In this issue of *Age and Ageing*, Hébert and colleagues report on their largely unsuccessful controlled trial of a nurse-led multidimensional prevention programme for people aged 75 or older who were living at home and felt to be at risk of functional decline [1]. The intervention consisted of a home visit by a nurse, followed by a written report to the subject’s general practitioner and a monthly follow-up phone call by the nurse. The main hypothesized outcome was avoidance of functional decline, something that was not accomplished by the intervention, despite a well-designed study. What do we learn from this finding?

Programmes of in-home geriatric assessment and follow-up have been around for over 20 years. They are theoretically very appealing: old people have long been shown to have many unreported conditions that can be uncovered and improved through outreach assessment programmes.

The results of randomized controlled studies, however, are controversial. Several earlier studies of preventive home visits were largely unsuccessful [2–5]. For example, a study of 580 older people in the Netherlands found no favourable effects for a 3-year intervention of quarterly home visits by public health nurses [2]. On the other hand, several other studies of preventive home visits have shown clinically important benefits on patient outcomes such as mortality, functional status and institutionalization [6–10]. For example, a study of medically and socially preventive home visits conducted in a suburb of Copenhagen revealed a marked reduction of nursing home admissions and mortality among older people receiving this intervention compared with controls [6]. What is the reason for these discrepancies between study results?

**Systematic reviews**

Several systematic analyses attempted to answer this question. One recent review included 15 trials of preventive home visits and found that five out of 12 trials measuring physical function observed favourable effects, with the other seven showing no significant effects on physical function (although most studies did include some significant programme benefit [11]). Van Haastregt *et al.* have analysed whether the methodological quality of the included studies might have been responsible for these discrepancies in results. From previous research on meta-analysis, it is known that the methodological quality of a study is likely to have an impact on outcomes [12]. However, they could not find such an association for preventive home visiting programmes.

A second recent review has identified 21 controlled trials of in-home and other community-based health assessment programmes and found significant benefits in 18 of them [13]. However, the authors did not find an explanation for the discrepancies in results.

The third review was our meta-analysis of geriatric programmes, published in 1993 [14]. Here, the pooled results of the preventive home visit studies showed significantly favourable effects of the intervention on mortality and institutionalization. However, heterogeneity tests revealed that the outcome results differed significantly among these seven studies. A covariate analysis [14] gave some preliminary insight into the potential underlying reasons for this heterogeneity, revealing that programmes that had a longer duration of intervention and a higher level of medical control over the geriatric recommendations had more favourable effects than programmes that had a short intervention or no control over the geriatric recommendations.

**Where does the present study fit?**

The best way to understand the contribution of the study by Hébert *et al.* is systematically to analyse the characteristics of this study and compare it with those of previous studies. First, the methodological aspects of the study design and analysis have to be considered. The main issue for a negative trial is the likelihood of a type II error (no favourable effects of intervention found when in reality there is an effect). The sample size of Hébert and co-workers’ study was not sufficient to detect a difference in mortality between intervention and control groups. Their results show that 12 of 250 subjects in the intervention group died compared with 18 of 253 controls (odds ratio 0.7; 95% confidence interval 0.3–1.5; *P*=0.3). This wide confidence interval reveals that, based on this study alone, we can make no conclusions on the effect of preventive home visits on mortality. However, the study did have a relatively high power for detecting a difference in functional status outcomes between intervention and control groups. The odds ratio of 1.00 with a 95% confidence interval of 0.82–1.23 indicates that the probability of an
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undetected yet clinically relevant favourable effect on functional status decline is low.

The next aspect to analyse is the selection of the study group for the study. Hébert et al. used a screening method to identify older people at higher risk for functional status decline and excluded lower-risk people from the study. Most other studies of preventive home visits included all older subjects willing to participate [3–7], or excluded only small groups of older people with dementia, severe disability or terminal disease [8, 10]. One recently published study [10] conducted in Bern, Switzerland, used a stratified randomization approach to analyse programme effects separately for those at high risk and for those at low risk for nursing home admission. This study revealed that subjects at low risk (but not those at high risk) had favourable intervention effects. This observation is compatible with the underlying concept that a preventive intervention works best at early and reversible stages in the process from health to disability, and that more disabled or frail people require a more intensive intervention that includes care co-ordination and tertiary prevention follow-up. Thus, one possible explanation for the negative findings of the present study is that this intervention was offered to high-risk older people. However this explanation might be questioned in view of the subjects’ relatively low 1-year mortality rate.

Probably the most important aspect responsible for the discrepant findings among previous studies of preventive home visits is the wide range of difference in the intensity and duration of the interventions used by the various studies. Several questions should be asked for determining the strength and duration of the intervention in the study of Hébert et al.

First, **what domains were included in the multidimensional assessment?** Twelve dimensions were defined for the multidimensional assessment. The list selected emphasizes medical or geriatric conditions requiring further work-up, treatment or rehabilitation. However, problems such as lack of physical activity, deficient preventive care (e.g. immunization deficit) or problems with alcohol—all major and potentially modifiable risk factors for adverse health outcomes among older people [15, 16]—were not included in this assessment, denoting a lack of emphasis in the primary and secondary prevention domain in this study.

Second, **what did the intervention comprise?** For most domains, the intervention team referred older people to the general practitioner or recommended further work-up or referral. Unfortunately, the authors do not provide process of care data to demonstrate the uptake of the recommendations, which is crucial in determining the strength of the intervention. Furthermore, in other studies [e.g. 8] there was a higher emphasis on direct recommendations to older people that aimed to change their behaviour (e.g. increasing physical activity) or increase their ability to deal with a problem themselves.

Third, **who were the people involved in the intervention team?** In this study, a unidisciplinary approach with nurses alone was used. The nurse was responsible for conducting the assessment and the follow-up intervention. In contrast, in other programmes that have shown favourable effects [e.g. 7, 8], interdisciplinary approaches were used, with geriatricians or general practitioners being directly involved in the intervention team.

Fourth, **how did the programme ensure that the primary-care provider complied with the preventive recommendations?** It is difficult to change physician behaviour, and only multidimensional and high-intensity programmes are likely to affect it [17, 18]. The intervention of this study included sending written lists to general practitioners and limited telephone follow-up contacts. Therefore, this study was unlikely to change the behaviour of the primary-care providers. Intense interventions include physician training, academic detailing and intense direct contact and follow-up with the primary-care provider.

Fifth, **what was the duration of the intervention?** The duration of the intervention was 1 year. Change of health behaviour takes time for older people, and favourable effects might take longer to develop. Most other programmes demonstrating favourable effects of preventive home visiting included a 2–3-year intervention.

Finally, **what was the quality of the intervention?** This is difficult to quantify, yet it is probably one of the key criteria determining success of preventive home visits. In the study conducted in Bern, a subgroup analysis revealed major differences in outcomes between older people allocated to one nurse and those allocated to the other two nurses of the programme [10]. These data strongly suggest that aspects of the quality of the intervention are likely to be responsible for differences in programme effects between studies.

Overall, the intervention approach used by Hébert et al. is considerably less intensive than those shown to be effective in previous studies. In addition, this programme emphasizes tertiary prevention among higher-risk older people and not primary or secondary prevention among lower-risk older people. Recent studies have shown more favourable effects of preventative home visits for lower-risk older people and suggest that higher-risk older subjects should be offered programmes emphasizing systematic care co-ordination as well as frequent intervention follow-up [10, 19–22]. Thus, the negative findings of the present study are consistent with data from previous research and re-emphasize the urgent need to develop criteria for successful preventative home visiting programmes.

The crucial point here is that not all geriatric prevention programmes are alike. Effective interventions need to have a critical intensity level and be targeted to the appropriate patient subpopulation. In these days of constant pressures for efficiency and cost-containment, we must still be prepared to invest sufficient resources