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Reply

SIR—We thank our colleagues for their comments on our paper [1] and agree that the interactions between fall prevention interventions may depend on the nature of the interventions and the population involved.

In our VIP study [2] of fall prevention there was a significant negative interaction (P = 0.016) between the two interventions, home-based exercise and home safety. In our Age & Ageing paper [1], in which we describe the lack of difference in the number of falls prevented by single interventions compared with multifactorial interventions, we have offered some possible explanations for this, such as confusion with advice from different health professionals. This may have been more likely to occur in the VIP trial where both the exercise programme and the home safety programme were delivered at home [2]. In the study by Day et al. [3] there was a group exercise programme away from home and home hazard management at home. In this study most participants rated their health as ‘good to excellent’ whereas participants in the VIP trial were older and had severe visual impairment.

Although single interventions may be more cost effective and reach the greatest numbers in population-based fall prevention programmes, clinicians seeing individual patients will advise intervention in a number of areas. We suggest that with individual patients the interventions are introduced only as rapidly as acceptance and adherence allow.

The study of Day et al. [3] was not included in our meta-analysis because they used ‘time to first fall’ rather than the total number of falls as the primary outcome measure in fall prevention trials. Analysis of efficacy using the total number of falls uses information on all fall events, increases the power of the study and has clinical relevance [4].

The loss of power using ‘fallers’ as the outcome measure can be seen by comparing the significant results of our meta-analysis of multifactorial interventions in the community setting [1] with one published concurrently using number of ‘fallers’ as the outcome measure and showing no significant benefit [5]. Such meta-analyses showing no benefit due to lack of statistical power do not help the promotion of falls prevention. This is disappointing when there is clear evidence of significant benefit when comprehensive, clinically important outcome measures are used.

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Delirium in older people: an epiphenomenon of incipient death or a separate biological process?

SIR—The paper by Adams et al., published in Age and Ageing [1], shows that Mini Mental State Examination (MMSE) scores, albumin serum levels and biomarkers of inflammation, but not delirium, are associated with 6-month mortality of medical inpatients. We would discuss this topic with our data, referring to 1,811 patients (≥65 years) discharged from a Rehabilitation and Aged Care Unit (RACU) between May 2003 and April 2006, and followed up
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Table 1. Characteristics of patients in three groups (delirium superimposed on dementia, delirium alone and no delirium)

<table>
<thead>
<tr>
<th></th>
<th>Delirium and dementia (n = 168)</th>
<th>Delirium alone (n = 71)</th>
<th>No delirium (n = 1,572)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>82.8 ± 7.7</td>
<td>78.8 ± 6.1</td>
<td>77.1 ± 7.9</td>
<td>0.00</td>
</tr>
<tr>
<td>Female gender</td>
<td>122 (72.2)</td>
<td>49 (70.0)</td>
<td>1160 (73.8)</td>
<td>0.72</td>
</tr>
<tr>
<td>Living alone before RACU admission</td>
<td>50 (29.6)</td>
<td>21 (30.0)</td>
<td>552 (35.5)</td>
<td>0.31</td>
</tr>
<tr>
<td>Charlson Index</td>
<td>3.8 (2.1)</td>
<td>2.9 ± 2.1</td>
<td>2.6 ± 2.2</td>
<td>0.00</td>
</tr>
<tr>
<td>C-reactive protein serum levels <em>mg/dL</em></td>
<td>5.0 ± 5.5</td>
<td>4.9 ± 4.9</td>
<td>2.8 ± 4.8</td>
<td>0.00</td>
</tr>
<tr>
<td>Albumin serum levels <em>g/dL</em></td>
<td>2.8 ± 0.4</td>
<td>2.9 ± 0.4</td>
<td>3.2 ± 0.6</td>
<td>0.00</td>
</tr>
<tr>
<td>Mini Mental State Exam 1 month before admission</td>
<td>15.5 ± 6.2</td>
<td>22.7 ± 6.5</td>
<td>23.8 ± 5.3</td>
<td>0.00</td>
</tr>
<tr>
<td>IADL 1 month before admission</td>
<td>3.5 ± 1.5</td>
<td>2.9 ± 1.9</td>
<td>2.9 ± 1.8</td>
<td>0.00</td>
</tr>
<tr>
<td>Length of RACU stay</td>
<td>26.2 ± 9.5</td>
<td>27.5 ± 12.3</td>
<td>22.4 ± 9.2</td>
<td>0.00</td>
</tr>
<tr>
<td>Died at 12 months</td>
<td>47 (27.8)</td>
<td>8 (8.6)</td>
<td>137 (8.5)</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Notes: Values denote mean ± standard deviation (SD) or n (%); P denotes significance on analysis of variance (ANOVA) for continuous or Chi-square for categorical variables.

RACU, Rehabilitation and Aged Care Unit.

* Scores refer to the cognitive assessment at resolution of delirium; it was not available for 8 patients with delirium alone and for 12 patients with delirium superimposed on dementia, respectively, because they were still delirious at discharge.

at 12 months. All patients were evaluated on admission with a multi-dimensional assessment including age, gender, living arrangement, MMSE scores, Charlson Index, albumin and C-reactive protein (CRP) serum levels and Instrumental Activity of Daily Living (IADL) scores [2], referenced to 1 month before admission. The diagnosis of delirium was obtained with the Confusion Assessment Method [3], while dementia was defined according to DSM III-R criteria [4]. Delirium was detected in 239 (13.2%) individuals: 71 (29.7%) had delirium alone while 168 (70.7%) had delirium superimposed on dementia (DSD). Subjects with DSD were oldest, had the greatest comorbidity, the lowest albumin and the highest CRP serum levels, the worst MMSE and IADL scores and the highest rate of 12-month mortality, in comparison with the other groups (Table 1).

To test the hypothesis of the report by Adams et al., we performed two multiple logistic regressions with mortality as the dependent variable. In the first regression, potential predictors were: age, gender, Charlson Index, CRP and albumin serum levels, MMSE and IADL scores and delirium (presence or absence). In the second, DSD was included as possible predictor in place of delirium. The first regression showed that age (odds ratio [OR] = 1.07, 95% confidence intervals [CI] 1.04–1.10, P<0.0005), Charlson Index (OR = 1.33, 95% CI 1.2–1.4, P<0.0005) and MMSE (OR = 1.06, 95% CI 1.02–1.09, P<0.005) were the only significant predictors. In the second regression, age (OR = 1.07, 95% CI 1.04–1.10, P<0.0005), Charlson Index (OR = 1.33, 95% CI 1.23–1.44, P<0.0005), and MMSE (OR = 1.06, 95% CI 1.03–1.09, P<0.0005) maintained their original significance, but DSD (OR = 1.69, 95% CI 1.14–2.76, P = 0.03) was also found to be a significant and independent predictor of 12-month mortality.

Our data only partially agree with those of Adams et al., showing that poor cognition, comorbidity and old age—but not delirium—predict mortality. According to these results, delirium could be regarded as a clinical epiphenomenon of incipient death rather than as a separate biological process. However, the results of the second regression suggest that when delirium is superimposed on dementia, it exerts an autonomous effect on mortality, independently from cognition and other related factors. We believe that DSD should be regarded as a separate pathophysiological entity; it can be hypothesised that a chain of adverse metabolic reactions, accompanying delirium in demented patients, can impair patients’ homeostasis and lead to increased mortality through self-maintaining pathophysiological mechanisms [5].