NUTRITION SCREENING SURVEYS IN CARE HOMES IN ENGLAND

A report based on the amalgamated data from the four Nutrition Screening Week surveys undertaken by BAPEN in 2007, 2008, 2010 and 2011

C A Russell and M Elia on behalf of BAPEN and collaborators
The four surveys and audits on nutritional screening were undertaken by BAPEN during 2007 - 2011 in collaboration with the British Dietetic Association and the Royal College of Nursing and with support from the Welsh Government, the Scottish Government, the Chief Nursing Officers for England and Northern Ireland and the Patient Safety, Domain 5, NHS England (who have taken on responsibilities of the former National Patient Safety Agency).
British Association for Parenteral and Enteral Nutrition (BAPEN)

BAPEN is a charitable association that raises awareness of malnutrition and works to advance the nutritional care of patients and those at risk from malnutrition in the wider community. Its membership is drawn from doctors, dietitians, nurses, patients, pharmacists and the health policy, industry, public health and research sectors.

- BAPEN works to achieve its mission by raising awareness of the prevalence and impact of malnutrition, raising standards in nutritional care and developing appropriate pathways to prevent malnutrition.

- BAPEN researches and publishes the evidence on malnutrition, and provides tools, guidance, educational resources and events for all health and social care professionals to support the implementation of nutritional care across all care settings and according to individual need.

- BAPEN works in partnership with its membership, its core specialist groups and external stakeholders to embed excellent nutritional care into the policy processes and practices of all health and care settings.

- The Nutrition Screening Week Surveys have been conducted as part of the activities of the Malnutrition Action Group, a standing committee of BAPEN.

For membership details, contact the BAPEN office or log on to the BAPEN website www.bapen.org.uk
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KEY POINTS

- ‘Malnutrition’ (medium + high risk according to the ‘Malnutrition Universal screening Tool’ (‘MUST’) for adults) was found to be a major social health problem, affecting 35% of care home residents. Most residents with ‘malnutrition’ were underweight (BMI <20 kg/m²), and most were at high risk of ’malnutrition’, which requires treatment.

- Underweight (BMI < 20 kg/m²) was distinctly more common among care home residents than the general population (30% v 4% in the general population; P <0.001) and obesity was less common (9% in residents v 26% in the general population; P <0.001). Underweight among care home residents increased with age, while obesity decreased with age. These differences, which are significant both from clinical and statistical points of view, reflect the extent to which the polar ends of weight status spectrum need to be tackled in care homes and the general population.

- There was considerable intra-individual variation in weight change between weight on admission and weight at the time of the survey (mean 0.2 kg; 95% range, -10.2 kg to 9.9 kg), which was largely unexplained. Nutritional status was found to be the single most important explanatory variable: subjects found to be ‘malnourished’ at the time of the survey were more likely to be underweight on admission and lose further weight during their residency, while’ non-malnourished’ subjects gained weight. Most residents who were underweight on admission remained underweight at the time of the survey, which took place up to 6 months after admission. Further investigations to understand the mechanisms responsible for the variability in weight change could help improve the nutritional care of the residents.

- ‘MUST’ was used in the majority of care homes. Among care homes using a screening tool (>90% of the total), 96% used ‘MUST’ (90% as the only tool) at the time of the 2011 survey). Unlike several other tools it can be used in other care settings and in all adult age groups, facilitating nutritional care during journeys within and between care settings.

- Over the period of the Nutrition Screening Week surveys there were significant trends reported by the participating care homes showing increased access to dietetic services, availability of policies to undertake nutritional screening and recording height on admission. However, there was room for improvement in some aspects of nutritional care, such as awareness of the existence of weighing scale standards (56% reported in 2011 survey) and auditing of nutritional screening (reported to take place in 75% of care homes in 2011).
EXECUTIVE SUMMARY

1. Between 2007 and 2011 four Nutrition Screening Week Surveys (NSW) of UK hospitals, care homes and mental health units were undertaken, each in a different season of the year. The surveys aimed to establish the prevalence of ‘malnutrition’ in the different care settings, to document current screening practice and identify problems that needed addressing and to provide feedback to local centres so their results could be benchmarked against those of the UK as a whole. The current report, which is based on the amalgamated data from UK care homes that participated in the four surveys, provides new information on the trends in nutritional care over time, factors affecting the prevalence of ‘malnutrition’ and weight change during residency. It also reports on the way in which the anthropometry of residents admitted to care homes differs from those of the general population.

2. The four NSW surveys involved a total of 374 care homes in England (52-134 per survey) and 3028 adult residents (369-1223 per survey). To overcome difficulties associated with non-responses to certain questions the data were subjected to three sensitivity analyses: one in which all the non-respondents were placed in one of two alternative categories, such as ‘yes’ and ‘no’; another in which they were all placed in the other category; and the third in which all were placed in the two categories in the same proportion as the respondents.

3. Most care homes reported having policies on nutritional screening (80-92%), weighing and recording of weight on admission (91-98%) and at intervals during residence (98-100%). The vast majority also reported linking the results of screening to a care plan (91-96%). The overall non-response (including ‘don’t know’) to questions about these items ranged from 1% to 6%.

4. Trend analysis (with sensitivity analysis) of consecutive surveys indicated significant improvements in the availability of policies on recording height on admission, and access to dietetic services. No significant trends (with consistent results from sensitivity analyses) were observed for recording of weight on admission and during stay, which already had high baseline rates, and other items, such as those related to proportion of resident screened on admission, frequency of nutritional screening, and awareness of weighing scale standards, which were accompanied with a non-response rates of 16-40%.

5. There was room for improvement in some aspects of nutritional care, such as awareness of the existence of weighing scale standards (56% in 2011 survey in association with no response in 25%) and undertaking audits on nutritional screening (75% in 2011 with no response in 17%).

6. In care homes that reported using a nutrition screening tool (>90% of the total) ‘MUST’ was the commonest. In the 2010 survey 86% of care homes used it (83% as the only tool) and in
2011 survey 96% used it (90% as the only tool), with an overall significant increase between the two surveys. The use of the consistent ‘MUST’ criteria within and between care homes and in multiple other care settings can facilitate continuity of nutritional care.

7. Among care home residents (mean age of 83 ± 9 years, body mass index (BMI) 23.1 kg/m²), who had been admitted in the previous 6 months, the prevalence of ‘malnutrition’ (medium + high risk according to ‘MUST’) was 35% and it remained high in various subgroup analyses (next point).

8. The prevalence of ‘malnutrition’ did not differ significantly between countries (England, Scotland, Wales and Northern Ireland), or between England (35%) and the rest of the UK (Scotland, Wales, and Northern Ireland; 36%), but it was lower (26%) in residents who had been admitted into exclusively residential care homes than all other types of care homes (39%), and it was also lower in those admitted from their own homes (28%) than from hospitals (40%) and other care homes (38%). In contrast, it was found to be higher in women (38%) compared to men (30%), who were almost four years younger than women, and in older than younger residents (24% in those <75 years, 34% in those 70-84 years, and 38% in the those ≥85 years). It varied with disease category, and was higher in residents with cancer than those without and in those suffering from multiple rather than a single major condition.

9. The mean body mass index (BMI) of the residents was more than 4 units lower than that of the general population before (23.1 ± 5.5 kg; care home residents) and after adjustment for age and sex, and also after adjustment for age and sex when only subjects aged ≥65 years were considered. This reflects the prevalence of underweight (BMI < 20 kg/m²), which was distinctly higher among care home residents than the general population (30% v 4%; P <0.001) and obesity, which was distinctly lower (9% v 26%; P <0.001). Underweight among care home residents increased with age, while obesity decreased with age.

10. The average intra-individual weight change in those who had been admitted in the previous 6 months was small, but the variability was large (mean 0.3 kg; median 0.1 kg; 95% range, -10.2 kg to 9.9 kg). ‘MUST’ categorisation at the time of the survey was found to be the most important single explanatory variable for the weight change. Those who were ‘malnourished’ (mostly underweight on admission and at the time of the survey), lost weight, whereas those who were not ‘malnourished’ gained weight. The weight change was not significantly affected by duration of residency or gender. However, it was found to be significantly affected by age (older people were more likely to lose weight) but together with other variables explained no more than 4% of the variability (14% when ‘MUST’ categorisation was included in the analysis). Most of the variability in weight change remained unexplained. There is a need to understand the mechanisms responsible for these weight changes, since they could influence the nutritional care in care homes.

11. Comparisons between England and the rest of the UK were generally not significant, and individual variables that were significant without adjustment for geographic location (England v rest of England) remained significant after adjustment, and vice versa.
INTRODUCTION

The four Nutrition Screening Week (NSW) surveys\(^1-4\), undertaken in the UK between 2007 and 2011, provided an array of local results, which were fed back to the participating centres for benchmarking against the national data, as part of the audit process. The surveys helped establish the burden of ‘malnutrition’ in hospitals, care homes and mental health units, and they facilitated care planning and estimation of the clinical and economic burden of ‘malnutrition’\(^5-7\). They also increased awareness about the need to combat ‘malnutrition’, which continues to be under-detected and under-treated. With accumulation of data over successive surveys it became possible to examine trends over time within the hospital setting not only within the UK as a whole but also within the individual constituent nations\(^8-11\). These nations, which have become devolved since 1999, have been increasingly developing their own healthcare systems\(^12\).

This report, based on the amalgamated data obtained from the four care home surveys, aimed to examine trends over time, particularly in relation to aspects of ‘malnutrition’ and in the organisational infrastructure for improving nutritional care. Previous results for the care home setting from individual NSW surveys have been reported separately, making it difficult to undertake trend analysis. To do this type of analysis well it is necessary to combine the data from the four surveys, take into account the effects of confounding variables, and perform sensitivity analyses to examine uncertainty. The cumulative sample size increased substantially with each additional survey, allowing the results to be reported with more confidence and to undertake trend analysis. Almost 80% of the care home data from the UK were obtained from England, which meant that data from other nations (Wales, Northern Ireland and Scotland) originated from less than 1000 subjects or a mean of less than 100 subjects per country for each survey. Such limited data prevented a detailed and confident analysis to be carried out within each country, especially since many questions were often not fully answered. Therefore, only two amalgamated care home reports have been produced: one for the UK as a whole and the other for England (this report). This contrasts with the five NSW hospital reports, one for each country and one of the UK as a whole, which were made possible by the availability of an order of ten-fold more subject data than those for care homes. Nevertheless, the overall combined data from care homes in England were compared with the combined data from the other three countries of the UK (Wales, Northern Ireland and Scotland). Separate analyses involving Wales, Northern Ireland and Scotland were not undertaken.

The combined care home reports, like those for hospitals, aimed to characterise the populations studied by comparing the data with those obtained from the general population. This included a comparison of body mass index and age distribution obtained from health surveys and a population census survey in England. Data from the health surveys, undertaken over the same time period as the NSW surveys, were merged before comparisons were made.

The two care home reports from this series, the five reports from the hospital series, and the individual NSW survey reports, containing data on hospitals care homes and mental health units, can be obtained from BAPEN (www.bapen.org.uk).
GENERAL FEATURES OF SURVEYS

The table below shows the general features of the Nutrition Screening Week (NSW) surveys which were undertaken in different seasons of the year. They involved a total of 374 care homes and 3028 adults, who were admitted in the previous 6 months. Children were not included.

TABLE 1 General features of the four Nutrition Screening Week Surveys in England†

<table>
<thead>
<tr>
<th>Survey number</th>
<th>Year of survey</th>
<th>Date of survey</th>
<th>Season†</th>
<th>Number of care homes</th>
<th>Number of subjects††</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2007</td>
<td>27-29 September</td>
<td>Autumn</td>
<td>134</td>
<td>1223</td>
</tr>
<tr>
<td>2</td>
<td>2008</td>
<td>1-3 July</td>
<td>Summer</td>
<td>62</td>
<td>651</td>
</tr>
<tr>
<td>3</td>
<td>2010</td>
<td>12-14 January</td>
<td>Winter</td>
<td>126</td>
<td>785</td>
</tr>
<tr>
<td>4</td>
<td>2011</td>
<td>5-7 April</td>
<td>Spring</td>
<td>52</td>
<td>369</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>374</td>
<td>3028</td>
</tr>
</tbody>
</table>

† The surveys were undertaken at 0.75 (autumn), 0.50 (summer), 0.04 (winter) and 0.26 (spring) of the way through the year
†† Not all questions were completed on all subjects

The first part of each survey involved gathering information about the care homes (Form 1a) and the second part about the residents (Form 2a). The forms used in individual surveys can be found in the previous reports 1–4 but the ones used in the last survey are included in Appendix 1. The forms differed slightly from year to year, mainly by the inclusion of a few more questions in the more recent surveys. For example, only the last two surveys included questions on the types of screening tool used by care homes, educational and training methods used for nutritional screening and awareness of standards for weighing scales.

In this report, the risk of malnutrition was assessed using the ‘Malnutrition Universal Screening Tool’ ('MUST') criteria 8, with ‘medium + high risk’ referred to as ‘malnutrition’.

Results from the four surveys were amalgamated into one database in order to establish the mean results for each of the four surveys and trends over time. Statistical analyses were carried out using the Statistical Package for the Social Sciences (SPSS Chicago, USA (versions 22)). A P value of <0.05 was considered to be statistically significant both for differences between subject groups or survey years, and P (trend) for linear trends over time (see Appendix 2 (Glossary of statistical terms)).

A proportion of centres responded to certain questions with ‘don’t know’ (DK) or ‘no answer’ (NA), which were amalgamated as ‘don’t know/no answer’ (‘DK/NA’). However, the proportion of ‘DK/NA’ responses varied from year to year creating difficulties in assessing trends over time or differences between seasons. Therefore, the following three types of sensitivity analysis were carried out in which different proportions of the DK/NA group was assigned to the two alternative categories involved in the trend:

a) all the care homes in the ‘DK/NA’ category were assigned to one of the two alternative categories (e.g. those responding ‘yes’)

b) all the DK/NA were assigned to the other alternative category (e.g. those responding ‘no’)

c) all the DK/NA responses were assigned to the two alternative categories in the same proportions as those reported for that question.

The first two sensitivity analyses involve extreme assumptions. However, if the results of these two analyses as well as that of the third are consistent in showing significant trends or differences in the
same direction, they would indicate substantial confidence in the conclusions. If the results from these analyses were inconsistent by showing different trends, it would become difficult to establish a conclusion with confidence.

To compare the anthropometry and age distribution of patients participating in the NSW surveys with those of the general population, raw data from four national surveys were obtained from the national archive centre at Essex University (now available from http://ukdataservice.ac.uk/): (Health Surveys for England 2007, 2008, 2009 and 2010; see reference13 for reports). These overlapped temporally with the NSW surveys. A secondary analysis of these surveys was undertaken using only adult data (≥ 18 years). The same was undertaken for the age distribution of the population based on data provided by mid-2010 population census in England.
CARE HOME AND SUBJECT CHARACTERISTICS

Care home characteristics

In the section that follows, the raw results are shown in a table, which may be followed by another table that summarises the results of sensitivity analyses. Generally, the results from care homes in England (N = 374) did not differ significantly from those in other nations of the UK (N = 100). Those that did are indicated.

Presence of a nutrition screening policy

TABLE 2 Distribution of care homes according to presence of nutrition screening policy

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>80</td>
<td>92</td>
<td>92</td>
<td>90</td>
<td>327</td>
<td>87</td>
<td>89</td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td>26</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>DK/NA</td>
<td>7</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>21</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>474</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Number of care homes (N)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>375*</td>
</tr>
</tbody>
</table>

P value†

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.021</td>
<td>0.029(adj)</td>
<td></td>
</tr>
</tbody>
</table>

Total(adj) = equal weighting for each year (equivalent to equal sample size each year). DK = Don’t know, NA = No answer
* The small discrepancy between ‘Total’ and ‘Total(adj)’ is due to rounding associated with the weighting procedure
† Chi squared test – the P values should be interpreted with caution since the assumptions of the test were not met

TABLE 3 Sensitivity analyses of care homes according to presence of nutrition screening policy

<table>
<thead>
<tr>
<th>Type of sensitivity analysis*</th>
<th>% yes</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007</td>
<td>2008</td>
</tr>
<tr>
<td>Model a</td>
<td>87</td>
<td>97</td>
</tr>
<tr>
<td>Model b</td>
<td>80</td>
<td>92</td>
</tr>
<tr>
<td>Model c</td>
<td>87</td>
<td>97</td>
</tr>
</tbody>
</table>

* In model a) all DK/NA assigned to ‘yes’
  In model b) all DK/NA assigned to ‘no’
  In model c) all DK/NA assigned to ‘yes’ and ‘no’ in the same proportion as respondents
† Chi squared (P) and Chi squared for trend (P(trend))

Sensitivity analyses involved two categories only (‘yes’ (presence of nutrition screening policy) and ‘no’ (absence of nutrition screening policy)). The results indicate significant changes in the proportion of care homes reporting that they have a nutrition screening policy.
**Audit of nutritional screening**

**TABLE 4** Distribution of care homes according to audit on nutritional screening

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>66</td>
<td>61</td>
<td>63</td>
<td>75</td>
<td>245</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>16</td>
<td>19</td>
<td>17</td>
<td>67</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>DK/NA</td>
<td>16</td>
<td>23</td>
<td>18</td>
<td>8</td>
<td>62</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>374</td>
<td>101*</td>
<td>100</td>
</tr>
</tbody>
</table>

*Results do not add up to 100% due to rounding of the component values to the nearest 1%*

**TABLE 5** Sensitivity analyses of care homes according to audit on nutritional screening

<table>
<thead>
<tr>
<th>Type of sensitivity analysis*</th>
<th>% yes</th>
<th>P value</th>
<th>P(trend)†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007</td>
<td>2008</td>
<td>2010</td>
</tr>
<tr>
<td>Model a</td>
<td>82</td>
<td>84</td>
<td>81</td>
</tr>
<tr>
<td>Model b</td>
<td>66</td>
<td>61</td>
<td>63</td>
</tr>
<tr>
<td>Model c</td>
<td>79</td>
<td>79</td>
<td>77</td>
</tr>
</tbody>
</table>

*Results do not add up to 100% due to rounding of the component values to the nearest 1%*

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Sensitivity analyses involved two categories only (‘yes’ (audit on nutritional screening) and ‘no’ (no audit on nutritional screening)). The overall results indicate no significant change in the proportion of care homes reporting that they audit nutritional screening practice.
**Frequency of nutritional screening audit**

The question on frequency of audit of nutritional screening was included in the last three surveys.

### TABLE 6 Distribution of care homes according to frequency of nutrition screening audit

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Every year</td>
<td>-</td>
<td>61</td>
<td>49</td>
<td>71</td>
<td>137</td>
<td>57</td>
<td>60</td>
</tr>
<tr>
<td>Every 2 years</td>
<td>-</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>7</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Every 3 or more years</td>
<td>-</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>DK/NA</td>
<td>-</td>
<td>39</td>
<td>44</td>
<td>29</td>
<td>9</td>
<td>40</td>
<td>38</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>240</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

### Number of care homes (N)

|                  | 62   | 126  | 52   | 240  | 240   | 240   | 240        |

**P value†**

0.045

0.013(adj)

Total(adj) = equal weighting for each year (equivalent to equal sample size each year), DK = Don’t know, NA = No answer

† Chi squared test – the P values should be interpreted with caution since the assumptions of the test were not met

### TABLE 7 Sensitivity analyses of care homes according to frequency of nutrition screening audit

<table>
<thead>
<tr>
<th>Type of sensitivity analysis*</th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>% yes</th>
<th>P value</th>
<th>P(trend)†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model a</td>
<td>-</td>
<td>100</td>
<td>94</td>
<td>100</td>
<td>100</td>
<td>0.024</td>
<td>0.862</td>
</tr>
<tr>
<td>Model b</td>
<td>-</td>
<td>61</td>
<td>49</td>
<td>71</td>
<td>100</td>
<td>0.020</td>
<td>0.373</td>
</tr>
<tr>
<td>Model c</td>
<td>-</td>
<td>100</td>
<td>89</td>
<td>100</td>
<td>100</td>
<td>0.001</td>
<td>0.816</td>
</tr>
</tbody>
</table>

* In model a) all DK/NA assigned to ‘every year’
  
  In model b) all DK/NA assigned to ‘not every year’
  
  In model c) all DK/NA assigned to ‘yes’ and ‘no’ in the same proportion as respondents

† Chi squared (P) and Chi squared for trend (P (trend)) – the P values for model a) and c) should be interpreted with caution since the assumptions of the test were not met

Sensitivity analyses involved two categories only (‘every year’ (audit undertaken (at least) once a year) and ‘not every year’ (less frequently than once a year)). The results indicate no significant change in the proportion of hospitals undertaking audits on nutritional screening every year.
Access to dietetic services

TABLE 8 Distribution of care homes according to access to dietetic services

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td></td>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>81</td>
<td>95</td>
<td>92</td>
<td>94</td>
<td>332</td>
<td>89</td>
<td>90</td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>24</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>DK/NA</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>18</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>101*</td>
<td>374</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Number of care homes (N) 134 62 126 52 374 374 375**

P value† 0.003 0.001(adj)

Total(adj) = equal weighting for each year (equivalent to equal sample size each year)
DK = Don’t know, NA = No answer
* Results do not add up to 100% due to rounding of the component values to the nearest 1%
** The small discrepancy between ‘Total’ and ‘Total(adj)’ is due to rounding associated with the weighting procedure
† Chi squared test – the P values should be interpreted with caution since the assumptions of the test were not met

TABLE 9 Sensitivity analyses of care homes according to access to dietetic services

<table>
<thead>
<tr>
<th>Type of sensitivity analysis*</th>
<th>% yes 2007</th>
<th>% yes 2008</th>
<th>% yes 2010</th>
<th>% yes 2011</th>
<th>P</th>
<th>P(trend)†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model a</td>
<td>87</td>
<td>100</td>
<td>97</td>
<td>96</td>
<td>&lt;0.001</td>
<td>0.002</td>
</tr>
<tr>
<td>Model b</td>
<td>81</td>
<td>95</td>
<td>92</td>
<td>94</td>
<td>0.002</td>
<td>0.002</td>
</tr>
<tr>
<td>Model c</td>
<td>86</td>
<td>100</td>
<td>97</td>
<td>96</td>
<td>&lt;0.001</td>
<td>0.001</td>
</tr>
</tbody>
</table>

* In model a) all DK/NA assigned to ‘yes’
  In model b) all DK/NA assigned to ‘no’
  In model c) all DK/NA assigned to ‘yes’ and ‘no’ in the same proportion as respondents
† Chi squared (P) and Chi squared for trend (P(trend)) for models a) and c) should be interpreted with caution since the assumptions of the test were not met

Sensitivity analyses involved two categories only (‘yes’ access to dietetic services) and ‘no’ (no access to dietetic services). These results indicate significant changes in the proportion of care home with access to dietetic services.

The overall combined results from all surveys undertaken in Wales, Northern Ireland and Scotland indicated significantly (P = 0.013) greater access to dietetic services (yes 98%, no 0%, DK/NA 2%; N =100) than in England (Table 8). Sensitivity analyses were also consistently significant (P = 0.009. P = 0.002 and P = 0.008 for models a, b, and c respectively.)
**Policy for weighing residents on admission**

**TABLE 10** Policy for weighing residents on admission

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>98</td>
<td>98</td>
<td>91</td>
<td>100</td>
<td>358</td>
<td>96</td>
<td>97</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>DK/NA</td>
<td>1</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>11</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>101*</td>
<td>100</td>
<td>374</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Number of care homes (N)** 134 62 126 52 374 374 374

**P value**

$0.007$

$0.003(adj)$

Total(adj) = equal weighting for each year (equivalent to equal sample size each year)

DK = Don’t know, NA = No answer

*Results do not add up to 100% due to rounding of the component values to the nearest 1%

† Chi squared test – the P values should be interpreted with caution since the assumptions of the test were not met

The proportion of care homes reporting that they had a policy for weighing residents on admission was over 91% in all individual surveys and over 97% in those that responded with a ‘yes’ or ‘no’

**TABLE 11** Sensitivity analyses of care homes according to policy for weighing residents on admission

<table>
<thead>
<tr>
<th>Type of sensitivity analysis*</th>
<th>% yes</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007</td>
<td>2008</td>
<td>2010</td>
<td>2011</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model a</td>
<td>99</td>
<td>98</td>
<td>98</td>
<td>98</td>
<td>100</td>
<td>0.843</td>
<td>0.596</td>
</tr>
<tr>
<td>Model b</td>
<td>98</td>
<td>98</td>
<td>90</td>
<td>98</td>
<td>100</td>
<td>0.004</td>
<td>0.251</td>
</tr>
<tr>
<td>Model c</td>
<td>99</td>
<td>98</td>
<td>98</td>
<td>98</td>
<td>100</td>
<td>0.843</td>
<td>0.596</td>
</tr>
</tbody>
</table>

* In model a) all DK/NA assigned to ‘yes’
  In model b) all DK/NA assigned to ‘no’
  In model c) all DK/NA assigned to ‘yes’ and ‘no’ in the same proportion as respondents

† Chi squared (P) and Chi squared for trend (P(trend)) – The P values for models a and c should be interpreted with caution since the assumptions of the test were not met

Sensitivity analyses involved two categories only (‘yes’ (policy for weighing on admission) and ‘no’ (no policy for weighing on admission)). However, only about 3% of reporters did not know if they had a policy for weighing residents on admission or did not respond to the question. The results indicated that with consecutive surveys there was no significant trend in the proportion of care homes that had a policy for weighing residents on admission.
**Regular weighing during stay**

TABLE 12 Regular weighing during stay

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>100</td>
<td>98</td>
<td>98</td>
<td>100</td>
<td>371</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>DK/NA</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>374</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Number of care homes (N)**: 134, 62, 126, 52, 374, 374, 375*

| P value† | 0.610 | 0.351(adj) |

Total (adj) = equal weighting for each year (equivalent to equal sample size each year). DK = Don’t know, NA = No answer.

* The small discrepancy between 'Total' and 'Total(adj)' is due to rounding associated with the weighting procedure.

† Chi squared test – the P values should be interpreted with caution since the assumptions of the test were not met.

In all surveys 99-100% of care homes undertook regular weighing of residents during their stay.

**Recording height on admission**

TABLE 13 Recording of height on admission

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>69</td>
<td>62</td>
<td>82</td>
<td>88</td>
<td>364</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>No</td>
<td>24</td>
<td>27</td>
<td>16</td>
<td>8</td>
<td>87</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>DK/NA</td>
<td>7</td>
<td>11</td>
<td>2</td>
<td>4</td>
<td>23</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>474</td>
<td>101*</td>
<td>100</td>
</tr>
</tbody>
</table>

**Number of care homes (N)**: 134, 62, 126, 52, 374, 374, 374

| P value† | 0.004 | <0.005(adj) |

Total(adj) = equal weighting for each year (equivalent to equal sample size each year). DK = Don’t know, NA = No answer.

* Results do not add up to 100% due to rounding of the component values to the nearest 1%

† Chi squared test

The proportion of care homes recording height on admission was less than those recording weight. The proportion recording height on admission generally appeared to increase over the period of the four surveys.
### TABLE 14 Sensitivity analyses of care homes according to recording height on admission

<table>
<thead>
<tr>
<th>Type of sensitivity analysis*</th>
<th>% yes</th>
<th></th>
<th></th>
<th></th>
<th>P value</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007</td>
<td>2008</td>
<td>2010</td>
<td>2011</td>
<td>P</td>
<td>P(trend)†</td>
<td></td>
</tr>
<tr>
<td>Model a</td>
<td>76</td>
<td>73</td>
<td>84</td>
<td>92</td>
<td>0.021</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Model b</td>
<td>69</td>
<td>61</td>
<td>82</td>
<td>88</td>
<td>0.001</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Model c</td>
<td>74</td>
<td>69</td>
<td>84</td>
<td>92</td>
<td>0.004</td>
<td>0.002</td>
<td></td>
</tr>
</tbody>
</table>

* In model a) all DK/NA assigned to ‘yes’
  In model b) all DK/NA assigned to ‘no’
  In model c) all DK/NA assigned to ‘yes’ and ‘no’ in the same proportion as respondents

Sensitivity analyses involved two categories only (recording of height on admission and not recording of height on admission). All three models showed that with consecutive surveys there was a significant trend towards measurement of height in a greater proportion of admissions.

The overall combined results from all surveys undertaken in Wales, Northern Ireland and Scotland indicated a borderline significant result (P = 0.043) more height measurements (yes 85%, no 14%, DK/NA 1%; N =100) than in England (Table 13). Sensitivity analyses showed a significant effect only with model b (P = 0.029; the P-value for model a) was P = 0.209, and for model c P = 0.124).

### Awareness of weighing scale standards

A question on awareness of standards on weighing scales was introduced in the 2010 survey and was also used in the 2011 survey.

### TABLE 15 Proportion aware of weighing scale standards

<table>
<thead>
<tr>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>48</td>
<td>56</td>
<td>89</td>
<td>50</td>
</tr>
<tr>
<td>No</td>
<td>-</td>
<td>-</td>
<td>26</td>
<td>21</td>
<td>44</td>
<td>25</td>
</tr>
<tr>
<td>DK/NA</td>
<td>-</td>
<td>-</td>
<td>26</td>
<td>23</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>100</td>
<td>178</td>
<td>100</td>
</tr>
</tbody>
</table>

Number of care homes (N) | - | - | 126 | 52 | 178 | 178 | 178 |

| P value† | 0.604 | 0.564(adj) |

Total(adj) = equal weighting for each year (equivalent to equal sample size each year), DK = Don’t know, NA = No answer
† Chi squared test
TABLE 16 Sensitivity analyses of care homes according to weighing scale standards

<table>
<thead>
<tr>
<th>Type of sensitivity analysis*</th>
<th>% yes</th>
<th>P value</th>
<th>P(trend)†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007</td>
<td>2008</td>
<td>2010</td>
</tr>
<tr>
<td>Model a</td>
<td>-</td>
<td>-</td>
<td>74</td>
</tr>
<tr>
<td>Model b</td>
<td>-</td>
<td>-</td>
<td>48</td>
</tr>
<tr>
<td>Model c</td>
<td>-</td>
<td>-</td>
<td>64</td>
</tr>
</tbody>
</table>

* In model a) all DK/NA assigned to ‘yes’
In model b) all DK/NA assigned to ‘no’
In model c) all DK/NA assigned to ‘yes’ and ‘no’ in the same proportion as respondents
† Chi squared (P) and Chi squared for trend (P(trend))

The sensitivity analyses involved only two groups (‘aware of the weighing scale standards’ and ‘not aware of weighing scale standards’). The results provide no evidence of a significant change between the 2010 and 2011 surveys.

Proportion of residents screened on admission

TABLE 17 Proportion of residents screened on admission

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>0-25%</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>26-50%</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>51-75%</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>13</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>76-100%</td>
<td>76</td>
<td>84</td>
<td>79</td>
<td>85</td>
<td>298</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>DK/NA</td>
<td>22</td>
<td>10</td>
<td>12</td>
<td>13</td>
<td>58</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>101*</td>
<td>126</td>
<td>52</td>
<td>374</td>
<td>100</td>
<td>99*</td>
</tr>
</tbody>
</table>

Number of care homes 134 62 126 52 374 374 375**

P value†

<table>
<thead>
<tr>
<th></th>
<th>0.155</th>
<th>0.168(adj)</th>
</tr>
</thead>
</table>

Total(adj) = equal weighting for each year (equivalent to equal sample size each year), DK = Don’t know, NA = No answer
* Results do not add up to 100% due to rounding of the component values to the nearest 1%
** The small discrepancy between ‘Total’ and ‘Total(adj)’ is due to rounding associated with the weighting procedure
† Chi squared test – the P values should be interpreted with caution since the assumptions of the test were not met
TABLE 18  Sensitivity analyses of care homes according to proportion screened on admission

<table>
<thead>
<tr>
<th>Type of sensitivity analysis*</th>
<th>% in 76-100% screening category</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007</td>
<td>2008</td>
</tr>
<tr>
<td>Model a</td>
<td>99</td>
<td>94</td>
</tr>
<tr>
<td>Model b</td>
<td>76</td>
<td>84</td>
</tr>
<tr>
<td>Model c</td>
<td>98</td>
<td>93</td>
</tr>
</tbody>
</table>

* In model a) all DK/NA assigned to '76-100% screening'
  In model b) all DK/NA assigned to '0-75% screening'
  In model c) all DK/NA assigned to 'yes' and 'no' in the same proportion as respondents
† Chi squared (P) and Chi squared for trend (P (trend))

Sensitivity analyses involved two categories only (% screened 76-100% and 0-75%). Two of the models indicated significant differences between surveys but none of them indicated a significant trend over time.

### Linking screening results to a care plan

A question on linking screening results to a care plan was included in the last three surveys only.

TABLE 19  Linking screening results to a care plan

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>-</td>
<td>95</td>
<td>90</td>
<td>96</td>
<td>223</td>
<td>93</td>
<td>93</td>
</tr>
<tr>
<td>No</td>
<td>-</td>
<td>3</td>
<td>9</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>DK/NA</td>
<td>-</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>13</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>240</td>
<td>100</td>
<td>99*</td>
</tr>
</tbody>
</table>

Number of care homes  | -    | 62   | 126  | 52   | 240   | 240  | 240       |

P value†  

<table>
<thead>
<tr>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.133</td>
</tr>
<tr>
<td>0.116(adj)</td>
</tr>
</tbody>
</table>

Total(adj) = equal weighting for each year (equivalent to equal sample size each year), DK = Don’t know, NA = No answer

*Results do not add up to 100% due to rounding of the component values to the nearest 1%
† Chi squared test – the P values should be interpreted with caution since the assumptions of the test were not met
TABLE 20  Sensitivity analyses of care homes according to linking results to a care plan

<table>
<thead>
<tr>
<th>Type of sensitivity analysis*</th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>P</th>
<th>P(trend)†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model a</td>
<td>-</td>
<td>97</td>
<td>99</td>
<td>98</td>
<td>0.466</td>
<td>0.542</td>
</tr>
<tr>
<td>Model b</td>
<td>-</td>
<td>95</td>
<td>90</td>
<td>96</td>
<td>0.295</td>
<td>0.915</td>
</tr>
<tr>
<td>Model c</td>
<td>-</td>
<td>97</td>
<td>99</td>
<td>98</td>
<td>0.466</td>
<td>0.542</td>
</tr>
</tbody>
</table>

* In model a) all DK/NA assigned to ‘yes’
In model b) all DK/NA assigned to ‘no’
In model c) all DK/NA assigned to ‘yes’ and ‘no’ in the same proportion as respondents
† Chi squared (P) and Chi squared for trend (P (trend)) – The P values for all models should be interpreted with caution since the assumptions of the test were not met

The sensitivity analyses involved two categories only (‘linking results to a care plan’ and ‘not linking results to a care plan’). With most care homes already linking the results of screening to a care plan none of the models showed a significant trend towards further improvement.

Type of screening tool used

TABLE 21  Type of screening tool used

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘MUST’</td>
<td>-</td>
<td>-</td>
<td>75</td>
<td>83</td>
<td>78</td>
<td>99*</td>
</tr>
<tr>
<td>‘MUST’+ local tool</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>‘MUST’ + other tool</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>NRS</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>‘MUST’+NRS</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>NRS + other tool</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>NRS + local tool</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other tool</td>
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<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>Local tool</td>
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<td>-</td>
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<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Local +other</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Local+ other+ NRS</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No tool</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>No answer</td>
<td>-</td>
<td>-</td>
<td>9</td>
<td>4</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>99*</td>
<td>101*</td>
<td>102*</td>
<td>99*</td>
</tr>
</tbody>
</table>

Number of care homes

Total(adj) = equal weighting for each year (equivalent to equal sample size each year)
‘MUST’ = The ‘Malnutrition Universal Screening Tool’; NRS = Nutrition Risk Score 2002
*Results do not add up to 100% due to rounding of the component values to the nearest 1%.

The type of screening tools used in care homes was assessed only in the 2010 and 2011 surveys. In both surveys the ‘Malnutrition Universal Screening Tool’ (‘MUST’) was the most commonly used tool. In 2010 ‘MUST’ was reported to be used in 77% of all care homes (75% as the only tool) and 88% in the 2011 (83% as the only tool). The second most commonly used tools were local screening tools. However, among those care homes that reported using a screening tool, ‘MUST’ was used in 86% of care homes (84% as the only tool) in 2010 and 96% in 2011 (90% as the only tool) (P =0.066 for increased overall use between 2010 compared to 2011).
**Training of staff in nutritional screening**

**TABLE 22** Method of training staff in nutritional screening

<table>
<thead>
<tr>
<th>Method of training staff in nutritional screening</th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workbook</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Lecture/workshop</td>
<td>-</td>
<td>-</td>
<td>42</td>
<td>35</td>
<td>40</td>
<td>39</td>
</tr>
<tr>
<td>Lecture/workshop + workbook</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>21</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>E-learning</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>E-learning + lecture/workshop</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>E-learning + workbook</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>E-learning + lecture/workshop + workbook</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>E-learning + other</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>E-learning + lecture/workshop + other</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>-</td>
<td>-</td>
<td>23</td>
<td>8</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>Other + lecture/workshop</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>17</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Other + workbook</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>No training</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>6</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>No answer</td>
<td>-</td>
<td>-</td>
<td>7</td>
<td>2</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>101*</td>
<td>101*</td>
<td>102*</td>
</tr>
</tbody>
</table>

*Number of care homes* | 126 | 52 | 178 | 177**

Total(adj) = equal weighting for each year (equivalent to equal sample size each year)

* Results do not add up to 100% due to rounding of the component values to the nearest 1%

** The small discrepancy between ‘Total’ and ‘Total(adj)’ is due to rounding associated with the weighting procedure

The most common training method of training was a combination of a lecture and workshop, which was used in about 40% of all care homes. The use of e-learning, either alone or in combination with other methods, rose slightly, from 1% of all care homes in 2010 to 4% in 2011. Overall, about 9% indicated that no training was provided (about 10% among those who responded to the question).
Subject characteristics

In this section subject characteristics of care home residents in England are summarised, and any that differ significantly from those in other parts of the UK are indicated.

Gender

TABLE 23  Residents according to gender

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total(adj)</th>
<th>%</th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>412</td>
<td>194</td>
<td>252</td>
<td>121</td>
<td>979</td>
<td>976</td>
<td>33</td>
<td>30</td>
<td>32</td>
<td>33</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Female</td>
<td>848</td>
<td>458</td>
<td>533</td>
<td>246</td>
<td>2085</td>
<td>2085</td>
<td>67</td>
<td>70</td>
<td>68</td>
<td>67</td>
<td>68</td>
<td>68</td>
<td>68</td>
</tr>
<tr>
<td>NA</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>N</td>
<td>1260</td>
<td>652</td>
<td>785</td>
<td>369</td>
<td>3066</td>
<td>3065**</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>101*</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Total(adj) = equal weighting for each year (equivalent to equal sample size each year), NA = No answer
*Results do not add up to 100% due to rounding of the component values to the nearest 1%
** The small discrepancy between 'Total' and 'Total(adj)' is due to rounding associated with the weighting procedure

Age

TABLE 24  Residents according to age (years) and gender

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Mean ± sd</td>
<td>81.1 ± 10.7</td>
<td>81.2 ± 8.1</td>
<td>82.3 ± 9.0</td>
<td>77.5 ± 13.3</td>
<td>81.0 ± 10.3</td>
</tr>
<tr>
<td></td>
<td>Median (IQ)</td>
<td>83 (77-88)</td>
<td>82 (76-87)</td>
<td>83 (78-88)</td>
<td>80 (72-88)</td>
<td>83 (77-88)</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>403</td>
<td>194</td>
<td>252</td>
<td>121</td>
<td>970</td>
</tr>
<tr>
<td>Female</td>
<td>Mean ± sd</td>
<td>84.7 ± 8.7</td>
<td>85.4 ± 8.2</td>
<td>84.5 ± 8.3</td>
<td>82.3 ± 10.6</td>
<td>84.5 ± 8.8</td>
</tr>
<tr>
<td></td>
<td>Median (IQ)</td>
<td>86 (81-90)</td>
<td>86 (81-90)</td>
<td>86 (81-90)</td>
<td>85 (78-89)</td>
<td>86 (81-90)</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>820</td>
<td>457</td>
<td>533</td>
<td>246</td>
<td>2056</td>
</tr>
<tr>
<td>Male + female</td>
<td>Mean ± sd</td>
<td>83.5 ± 9.5</td>
<td>84.1 ± 8.4</td>
<td>83.8 ± 8.6</td>
<td>80.8 ± 11.8</td>
<td>83.4 ± 9.4</td>
</tr>
<tr>
<td></td>
<td>Median (IQ)</td>
<td>85 (79-89)</td>
<td>85 (80-90)</td>
<td>85 (79-89)</td>
<td>84 (76-89)</td>
<td>85 (79-89)</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>1223</td>
<td>651</td>
<td>785</td>
<td>369+</td>
<td>3028</td>
</tr>
</tbody>
</table>

Total(adj) = equal weighting for each year (equivalent to equal sample size each year)
IQ= Interquartile range
† Includes two subjects whose sex was not specified

The mean age was 83.4 (sd ±9.4) years (median 85 (IQ 79-89) years. Figure 1 shows that the age distribution is skewed to the left.
The mean age of residents in England was greater than in other parts of the UK by a mean of 1.83 years (P<0.001), and slightly more for men in other parts of the UK (2.13 years; P = 0.003) than women (1.66 years; P < 0.001).

Body mass index

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± sd</td>
<td>23.5 ± 5.6</td>
<td>22.5 ± 5.3</td>
<td>23.0 ± 5.3</td>
<td>23.1 ± 5.9</td>
<td>23.1 ± 5.5</td>
<td>23.0 ± 5.5</td>
</tr>
<tr>
<td>Median (IQ)</td>
<td>22.9 (19.7-26.2)</td>
<td>22.0 (19.1-24.9)</td>
<td>22.3 (19.4-25.8)</td>
<td>22.5 (18.7-26.1)</td>
<td>22.5 (19.3-25.8)</td>
<td>22.4 (19.2-25.8)</td>
</tr>
<tr>
<td>N</td>
<td>1101</td>
<td>503</td>
<td>630</td>
<td>324</td>
<td>2558</td>
<td>2558</td>
</tr>
</tbody>
</table>

Total(adj) = equal weighting for each year (equivalent to equal sample size each year), IQ= Interquartile range

The mean BMI was 23.1 kg/m² (sd ±5.5) and the median 22.5 kg/m² (IQ 19.3-25.8). Figure 2 shows that the BMI distribution is skewed to the right.
FIGURE 2 Histogram of the BMI distribution of adult residents (≥18 years) participating in the four NSW surveys (N = 2534). The frequency refers to the number of subjects in individual 2 kg/m$^2$ BMI band (individual bar). The red vertical red line corresponds to a BMI of 20 kg/m$^2$.

TABLE 26  BMI categories

<table>
<thead>
<tr>
<th>kg/m$^2$</th>
<th>2007 %</th>
<th>2008 %</th>
<th>2010 %</th>
<th>2011 %</th>
<th>Total N</th>
<th>Total %</th>
<th>Total(adj) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18.5</td>
<td>17</td>
<td>21</td>
<td>19</td>
<td>23</td>
<td>491</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>&lt;20.0</td>
<td>28</td>
<td>33</td>
<td>30</td>
<td>32</td>
<td>772</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>20.0-24.9</td>
<td>39</td>
<td>43</td>
<td>39</td>
<td>36</td>
<td>1015</td>
<td>40</td>
<td>39</td>
</tr>
<tr>
<td>≥25.0</td>
<td>32</td>
<td>24</td>
<td>31</td>
<td>31</td>
<td>771</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>≥30.0</td>
<td>10</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td>240</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>N</td>
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<td>503</td>
<td>630</td>
<td>324</td>
<td>2558</td>
<td>2558</td>
<td>2558</td>
</tr>
</tbody>
</table>

Total(adj) = equal weighting for each year (equivalent to equal sample size each year)
Comparison of current BMI (survey BMI) and admission BMI

The weight on admission to care homes was reported in most subjects participating in the surveys, and with the information on height obtained in the survey the admission BMI was calculated. A strong correlation coefficient was found between admission and current (survey) BMI ($r = 0.936$; standard error of the estimate $1.89 \text{ kg/m}^2$). The cross tabulation in Table 27, the same as that obtained using the BMI categories of ‘MUST, shows a strong agreement between admission and current BMI categories (the diagonals shaded in blue indicate 87.7% agreement). Of the subjects who were underweight on admission 71% remained underweight at the time of the survey. Nevertheless, 1 in 8 of all subjects changed categories, about half from a lower to a higher BMI category and another half from a higher to a lower category. This explains why the proportion of underweight (BMI <20 kg/m²) on admission (31.1%) was similar to that found at the time of the survey (29.8%). Further discussion on the determinants of the intra-individual weight changes can be found at the end of this section.

**TABLE 27** Cross-tabulation of current (survey) BMI with admission BMI categories (kg/m²)†

<table>
<thead>
<tr>
<th>Admission BMI category</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18.5</td>
<td>15.5%</td>
</tr>
<tr>
<td>18.5-&lt;20.0</td>
<td>2.2%</td>
</tr>
<tr>
<td>≥20</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

† Total N = 1948
Comparison of the age and BMI distribution of adults admitted to care homes with those of the general population

FIGURE 3 A comparison of the age distribution of adult subjects (≥18 years) admitted to care homes (NSW(Eng); red line) with that of the general population according to a population census of England (black dotted line) and Health Surveys for England (HSE) (blue line). The data from the four Health Surveys for England (2007, 2008, 2009 and 2010) were amalgamated. The data of subjects admitted to English care homes (NSW surveys 2007, 2008, 2010 and 2011; total N =3,028) were also amalgamated (Elia unpublished). The census data (black dotted line) were based on the mid-2010 census, as reported by the Office of National Statistics. Each data point represents the proportion of adult subjects (≥18 years) within 10 year age bands starting from 10 years (first data point is for subjects aged 18 and 19 years only). The curves were constructed using third order (cubic) polynomials (HSE; population census) and cubic spline (NSW Eng).
Thirty per cent of the subjects participating in the NSW care home surveys in England had a BMI <20 kg/m$^2$ compared to 4.2% of the general population (Health Survey England).

The mean BMI of adults (>18 years) admitted to care homes in England in the previous 6 months was lower than that of the general population of England by more than four BMI units (23.1 v 27.4 kg/m$^2$ (P <0.001)). It remained lower after adjustment for age and sex (21.9 v 27.5 kg/m$^2$ (P < 0.001) and also after adjustment for age and sex among those aged ≥65 years (23.9 v 27.7 kg/m$^2$; P <0.001).

The data for the general population are based on an amalgamation of results from national surveys and those for care homes on amalgamation of data from the four Nutrition Screening Week surveys (see legends to figures; Elia unpublished).

The BMI of the care home residents tended to decrease through most of the age ranges (although only about 8% were <70 years) whereas the BMI of the general population tended to decrease only after the age of about 60-70 years (Figure 5).
The proportion of subjects admitted to care homes with a BMI of <20 kg/m² at the time of the NSW surveys (England) was 30%, and it progressively increased with age. In contrast, the proportion with obesity (BMI ≥ 30 kg/m²) decreased with age. The health surveys of the general population (≥ 18 years) differed from the NSW surveys in that the proportion of underweight in the general population (BMI <20 kg/m²) was lower (4% v 30%), whilst that for obesity (BMI ≥30kg/m²; 26% v 9 %) and severe obesity (BMI ≥40 kg/m²; 2.3% v 1.1%) were higher. In addition, the variation in underweight and overweight with age was less pronounced in the general population than in the population of home care residents.

FIGURE 5 The effect of age on the BMI distribution of subjects admitted to care homes in the previous 6 months (NSW England; red line) and the general population (Health Survey England (HSE) blue line). The data for the general population are based on an amalgamation of results from four Health Surveys for England (HSE) (2007, 2008, 2009 and 2010); N = 28,917), Each data point represents the mean results of adult subjects in 10 year age bands (the age band 10-19 only includes adults aged 18 and 19 years). Two subjects from the NSW, one aged <20 years and the other >110 years are not included in the curve estimations which were established using second order (quadratic) polynomials.
FIGURE 6 A comparison of the effect of age on the proportion of subjects with a BMI <20 kg/m\(^2\) (upper figure) and BMI ≥30 kg/m\(^2\) (lower figure) admitted to care homes during the NSW surveys in England (NSW Eng; red line) and those in the general population (Health Survey England (HSE); blue line) based on the sources indicated in the legend to the previous figure (Elia unpublished). Each point represents the proportion for 10 year age bands (10-100 years), with the lowest band (10-19 years) involving only subjects aged 18 and 19 years. The curves were drawn using second order polynomials.
Weight change

There were 2422 residents for which a weight change could be calculated during the period (up to 6 months) between admission and the time of the survey. On average there was little weight change but the variation was large. Expressed in kg the results were as follows: mean ± sd, 0.31 ± 5.0 kg; median 0.1 kg; 95% range, -10.2 kg to 9.9 kg (N = 2422)). The corresponding results expressed in percentages were: mean ± sd, 0.8 ± 8.9%; median 0.2%; 95% range, -17.0% to 18.9%. Figure 7 shows a histogram of the distribution of this weight change. These intra-individual changes in weight were not significantly affected by duration of stay (0.10 kg 0.28 kg and 0.410.32 kg for those in residence for 0-1.9 months, 2.0-3.9 months, and 4.0-5.9 months respectively)(P = 0.533, analysis of variance). There was also no significant difference between groups when the weight changes were adjusted for age, sex, type of care home, source of admission and presence of cancer and nutritional status. However, the variability in weight change (sd) was substantially greater in the group that had been in residence for 4-6 months than in the groups that had been in residence for less than 4 months (P <0.001).

TABLE 28  Intra-individual weight changes according to length of stay in care home†

<table>
<thead>
<tr>
<th>Length of residence (time since admission) (months)</th>
<th>Number of subjects</th>
<th>Weight change (mean ± sd) (kg)</th>
<th>P value††</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-1.9 months</td>
<td>436</td>
<td>0.10 ± 3.93</td>
<td>0.601</td>
</tr>
<tr>
<td>2.0-3.9 months</td>
<td>832</td>
<td>0.28 ± 3.74</td>
<td>0.033</td>
</tr>
<tr>
<td>4.0-5.9 months</td>
<td>1154</td>
<td>0.41 ± 6.32</td>
<td>0.028</td>
</tr>
<tr>
<td>All periods</td>
<td>2422</td>
<td>0.31 ± 5.2</td>
<td>0.003</td>
</tr>
</tbody>
</table>

† Although the changes in weight are intra-individual changes, the three groups involve different residents. †† Paired t-test

The subjects who were ‘malnourished’ at the time of the survey had a lower admission BMI than those who were not ‘malnourished’ (admission BMI 19.2 ± 4.2 kg/m² v 25.1 ± 4.8 kg/m²)(P <0.001). They also had a substantially lower admission weight than those who were not ‘malnourished’ (51.50 ± 12.42 kg v 65.42 ± 14.49 kg (49.77 ± 10.91 kg v 66.97 ± 14.23 kg). In bivariate analysis the presence of ‘malnutrition’ was significantly related to weight change (-1.81 kg (high risk) v +1.48 kg (low risk); R² = 0.093, p <0.001, N = 2330).

Another potential explanation for the variability weight loss was the admission BMI, which was inversely related to weight loss (-0.17 kg per unit increase in admission BMI (R² = 0.025; P <0.001). Those who were underweight on admission (BMI < 20kg/m²) gained a mean of 1.38 kg while those who were not underweight (BMI ≥ 20 kg/m²) maintained their body weight (0.12 kg) (R² = 0.013; P <0.001). In contrast to the ‘MUST’ categories (low risk v medium + high risk) obtained at the time of the survey which explained 9.3% of the variability of the weight change since admission, admission BMI categories (<20 kg/m² v ≥ 20 kg/m²) explained only 1.3% of the variability (bivariate analysis).

Other factors were found to be much less important in explaining the variability in weight change, but age had a small significant influence (-0.029 kg per year increase in age; R² =0.003, P= 0.010). Among the other factors examined were source of admission (other care home +0.10 kg, hospital +0.38 kg and own home +0.10 kg (R² = 0.001, P = 0.053)); and type of care home (residential +0.76 kg, EMI +0.11 kg, nursing home +0.13kg, other +0.15kg (R² =0.003, P= 0.083)) and presence of cancer (with cancer -0.25 kg, without cancer+0.10 kg; (R²<0.001 P = 0.503)). Sex, country, presence of other conditions and duration of stay were not significantly related to weight change.
In multivariate analysis involving all the above variables (except admission BMI which caused multi-collinearity problems), the model explained 14.1\% of the variability in weight change ($R^2 = 0.141$; $P <0.001$), the dominant explanatory variable being the presence of ‘malnutrition’. The source of admission ($P = 0.006$) and the presence of other conditions ($P = 0.014$) were the only other two variables that had significant independent effects. Without inclusion of ‘MUST’ in the model (but with all the other variables indicated above) the other variables explained only 1.4\% of the total variability when no interactions were included, and about 4\% of the variability when 2-way interactions were used.

Future work should explore in detail the causes of the variability in weight changes. Among the factors to consider are the existence of specific strategies to deal with both the causes and consequences of the weight changes, and particularly large weights losses which affect health and well-being and the activities of daily living. Prospective longitudinal measurement of weight changes in weight and their relationship to underlying disease processes, survival time and end of life care, would be valuable. They could not only help understand their contribution to the variability in weight change, but also actions that need to be taken to alleviate suffering from underweight and malnutrition.

**FIGURE 7** Weight change in care home residents during periods up to 6 months following admission ($N = 2422$; 0.3\% outside the range of ± 20kg)
### Diagnostic categories

**TABLE 29** Proportion of residents according to diagnostic categories

<table>
<thead>
<tr>
<th>Category</th>
<th>2007 %</th>
<th>2008 %</th>
<th>2010 %</th>
<th>2011 %</th>
<th>Total N</th>
<th>2011 %</th>
<th>2011 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Musculoskeletal</td>
<td>9</td>
<td>7</td>
<td>8</td>
<td>5</td>
<td>233</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Gastrointestinal (GI)</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>48</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Cardiovascular (CVD)</td>
<td>6</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>186</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Respiratory</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>102</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Genito/Renal</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>71</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Neurological (CNS)</td>
<td>48</td>
<td>51</td>
<td>57</td>
<td>58</td>
<td>1531</td>
<td>52</td>
<td>53</td>
</tr>
<tr>
<td>Frail elderly</td>
<td>19</td>
<td>17</td>
<td>16</td>
<td>10</td>
<td>500</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Mental Health</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>9</td>
<td>220</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Sensory impairment</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>&lt;1</td>
<td>8</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>6</td>
<td>49</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>99*</td>
<td>100</td>
<td>100</td>
<td>2948</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

N: 1237 652 698 361 2948 2948 2950**

**Total(adj)** = equal weighting for each year (equivalent to equal sample size each year)

* Results do not add up to 100% due to rounding of the component values to the nearest 1%

** The small discrepancy between 'Total' and 'Total(adj)' is due to rounding associated with the weighting procedure

A little more than half of the residents had neurological conditions (51.9%), including dementia, Parkinson’s disease and motor neurone disease. The proportion in other parts of the UK (Wales, Northern Ireland and Scotland) was higher, being a little greater than 60% (60.3%). In contrast, the proportion of most other conditions was smaller in other parts of the UK by about ≤2%).

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**Nutrition Screening Surveys in Care Homes in England:** Subject Characteristics
PREVALENCE OF ‘MALNUTRITION’ (MEDIUM + HIGH RISK USING ‘MUST’)

This section summarises the prevalence of malnutrition among care home residents in England, according to variables such as type of care home and subject characteristics (e.g. sex, age, presence of cancer). The results from England were also compared with those from the rest of the UK. However, no significant difference was found between the prevalence of ‘malnutrition’ in England (35%; N = 2744) and the rest of the UK (36%; N = 817) (P = 0.622, Chi squared test), even when adjusted for individual care home and subject characteristics. At the same time, variables that had a significant effect on malnutrition without adjustment for geographic location (e.g. source of admission, presence of cancer) remained significant after adjustment (by binary logistic regression) for geographic location and vice versa. For simplicity, the detailed comparisons involving England and the rest of the UK are not presented.

‘Malnutrition’ according to risk category and country

‘Malnutrition’ risk categories

TABLE 30  ‘Malnutrition’ according to risk category (medium + high risk)

<table>
<thead>
<tr>
<th>Malnutrition risk</th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Low</td>
<td>70.1</td>
<td>57.6</td>
<td>63.2</td>
<td>59.4</td>
<td>1779</td>
<td>64.8</td>
<td>62.6</td>
</tr>
<tr>
<td>Medium</td>
<td>10.5</td>
<td>11.4</td>
<td>15.7</td>
<td>14.5</td>
<td>338</td>
<td>12.3</td>
<td>13.0</td>
</tr>
<tr>
<td>High</td>
<td>19.4</td>
<td>31.1</td>
<td>21.1</td>
<td>26.2</td>
<td>627</td>
<td>22.8</td>
<td>24.4</td>
</tr>
<tr>
<td>Medium + High</td>
<td>29.9</td>
<td>42.4*</td>
<td>36.8</td>
<td>40.6*</td>
<td>965</td>
<td>35.2*</td>
<td>37.4</td>
</tr>
<tr>
<td>N</td>
<td>1260</td>
<td>528</td>
<td>631</td>
<td>325</td>
<td>2744</td>
<td>2744</td>
<td>2744</td>
</tr>
</tbody>
</table>

Total(adj) = equal weighting for each year (equivalent to equal sample size each year)
* The small discrepancy between ‘medium + high risk’ and the sum of ‘medium’ and ‘high’ risk is due to rounding.

Among those with medium and high risk 65% were at high risk. Medium + high risk accounted for 35% of all residents.
The proportion of ‘malnourished’ subjects (medium + high risk) differed significantly between survey years (P <0.001; Chi squared test)

Overall, a BMI of <20 kg/m² was present in 30% of residents and 82% of those with ‘malnutrition’ (medium + high risk of malnutrition).
‘Malnutrition’ according to country

TABLE 31  ‘Malnutrition’ in the UK according to country

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>England</td>
<td>30</td>
<td>42</td>
<td>37</td>
<td>41</td>
<td>2744</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>Wales</td>
<td>27</td>
<td>33</td>
<td>0‡</td>
<td>-</td>
<td>70</td>
<td>27</td>
<td>29</td>
</tr>
<tr>
<td>Scotland</td>
<td>29</td>
<td>43</td>
<td>45</td>
<td>41</td>
<td>512</td>
<td>39</td>
<td>41</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>35</td>
<td>23</td>
<td>31</td>
<td>29</td>
<td>242</td>
<td>33</td>
<td>32</td>
</tr>
<tr>
<td>Mean(UK)†</td>
<td>30</td>
<td>42</td>
<td>27</td>
<td>37</td>
<td>41</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>N</td>
<td>1610</td>
<td>614</td>
<td>821</td>
<td>523</td>
<td>3568</td>
<td>3568</td>
<td>3570*</td>
</tr>
<tr>
<td>P value††</td>
<td>0.553</td>
<td>0.443</td>
<td>0.059</td>
<td>0.794</td>
<td>0.163</td>
<td>0.054</td>
<td></td>
</tr>
</tbody>
</table>

Total(adj) = equal weighting for each year (equivalent to equal sample size each year)

† There was a significant difference in prevalence between the four surveys (P < 0.001)

†† Chi squared test for differences between countries in the UK

* The small discrepancy between 'Total' and 'Total(adj)' is due to rounding associated with the weighting procedure

Overall, 77% residents at risk were admitted to care homes in England, 2% to care homes in Wales, 14% to care homes in Scotland, 7% to care homes in Northern Ireland

There were no significant differences in the prevalence of ‘malnutrition’ between countries and no significant difference between England (35%) and other parts of the UK (36%) (odds ratio (OR) 1.042 (95% CI, 0.885, 1.226; P =0.622). In a binary logistic model which included a range of other variables with significant independent effects on ‘malnutrition’ risk (age, sex, type of care home, source of admission, primary clinical problem, and presence of cancer) the effect on malnutrition risk was small (adjusted OR 1.100 (95% CI, 0.925, 1.309; P 0.280). This meant that prevalence of ‘malnutrition’ after controlling for these variables remained non-significantly different between England and the rest of the UK.

‘Malnutrition’ according to type of care home and care home characteristics

TABLE 32  ‘Malnutrition’ according to type of care home

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Nursing homes</td>
<td>37</td>
<td>47</td>
<td>46</td>
<td>45</td>
<td>638</td>
<td>43</td>
<td>44</td>
</tr>
<tr>
<td>Elderly Mentally Ill homes</td>
<td>13</td>
<td>59</td>
<td>20</td>
<td>30</td>
<td>104</td>
<td>23</td>
<td>28</td>
</tr>
<tr>
<td>Residential homes</td>
<td>23</td>
<td>36</td>
<td>27</td>
<td>37</td>
<td>770</td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>Other homes*</td>
<td>35</td>
<td>42</td>
<td>38</td>
<td>41</td>
<td>1232</td>
<td>38</td>
<td>39</td>
</tr>
<tr>
<td>N</td>
<td>1260</td>
<td>528</td>
<td>631</td>
<td>325</td>
<td>2744</td>
<td>2744</td>
<td>2744</td>
</tr>
<tr>
<td>P value†</td>
<td>&lt;0.001</td>
<td>0.189</td>
<td>&lt;0.001</td>
<td>0.780</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td></td>
</tr>
</tbody>
</table>

Total (adj) = equal weighting for each year (equivalent to equal sample size each year)

* Other homes include those providing a combination of nursing, elderly mentally ill and residential accommodation

† Chi squared test
Exclusively residential care homes had a significantly lower prevalence of ‘malnutrition’ (26%; N = 770) than all other types of care homes (39%, N = 1974) (P <0.001; Chi squared test). The small number of subjects in care homes restricted to the elderly mentally ill (N = 104 over the 4 surveys) were associated with large fluctuations in the prevalence of ‘malnutrition’ between surveys.

‘Malnutrition’ according to number of care home beds

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>1-24 beds</td>
<td>26</td>
<td>60</td>
<td>26</td>
<td>37</td>
<td>218</td>
<td>33</td>
<td>43</td>
</tr>
<tr>
<td>25-49 beds</td>
<td>27</td>
<td>40</td>
<td>33</td>
<td>43</td>
<td>1116</td>
<td>33</td>
<td>35</td>
</tr>
<tr>
<td>50-74 beds</td>
<td>29</td>
<td>39</td>
<td>50</td>
<td>42</td>
<td>763</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>75-99 beds</td>
<td>30</td>
<td>0</td>
<td>31</td>
<td>27</td>
<td>167</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>100+ beds</td>
<td>54</td>
<td>52</td>
<td>41</td>
<td>45</td>
<td>293</td>
<td>47</td>
<td>46</td>
</tr>
<tr>
<td>DK/NA</td>
<td>37</td>
<td>38</td>
<td>33</td>
<td>23</td>
<td>187</td>
<td>36</td>
<td>37</td>
</tr>
</tbody>
</table>

N = 1260 528 631 325 2744 2744 2740*

P value†<0.005 0.102 0.011 0.652 <0.001 0.001

Total(adj) = equal weighting for each year (equivalent to equal sample size each year), DK = Don’t know, NA = No answer
* The small discrepancy between ‘Total’ and ‘Total(adj)’ is due to rounding associated with the weighting procedure
† Chi squared test

Although in three of the surveys the prevalence of ‘malnutrition’ was significantly influenced by the number of beds, the results within each bed category varied substantially from year to year and were not associated with a linear trend in prevalence as the number of beds increased.

‘Malnutrition’ according to source of admission

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Home</td>
<td>22</td>
<td>38</td>
<td>28</td>
<td>39</td>
<td>999</td>
<td>28</td>
<td>31</td>
</tr>
<tr>
<td>Hospital</td>
<td>36</td>
<td>46</td>
<td>45</td>
<td>39</td>
<td>1211</td>
<td>40</td>
<td>41</td>
</tr>
<tr>
<td>Other care home</td>
<td>31</td>
<td>44</td>
<td>41</td>
<td>48</td>
<td>481</td>
<td>38</td>
<td>41</td>
</tr>
<tr>
<td>DK</td>
<td>21</td>
<td>31</td>
<td>40</td>
<td>39</td>
<td>53</td>
<td>28</td>
<td>30</td>
</tr>
</tbody>
</table>

N = 1260 528 631 325 2744 2744 2742*

P value†<0.001 0.221 0.001 0.422 <0.001 <0.001

Total(adj) = equal weighting for each year (equivalent to equal sample size each year), DK = Don’t know, NA = No answer
* The small discrepancy between ‘Total’ and ‘Total(adj)’ is due to rounding associated with the weighting procedure
† Chi squared test

Overall, 44% were admitted from hospital, 36% from their own homes, 18% from another care home, and 2% from an uncertain setting (DK).
The prevalence of ‘malnutrition’ according to source of admission during the previous 6 months varied significantly. It was lower among those admitted from their own homes (28%) than from hospitals (40%) and other care homes (38%).

**Malnutrition according to length of stay in care homes**

**TABLE 35  ‘Malnutrition’ according to length of stay in care home**

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 month</td>
<td>27</td>
<td>37</td>
<td>36</td>
<td>30</td>
<td>609</td>
<td>31</td>
<td>32</td>
</tr>
<tr>
<td>2-3 months</td>
<td>32</td>
<td>36</td>
<td>38</td>
<td>44</td>
<td>878</td>
<td>36</td>
<td>37</td>
</tr>
<tr>
<td>4-6 months</td>
<td>30</td>
<td>47</td>
<td>36</td>
<td>42</td>
<td>1256</td>
<td>37</td>
<td>39</td>
</tr>
<tr>
<td>DK/NA</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>41</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>N</td>
<td>1260</td>
<td>528</td>
<td>631</td>
<td>325</td>
<td>2744</td>
<td>2744</td>
<td>2745*</td>
</tr>
</tbody>
</table>

* The small discrepancy between ‘Total’ and ‘Total(adj)’ is due to rounding associated with the weighting procedure
† Chi squared test

Overall, 46% had been admitted 4-6 months previously 32% 2-3 months previously and 22% 0-1 month previously

Although three out of the four surveys showed no significant change in the prevalence of ‘malnutrition’ with increasing duration of residential stay, the amalgamated results showed a trend of borderline significance towards a progressive increase.

**‘Malnutrition’ according to nutrition screening policy**

**TABLE 36  ‘Malnutrition’ according to nutrition screening policy**

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>31</td>
<td>41</td>
<td>37</td>
<td>41</td>
<td>2281</td>
<td>36</td>
<td>38</td>
</tr>
<tr>
<td>No</td>
<td>25</td>
<td>83</td>
<td>25</td>
<td>35</td>
<td>142</td>
<td>29</td>
<td>32</td>
</tr>
<tr>
<td>DK/NA</td>
<td>27</td>
<td>49</td>
<td>36</td>
<td>45</td>
<td>321</td>
<td>31</td>
<td>34</td>
</tr>
<tr>
<td>N</td>
<td>1260</td>
<td>528</td>
<td>631</td>
<td>325</td>
<td>2744</td>
<td>2744</td>
<td>2743*</td>
</tr>
</tbody>
</table>

* The small discrepancy between ‘Total’ and ‘Total(adj)’ is due to rounding associated with the weighting procedure
† Chi squared test - the P values for years 3 and 4 and should be interpreted with caution since the assumptions of the test were not met

Overall, 83% of residents were admitted to care homes with a screening policy, 5% to care homes without a screening policy and 12% to care homes where it was uncertain if there was a screening policy.

The prevalence of ‘malnutrition’ according to screening policy varied non-significantly.
TABLE 37  Sensitivity analyses of ‘malnutrition’ according to nutrition screening policy

<table>
<thead>
<tr>
<th>Type of sensitivity analysis*</th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>P(year)†</th>
<th>P (screening policy)†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model a: Screening policy present</td>
<td>30</td>
<td>42</td>
<td>37</td>
<td>41</td>
<td>&lt;0.001</td>
<td>0.188</td>
</tr>
<tr>
<td>Screening policy absent</td>
<td>25</td>
<td>83</td>
<td>25</td>
<td>35</td>
<td>&lt;0.001</td>
<td>0.097</td>
</tr>
<tr>
<td>Model b: Screening policy present</td>
<td>31</td>
<td>41</td>
<td>34</td>
<td>41</td>
<td>&lt;0.001</td>
<td>0.156</td>
</tr>
<tr>
<td>Screening policy absent</td>
<td>26</td>
<td>54</td>
<td>37</td>
<td>38</td>
<td>&lt;0.001</td>
<td>0.097</td>
</tr>
<tr>
<td>Model c: Screening policy present</td>
<td>30</td>
<td>42</td>
<td>37</td>
<td>41</td>
<td>&lt;0.001</td>
<td>0.156</td>
</tr>
<tr>
<td>Screening policy absent</td>
<td>25</td>
<td>83</td>
<td>25</td>
<td>35</td>
<td>&lt;0.001</td>
<td>0.097</td>
</tr>
</tbody>
</table>

* In model a) the results in the DK/NA category were assigned to care homes with a screening policy
In model b) the results in the DK/NA category were assigned to care homes without a screening policy
In model c) the results in the DK/NA category were assigned to the two categories in the same proportions as originally reported
† Analysis undertaken using binary logistic regression with ‘year’ and ‘screening policy’ as categorical variables

Although the prevalence of ‘malnutrition’ fluctuated significantly between survey years, none of the three models showed a significant effect of screening policy.

‘Malnutrition’ according to proportion of residents screened

TABLE 38  ‘Malnutrition’ according to proportion of residents screened

<table>
<thead>
<tr>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>0-25%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>26-50%</td>
<td>38</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>9</td>
<td>33</td>
</tr>
<tr>
<td>51-75%</td>
<td>0</td>
<td>45</td>
<td>33</td>
<td>60</td>
<td>38</td>
<td>34</td>
</tr>
<tr>
<td>76-100%</td>
<td>32</td>
<td>42</td>
<td>35</td>
<td>41</td>
<td>2197</td>
<td>36</td>
</tr>
<tr>
<td>DK/NA</td>
<td>25</td>
<td>45</td>
<td>68</td>
<td>35</td>
<td>500</td>
<td>33</td>
</tr>
<tr>
<td>N</td>
<td>1260</td>
<td>528</td>
<td>631</td>
<td>325</td>
<td>2744</td>
<td>2744</td>
</tr>
<tr>
<td>P value†</td>
<td>0.009</td>
<td>0.823</td>
<td>&lt;0.001</td>
<td>0.461</td>
<td>0.157</td>
<td>0.494</td>
</tr>
</tbody>
</table>

Total(adj) = equal weighting for each year (equivalent to equal sample size each year)DK = Don’t know, NA = No answer
† Chi squared test - the P values for years 2010 and 2011 should be interpreted with caution since the assumptions of the test were not met
Overall, of the residents screened 80% were in care homes that screened 76-100% of their clients, 2% were in care homes that screened 26-75% and the remainder in care homes that were uncertain about the proportion of residents screened or did not answer the question.

The prevalence of ‘malnutrition’ according to proportion of residents screened in routine care was not found to vary significantly.
‘Malnutrition’ according to subject characteristics

‘Malnutrition’ according to gender

**TABLE 39  ‘Malnutrition’ according to gender**

<table>
<thead>
<tr>
<th></th>
<th>2007 %</th>
<th>2008 %</th>
<th>2010 %</th>
<th>2011 %</th>
<th>N</th>
<th>%</th>
<th>Total(adj) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>27</td>
<td>35</td>
<td>31</td>
<td>29</td>
<td>878</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>Female</td>
<td>31</td>
<td>45</td>
<td>39</td>
<td>47</td>
<td>1865</td>
<td>38</td>
<td>41</td>
</tr>
<tr>
<td>N</td>
<td>1260</td>
<td>528</td>
<td>631</td>
<td>325</td>
<td>2744</td>
<td>2744</td>
<td>2744</td>
</tr>
</tbody>
</table>

**P value†**

|       | 0.178  | 0.031  | 0.040  | 0.007  | <0.001 | <0.001 |

Total(adj) = equal weighting for each year (equivalent to equal sample size each year)
† Chi squared test

Overall, women accounted for 68% of the residents and men 32%

Females, who were older than males by a mean of 4 years (see Table 24), had a higher prevalence of ‘malnutrition’ (P<0.001), which was significant both before and after adjustment for age. Using binary logistic regression the odds ratio (OR) before adjustment for age was 1.422 (95%CI, 1.197 - 1.690) and after adjustment for age 1.340 (95%CI, 1.123 - 1.598). Adjustment for other variables, such as type of care home, length of residency, source of admission had little or no effect on the difference between men and women.

‘Malnutrition’ according to age

**TABLE 40  ‘Malnutrition’ according to age categories**

<table>
<thead>
<tr>
<th></th>
<th>2007 %</th>
<th>2008 %</th>
<th>2010 %</th>
<th>2011 %</th>
<th>N</th>
<th>%</th>
<th>Total(adj) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;70 years</td>
<td>22</td>
<td>38</td>
<td>18</td>
<td>22</td>
<td>235</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td>70-84 years</td>
<td>29</td>
<td>38</td>
<td>35</td>
<td>43</td>
<td>1048</td>
<td>34</td>
<td>36</td>
</tr>
<tr>
<td>≥85 years</td>
<td>32</td>
<td>46</td>
<td>41</td>
<td>45</td>
<td>1423</td>
<td>38</td>
<td>41</td>
</tr>
<tr>
<td>DK/NA</td>
<td>22</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>38</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>N</td>
<td>1260</td>
<td>528</td>
<td>631</td>
<td>325</td>
<td>2744</td>
<td>2744</td>
<td>2742*</td>
</tr>
</tbody>
</table>

**P value†**

|       | 0.140  | 0.271  | 0.008  | 0.009  | <0.001 | <0.001 |

Total (adj) = equal weighting for each year (equivalent to equal sample size each year)
* The small discrepancy between ‘Total’ and ‘Total(adj)’ is due to rounding associated with the weighting procedure
† Chi squared test

Among those whose age was reported 53% were aged 85 years and over, 38% between 70 and 84 years and only 9% were <70 years

The prevalence of ‘malnutrition’ generally increased with age (Table 40 and Figure 8).
FIGURE 8 The prevalence of malnutrition according to age. The age categories are in 10 year age bands with the exception of those aged <40 years, who accounted for only 0.3% of the total, and those ≥100 years, who accounted for only 1.1% of the total.

'Malnutrition' according to primary diagnostic category

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Neurological (CNS)</td>
<td>28</td>
<td>43</td>
<td>41</td>
<td>37</td>
<td>1390</td>
<td>36</td>
<td>38</td>
</tr>
<tr>
<td>Gastrointestinal (GI)</td>
<td>52</td>
<td>80*</td>
<td>44</td>
<td>67*</td>
<td>43</td>
<td>56</td>
<td>60</td>
</tr>
<tr>
<td>Respiratory</td>
<td>45</td>
<td>33</td>
<td>50</td>
<td>50</td>
<td>88</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Cardiovascular (CVD)</td>
<td>36</td>
<td>36</td>
<td>38</td>
<td>31</td>
<td>172</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>Genito/Renal</td>
<td>44</td>
<td>31</td>
<td>47</td>
<td>68</td>
<td>61</td>
<td>44</td>
<td>46</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>27</td>
<td>40</td>
<td>42</td>
<td>59</td>
<td>213</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td>Frail elderly</td>
<td>33</td>
<td>48</td>
<td>32</td>
<td>52</td>
<td>441</td>
<td>37</td>
<td>40</td>
</tr>
<tr>
<td>Mental health</td>
<td>20</td>
<td>46</td>
<td>15</td>
<td>28</td>
<td>208</td>
<td>23</td>
<td>26</td>
</tr>
<tr>
<td>Sensory impairment</td>
<td>-</td>
<td>16*</td>
<td>-</td>
<td>100*</td>
<td>7</td>
<td>29</td>
<td>33</td>
</tr>
<tr>
<td>Other</td>
<td>-</td>
<td>31</td>
<td>-</td>
<td>38</td>
<td>32</td>
<td>34</td>
<td>35</td>
</tr>
<tr>
<td>DK/NA</td>
<td>17</td>
<td>-</td>
<td>22</td>
<td>71</td>
<td>89</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>1260</td>
<td>528</td>
<td>631</td>
<td>325</td>
<td>2744</td>
<td>2744</td>
</tr>
<tr>
<td>P value†</td>
<td>0.002</td>
<td>0.466</td>
<td>0.009</td>
<td>0.110</td>
<td>&lt;0.001</td>
<td>0.002</td>
<td></td>
</tr>
</tbody>
</table>

Total (adj) = equal weighting for each year (equivalent to equal sample size each year)
*Small number of subjects ranging from 1 to 6
** The small discrepancy between 'Total' and 'Total(adj)' is due to rounding associated with the weighting procedure
† Chi squared test - the P values for 2011 should be interpreted with caution since the assumptions of the test were not met

Overall, 51% patients screened had Neurological (CNS) diseases which included dementia, stroke, and Parkinson’s disease, 16% were frail elderly, and the others were in categories that accounted from 0.3% to 8%.
The prevalence of ‘malnutrition’ varied by as much as two-fold according to the diagnostic category. It was highest in the gastrointestinal and respiratory categories, and lowest in the sensory impairment and mental health categories.

‘Malnutrition’ according to presence of other conditions

TABLE 42 ‘Malnutrition’ according to presence of other conditions

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>31</td>
<td>44</td>
<td>39</td>
<td>42</td>
<td>1819</td>
<td>37</td>
<td>39</td>
</tr>
<tr>
<td>No</td>
<td>28</td>
<td>38</td>
<td>33</td>
<td>37</td>
<td>902</td>
<td>32</td>
<td>34</td>
</tr>
<tr>
<td>DK/NA</td>
<td>25</td>
<td>100</td>
<td>33</td>
<td>33</td>
<td>23</td>
<td>30</td>
<td>32</td>
</tr>
<tr>
<td>N</td>
<td>1260</td>
<td>528</td>
<td>631</td>
<td>325</td>
<td>2744</td>
<td>2744</td>
<td>2745*</td>
</tr>
</tbody>
</table>

P value† 0.562 0.225 0.422 0.610 0.037 0.020

Total(adj) = equal weighting for each year (equivalent to equal sample size each year), DK = Don’t know, NA = No answer
* The small discrepancy between ‘Total’ and ‘Total(adj)’ is due to rounding associated with the weighting procedure
† Chi squared test – the p values for years 2008, 2010 and 2011 should be interpreted with caution since the assumptions of the test (≤25% cell with less than 5 expected counts) were not met
Overall 66% of residents were reported to have other conditions, 33% were reported not to have other conditions and 1% did not know or did not respond.
TABLE 43  Sensitivity analyses of ‘malnutrition’ according to presence of other conditions

<table>
<thead>
<tr>
<th>Type of sensitivity analysis*</th>
<th>% ‘malnourished’</th>
<th>P(year)†</th>
<th>P (other conditions)†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007</td>
<td>2008</td>
<td>2010</td>
</tr>
<tr>
<td>Model a: Other conditions present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No other conditions</td>
<td>31</td>
<td>44</td>
<td>38</td>
</tr>
<tr>
<td>Model b: Other conditions present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No other conditions</td>
<td>31</td>
<td>44</td>
<td>39</td>
</tr>
<tr>
<td>Model c: Other conditions present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No other conditions</td>
<td>31</td>
<td>44</td>
<td>39</td>
</tr>
</tbody>
</table>

*In model a) the results in the DK/NA category were assigned to the ‘other conditions’ category
In model b) the results in the DK/NA category were assigned to the ‘without other conditions’ category
In model c) the results in the DK/NA category were assigned to the two categories in the same proportions as originally reported
† Analysis undertaken using binary logistic regression with ‘year’ and ‘other conditions’ as categorical variables

The prevalence of ‘malnutrition’ fluctuated significantly between survey years, and it was significantly increased by the presence of other conditions (all three models).

**Malnutrition’ according to presence of cancer**

The question on cancer was included only in the last three surveys

TABLE 44  ‘Malnutrition’ according to presence of cancer

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
<th>Total(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>-</td>
<td>56</td>
<td>39</td>
<td>56</td>
<td>95</td>
<td>49 51</td>
</tr>
<tr>
<td>No</td>
<td>-</td>
<td>42</td>
<td>37</td>
<td>40</td>
<td>1377</td>
<td>39 39</td>
</tr>
<tr>
<td>DK/NA</td>
<td>-</td>
<td>0</td>
<td>25</td>
<td>17</td>
<td>12</td>
<td>17 20</td>
</tr>
<tr>
<td>N</td>
<td>-</td>
<td>528</td>
<td>631</td>
<td>325</td>
<td>1484</td>
<td>1484 1494</td>
</tr>
<tr>
<td>P value†</td>
<td>-</td>
<td>0.130</td>
<td>0.835</td>
<td>0.138</td>
<td>0.036</td>
<td>0.024</td>
</tr>
</tbody>
</table>

Total(adj) = equal weighting for each year (equivalent to equal sample size each year). DK = Don’t know, NA = No answer
† Chi squared test - the P values for years 2008, 2010 and 2011 should be interpreted with caution since the assumptions of the test were not met (years 2008 and 2009 for the Total(adj)

Overall, 6% of residents were reported to have cancer, 93% did not and in 1% it was not known or reported.
TABLE 45  Sensitivity analyses of ‘malnutrition’ according to presence of cancer

<table>
<thead>
<tr>
<th>Type of sensitivity analysis*</th>
<th>% ‘malnourished’</th>
<th>(P(\text{year}))†</th>
<th>(P(\text{cancer}))†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model a: Cancer</td>
<td>-</td>
<td>53</td>
<td>38</td>
</tr>
<tr>
<td>No cancer</td>
<td>-</td>
<td>42</td>
<td>37</td>
</tr>
<tr>
<td>Model b: Cancer</td>
<td>-</td>
<td>56</td>
<td>39</td>
</tr>
<tr>
<td>No cancer</td>
<td>-</td>
<td>42</td>
<td>37</td>
</tr>
<tr>
<td>Model c: Cancer</td>
<td>-</td>
<td>56</td>
<td>39</td>
</tr>
<tr>
<td>No cancer</td>
<td>-</td>
<td>42</td>
<td>37</td>
</tr>
</tbody>
</table>

* In model a) the results in the DK/NA category were assigned to the ‘with cancer’ category
  In model b) the results in the DK/NA category were assigned to the ‘without cancer’ category
  In model c) the results in the DK/NA category were assigned to the two categories in the same proportions as originally reported
† Analysis undertaken using binary logistic regression with ‘year’ and ‘cancer’ as categorical variables

The prevalence of ‘malnutrition’ fluctuated non-significantly between survey years and using models b and c it was found to be significantly increased by the presence of cancer. Although model a did not demonstrate a significant effect of cancer, the overall prevalence of ‘malnutrition’ in each of the surveys was higher in subjects with cancer than without.
The NSW care home surveys in England mirror those in the UK, which is not surprising since they contributed to more than three quarters of the total care home and subject data the UK surveys, the remainder originating from Scotland, Wales, and Northern Ireland. The surveys suggest that ‘malnutrition’ was common, and, with a prevalence of about 35% among residents admitted in the previous 6 months (as for the UK as a whole), it poses a substantial social care burden. The surveys in England (and the UK as a whole) also suggest there were improvements in certain aspects of the management of ‘malnutrition’ over the period of the surveys.

Most care homes reported having policies on nutritional screening, weighing and recording of weight on admission and also at intervals during residence, and the vast majority of care homes indicated that the results of screening were linked to a care plan. Furthermore, although most care homes reported having access to dietetic services and policies on nutritional screening at baseline (first survey in 2007), trend analysis indicated significant improvements during the subsequent surveys. The existence of policies to record height on admission also improved significantly during the period of the surveys. These trends were considered to be robust since they were subjected to sensitivity analyses to take into account the uncertainty resulting from a few non-responders (4-5%) to questions about these items. The same conclusions were drawn for the UK as a whole. It is possible that improvements in some of the other aspects of nutritional care in England were not demonstrated because care homes already had very high rates of acceptable standards at baseline (e.g. recording weight on admission and during stay). It is also possible that improvements were not demonstrated because a large proportion of some questions related to nutritional care were not answered (e.g. 16% non-response/don’t know to the question about the proportion screened on admission, 25% to the question on awareness of weighing scale standards, and 40% to the question on frequency of nutrition screening audit). Access to dietetic services was the only reported variable that was found to differ significantly between England (lower access) and the rest of the UK (higher (complete or almost complete) access) and to continue to differ significantly when examined using all three models involved in the sensitivity analysis. This suggests that some improvements in England are still possible. The proportion of care homes in which measurement of height was made on admission was also lower in England compared to the rest of the UK, but the finding was not considered to be robust, since it was significant with only one of the three models used in the sensitivity analysis.

The surveys indicated that the most commonly used nutrition screening tool was ‘MUST’. The widespread use of ‘MUST’ has been facilitated by the support provided by various organisations, including National Institute for Health and Care Excellence (NICE), British Association for Parenteral and Enteral Nutrition (BAPEN), British Dietetic Association (BDA), Royal College of Nursing (RCN), the Registered Nursing Home Association (RNHA), Royal College of Physicians (RCP), Royal College of General Practitioners (RCGP) and others. It has also been facilitated by an increase in awareness about the importance of identification and treatment of malnutrition, brought about by education and training, the availability of national standards on nutritional care and inspection and regulation on nutritional care. It has also become increasingly recognised that it is clinically advantageous to use the same screening tool within and between different care settings since it facilitates continuity of care, allows meaningful audits to be carried out and permits trends to be established over time.
using consistent criteria for ‘malnutrition’. This would not be easy to achieve if different screening tools were used within and between care setting, especially those designed for specific care settings for specific types of healthcare workers, and sometimes for specific conditions or groups of conditions. In order to avoid such complexities this report presents the effect of different variables on the prevalence of ‘malnutrition’ according to ‘MUST’.

‘Malnutrition’ according to country

There was no significant difference between the prevalence of malnutrition in England (35%) and the rest of the UK (36%) and no overall difference between the individual countries. However, this may have been due to the small number of entries from some countries (70 residents screened for ‘malnutrition’ in Wales, 242 in Northern Ireland and 512 in Scotland). Since the majority of the data on nutritional screening were obtained for residents in care homes in England (n = 2744; 77% of the total), they had a dominant effect on the results in the UK. Furthermore, the prevalence of malnutrition in England (35%) was almost identical to that found in the rest of the UK (36%), which explains why care home and subject variables that had a significant effect on the prevalence of ‘malnutrition’ retained their significance after adjusting for geographic location, and vice versa.

The national results described in this report do not necessarily apply to other countries, which operate different health and social care systems and involve different groups of care home residents in whom malnutrition may be assessed using a range of different criteria. However, even if ‘malnutrition’ is identified with ‘MUST’ the results may still vary widely. For example, using ‘MUST’ only 16.2% of nursing home residents in Germany (n= 200 residents from 2 nursing homes) and 20.1% in Italy (n= 641, 67 nursing homes), compared to 33% in Norway (n=358, 21 municipal nursing homes; dementia only) and 38.2% in Hungary (n= 1382, 20 nursing homes) (in the NSW surveys the overall prevalence of malnutrition in those admitted in the previous 6 months was 35.2%). None of the studies recruited representative samples, although the study from Hungary provided some support for a representative sample. There were indications that the studies differed in other ways, including the following: the ratio of high to medium risk of malnutrition, which ranged from 0.65 to 3.89 (compared to 1.86 in the NSW surveys), the mean age of the residents, which ranged from 78 years to 85.5 years or 85.6 years (compared to 83.4 years in the NSW surveys); and ratio of women to men which ranged from 2.5 to 3.4 (not reported in one study) (compared to 2.1 in the NSW surveys).

‘Malnutrition’ according to type of care home

‘Malnutrition’ was found to be significantly less common in exclusively residential homes (26%) than other types of care homes in combination (39%). This may be because residents in the other types of care homes, especially nursing homes, are expected to have more severe disease. However, the same care home may provide residential care, nursing care and specialist nursing care for the elderly mentally ill. In the absence of information on the type of care received by individual subjects, it was not possible to examine this issue further. The source of admission was another major factor that
influenced the prevalence of ‘malnutrition’. It was higher among those admitted from hospital (40%) and other care homes (38%) than in those admitted from the subjects’ own homes (28%). Again this may reflect the type and severity of disease likely to predispose to or be the result of ‘malnutrition’ and vice versa. There were no significant effects of screening policy and the proportion of residents screened on the prevalence of ‘malnutrition’.

‘Malnutrition’ according to subject characteristics

Since women outlive men, it is not surprising that the survey registered twice as many women than men. In addition, women had a higher prevalence of ‘malnutrition’ (38% v 30%) and were significantly older than men by a mean of almost 4 years. Since age was found to be significantly related to the prevalence of ‘malnutrition’ some of the differences in prevalence between men and women were due to age. However, the difference in the prevalence of ‘malnutrition’ remained significant after adjustment for age. Furthermore, adjustment for other variables such as type of care home, length of residency, source of admission had little or no effect on the gender difference. The reason for the persisting gender difference remains unclear.

No disease category was free from ‘malnutrition’ and so none should be dismissed as being unimportant. However, the prevalence of ‘malnutrition’ was found to be higher in subjects suffering from gastrointestinal (60%), respiratory (44%) and neurological conditions (36%) than sensory impairment (29%) and mental health conditions (23%). Some of these conditions and/or their treatment may restrict ability of subjects to eat independently (e.g. some neurological conditions), others may cause anorexia (various conditions), and yet others may impair absorption of food (gastrointestinal conditions). Two other disease factors were found to be significantly related to ‘malnutrition’: the presence of more than one condition (disease category), and the presence of cancer. There appeared to be an overall increase in the prevalence of ‘malnutrition’ with duration of residency, (although this was not demonstrated in three of the four NSW surveys), but this involved cross-sectional rather than longitudinal data analysis. Indeed, intra-individual changes in weight since admission tended to show a small increase rather than a decrease during residence of 0-1.9 months, 2.0-3.9 months and 4.0-5.9 months with no significant differences between duration of residency (see below). Furthermore, since only subjects who were residents at the time of the survey were included in the survey, those who had been admitted and died during the six months before the start of the NSW survey could not be included in the survey; and those who had been in residence for more than 6 months (the majority of residents) were also not included to conform with the pre-planned study exclusion criterion. In contrast, a survey in Hampshire screened all residents in care homes using ‘MUST’²¹, irrespective of duration of residency. This survey found no significant effect of duration of residency on the prevalence of ‘malnutrition’ which was 37% for the combined results. It also found that those who had been in residence for less than 6 months accounted for only about a quarter of the total resident population.
Anthropometry and weight changes

In comparison with the general population, care home residents were much more likely to be underweight (BMI <20 kg/m\(^2\) ~ 30% v ~5%). The frequency of underweight in care home residents was also found to strikingly increase between the age of 50 and 100 years. In contrast, the prevalence of obesity was distinctly less common among care home residents than the general population (9% v 28%). An obvious explanation is that care home residents likely to be less healthy, suffer more diseases or more severe diseases, and more likely to have dementia and frailty than older subjects in the general population.

The mean intra-individual change in weight between admission and time of survey (residency of up to 6 months) was small (0.25 kg) and was not significantly affected by the duration of stay (the mean values for 0.0-1.9 months, 2.0-3.9 months and 4.0-5.9 months being 0.10, kg, 0.28 kg and 0.41 kg respectively). About half of all the residents had lost weight and the other half gained weight to an approximately equal extent. There was a strikingly large variability in intra-individual weight change following admission to care homes (mean 0.25 kg (95% range -10.2 to 9.9 kg; N = 2422). Most of the changes in weight occurred within the same BMI category, although 1 in 8 subjects changed BMI categories (three categories <18.5 kg/m\(^2\), 18.5-19.9 kg/m\(^2\), and ≥20 kg/m\(^2\)), about half from a lower to a higher category, and the other half from a higher to a lower category. The most important explanatory variable was the presence of ‘malnutrition’, which partly developed as a consequence of weight loss. Those with ‘malnutrition’ at the time of the surveys (35% of the total), who had generally been underweight both at the time of admission to the care home as well as the time of the survey (~30% of the total), went on to lose ~1.8 kg during their residency, while those without ‘malnutrition’ at the time of the survey and who were not underweight on admission gained weight ~1.5 kg during their residency (difference 3.3 kg). It is possible that an underlying disease (or more severe disease, either physical or psychological or both) contributed to the underweight status on admission and continued to produce further weight loss after admission. A series of other factors are probably operating that increase body weight in some subjects and decrease it in others. For example, the admission BMI, was found to be inversely related to weight change (underweight on admission followed by weight gain), perhaps reflecting an anabolic potential in a subgroup of underweight subjects whose underlying clinical condition had been adequately controlled. However, admission BMI categorisation accounted for only 1.4% of the total variability (considerably less than ‘MUST’ categorisation which explained 9.5% of the variability), and most subjects remained in the same BMI category during their residency (up to 6 months).

Consideration was given to a series of other potential explanatory variables for the weight change, but these were not direct measures of nutritional status and they were found to be generally weak at predicting weight change. One of these explanatory variables was the source of admission, since people admitted to care homes from hospitals gained more weight (mean 0.39 kg), than those admitted from another care home (mean of 0.10 kg). This may be because acute and/or chronic conditions were adequately controlled before they were transferred to their care homes. Other potential variables included the type of care home (residents gained more weight in exclusively residential homes (0.76 kg) compared to the smaller weight changes observed in other types of care homes) and the presence of cancer (mean weight loss of 0.25 kg). However, all these factors in combination with others such as country, explained no more than 4% of the total variability in
weight change and in combination with ‘MUST’ for no more than 14% of the variability (‘MUST’ alone explained 9.5% of the variability). Among the other plausible factors that might help explain the majority of the variability are the following: anxiety and uncertainty about the future (which may cause weight loss); a feeling of being safe and secure after a period of feeling unsafe and insecure (which may cause weight gain); medications (some of which cause weight gain and others weight loss); confusion; the extent to which help with eating is provided to those that need it; the eating ambiance; the type and quality of food provided, and the variety of food on the menu. None of these variables were examined in the NSW surveys but they offer fruitful avenues for future investigations.

This survey has a number of limitations. The lack of data on disease severity prevented an examination of the impact of this variable on the weight status, ‘MUST’ categories and weight loss. Since the samples were not randomly drawn from the general population of care home residents in England there is a risk of selection bias. Another limitation is that the surveys only considered residents admitted to care homes in the previous six months and so no firm overall conclusions can be made about the entire population of home care residents. Since the surveys included only subjects who had been admitted during the previous 6 months, no admission was duplicated in subsequent surveys, which were undertaken about a year apart. However, some care homes were sampled more than once.

In summary, the present report indicates that ‘malnutrition’ in care homes in England is a major health and social care burden. While care homes are generally funded to provide social care, the boundaries between social and healthcare are ill defined and sometimes problematic, suggesting that more integrated health and social care strategies to combat the problems would be beneficial. The care home surveys suggest that there have been some improvements in the operational infrastructure for the management of ‘malnutrition’, but there is still room for further improvement, in line with the conclusions of the Dignity and Nutrition Inspections of care homes undertaken by the Care Quality Commission22.
REFERENCES


APPENDICES

Appendix 1: Forms used in NSW11

This section includes:

1. The form used to gather data about care homes including their policies on aspects of nutritional care
2. The form used to gather data from residents
3. Guidance notes
SHEET 1(b) FOR CARE HOMES

INFORMATION ABOUT YOUR HOME

Care Home Name: …………………………………  Code Number: …………………

Location:

☐ England  ☐ Scotland  ☐ Wales  ☐ N. Ireland  ☐ ROI

Please complete by putting an X in the appropriate boxes. Please use black ink.

1. What type of Care Home are you? (please tick all that apply)
   ☐ Nursing  ☐ Elderly Mentally Ill  ☐ Disabled  ☐ Residential

2. How many beds? Please state number ………………………

3. Do you have access to a Nutrition and Dietetic service?  ☐ Yes  ☐ No  ☐ ?

4. Is it your policy to weigh residents on admission?  ☐ Yes  ☐ No  ☐ ?

5a. Are residents weighed regularly during their stay?  ☐ Yes  ☐ No  ☐ ?

5b. If you have answered ‘Yes’ to 5a, please indicate how often:
   ☐ Monthly  ☐ As required  ☐ Other, please state ……………………. 

6. Are you aware of any standards regarding the type of and maintenance requirements for weighing scales used in your Home?
   ☐ Yes  ☐ No  ☐ ?

   If yes, please specify which standard you are aware of/following:
   ……………………………………………………………………………………………………………………………...

7. Is the height of residents recorded on admission?  ☐ Yes  ☐ No  ☐ ?

8. Do you have a Nutrition Screening Policy?  ☐ Yes  ☐ No  ☐ ?

9a. Do you know what % of residents are screened on admission?
   ☐ Yes  ☐ No  ☐ ?

9b. If you have answered ‘Yes’ to 9a, please indicate that %:
   ☐ 0 - 25%  ☐ 26-50%  ☐ 51-75%  ☐ 76-100%
10. Which nutrition screening tool is routinely used in your care home?

- 'MUST'
- MNA
- NRS
- Local tool
- No tool used
- Other (please specify) ..........................................................

11. How are staff trained on nutritional screening? (please tick all that apply)

- Lecture/workshop
- Workbook
- No training provided
- e-learning
- Other: please specify details: ..................................................

12a. Is the practice of nutrition screening audited?

- Yes
- No
- ?

12b. If yes, how often?

- Every year
- Every 2 years
- Every 3 or more years
- ?

13. Do you have a care plan for the management of residents identified as at risk of malnutrition/underweight?

- Yes
- No
- ?

14a. Have you participated in previous Nutrition Screening Week Surveys?

- Yes
- No
- ?

14b. If yes, which ones? (please tick all that apply)

- 2007
- 2008
- 2010

Thank you
# Care Home Sheet 2(b) Client data

**To be collected for residents admitted during past 6 months**

**Client data**
To be collected for residents admitted during past 6 months

- **Country:**
- **Code Number:**
- **Name of Care Home/Unit:**
- **Date:**

**Have the scales on your unit been calibrated within the last 12 months?**
- **Yes**
- **No**
- **?**

## Client/Resident Number

<table>
<thead>
<tr>
<th>Age</th>
<th>sex</th>
<th>Where admitted</th>
<th>When admitted</th>
<th>Primary clinical problem</th>
<th>Other current medical conditions</th>
<th>Edema present on admission?</th>
<th>Current weight (kg) if not available</th>
<th>Edema present now?</th>
<th>Height (m)</th>
<th>Unintentional weight loss (past 3-6 months)</th>
<th>Food intake over past 5 days</th>
<th>Likely food intake over next 5 days</th>
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</table>

### Where Admitted From

1. Home, 2. Hospital, 3. Other Care Home

### When Admitted

1. Up to 1 mth ago, 2. 2-3 mths ago, 3. 4-6 mths ago

### Primary Clinical Problem

1. CNS (e.g. stroke, dementia, Parkinson’s Disease, Alzheimer’s MS), 2. GI Disease, 3. Respiratory Disease, 4. Cardiovascular Disease, 5. Genito/ Renal Disease, 6. Musculoskeletal (including orthopaedic) conditions (e.g. post #NOF), 7. Frail Elderly (various reasons), 8. Mental health disorders (e.g. anxiety, depression, psychosis), 9. Sensory impairment (e.g. of sight, hearing, balance), 10. other
Guidance Notes: Care Homes

Thank you for participating in Nutrition Screening Week 2011. The aim of this survey is to establish the prevalence of malnutrition risk in patients and clients admitted to hospitals, care homes and mental health units across the United Kingdom and Republic of Ireland (ROI) in the spring season, to complete and complement data already collected from previous screening weeks held in the summer (NSW08), autumn (NSW07) and winter (NSW10) and to provide additional information on nutritional care practice across the UK and ROI.

Preliminary results will be presented at the BAPEN Conference in Harrogate, 29 -30 November 2011. Additionally we will analyse and send you the results of your data to enable you to report the scale of the problem in your locality and to compare your data with the national picture. This is the final screening survey that will be carried out. Following the NSW11 results, the data from all 4 surveys will be compiled to produce the most comprehensive picture of prevalence of malnutrition in the UK and Ireland ever undertaken, which will also consider any seasonal variation in numbers. Participating in the Nutrition Screening Week will help demonstrate how you are striving to achieve nutritional standards and your commitment to meeting the nutritional needs of your residents or clients.

The survey is based on 2 questionnaires, a general questionnaire about your Care Home and practice of nutritional screening (Sheet 1(b)) and a client data collection sheet (Sheet 2 (b)). Please read the following guidance notes carefully before completing the forms.

Sheet 1(b): You will be issued with a code number for the Home, please write it in the space on the form. Please document the name of your Care Home clearly and tick in which country it lies. If you don’t know the answer to any question, please put an X in the box with a question mark beside it.

In the question regarding screening tools used in your Care Home, please tick all that apply if more than one tool is used. The tools are defined as follows:

‘MUST': ‘Malnutrition Universal Screening Tool'

MNA: Mini Nutritional Assessment

NRS: Nutrition Risk Score

Other: to be specified.

Sheet 2(b) Resident / Client data:

Please collect the information requested for all residents / clients who were admitted to your Care Home in the last 6 months (including those admitted on 5th – 7th April) and who are still resident. Those admitted for respite care, who are not resident on the survey days should not be included.

Residents who were already established on nutritional support when admitted (including oral nutritional supplements, enteral tube feeding, PEG feeding or parenteral nutrition) are
**excluded from the study and therefore should not have data recorded.** Please add any such residents to the form, but simply insert across the row next to their number what method of support they are on, e.g. ‘002 = excluded – PEG feeding

**Code number:** Please write the same code number inserted on Sheet 1(b) onto each copy of Sheet 2(b) that you use.

**Name of Care Home:** Please write the name of your Care Home and /or unit in the space at the top of each Sheet 2(b) that you use.

**Have your scales been calibrated in the last 12 months?:** Please enter yes, no or don’t know as appropriate.

**Resident Number:** Please number residents simply as 001, 002, 003 in the order in which their data is recorded. Please do not include residents’ names.

**Age:** Please give age of the resident in years. There is no need to include number of months as well.

**Primary Clinical Problem:** Please insert appropriate number, only one number is required. If the primary diagnosis is an infection or cancer, please use the category number relating to the location of the infection/cancer, for example cancer of the colon should be recorded under diagnostic category 2 (GI disease); pneumonia or chest infection under category 3 (respiratory disease), a UTI under category 5 (genito/renal disease)

**Other Medical Conditions:** Please indicate whether the resident has other relevant medical conditions or problems. A yes or no answer only is sufficient – no specific category information is required here.

**Cancer?:** Please indicate if the primary diagnosis or any other ongoing medical condition is one of cancer. A yes, no or don’t know answer is sufficient.

**Oedema Present ?:** Please indicate whether the patient was oedematous on admission. A yes or no answer is sufficient. If you do not know insert DK (Don’t Know). Please also indicate if resident is oedematous now. A yes or no answer is sufficient.

**Weight:** Please state weight (in kg) of resident on admission using documented value in resident’s notes. If weight on admission was not recorded, write NA (Not Available). Please state current weight (in kg) of resident in appropriate column. Write NA (Not Available) in box if for any reason it is not possible to weigh the resident.

**Height:** Please state height in metres in appropriate column indicating if height is an actual measurement, a height recalled by the resident or carer or a value calculated from length of the ulna (see information on measurement of ulna and conversion table). Write NA (Not Available) in box if for any reason it is not possible to obtain a height for the resident.

**Recent unintentional weight loss:** Please give amount of any weight lost unintentionally in the last 3-6mths. Do not include any weight lost due to use of diuretics. Please give value in kg (1kg =2.2lbs). If recent weights are not available in the resident’s notes please ask the
resident / carer if they know how much weight the resident has recently lost. If resident / carer does not know how much weight has been lost, insert DK (Don’t know).

**Food intake, past and future:** Please tick the relevant boxes. Please use your professional judgement as to the likely food intake over the next 5 days. Please note that the very little / no food box specifically means *a few mouthfuls of food at the most*, i.e. nothing or virtually nothing. There is no need to record actual food intake.
Appendix 2: Glossary of statistical terms

Binary logistic regression
A type of regression analysis involving logarithmic transformations (the logistic or logit transformation of a proportion = \log (\text{proportion}/1-\text{proportion})) that is used when the outcome variable is binary (e.g. ‘yes’ or ‘no’; ‘malnutrition’ or ‘no malnutrition’). It provides results as odds ratios and it avoids potential problems that may arise when the proportion is modelled as a linear function of the prediction variables. Binary logistic regression can involve both continuous and categorical input (explanatory) variables: the overall result of the outcome variable can be said to have been adjusted for or controlled for the input variables.

Chi squared test and P values
A statistical test used to assess the independence of two variables in a contingency table, which is used to examine the observed and expected frequencies under independence. A statistically significant test, typically indicated by a probability (P value) of < 0.05, indicates that the result is significantly different from expected. The test does not assess trends (e.g. trends over time or trends associated with consecutive surveys; see next item).

Chi squared test for trend and P (trend) values
A statistical test applied to a Chi squared contingency table in which one of the variables has two categories (e.g. yes and no) and the other has more than two ordered categories (e.g. survey number to represent consecutive surveys over time). The test assesses whether there is a trend associated with the proportion of the first variable (e.g. proportion answering ‘yes’) in relation to the variable with ordered categories (e.g. a trend with consecutive surveys).

Mean and standard deviation (see also weighted mean and weighted standard deviation; Mean and Mean (adj))
The equations for the mean (\( \bar{x} \)) and standard deviation (\( sd \)) are:

\[
\bar{x} = \frac{x_1 + x_2 + \ldots + x_n}{N}
\]

\[
sd = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \bar{x})^2}{N-1}}
\]

where \( x_1 + x_2 + \ldots + x_n \) are the observations, \( N \) is the number of sample observations, and \( \sum_{i=1}^{N} (x_i - \bar{x})^2 \) represents the sum of the squared differences between the individual \( i \) observations and the mean (\( \bar{x} \)).

P value (P)
The probability of obtaining a given result, such as a difference, a correlation or a ratio, or more extreme result, assuming that for the particular result there is no difference, no correlation and that the ratio is 1.0.
Sensitivity analysis

A sensitivity analysis is used to assess the variability in a result (outcome variable) when there is uncertainty about the values of an input variable (e.g. non-responses to a question). It quantifies how changes in the values of the input variable affect the outcome variable. If extreme values are assigned to the missing data of the input variable and there is little alteration in the results of the outcome variable, the sensitivity analysis can provide more confidence in the precision of the result.

‘Total’ and ‘Total adjusted’ (Total (adj))

In this report the term ‘Total’ is used to indicate the mean and standard deviation of a series of observations. Surveys with larger sample sizes will contribute more to the result than those with smaller sample sizes. ‘Total adjusted’ (Total (adj)) is used to indicate that the overall mean and standard deviation are calculated (see weighted mean and weighted standard deviation) assuming that all the individual surveys have equal weight (equivalent to equal sample size).

Weighted mean and weighted standard deviation

The equations for the weighted mean ($\bar{x}_w$) and weighted standard deviation ($sd_w$) are:

$$\bar{x}_w = \frac{\sum w_i x_i}{N}$$

$$sd_w = \sqrt{\frac{\sum (w_i (x_i - \bar{x}_w)^2)}{(N-1) \sum w_i}}$$

where $x_i$ ($x_1, x_2, ..., x_n$) are the observations, $w_i$ are the weights and $\sum_{i=1}^{N} w_i (x_i - \bar{x}_w)^2$ represents the sum of the squared differences between the weighted individual $i$ observations and the weighted mean ($\bar{x}_w$). $N$ is the number of observations, $N'$ is the number of non-zero weights and $\sum_{i=1}^{N'} w_i (x_i - \bar{x}_w)^2$ is the sum of the squared differences between the weighted individual $i$ observations and the weighted mean ($\bar{x}$).
CONFLICT OF INTEREST

No conflict of interest declared by the authors (CAR and ME).

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