (82.4% participation rate). At the 5-year follow-up examination, 2335 surviving participants (75.1% of survivors; 543 had died) and an additional 1174 individuals were examined. This provided a sample of 3508 individuals who had self-reported health status information. Of these, 22 participants had missing mortality and living alone data and so were excluded from analyses, leaving 3486 participants.

To identify and confirm persons who died after the baseline examination, participants were cross-matched with Australian National Death Index data for deaths until December 31, 2007 (10-year follow-up). Total and cause-specific mortality were assessed using the International Classification of Diseases, Ninth Revision (ICD-9) and International Statistical Classification of Diseases, Tenth Revision (ICD-10) definitions, as described in our previous study. Self-reported health status was assessed using the 36-Item Short-Form Survey (SF-36), which produces 8 subscale scores representing dimensions of health and well-being. Participants were asked who lived with them; if they responded that they lived with nobody or with pets only, they were classified as living alone. Covariates adjusted for in mortality analyses were age, sex, educational status (tertiary qualified or not), current smoking, body mass index, walking disability, prior diagnosis of heart disease, angina, heart attack, diabetes mellitus, cancer, poor self-rated health, and SF-36 mental and physical component summary scores.

Results. During the 10-year follow-up period, a total of 739 participants (21.2%) died. After multivariate adjustment, living alone was not associated with total mortality in the overall cohort (Table). There was a nonsignificant effect modification by age ($P = .50$ for interaction). However, given that there is a psychosocially plausible reasoning for an age-specific effect of living alone on mortality risk; analyses were stratified by age-group. Among participants younger than 75 years, living alone was associated with a 36% increased risk of all-cause mortality (15.0% vs 11.4%; multivariate-adjusted hazard ratio, 1.36 [95% CI, 1.04-1.79]). In those 75 years or older, living alone was not associated with both total mortality (Table) and CVD mortality ($P = .48$).

Comment. In the BMES, living alone was a significant predictor of all-cause mortality among those younger than 75 years, independent of self-perceived health status and socioeconomic and medical covariates. This observation is similar to that of the REACH study, which found a more marked association between living alone and mortality in those 80 years or younger. This is not surprising given that living alone is both a measure of normative behavior and functional independence in the very elderly. Unlike the REACH study, we could not confirm a significant association with CVD mortality, and

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This is likely due to ours being a population-based sample, whereas REACH is a sample of outpatients with pre-existing CVD risk. Nevertheless, our findings concur with those of Perissinotto et al.15 and Udell et al.16 that lack of social support, whether it be measured objectively (living arrangements) or subjectively (feelings of loneliness), has a negative impact on health and would be worth addressing in future intervention studies.

The Differential Diagnosis of Living Alone

It is interesting, but perhaps not surprising, that living alone seems to be a stronger predictor of mortality in younger persons than older persons. In older persons, living alone may be a proxy for very different phenomena that have opposing impacts on mortality. On the one hand, persons who live alone are more likely to have limited social support, and limited social support increases the risk for mortality. On the other hand, an older person who lives alone is more likely to have good functional status, particularly independence in the basic activities of daily living that are required to live without assistance. Functional independence is a powerful predictor of survival in older persons. In epidemiologic studies, these 2 factors may cancel each other out, leading to a null impact on mortality.

Epidemiologic studies often are not able to fully identify what is going on with an older person who lives alone. But clinicians should identify what is going on with their older patients who live alone. How good is their social support structure? Is there someone who could help them if they need care? Do they feel that they have someone they can discuss concerns with? And are they developing any difficulties with basic activities of daily living such as taking a bath or shower, getting dressed, or getting out of bed or a chair? Living alone has a differential diagnosis, just like any important sign or symptom in a patient.