Symposium 2

“Feeding the Older Person in the Community”
Micronutrients in the Older Person

Anne Holdoway
Why Focus on Older people?

- Prevalence of malnutrition is much higher
- Estimated >1.3 million “at risk”
- Over half the costs are expended on people aged 65 years and over
- Older people are less likely to recover from malnutrition

Stratton, Proc Nut Soc. 2007 (in press)
Why Focus on Micronutrients?
Micronutrients?

There is nothing “micro” about micronutrients
Do we have practical methods available to identify low intakes?

- Do micronutrients make a difference?
- Are present oral intervention strategies robust/appropriate for the older person?
- Have we got the ideal range of products/tools?
Micronutrient Status

- Do we know what to look for in clinical practice?
- Are overt deficiencies present?
Micronutrients in the Older Person

Should we be concerned?
Factors Affecting Micronutrient Status in the Older Person

- Restricted diet
- Reduced absorption
- Altered metabolism
- Poly-pharmacy
- Multiple medical conditions
Micronutrients
What is Adequate?

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Free living</th>
<th>Institutionalised</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnesium</td>
<td>82*</td>
<td>68*</td>
</tr>
<tr>
<td>Zinc</td>
<td>90</td>
<td>87</td>
</tr>
<tr>
<td>Potassium</td>
<td>76*</td>
<td>67*</td>
</tr>
<tr>
<td>Copper</td>
<td>82</td>
<td>70</td>
</tr>
</tbody>
</table>

* Beware diuretic users

Finch et al, NDNS 1998
### Average daily intake of Minerals

#### Median as % RNI – Females

<table>
<thead>
<tr>
<th></th>
<th>Free living</th>
<th>Institutionalised</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td>96</td>
<td>91</td>
</tr>
<tr>
<td>Magnesium</td>
<td>70*</td>
<td>67*</td>
</tr>
<tr>
<td>Zinc</td>
<td>93</td>
<td>100</td>
</tr>
<tr>
<td>Potassium</td>
<td>100</td>
<td>60*</td>
</tr>
</tbody>
</table>

*Beware diuretic users*

Finch et al, NDNS 1998
% of Older Persons with Intakes $<$LRNI

<table>
<thead>
<tr>
<th></th>
<th>% $&lt;$LRNI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vit. A</td>
<td>5</td>
</tr>
<tr>
<td>Vit. B$_6$</td>
<td>2</td>
</tr>
<tr>
<td>Folate</td>
<td>5</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>3</td>
</tr>
</tbody>
</table>

Finch et al, NDNS 1998
<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Free Living</th>
<th>Institutionalised</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riboflavin</td>
<td>7% 40%</td>
<td>3% 40%</td>
</tr>
<tr>
<td>Thiamin</td>
<td>1% &gt;10%</td>
<td>1% &gt;10%</td>
</tr>
<tr>
<td>Vit. C</td>
<td>2% 15%</td>
<td>1% 40%</td>
</tr>
<tr>
<td>Folate</td>
<td>4% 15%</td>
<td>5% 40%</td>
</tr>
</tbody>
</table>

Finch et al, NDNS 1998
What is the Effect of Illness on Dietary Intakes?
Median Intakes of Those Unwell as % of Intakes of Well Males and Females

100% = Intake of “Well”

Based on Finch et al, 1998
Poorer vitamin status in the elderly at risk of malnutrition

<table>
<thead>
<tr>
<th>Vitamin</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>ANOVA P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vit. A</td>
<td>2.20</td>
<td>2.01</td>
<td>2.07</td>
<td>0.025</td>
</tr>
<tr>
<td>Vit. C</td>
<td>41.1</td>
<td>31.3</td>
<td>28.4</td>
<td>0.000</td>
</tr>
<tr>
<td>Vit. D</td>
<td>52.1</td>
<td>44.9</td>
<td>43.1</td>
<td>0.003</td>
</tr>
<tr>
<td>Vit. E</td>
<td>36.7</td>
<td>33.0</td>
<td>32.8</td>
<td>0.002</td>
</tr>
<tr>
<td>Alpha toc</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Secondary analysis of NDNS
Elia & Stratton 2005
Vitamin and Mineral Supplementation

- Self administered in those with higher intakes from dietary sources

Finch et al, NDNS 1998
Chandra et al, 1992 & 2002 showed micronutrient supplementation improved cognitive function and immunity. Validity later questioned - BMJ, 2005

Avenell et al, 2005 showed no effect on “self reported” infections in older persons at home during micronutrient supplementation

Studies inconclusive, use varying doses, for various time periods. Not necessarily in the “nutritionally vulnerable”

Further research warranted

Strategies for Treating & Preventing Malnutrition in the Older Person

- Assistance at meal times / aids
- Meal delivery
- Appropriate foods / textures
- Education
- Food fortification
- Oral nutritional supplements (ONS)
Micronutrient Provision

- Is this considered in improving intake through normal foods?
- Is it considered when ONS are provided and consumed?
- Are modular supplements used appropriately?
Micronutrient Provision

- Is this considered in improving intake through normal foods? **NOT ALWAYS**
- Is it considered when ONS are provided and consumed? **NOT ALWAYS**
- Are modular supplements used appropriately? **NOT ALWAYS**
Artificial nutritional support

- Risk of re-feeding syndrome may address initial low status
- Complete feeds provide range of nutrients
- Do we apply the same rigour to oral nutritional support?
Dietary Strategies – Oral Route

- Focus tends to be on energy and protein intake
- May result in further dilution of micronutrient intake
- Does low micronutrient status / intake result in sub optimal performance / reduced response to intervention?
Improving Oral Intake

- ONS provide “balanced” nutrition
- ONS have been shown to improve intake and outcome vs. snacks (Stratton et al, 2003. NICE, 2006)
- Is the reason for improved outcomes the result of providing micronutrients in addition to energy and protein? (Stratton et al, 2005)
Oral Nutritional Support

Minimum Standards

- Ensure that the overall nutrient provision & intake contains a balanced mixture of protein, energy, fibre, electrolytes, vitamins and minerals
- Ensure RNI for micronutrients are met

*NICE Nutrition support in adults 2006*
Oral Nutritional Support

Minimum Standards

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- Ensure RNI for micronutrients are met

→ Resource implications
Oral Nutritional Support

- To ensure RNI for micronutrients are provided may necessitate the use of a complete oral multivitamin and mineral supplement

*NICE Nutrition support in adults 2006*
Factors to Consider When Providing Additional Micronutrients

- How much and for how long?
- Format – liquid vs. tablet form
- Compliance
- Over-dosing
Micronutrient content of ONS

- Governed by European legislation
- Many supplements provide a % of RNI
- Many patients take 1 -2 units daily
Oral Nutritional Supplements

- Is there an opportunity to develop ONS that provide a better safety net for the older person?
- If yes, will they result in improved outcomes?
Micronutrients in the Older Person

We don’t have all the answers.
Take Home Messages

- Many older people have sub-optimal micronutrient intakes and low status
- Vitamin and mineral status may be further compromised during illness
- Nutritional assessments need to take into account deficits in energy, protein and micronutrients
- ONS (multi-nutrient) have been shown to improve intake and outcome
- Action plans should aim to ensure micronutrient requirements are met
Optimum nutrition - adding life to years as well as years to life