



# ONUUK

## Optimum Nutrition UK

A Comparison of the Health and Nutrition  
of over 37,000 people in Britain  
and the Effects of Improving Nutrition  
in a Cohort over 3 months



OCTOBER 2004

## Contacts and Publication Information

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## 1 Advisory Panel

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## 2 Author Acknowledgements

We would like to thank everyone who contributed to the survey and production of this report:

- The respondents without whose co-operation the survey would not have been possible;
- The staff and board of MyNutrition.co.uk
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- The board of scientific advisors who checked our data and analyses
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- Jonathan Phillips at Toccatà Design

### 3 Foreword

It is extraordinary to conceive that, in a country where the annual spend on health care exceeds £60 billion and is set to rise to £90<sup>1</sup> billion by 2007/08, no comprehensive survey has ever examined what is arguably the most fundamental aspect of health – what we eat, and how what we eat is associated with day to day symptoms of illness or wellness.

The ONUK Survey, involving 37,053 people, is by far the largest health survey of its kind ever undertaken and hence the most significant in its results. It is also the first to compare objectively the influence of specific food groups in relation to wellbeing. As such it deserves to have a significant impact on Government guidelines for healthy eating, some of which are in sharp contrast to the recommendations of this survey.

The ONUK Survey represents the most comprehensive analysis of the health of people in Britain in the 21st century, living for the most part in sub-optimal health, in the 'grey' area between diagnosed disease and true wellness. While much is known about sick people, little is known about the grey area between symptom-free health and diagnosed disease. Many people live in this grey area and it is from this group that emerge those that are destined to suffer from the diseases that cause most suffering and consume the majority of the health care cost in Britain. While it is estimated that the current healthcare costs of directly diet-related diseases is in the order of £13.5 billion<sup>2</sup>, the true cost of the nation's current eating and drinking habits is likely to be far higher.

This illustrates why prevention truly can be more effective, and less expensive, than attempted cure of disease, which is the current major focus of the National Health Service. However, the time to act is before disease states are manifest and the MyNutrition.co.uk questionnaire provides, not only an immediately accessible way for people to estimate increasing risk beforehand, but also to know what to do to lower or reverse risk. It is therefore a prevention tool of immense significance, the proper use of which could dramatically reduce the burden on the NHS.

The cohort intervention pilot studies included in the Appendix, indicate how relatively simple changes and small steps towards a healthier lifestyle can reap noticeable rewards within a short time. We look forward to testing further the impact of making positive changes towards optimum nutrition, based on the results of this survey, in the next phase of the ONUK initiative.

Adam Porter-Blake  
Executive Director  
Institute for Optimum Nutrition

<sup>1</sup> HM Treasury 2004, [http://www.hm-treasury.gov.uk/spending\\_review/spend\\_sr04/spend\\_sr04\\_statement.cfm](http://www.hm-treasury.gov.uk/spending_review/spend_sr04/spend_sr04_statement.cfm)

<sup>2</sup> Fairweather-Tait S. J. 2003 Human nutrition and food research – opportunities and challenges in the post-genomic era, *Philosophical Transactions Series B, Volume 358*, pp 1709-1727

## **4 Executive Summary and Review of Findings**

### **4.1 Purpose of Survey**

While much is known about the profile of disease in the UK, little is known about the profile of health, and the lack of it and how 'sub-optimal' health is related to different aspects of diet. Most dietary guidance is derived, not from research, but from opinion regarding the best sources of protein, carbohydrate, fat, vitamins or minerals. The ONUK survey set out to examine the health of a large sample of the UK population and to compare subjective ratings of health to specific consumption of food groups in order to derive a research-based guideline for healthy eating.

Most research of this nature compares diet intakes with the prevalence of diagnosed diseases. The ONUK Survey analyses a very large group of people who do not have a high incidence of disease as such, but who nevertheless do experience a huge number of adverse symptoms. This group is more likely to progress to disease unless they take action to improve their underlying health and wellbeing.

The pilot cohort intervention studies (in Appendix) set out to test methods of educating and motivating individuals to make improvements to their nutrition, and to gauge the effectiveness of these strategies, both in terms of compliance and on overall health.

### **4.2 Who took part in the survey**

#### **4.2.1 Core survey**

The main survey involved 37,053 people, predominantly women (81%) from London and the South East (66%) in full-time employment (80+%) who completed the MyNutrition online questionnaire between March 2001 and September 2004. This very large self-selected sample delivers powerful statistical correlations between diet, lifestyle and wellbeing.

#### **4.2.2 Cohort Intervention 1**

A group of 29 people who completed the MyNutrition questionnaire, attended a weekend workshop, made diet and lifestyle changes, and then returned 3 months later to complete another questionnaire. See Appendix.

#### **4.2.3 Cohort Intervention 2**

A group of 22 directors and senior managers of a large global corporation who received the support of a nutritional therapist. They completed initial questionnaires and then gave qualitative estimates of the degree to which their health and wellbeing improved. See Appendix.

### **4.3 The Questionnaire**

The MyNutrition questionnaire covers 148 questions about diet, lifestyle and symptoms as well as a demographic set of questions. See Appendix.

### **4.4 Overview of Findings**

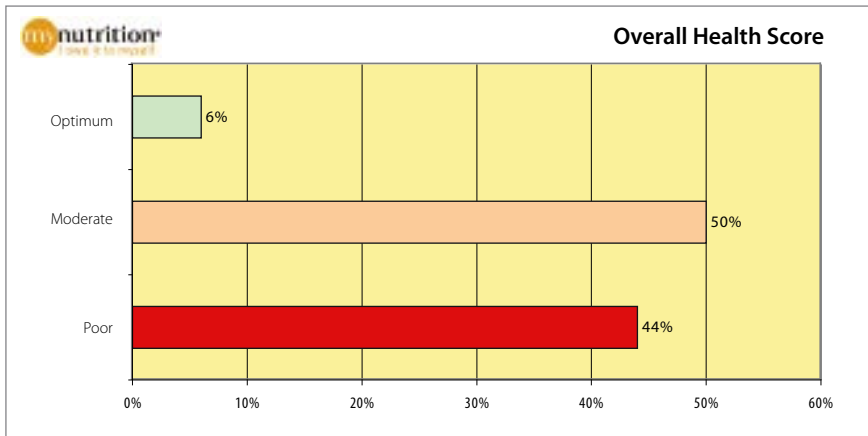
This survey, the largest ever in Britain, found that only 6% were in optimal health, with minimal symptoms of sub-optimal health. Conversely, 44% were in poor health, often excessively tired, stressed and burned out, with a plethora of negative health symptoms, and a diet of food groups that are negatively correlated with health. It demonstrates that staple foods and drinks in the UK diet including wheat, dairy, refined sugar, tea & coffee and red meat appear to have negative associations with health with direct correlations between how much is eaten and the extent to which negative symptoms are experienced.

It shows that the beneficial effects of the 'positive' foods including fruit, vegetables and fresh water are significantly outweighed by the adverse effects of the 'negative' foods.

#### 4.5 Overall health

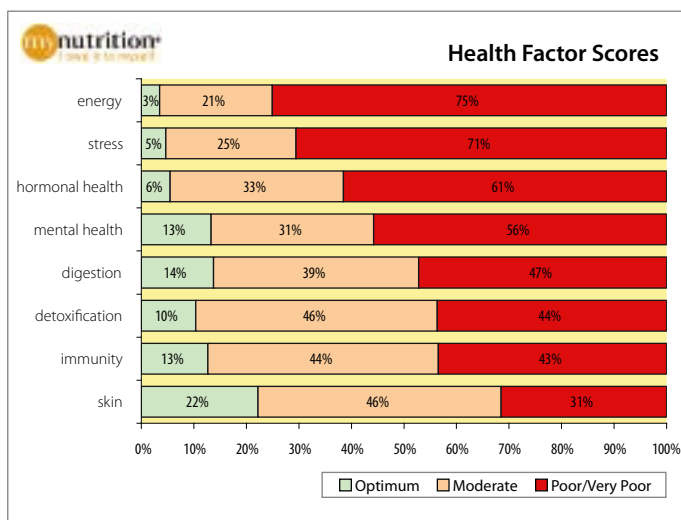
The survey rated every individual on a scale for overall health. This places people who are largely symptom free into an 'Optimum' group and those with a lot of symptoms into 'Poor' or 'Very Poor', combined in the graph below.

The overall picture is dramatic. This group of people, the majority of which do not report disease states, have not seen a doctor in the last 12 months and who are not significantly self medicating, report significant symptoms of sub-optimal wellbeing demonstrated by the 'moderate and ' poor' groups



#### 4.6 Key Health Factors

The survey collected data on a large range of every day symptoms. By grouping these symptoms into factors it was possible to get an indication of each respondent's score in a number of key underlying health areas.



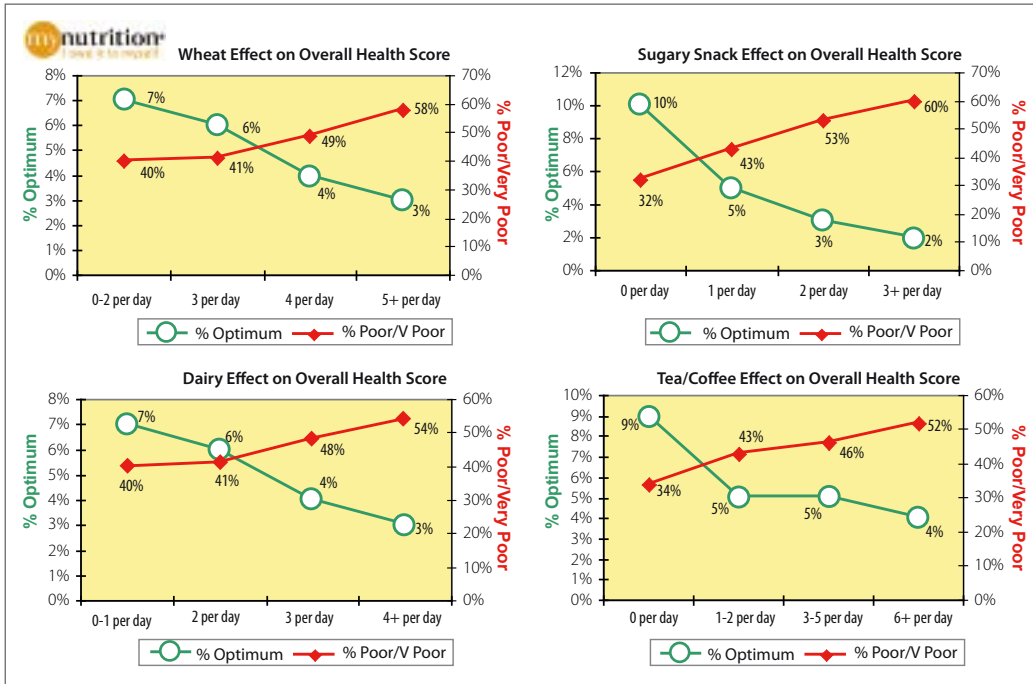
The majority of respondents have generally experienced frequent and severe problems with energy (75% of respondents), stress (71%), hormonal health (61%) and mental health (56%) respectively. Key indicator symptoms reported as occurring occasionally to frequently include:

- 80% of people reported low energy
- 82% become quickly impatient when held up and 62% easily become tense or anxious
- 64% of women report suffering from PMS/PMT
- 46% report suffering from depression
- 81% of people fail to have a bowel movement every day
- 64% suffer from abdominal bloating
- 54% report dark circles or bags under their eyes
- 46% suffer from headaches and migraine
- 50% have more than two colds or flu a year
- 40% find it hard to shift an infection

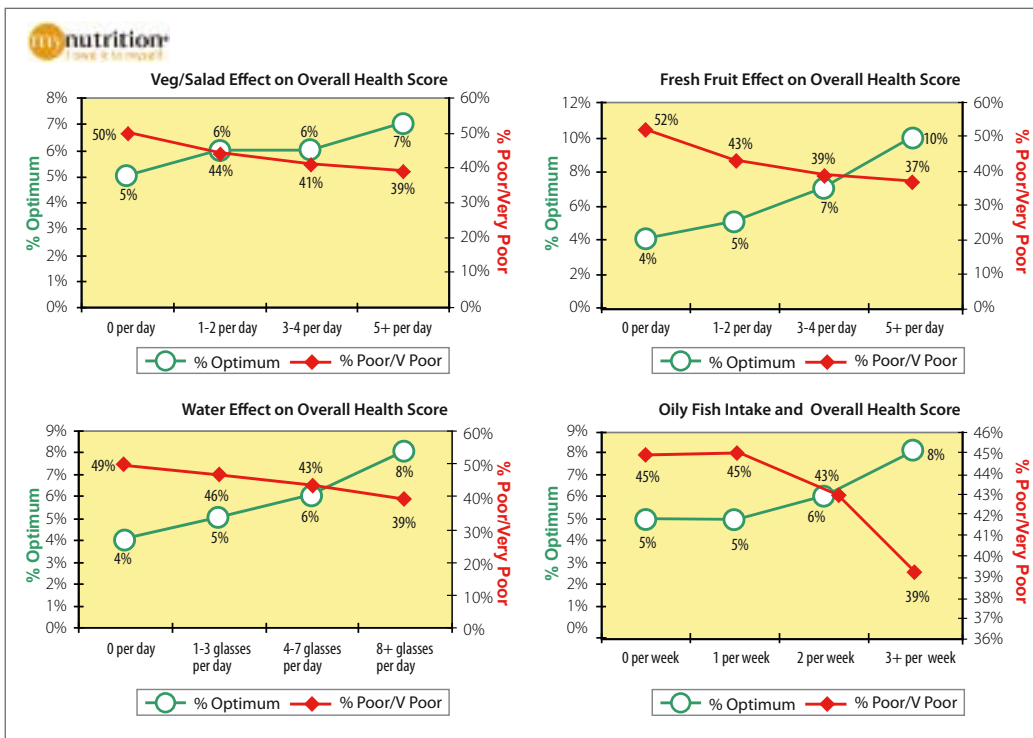
People in the optimum group report having few or none of the above symptoms.

## 4.7 Impact of Diet on Health

The most profound finding of the survey is a direct correlation between the increasing consumption of some food groups with an increase in adverse symptoms and a decrease in likelihood of optimum wellbeing. The charts below indicate that increasing consumption of wheat (bread, rolls, pasta, cereal), dairy, tea/coffee and sugary snacks is associated with a notable increase in the number of people with a poor/very poor overall health rating, and a notable decrease in the number of people with an optimum health rating.



- A single sugar based snack a day halves the likelihood of being in optimum health.
- Low wheat and dairy consumers are more than twice as likely to be in optimum health as high consumers.
- As little as 1 cup of tea or coffee a day almost halves the chance of being in optimum health.



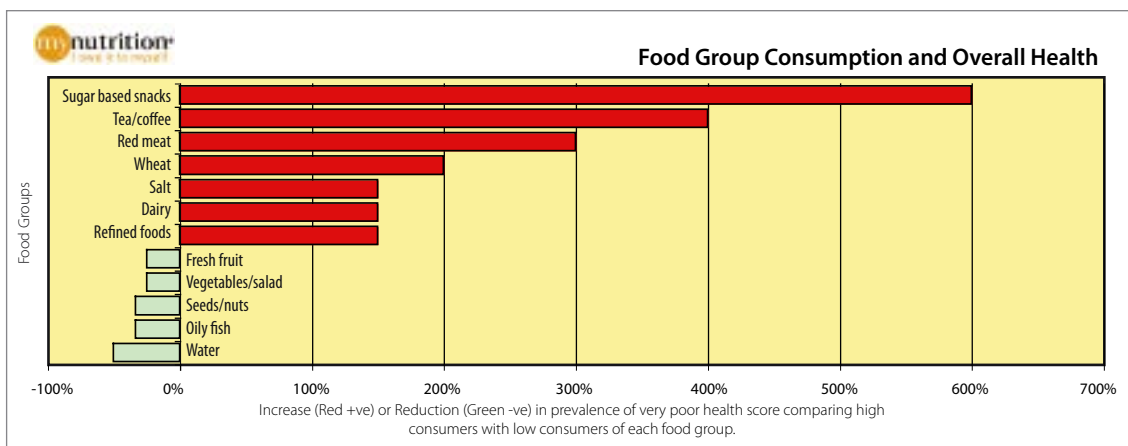
There are foods that have a beneficial effect but this is not nearly so marked as the adverse effect of the 'negative' foods.

- Fruit has a more marked beneficial association with health than vegetables.
- Consumers of 8 glasses of water a day are twice as likely to be in optimum health than non-water drinkers.

#### 4.8 Relative effects of foods on health factors

A comparison of the prevalence of very poor health scores between high consumers and low consumers of each food group gives a relative impact of increased consumption of each food on the likelihood of a very poor health score.

Respondents who consumed high amounts of sugar based snacks, tea/coffee, red meat, wheat, refined foods, dairy and salt were more likely to have very poor health. High consumers of sugar based snacks and tea/coffee were 600% and 400% more likely to have very poor health respectively.



#### 4.9 Overall picture of food group impacts

Using the analysis of relative effects of food groups it is possible to produce a 'heat map' that shows the foods that have the most significant positive and negative effects on likelihood to have a very poor health score. A person's health score was further broken down into eight Key Health Factors, derived by a set number of symptoms associated with each aspect of health. (The term 'detoxification' related to symptoms indicating poor elimination or symptoms associated with poor sub-clinical liver detoxification, while the term 'hormonal health' related to symptoms most often experienced pre-menstrually or in association with the menopause. Illustrative symptoms for each Key health Factor are given in 7.4 to 7.11.)

Effects of High Food Group Consumption on Health Scores									
% Increase in likelihood of very poor health scores comparing high consumers with low consumers of each food group									
Food Group	Overall Health	Energy	Stress	Hormone Health	Mental Health	Digestion	Detox	Immunity	Skin
Sugar based snacks	600%**	177%**	61%**	100%**	144%**	90%**	160%**	129%**	150%**
Tea/Coffee	400%**	314%**	57%**	69%**	63%**	36%**	120%**	63%**	40%**
Red Meat	300%**	52%**	41%**	47%**	50%**	83%**	114%**	44%*	50%*
Wheat	200%**	77%**	42%**	64%**	75%**	33%**	117%**	56%**	80%**
Dairy	150%**	76%**	26%**	47%**	52%**	25%**	67%**	44%**	40%**
Refined Foods	150%**	100%**	18%**	54%**	43%**	50%**	100%**	63%**	75%**
Salt	150%**	69%**	35%**	50%**	50%**	90%**	140%**	63%**	40%**
Fruit	-25%*	-47%**	-3% NS	-35%	-31%**	-33%**	-44%**	-33%**	-29%*
Vegetables/salad	-25% NS	-40%**	0%	-21%**	-27%**	-7% NS	-22%**	-18%**	-14% NS
Oily Fish	-33% NS	-32%**	0%	-13% NS	-13% NS	-8% NS	0%	-20%**	-17%*
Seeds/Nuts	-33% NS	-42%**	0%	19% NS	4% NS	31%*	14% NS	-30%**	-17% NS
Water	-50%**	-46%**	-19%	-30%**	-38%**	-15%**	-33%**	5%*	-17%**

\*\* = statistically significant (p<0.001) \* = statistically significant (p<0.05) NS = not statistically significant

Effect	Consumption Level	Description
Negative effect of increasing quantity	> 100%	Increase in prevalence of very poor health score - high vs low consumption.
	51%-100%	
	26%-50%	
	1%-25%	
No apparent effect	0%	No change in prevalence based on level of consumption
Positive effect of increasing quantity	1%-25%	Reduction in prevalence of very poor health score - high vs low consumption
	26%-50%	

This shows that increasing consumption in a range of staple food groups may have a significant, negative impact on wellbeing. In some cases this may be due to a 'feedback cycle'. For example, whilst excessive consumption of sugar based snacks may contribute to energy problems, the presence of energy problems may encourage compensatory consumption of sugar based snacks. Nonetheless the relationships are very clear and the consistent correlations in areas for which there is unlikely to be this feedback cycle (immunity, skin, detoxification, digestion) suggest that the foods are having increasingly negative effects in line with volume of consumption.

#### **4.10 Individual Requirements**

This analysis shows that different people will have different diet requirements/priorities at different times. For example water has a stronger association with improving health for people with hormone issues than immune issues. Fruit appears to be more beneficial than vegetables in relation to hormone health issues. Similarly the relative importance of reducing food intakes in the 'negative' group depends on the underlying health profile.

This survey group of ostensibly 'healthy' people demonstrates significant symptoms of ill health. Most have not consulted their doctor but they are aware of negative day-to-day symptoms that are impairing their health, vitality and wellbeing.

The data shows that the largest underlying health problems relate to energy and stress with 75% of people reporting significant symptoms related to low energy.

Symptoms related to hormonal health and mental health are significant issues for more than 50% of respondents, closely followed by issues related to poor digestion, impaired detoxification and low immune function.

This survey looks in more detail at these 'pre-clinical', 'pre-disease' groups and looks at the links between diet and symptoms.

Very few people live free of these, at best irritating and, at worst debilitating symptoms. This is likely to be having a very significant impact on the wellbeing of people who are not yet diagnosed with a specific disease. The cohort studies later in this report indicate how these symptoms may be alleviated by making some simple nutritional changes.

#### 4.11 Overall Recommendations

The survey shows that those people with the highest health rating consistently consumed less sugar, refined foods, caffeinated drinks, less wheat, dairy products and salt, while consuming more fresh fruit, vegetables, nuts, seeds, fish and water.

If these healthy people's lifestyle explains their health and wellbeing, we can come forward with the following simple recommendations:

1. **Reduce wheat consumption to a maximum of 1 serving<sup>3</sup> per day (bread, pasta, pizza etc).**
2. **Eliminate sugar based snacks or limit these products to very occasional use.**
3. **Avoid adding salt to food, eliminate or minimise consumption of salted snacks and reduce use of salted, processed food.**
4. **Reduce eating dairy products to a maximum of 1 serving per day.**
5. **Reduce consumption of refined foods (white bread, flour, rice etc) to a maximum of 1 serving a day.**
6. **Increase consumption of fresh fruit and vegetables to a combined total of 8-10 servings a day.**
7. **Eliminate tea/coffee consumption or limit these to very occasional use.**
8. **Reduce the consumption of red meat to a maximum of 2 servings per week.**
9. **Increase consumption of oily fish to 3 servings per week.**
10. **Increase consumption of fresh, raw seeds and nuts to 3 servings per day.**
11. **Increase consumption of water to 8 glasses per day.**

## Conclusion

These recommendations endorse the current government attempts to increase fruit and vegetable consumption and to reduce salt consumption. This survey suggests, however, that the guideline for fruit and vegetables (5 a day) is too low.

The most marked finding however is the marked negative effect of increasing consumption of 'negative' foods including:

- **Sugar based snacks**
- **Stimulants (Tea, Coffee, Cola)**
- **Added salt**
- **Refined foods**
- **Wheat**
- **Dairy**
- **Red Meat**

The inclusion in this 'negative' group of items that are commonly considered 'essential' or 'important' components of food groups suggests a need for a complete review of the current guidelines within the 'balance of good health' and very clear upper limits for all of the above 'negative' foods.

It would appear that a wheat based cereal with milk and sugar consumed with a cup of tea or coffee in the morning may be a very negative and counter-productive way to start the day.

On observation of the groups of people from the cohort intervention studies, who make changes based on these recommendations, show improvements. The occurrence of everyday adverse symptoms - from low energy, to digestive problems to hormonal issues - do not appear to be normal or inevitable. They appear directly linked to what we eat. While it is both ideal and difficult for any individual to make all these changes, the cohort intervention studies clearly indicate that making modest improvements to one's nutrition can be effective in improving wellbeing.

<sup>3</sup>Serving definition: the term 'servings' is used for the purposes of simplifying the questionnaire and is used to indicate the frequency of consumption. It does not enable quantitative measures to be calculated.

## 5 Background, research design and response

### 5.1 The MyNutrition questionnaire

Between 1984 and 2000 in excess of 100,000 clients consulted nutritional therapists trained at the Institute for Optimum Nutrition, and completed the Nutrition Programme Questionnaire, authored by Patrick Holford. This questionnaire, designed to elicit information about a person's overall health; symptoms associated with nutritional deficiency; symptoms, signs and measures associated with increasing risk of disease; and dietary information, was created to allow nutrition professionals to assess a person's nutritional needs for restoring and maintaining wellbeing. Follow-up of clients treated by ION nutritional therapists has substantiated that the majority of signs and symptoms are no longer reported after 3 to 6 months of implementing optimum nutrition recommendations, illustrated by the Cohort Intervention Study 1 and 2 (see Appendix). An ION research study on symptoms associated with vitamin B6 deficiency also found that the majority of symptoms are no longer reported after 3 to 6 months.<sup>4</sup>

Based on results obtained over 16 years of using this questionnaire, the MyNutrition.co.uk team created an enhanced web-based version of the questionnaire, with built-in analytical programmes to allow the automated assessment of a person's current level of overall health, key health factors and dietary weaknesses. Respondents receive a report giving constructive steps to effect improvement.

An example of the questionnaire is given in the Appendix. Each question has a four point scale of answers from 'no' to 'rarely' to 'occasionally' to 'frequently'.

- No/Never
- Rarely
- Occasionally/Sometimes
- Yes/Frequently

### 5.2 Health Reporting to respondents

The MyNutrition questionnaire enables a qualitative assessment of overall health and the status of ten key health factors. Results and advice are reported back to respondents immediately.

#### 5.2.1 Overall Health

The health report generated for each individual provides an Overall Health Score out of 100 for general health, based on an analysis of answers from a series of key questions. The MyNutrition Questionnaire asks questions about symptoms that are commonly experienced and the presence, or absence, of these symptoms gives a qualitative view of overall health. For simplicity the scores are divided into four bands:

- Level A - Optimum
- Level B - Moderate
- Level C - Poor
- Level D - Very poor

• Chaudary AN, Porter-Blake A. and Holford P. Indices of Pyridoxine Levels on Symptoms Associated with Toxicity: A Retrospective Study, J Orthomol Med 2004; 18(2): 65-76.

For the purposes of this survey Level C and D were combined, giving three reporting levels: Optimum, Moderate or Poor.

### 5.2.2 Key Health Factors

A person's health rating is further analysed in relation to eight Key Health Factors. Each of these health areas has an effect on overall health. The key health areas are:

- Blood sugar/energy
- Stress
- Hormonal health (women only)
- Mental health
- Digestion
- Detoxification
- Immunity
- Skin

**Please note:** The term 'detoxification' related to symptoms indicating poor elimination or symptoms associated with poor sub-clinical liver detoxification, while the term 'hormonal health' related to symptoms most often experienced pre-menstrually or in association with the menopause. Illustrative symptoms for each Key health Factor are given in 7.4 to 7.11.

### 5.2.3 Assessing Key Health Factor Status

Each Key Health Factor is scored based on answers to a number of relevant questions. For example, a person's digestive health is assessed in relation to their answers to questions including:

- Do you have loose stools or get diarrhoea?
- Do you strain when having a bowel movement?
- Do you suffer from indigestion or heartburn?
- Do you suffer from flatulence?
- Do you experience abdominal bloating?
- Do you have at least one bowel movement per day?

### 5.2.4 Key Health Factor Prioritisation

Key Health Factors are prioritised based on their relative scores with the highest scoring areas reported to the respondent as requiring most attention.

### 5.2.5 Body Mass Index

A person's Body Mass Index is also calculated. The calculation of Body Mass Index is based on the standard accepted formula (weight in kilograms, divided by height in metres squared: kg/m<sup>2</sup>). A full analysis of the effects of diet and Key Health Factor ratings on weight-related issues and body mass index will be reported on in a detailed report in 2005 and is excluded from this survey report.

### 5.2.6 Diet Advice

A person's diet is then analysed on the basis of a series of questions relating to the frequency of consumption of certain foods and drinks. Diet questions include questions on consumption of:

- Dairy products
- Wheat products
- Added salt
- Sugary snacks
- Refined foods (white rice, pasta, flour)
- Stimulants – tea, coffee, cola
- Processed food
- Red meat
- Oily fish
- Fresh fruit

## 6 Sample & Research Process

### 6.1 Research Process

Between March 2001 and June 2004 people of mixed age, sex and social class completed the MyNutrition questionnaire. These were recruited partly through advertisements and promotions in national publications, and partly self-selected by visiting the MyNutrition website [www.mynutrition.co.uk](http://www.mynutrition.co.uk), the latter group paying for the nutritional analysis.

The sample, while providing a broad cross-section of the public, were not randomly selected. It is likely that their willingness to commit approximately 20 minutes (and/or pay for the privilege) to complete a comprehensive questionnaire, may bias the results in favouring people who are likely to be more health conscious, aware of the connection between nutrition and health and possibly more concerned about health-related issues.

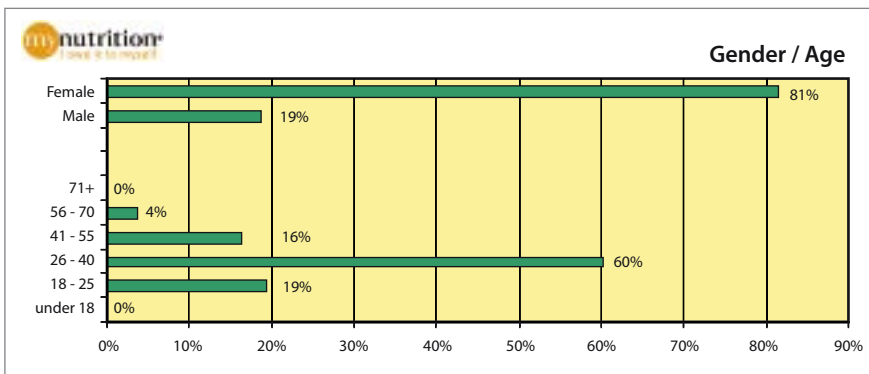
### 6.2 Demographics

#### 6.2.1 Total Sample

The on-line questionnaire was completed, in full, by 37,053 people.

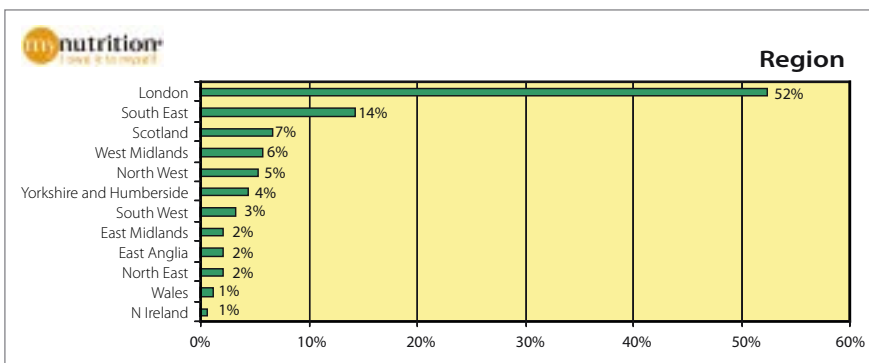
#### 6.2.1 Gender, Age and Marital Status

The majority of the sample were female (81%), with 7,040 men completing the questionnaire, compared to 30,013 women. This is in accordance with previous findings that women are more likely to take an active interest in health and to acknowledge the connection between nutrition and health. 53% were married or with partners and 47% single.



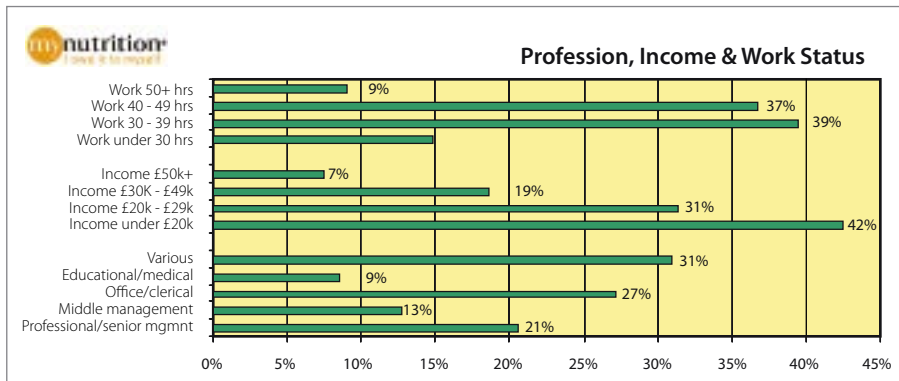
The sample base was predominantly adult with the majority being between 26-40 years old. This may reflect the experience of nutritional therapists that people in their late 20s start to experience day to day symptoms of degeneration and look to take action to improve their wellbeing. It may also reflect the age group more likely to have computer skills and internet access.

#### 6.2.3 Region



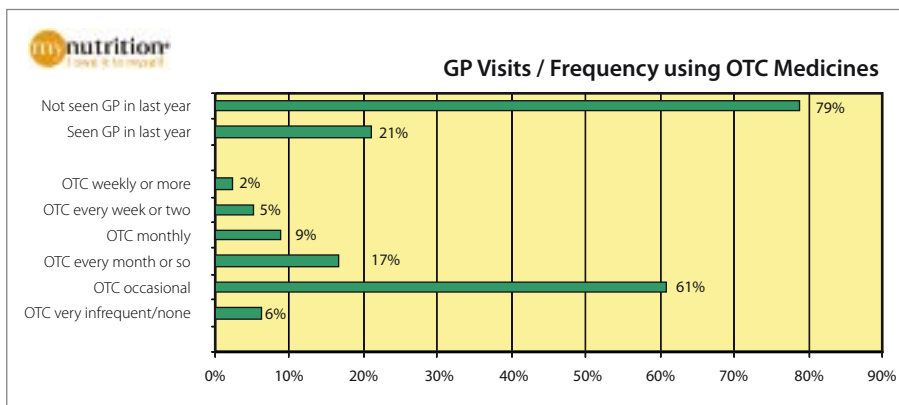
The sample base was predominantly drawn from London and the South East. This seems to be due to the localised regional media exposure of the MyNutrition profiling service and referrals from a client base initially drawn from the London area.

### 6.2.4 Profession, Income & Work Status



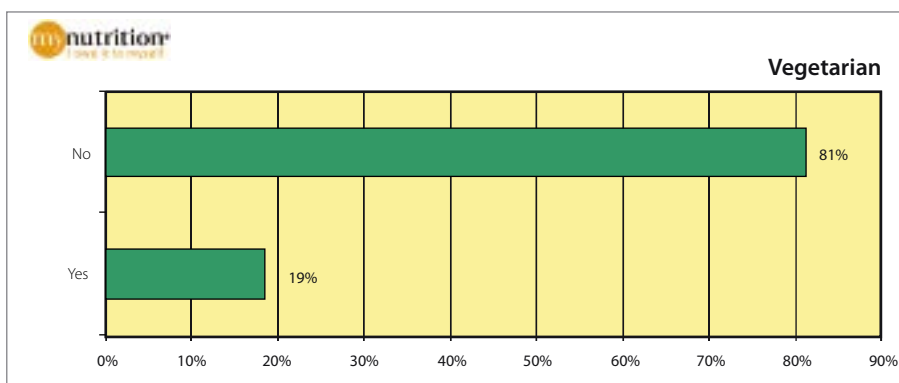
Most respondents were in full-time employment, in a wide variety of occupations.

### 6.2.5 GP Visits and Use of Over the Counter Medications



Most respondents had not seen their GP in the last year and reported occasional use (less than monthly) of over the counter medications. Given that approximately 80% of the UK population see their doctor every year, this indicates that most of the respondents are what might medically be termed 'healthy' in that they have had no reason to see a doctor for a diagnosis or treatment and are not significantly self-medicating.

### 6.2.6 Vegetarian



19% of the sample classed themselves as vegetarian. This is higher than current estimates of 11% of the population being vegetarian or avoiding red meat, further confirming that the survey population were generally more diet/health conscious than the general population. Differences in patterns of health will be investigated in a follow-up report.

## 6.3 STATISTICS

It is important to note that the sample in this survey is self-selecting and has a majority of female respondents. The data has not been weighted to be representative of any population so it stands as a representation only of this group of 37,053 people. The group is made up of people who have internet access and the motivation to complete an on-line health profile.

Where statistical significance tests have been applied these have been used to indicate the strength of the difference between groups and significance tests (T-tests and Z-tests) have been applied to the difference between groups consuming foods in different quantities and their health scores. Where pertinent, the presence of significance tests giving significance to 99% ( $p < 0.001$ ) and 95% ( $p < 0.05$ ) have been indicated.

Correlation analysis has been used to corroborate the connection between health scores and food intakes. These analyses have corroborated the findings that compare the raw data and apparent differences between the groups. Correlation analysis has further been used to link symptoms that are most correlated with intakes of different foods.

This survey is based on a very significant sample and, as such, provides a valuable insight into the likely connections between diet and wellbeing as evidenced by the presence or absence of everyday symptoms.

## 7 Health Ratings

The objective of this aspect of the ONUK survey was to get an extensive insight into the general physical and mental health of the respondents. Data was analysed, both in relation to individual questions, in relation to defined groups of questions used to derive 'Key Health Factor' assessment, and 'Overall Health' scores.

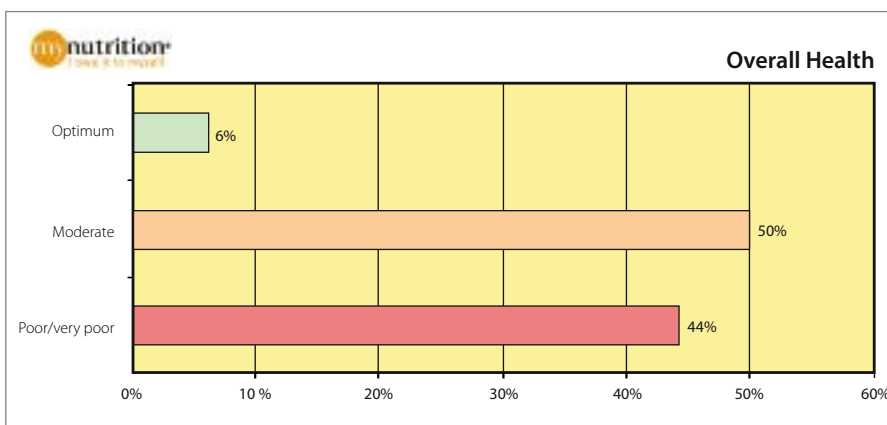
The Overall Health scores were assessed based on a consolidation of symptom scores indexed to 100, with 100 being a completely symptom-free individual. This is a qualitative evaluation of health and individuals were categorised into four bands based on the prevalence and frequency of symptoms. People in the Level D (Very Poor) and Level C (Poor) bands are those that have significant symptoms of impaired wellbeing.

Level A - Optimum	81-100	Few symptoms of impaired well-being
Level B - Moderate	61-80	Moderate number of such symptoms
Level C - Poor	41-60	Substantial number and severity of symptoms
Level D - V Poor	0-40	Very large number and severity of symptoms

For the purposes of the following graphs Level C and D were combined, giving three reporting levels: Optimum, Moderate or Poor.

### 7.1 Overall Health

The results show that 94% of people have sub-optimal health scores (level B to D), with 44% having poor or very poor health scores.

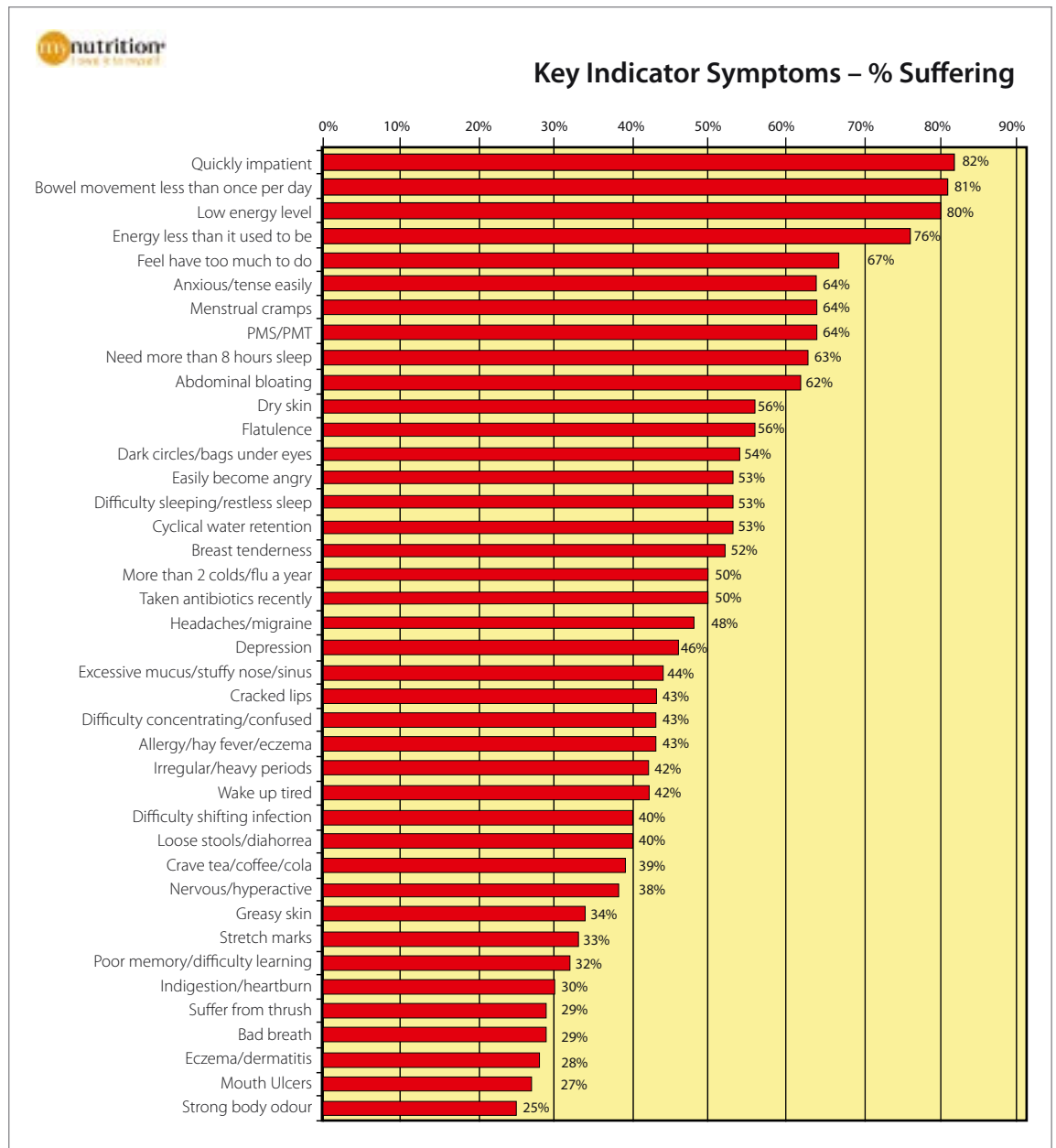


Only 6% of respondents, were classified as 'optimum health', reporting few adverse health symptoms. This may not be a representative view of the UK population, given that most of the respondents were middle class adults, most in full employment and with reasonably good income, in apparently above average health, (reflected by the fact that most did not feel ill enough to seek their GP's

advice in recent months) and above average motivation to maintain their health (since the majority of respondents were sufficiently motivated to complete the questionnaire). Despite this, the majority reported a significant number of symptoms associated with sub-clinical ill health. A broader population base could reasonably be expected to be in worse health.

## 7.2 Key symptoms of sub-optimal health

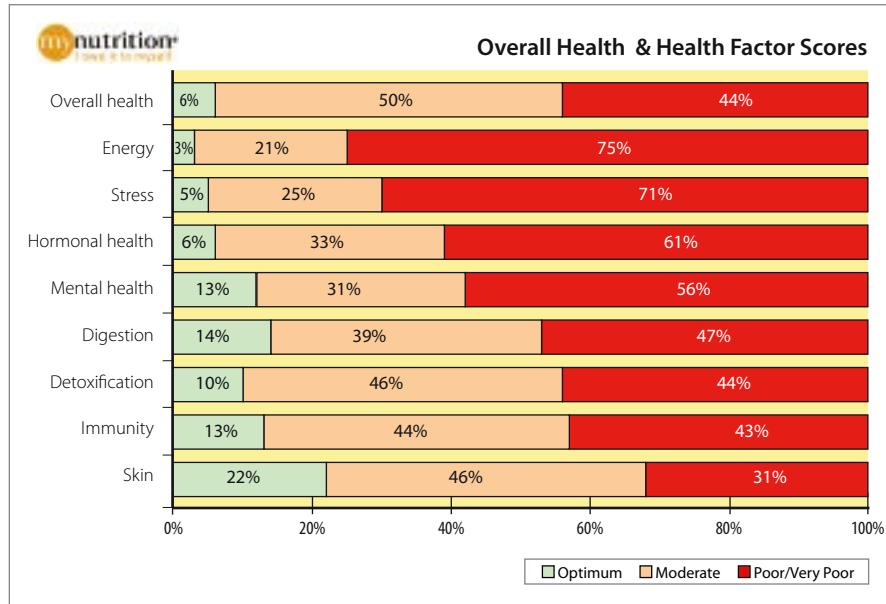
There was a very high prevalence of symptoms that indicate sub-optimal health. The following chart shows key symptoms, reported by 25% or more of respondents. Optimally healthy people remain largely free of these types of symptoms. The percentages here reflect those that frequently and occasionally experience the symptoms. In optimally well people the majority of these symptoms are rarely or never present.



### 7.3 Key Health Factors - Overview

As discussed in 5.2.3, these symptoms were grouped together to give an indication of the health of 'Key Health Factors' such as digestion, hormonal health, immunity, energy and stress.

An overview of the scores in the underlying health factors can be seen here.



This survey group of ostensibly 'healthy' people demonstrates significant symptoms of ill health. Most have not consulted their doctor but they are aware of negative day-to-day symptoms that are impairing their health, vitality and wellbeing.

The data shows that the largest underlying reported health problems relate to energy and stress with 75% of people reporting significant symptoms related to low energy.

Symptoms related to hormonal health and mental health are significant issues for more than 50% of respondents, closely followed by issues related to poor digestion, impaired detoxification and low immune function.

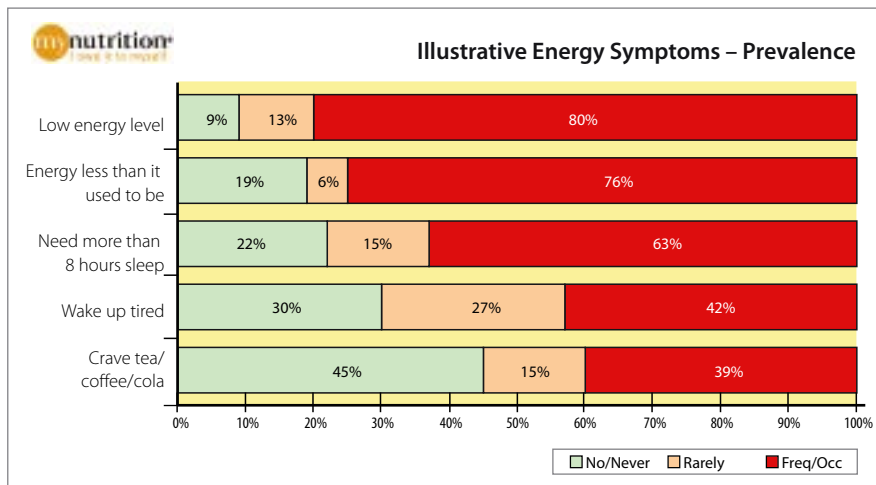
This survey looks in more detail at these 'pre-clinical', 'pre-disease' groups and looks at the links between diet and symptoms.

Very few people live free of these, at best irritating and, at worst debilitating symptoms. This is likely to be having a very significant impact on the wellbeing of people who are not yet diagnosed with a specific disease. The cohort intervention studies later in this report indicate how these symptoms may be alleviated by making some simple nutritional changes.

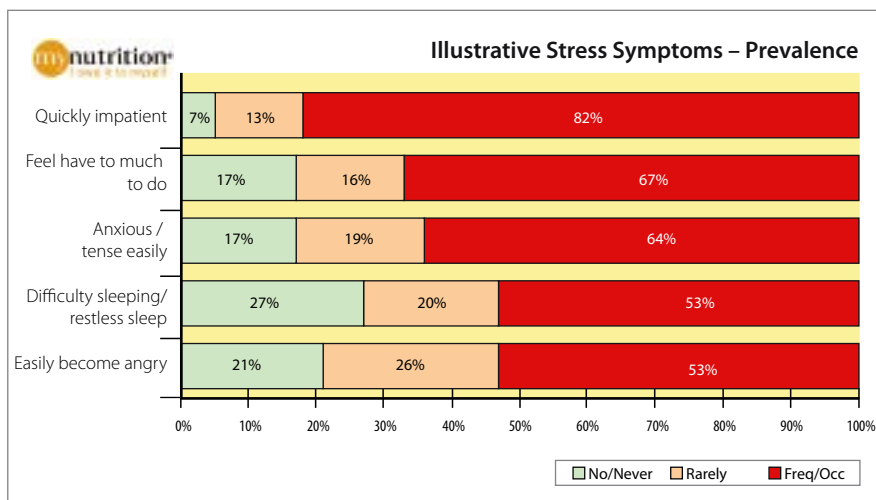
### 7.4 Key Health Factors – Detail

Each health factor is a compilation of the prevalence of a number of indicator symptoms. The following charts show some of the main symptoms driving the health factor scores. For the purposes of this analysis the frequent or occasional occurrence of symptoms is deemed a significant indicator of sub-optimal health. Individuals in optimum health experience symptoms rarely, if ever. The symptoms listed are a person's subjective self-assessment and do not represent medical diagnoses of, for example, eczema or depression.

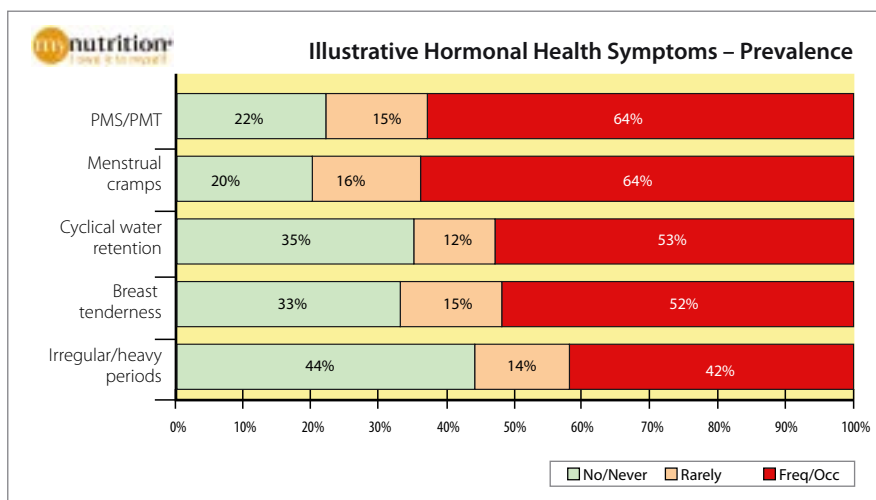
## Energy



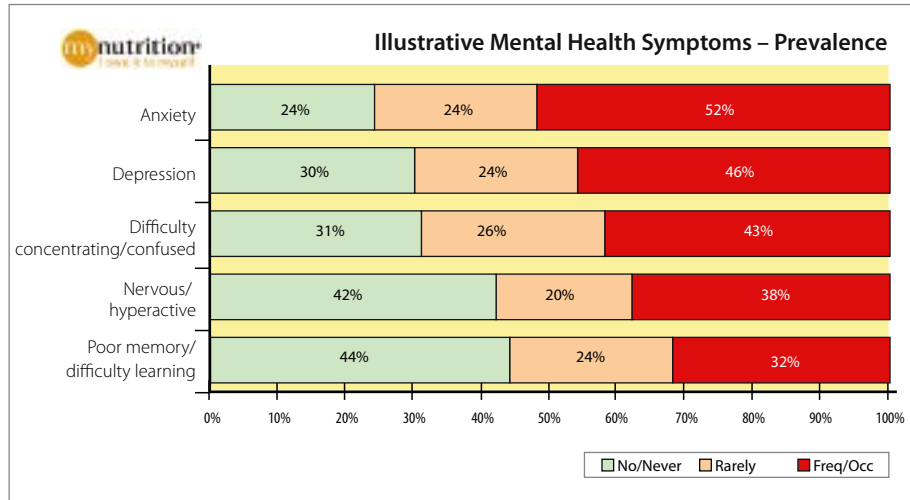
## Stress



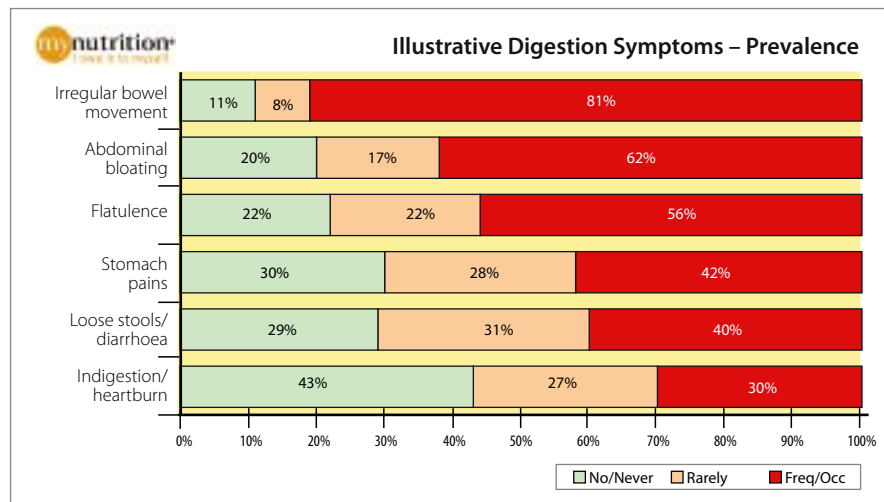
## Hormonal Health



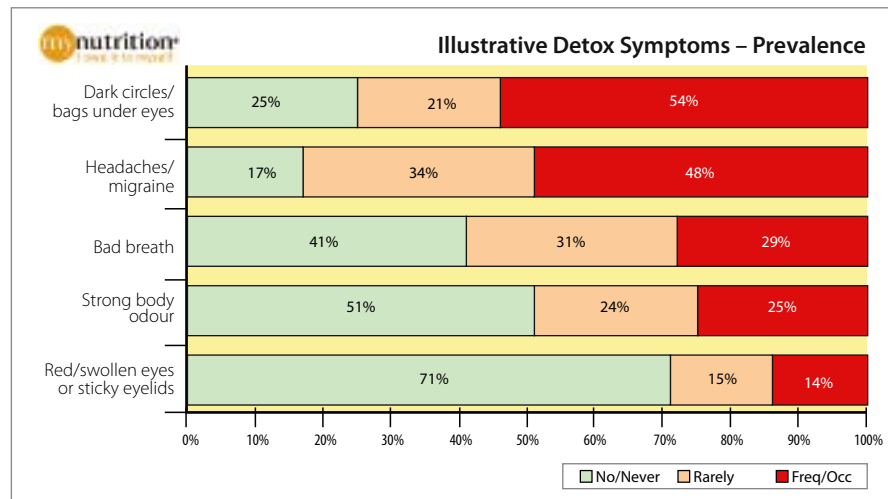
## Mental Health



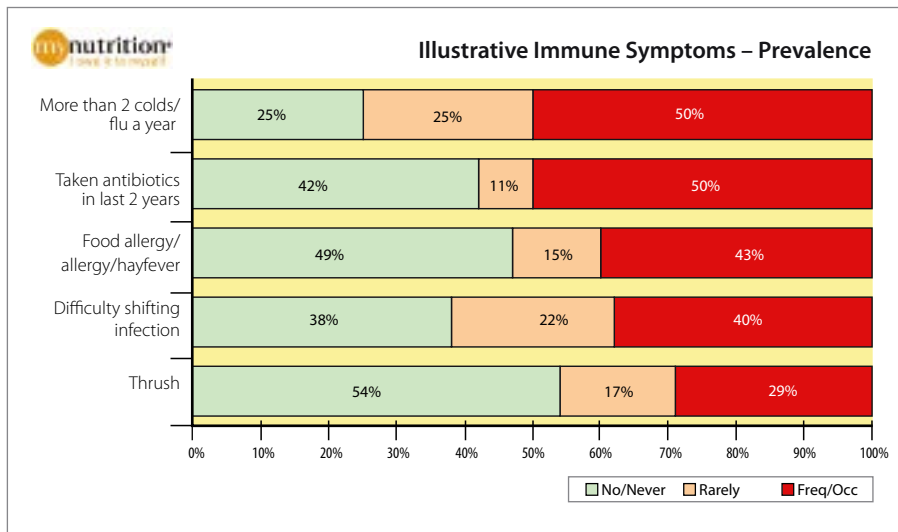
## Digestion



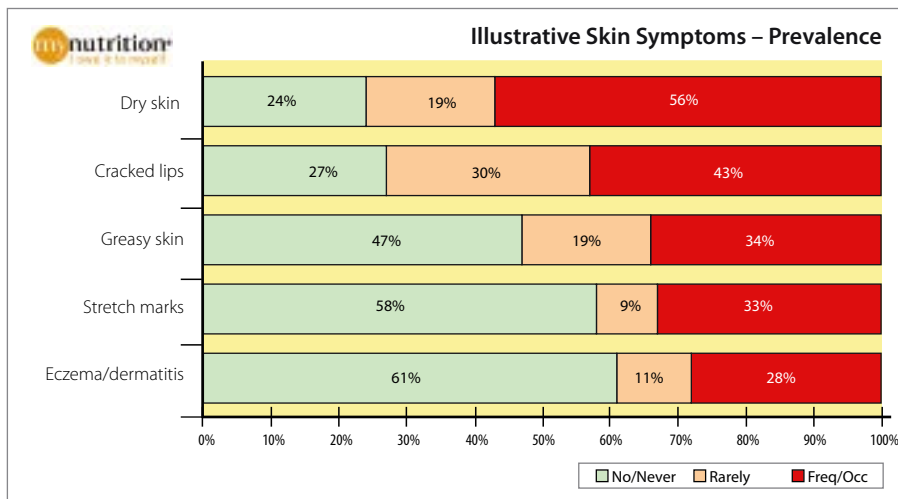
## Detoxification



Immunity



Skin



## 8 Consumption of Different Food Groups

Dietary intakes were assessed by means of frequency questions, such as “How many times a week do you eat red meat?” or “How many cups of tea, coffee or cola drinks do you consume each day in total?” On the basis of these questions the following pattern of consumption was reported by respondents.

Food		None/Low	Mod	High	V High
Dairy	Quantity	0-1 per day	2 per day	3 per day	4+ per day
	Prevalence	22%	37%	32%	8%
Wheat	Quantity	0-2 per day	3 per day	4 per day	5+ per day
	Prevalence	33%	31%	29%	7%
Use of added salt	Quantity	0 per day	1 per day	2 per day	3+ per day
	Prevalence	27%	46%	17%	9%
Sugary snacks	Quantity	0 per day	1 per day	2 per day	3+ per day
	Prevalence	19%	53%	22%	6%
Refined foods	Quantity	0 per day	1 per day	2-3 per day	4+ per day
	Prevalence	11%	48%	34%	7%
Tea, coffee, cola	Quantity	0 per day	1-2 per day	3-5 per day	6+ per day
	Prevalence	11%	45%	35%	9%
Processed meals	Quantity	0 per week	1-2 per week	3-4 per week	5+ per week
	Prevalence	21%	55%	19%	5%
Red meat	Quantity	0-2 per week	3-5 per week	6-7 per week	8+ per week
	Prevalence	64%	29%	6%	1%
Fresh fruit	Quantity	0 per day	1-2 per day	3-4 per day	5+ per day
	Prevalence	25%	48%	22%	5%
Fresh vegetables	Quantity	0 per day	1-2 per day	3-4 per day	5+ per day
	Prevalence	18%	60%	21%	4%
Water	Quantity	0 per day	1-3 per day	4-7 per day	8+ per day
	Prevalence	15%	39%	31%	15%
Oily fish	Quantity	0 per week	1 per week	2 per week	3+ per week
	Prevalence	36%	40%	19%	5%
Fresh, raw nuts and seeds	Quantity	0 per day	1 per day	2 per day	3+ per day
	Prevalence	75%	18%	6%	2%

The average reported consumption of these food groups was:

The term ‘servings’ was used for the purposes of simplifying the questionnaire and represents a subjective view of the respondents and is used to indicate the frequency of consumption. It does not enable quantitative measures to be calculated from this.

Food Group	Amount
Dairy	2.3 servings per day
Wheat	2.8 servings per day
Use of added salt	1.1 times per day
Sugary snacks	1.2 servings per day
Refined foods	1.6 servings per day
Tea, coffee, cola	2.6 cups/glasses per day
Processed meals	1.8 times per week
Red meat	2.3 servings per week
Fresh fruit	2.0 servings per day
Fresh vegetables	2.0 servings per day
Water	3.8 glasses/cups per day
Oily fish	1.3 servings per week
Fresh, raw nuts and seeds	1.1 servings per day

## 9 Diet and Health

Analysis of the impact on health score of increasing consumption of food groups produced some very significant findings. These are detailed in this section.

### 9.1 Overview

The following grid indicates the relative impact of high consumption of each food group on the likelihood to have a very poor health score.

Effects of High Food Group Consumption on Health Scores									
% Increase in likelihood of very poor health scores comparing high consumers with low consumers of each food group									
	Overall Health	Energy	Stress	Hormone Health	Mental Health	Digestion	Detox	Immunity	Skin
Sugar based snacks	600%**	177%**	61%**	100%**	144%**	90%**	160%**	129%**	150%**
Tea/Coffee	400%**	314%**	57%**	69%**	63%**	36%**	120%**	63%**	40%**
Red Meat	300%**	52%**	41%**	47%**	50%**	83%**	114%**	44%*	50%*
Wheat	200%**	77%**	42%**	64%**	75%**	33%**	117%**	56%**	80%**
Dairy	150%**	76%**	26%**	47%**	52%**	25%**	67%**	44%**	40%**
Refined Foods	150%**	100%**	18%**	54%**	43%**	50%**	100%**	63%**	75%**
Salt	150%**	69%**	35%**	50%**	50%**	90%**	140%**	63%**	40%**
Fruit	-25%*	-47%**	-3% NS	-35%	-31%**	-33%**	-44%**	-33%**	-29%**
Vegetables/salad	-25% NS	-40%**	0%	-21%**	-27%**	-7% NS	-22%**	-18%**	-14% NS
Oily Fish	-33% NS	-32%**	0%	-13% NS	-13% NS	-8% NS	0%	-20%**	-17%*
Seeds/Nuts	-33% NS	-42%**	0%	19% NS	4% NS	31%*	14% NS	-30%*	-17% NS
Water	-50%**	-46%**	-19%	-30%**	-38%**	-15%**	-33%**	5%*	-17%**

\*\* = statistically significant (p<0.001) \* = statistically significant (p<0.05) NS = not statistically significant

Negative effect of increasing quantity	> 100%	Increase in prevalence of very poor health score - high vs low consumption.
	51%-100%	
	26%-50%	
	1%-25%	
No apparent effect	0%	No change in prevalence based on level of consumption
Positive effect of increasing quantity	1%-25%	Reduction in prevalence of very poor health score - high vs low consumption
	26%-50%	

In this chart different food groups have different relative effects on overall health and on the various underlying health factors. Increasing consumption of the 'red' food groups is associated with a negative impact on health, while increasing consumption in the 'green' areas is associated with a positive impact.

There is a marked difference in the degree of impact. Increasing consumption of fruit and vegetables, for example, has a net positive effect but it is far less powerful than the adverse impact of the negative foods.

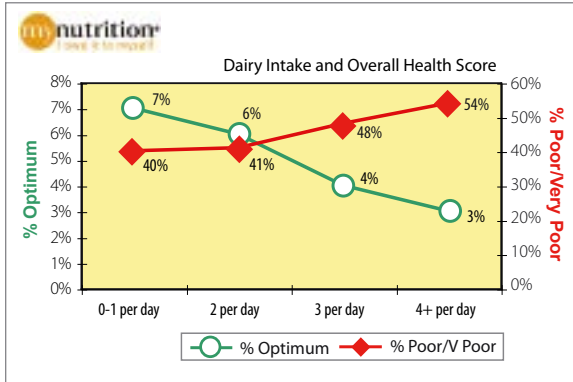
This analysis endorses the governments approach on 'five servings of fruit and vegetables a day' although this is unlikely to be enough fruit and vegetables for most people. It also endorses the current campaign against excessive salt consumption. The urging of reductions should now also spread to sugar and sugar based snacks. This data endorses the World Health Organisation (WHO) suggestion that refined sugar consumption should be reduced significantly. The WHO and Food Standards Agency recommend that sugar should not exceed 10% of daily calories. This data suggests that the lower a person's consumption of sugar-based snacks the better their health.

### 9.2 Food Intake and Overall Health Score

For each food group a comparison was made between increasing consumption and the percentage of respondents with an 'optimum' overall health score or a 'poor/very poor' overall health score. For those food groups which were negatively correlated with overall health an analysis of key symptoms reported was also made.

### 9.2.1 Dairy

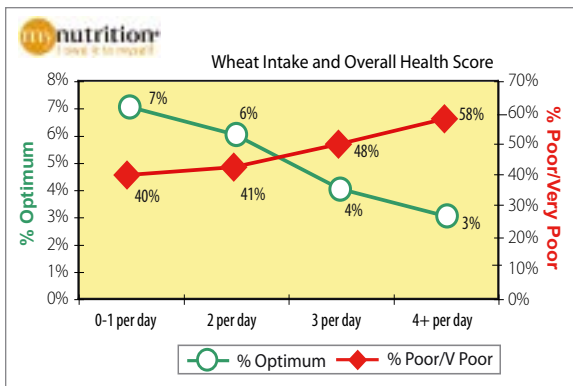
Increasing consumption of dairy products beyond 0-1 servings per day correlates with increasing prevalence of poor Overall Health scores (eg. more symptoms). The healthiest people, with the best Overall Health scores, are the lowest consumers of dairy products.



- High dairy consumers are 35% more likely to have poor health scores than low dairy consumers.
- Low consumers of dairy are more than twice as likely (133%) to have optimum health scores than high dairy consumers.
- Symptoms most correlated with increasing dairy consumption include
  - Gaining weight
  - Headaches and migraine
  - Craving tea and coffee
  - Waking up tired and needing something to get going in the morning

### 9.2.2 Wheat

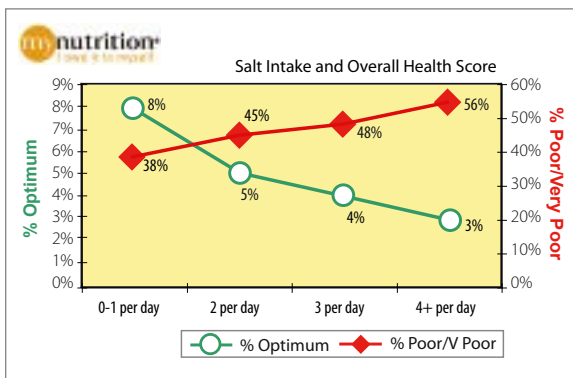
Increasing wheat consumption correlates with increasing symptoms and poor Overall Health scores.



- High wheat consumers are 45% more likely to have poor Overall Health scores than low wheat consumers.
- Low consumers of wheat are more than twice as likely (133%) to have optimum health scores than high wheat consumers.
- Symptoms most correlated with increasing wheat consumption include:
  - Gaining weight
  - Difficulty losing weight
  - Feeling apathetic and unmotivated
  - Low energy

### 9.2.3 Salt

Adding salt increases symptoms and reduces chances of having optimum health.

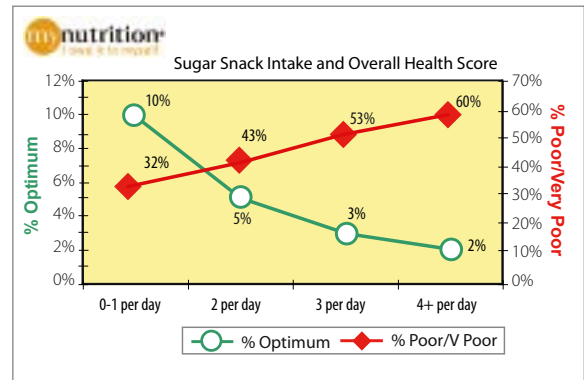


- Adding salt just once a day makes a significant reduction in the prevalence of optimum health scores.
- High salt consumers are nearly 50% more likely to suffer from poor Overall Health scores.
- Low consumers of salt are 63% more likely to have optimum health scores than high salt consumers.
- Symptoms most correlated with increasing salt consumption include:
  - Indigestion and heartburn
  - Gaining weight
  - Bad breath
  - Irritability

### 9.2.4 Sugar based snacks (chocolate bars, cakes, confectionery)

Sugar based snacks have a dramatic adverse effect on overall health score. A single sugary snack a day halves your chances of being in optimum health.

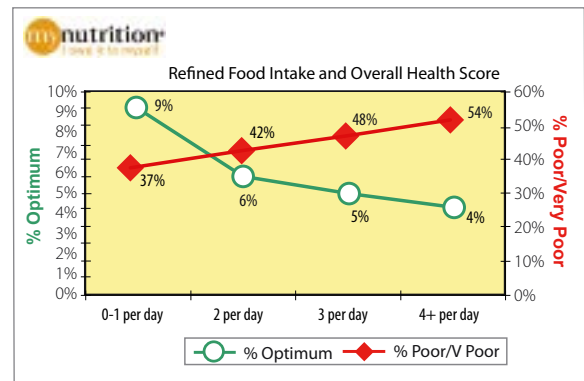
- Consuming 3 or more sugar based snacks a day reduces optimum health scores by 400% compared with avoiding them altogether.
- High consumers of sugar based snacks are nearly twice as likely (88% more likely) to have poor health scores than abstainers.
- Symptoms most correlated with increasing sugar consumption include:
  - Gaining weight
  - Feeling apathetic and unmotivated
  - Difficulty concentrating and becoming confused
  - Low energy in the morning



### 9.2.5 Refined foods (white rice, bread, pasta, flour)

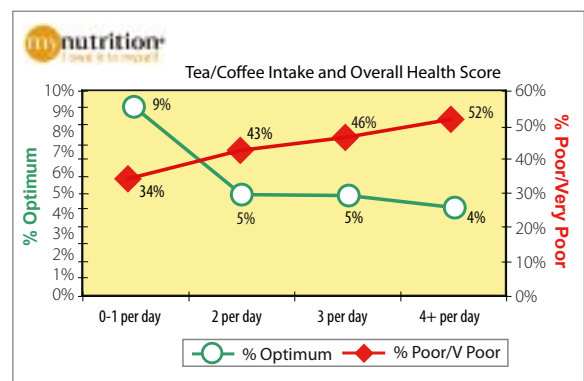
Eliminating refined foods more than doubles your chances of being in optimum health. There is a direct, negative impact on overall health score with increasing refined food consumption.

- People who avoid refined foods are more than twice as likely (125%) to be in optimum health than high refined food users.
- Highly refined food users show significantly greater (46%) propensity to report more symptoms than abstainers.
- Symptoms most correlated with increasing consumption of refined foods include:
  - Stretch marks
  - Feeling apathetic and unmotivated
  - Frequent infections
  - Difficulty losing weight

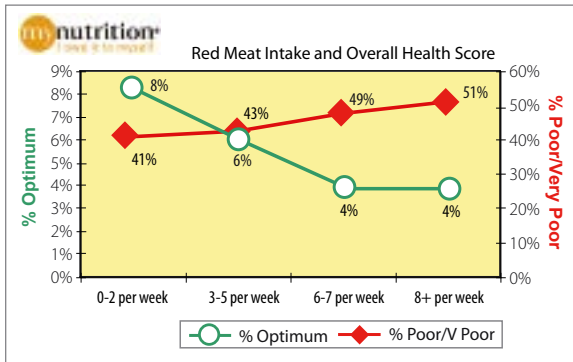


### 9.2.6 Stimulants – Tea, Coffee, Cola

- People who avoid stimulants are more than twice as likely (125%) to be in optimum health than high stimulant users.
- High stimulant users show significantly greater (53%) propensity to report more symptoms than abstainers.
- Symptoms most correlated with increasing consumption of tea, coffee and cola include:
  - Menopausal symptoms
  - Loss of energy
  - Reduced libido, loss of sex drive
  - Joint stiffness

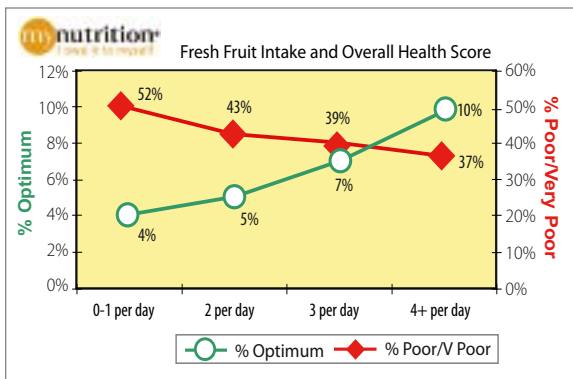


### 9.2.7 Red meat



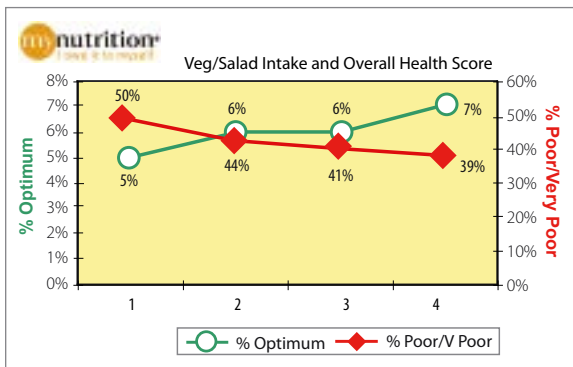
- High consumers of red meat show significantly greater (24%) propensity to report more symptoms than low consumers of red meat.
- Low red meat eaters are 50% more likely to have optimum health scores than high red meat eaters.
- Symptoms most correlated with increasing consumption of red meat include:
  - Menopausal symptoms
  - Reduced libido/loss of sex drive
  - Fertility problems
  - Gaining weight

### 9.2.8 Fresh fruit



- People who eat 5 or more pieces of fruit daily are two and a half times more likely to have optimum health than those who do not eat fruit.
- People who do not eat fruit are 40% more likely to report more symptoms than those who eat 5 or more pieces of fruit daily.

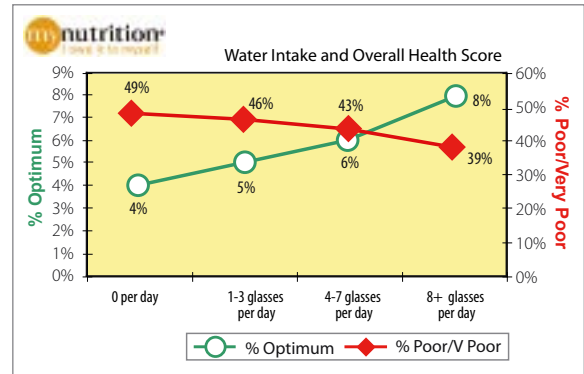
### 9.2.9 Fresh vegetables



- People who eat 5 or more servings of vegetables daily are 40% more likely to have optimum health than those who do not eat vegetables.
- People who do not eat vegetables are 28% more likely to report more symptoms than those who eat 5 or more servings of vegetables daily.

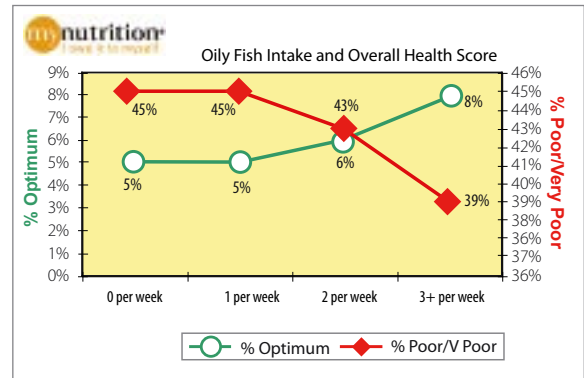
### 9.2.10 Water

- People who drink 8 or more glasses of water daily are 100% more likely to have optimum health than those who do not drink water.
- People who do not drink water are 26% more likely to report more symptoms than those who drink 8 or more glasses of water daily.



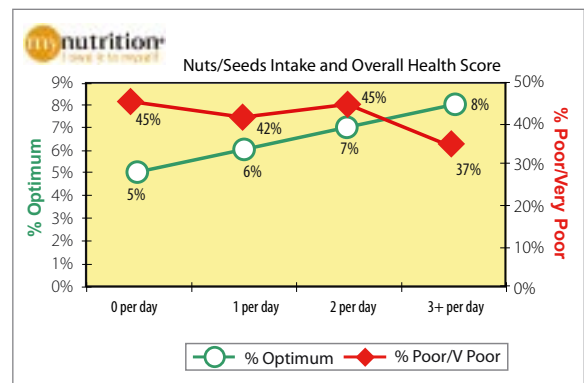
### 9.2.11 Oily fish

- People who eat oily fish 3 or more times per week are 60% more likely to have optimum health than those who do not eat oily fish.
- People who do not eat oily fish are 15% more likely to report more symptoms than those who eat 3 or more servings of oily fish per week.



### 9.2.12 Fresh, raw nuts and seeds

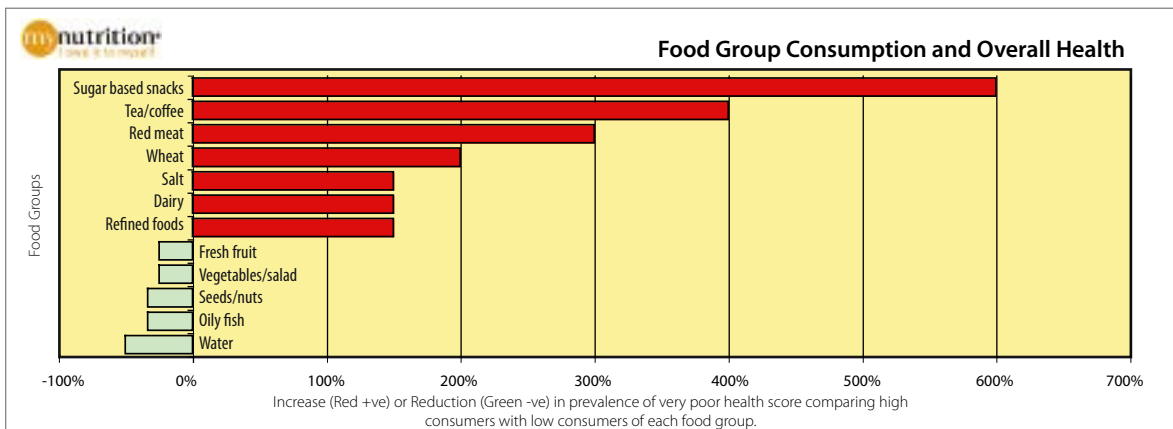
- People who eat nuts and seeds 3 or more times per day are 60% more likely to have optimum health than those who do not eat nuts and seeds.
- People who do not eat nuts and seeds are 22% more likely to report more symptoms than those who eat 3 or more servings of nuts and seeds daily.



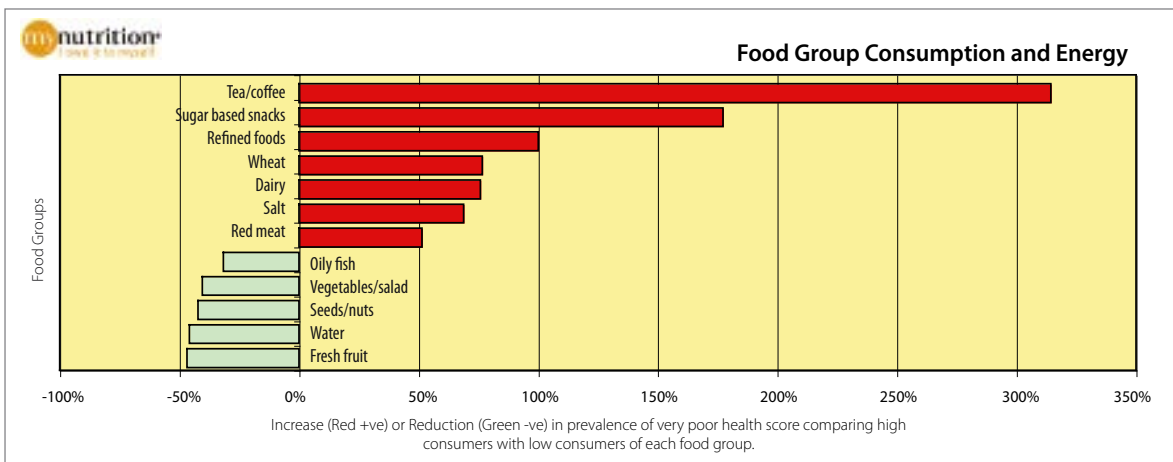
### 9.3 Effect of Food Groups on Key Health Factors

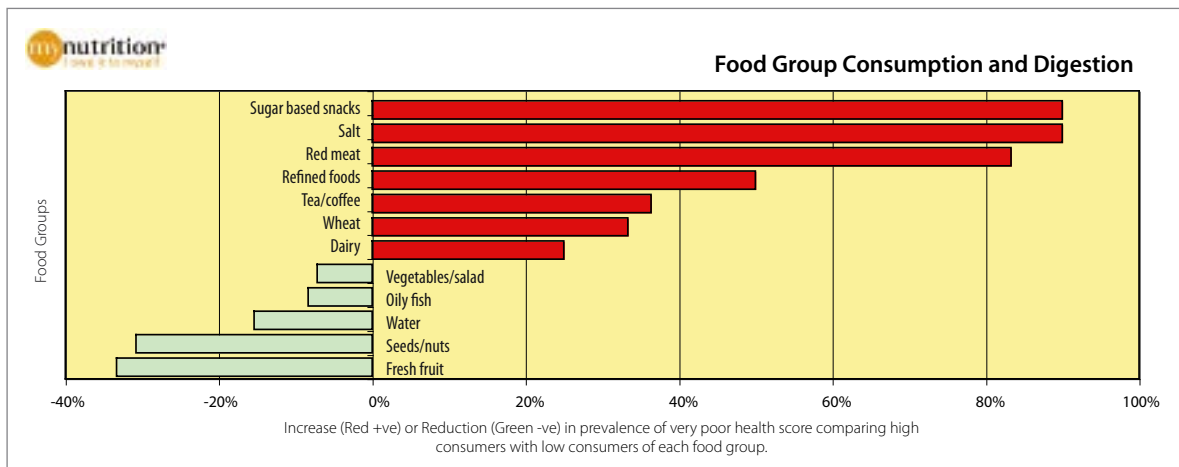
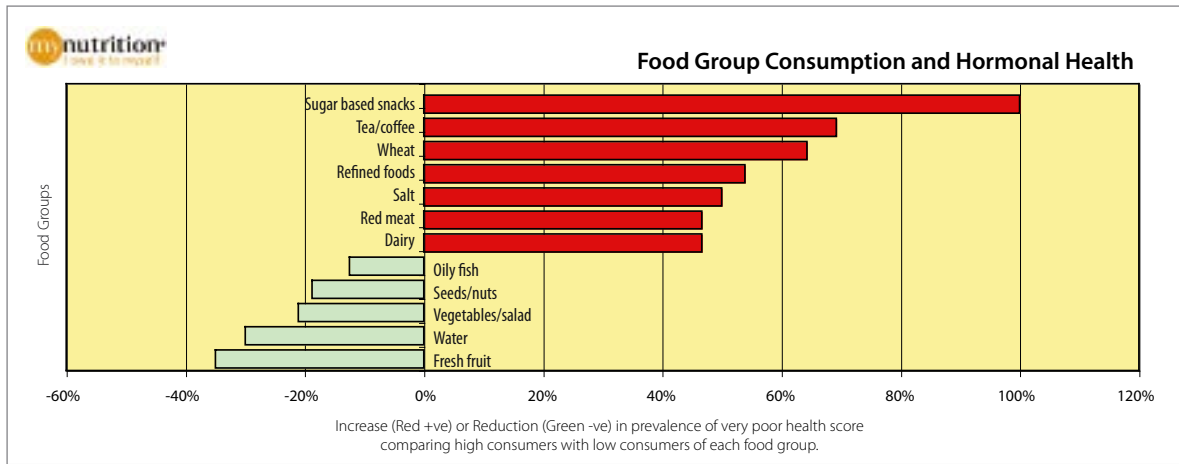
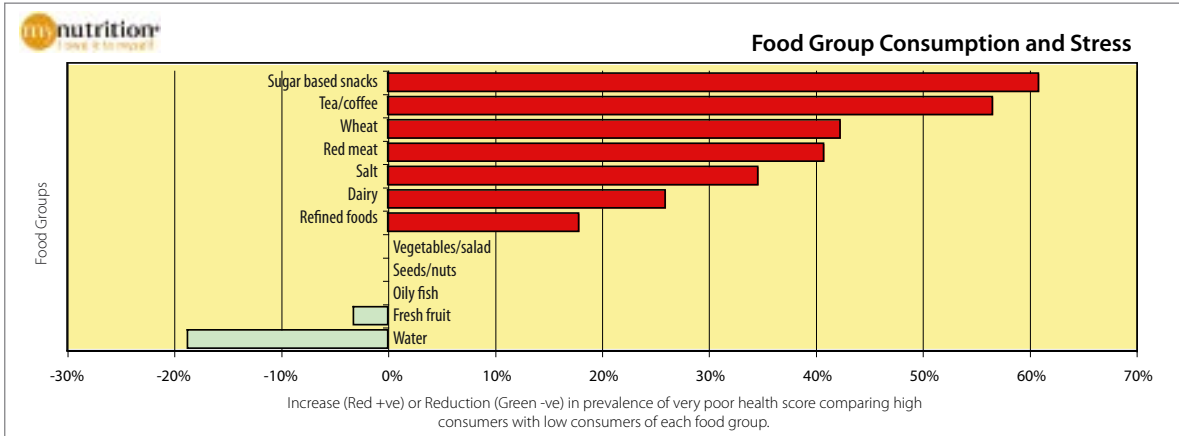
Having identified the effect of food groups on overall health score a further analysis was undertaken to identify the relative effect of food group consumption on key health factors.

In the following graphs a comparison of the prevalence of very poor health scores between high consumers and low consumers of each food group gives a relative impact of increased consumption of each food on the likelihood of a very poor health score. The percentages indicate the chances of a high or low consumer having a very poor health rating. For example, in the chart below on Overall Health, a high consumer of sugar-based snacks is six times more likely to have a 'very poor' health rating.

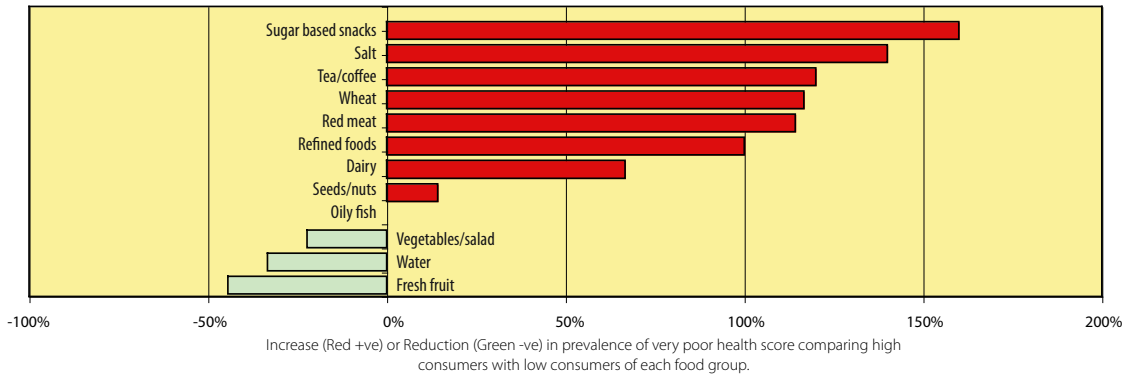


High consumers of sugar based snacks are 6 times more likely to have a very poor overall health score than people who avoid sugary snacks.

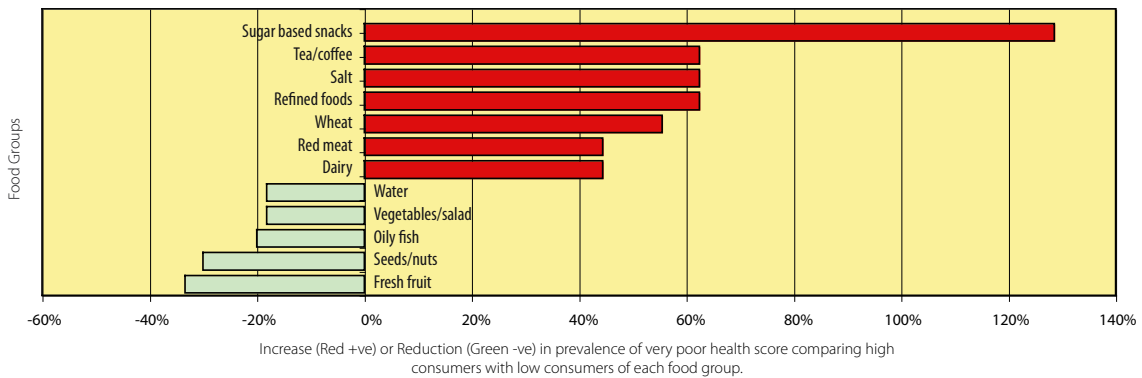




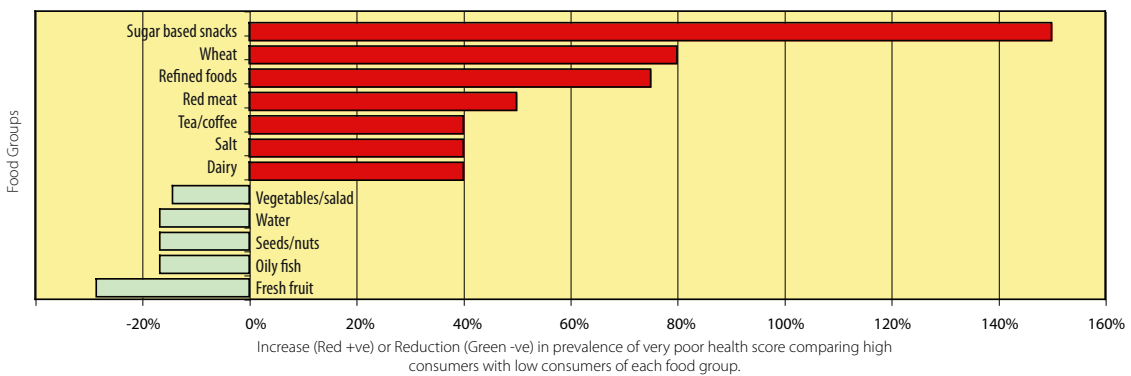
### Food Group Consumption and Detoxification



### Food Group Consumption and Immunity



### Food Group Consumption and Skin



## 10 DISCUSSION

The results from this survey have reinforced the current recommendations set by the Government. The very large sample size provides strong association between health and diet. One of the limitations of this survey is that the self-selected sample base is skewed towards a more affluent, health conscious and health aware section of society. On the one hand, this might suggest that these results in terms of general health profile, could be expected to be better than that of the general public. On the other hand, it could be argued that such people are more aware of minor health symptoms and therefore exaggerate findings of sub-optimal health. Further investigation into a randomly selected sample base would provide clarification, however the size of the sample, and the high level of statistical significance of the findings does provide sufficient data to conclude that such health related symptoms are both widespread, and associated with intakes of different foods.

Association, however, does not prove cause. It could be argued that lifestyle factors, not diet, could explain the results. For example, that older people could have worse health and, eat more wheat, invalidating the association of wheat consumption to health. To test for the possibility that these results were biased by lifestyle factors, we ran cross tabulations for age (over or under 40), sex (male/female), alcohol consumption, smoking and exercise. The data shows similar patterns and correlations across these groups and is consistent with the overall findings for the group in total. We did not investigate potential bias for all lifestyle factors across all reported symptoms and key health factors. This is a matter for ongoing investigation and analysis and it will, undoubtedly deliver more detailed findings about the relative impact of foods on groups with different lifestyles.

The pilot intervention studies, although small in size, and therefore considerably less robust in terms of statistical significance, further confirmed the hypothesis that a person's nutrition has a direct effect on their perceived pattern of health-related symptoms. Further intervention studies, larger in size and more robust in design, need to be carried out to substantiate the level of impact changes in nutrition can have on perceived health.

A valid criticism of this survey is that no objective (other than BMI, which will be reported on in the ONUK Weight Survey in 2005) or independently measured health criteria were included. The survey is therefore based exclusively on subjective data. While this inevitably introduces a level of inaccuracy, especially in relation to assessments of dietary intake, the survey's validity as a detailed analysis of self-reported health status is robust. This factor could be further mitigated by the inclusion of seven day diet diaries in addition to the frequency questions, as well as objective health measures, such as blood pressure, cholesterol and homocysteine, in future surveys.

Respecting the weaknesses and limitations of this survey, we conclude that the reported associations between nutrition and health remain robust, given the sample size and level of statistical significance, and warrant further investigation into the impact of nutrition on health and into validating effective methods for facilitating improvements in the both the nation's nutrition and nutrition education.

## 11 Appendices

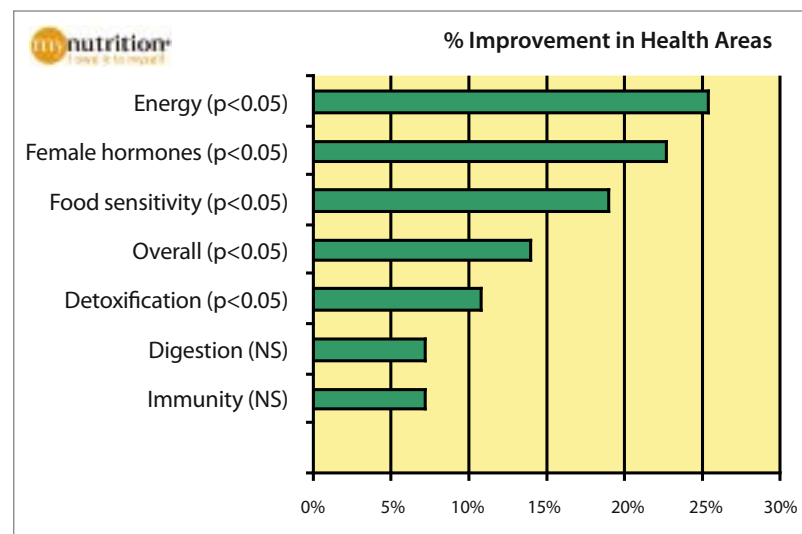
### 11.1 Cohort Intervention Study 1 – 100% Health Workshop Attendees

#### 11.1.1 Background & Design

This pilot study aimed to test the effects of a two day workshop on changing diet and health ratings. The participants were 29 people who first completed the MyNutrition questionnaire, then attended a 2 day '100% Health' workshop during which they were advised to make positive changes to their diet and lifestyle, and to take supplements based on their MyNutrition assessment. Three months from the date of the workshop they were re-assessed using the MyNutrition questionnaire.

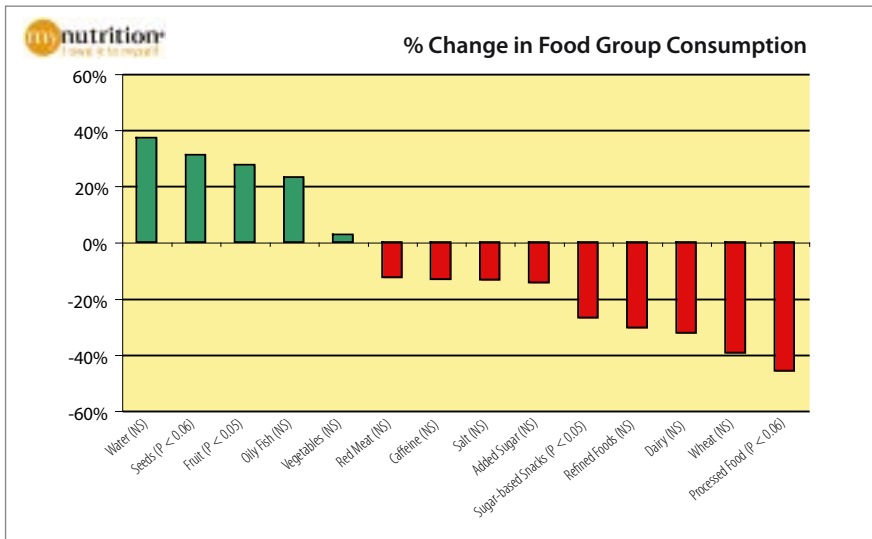
#### 11.1.2 Change in Health Ratings

By comparing 'before' and 'after' Overall Health scores and Key Health Factor scores the group showed a significant 14% improvement in Overall Health score and a consistent pattern of improvement in Key Health Factor scores, ranging from a significant 25% improvement in energy, 23% improvement in hormonal health (women only), 11% improvement in detoxification, down to a non-significant 7% improvement in both digestion and immunity.



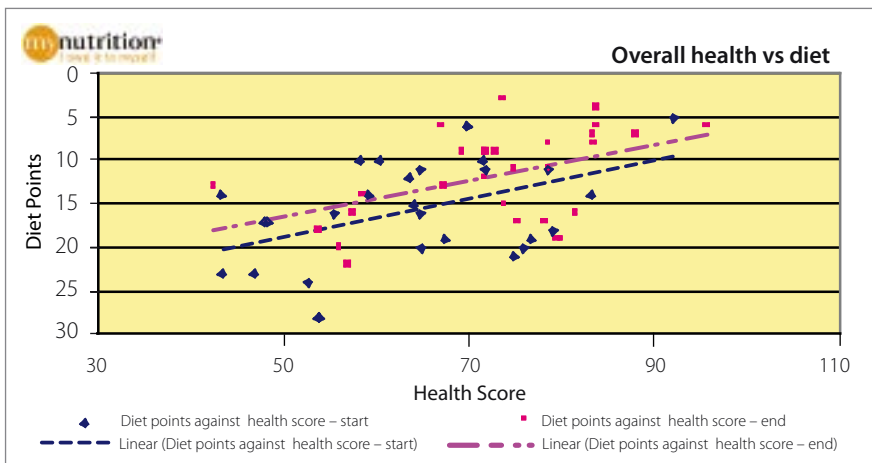
#### 11.1.3 Changes in Diet Ratings

A total diet score 'before' and 'after' was calculated by analysing reductions in frequency of consumption in 'negative' food factors, as defined by the main survey (sugar, refined foods, caffeinated drinks, alcohol, salt, meat, dairy and wheat products) and increase in frequency of consumption in 'positive' food factors (fruits, vegetables, water, oily fish, nuts and seeds). Overall there was an 33% reduction (statistically significant,  $P<0.05$ ) in total diet score. There was consistent pattern across all the food groups of dietary improvement, ranging from a 46% reduced consumption of processed foods, to an 37% increased consumption of water. However, not all changes reached statistical significance. The overall pattern of results indicates that this intervention was successful at effecting considerable improvements in the diets of participants.

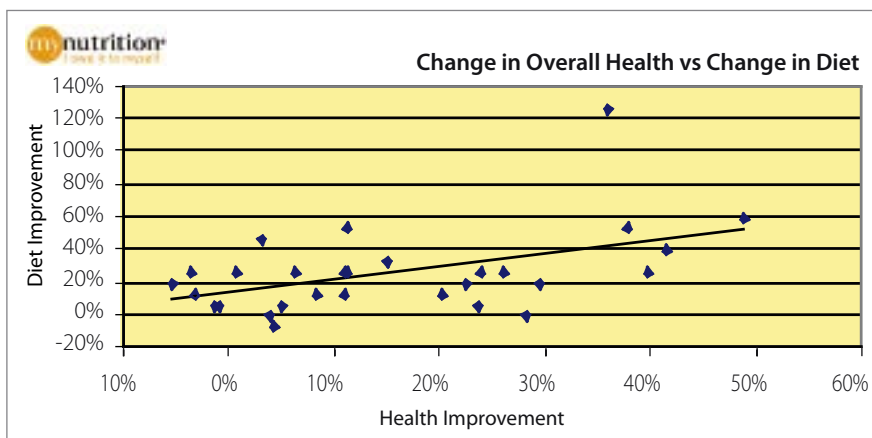


### 11.1.4 Comparison of Health in Relation to Diet

A comparison of Overall Health score with Overall Diet Score in the first completed MyNutrition questionnaire, prior to the workshop, shows a correlation between increasing health score with decreasing diet score, implying that the better a person's diet the better their health. The same significant trend was seen in the second questionnaire.



Given the variability in participants' level of change in diet, a comparison of the change in Overall Health score in relation to the change in diet was made. Once again, there was a correlation between the degree of improvement in Overall Health score with the degree of improvement in Overall Diet score, further strengthening the association between diet and health.



### 11.1.5 Individual Results

To further investigate the degree of improvement in Overall Health and specific Key Health Factors an examination of each participant's health improvement was compared with their subjective rating of compliance with their intended dietary regime and supplement programme, generated during the weekend workshop. The chart below lists participants in order of compliance score, starting with those who made the most positive changes to their nutrition.

In the chart below the % change for each Key Health Factor is shown within a coloured box, with dark green boxes indicating the most change (25% of more improvement) and dark red boxes indicating the most pronounced worsening of health scores.

Self-assessed compliance was rated on a three point scale, ranging from '0' being no compliance, to 2 indicating significant compliance.

Compliance		Health Factor Result							
Diet	Supps	Overall	Digestion	Energy	Detox	Immune	Food sensitivity	Hormones	BMI
2	2	22%	20%	35%	16%	21%	27%	17%	0%
2	2	38%	31%	71%	32%	6%	36%	82%	9%
2	2	6%	5%	11%	2%	3%	9%	8%	6%
2	2	8%	15%	-4%	6%	5%	23%	3%	-6%
2	2	41%	42%	72%	30%	16%	58%	67%	-2%
2	2	36%	83%	69%	28%	8%	39%		8%
2	2	26%	16%	6%	29%	31%	25%	47%	8%
2	2	24%	20%	27%	39%	11%	38%	11%	2%
2	2	28%	19%	25%	7%	13%	38%	101%	4%
1	2	29%	45%	28%	21%	19%	53%	21%	5%
1	2	4%	0%	10%	2%	3%	5%		3%
1	2	15%	7%	36%	8%	15%	15%	16%	3%
1	2	40%	9%	100%	39%	10%	50%	94%	4%
1	2	5%	-11%	24%	1%	0%	9%	9%	0%
1	2	-1%	-14%	23%	9%	-22%	4%	-7%	0%
1	2	20%	4%	28%	25%	6%	31%		4%
1	2	49%	55%	85%	16%	28%	59%	117%	-1%
1	2	11%	-1%	41%	5%	9%	12%	6%	1%
1	2	11%	-4%	26%	7%	1%	19%	20%	0%
1	1	11%	-4%	26%	7%	1%	19%	20%	0%
1	1	-3%	4%	-5%	-2%	-15%	-5%	8%	-4%
2	0	3%	4%	-29%	12%	1%	8%	-9%	-1%
0	2	24%	20%	15%	25%	9%	41%	32%	0%
0	1	-1%	-41%	11%	8%	5%	0%	3%	7%
NA	NA	4%	6%	-4%	-4%	3%	1%	38%	0%
NA	NA	-5%	-59%	-5%	7%	-15%	-7%	-60%	-3%
NA	NA	-4%	-12%	-10%	-1%	21%	-10%	-7%	-9%
NA	NA	1%	-1%	-14%	4%	-2%	4%	7%	1%
NA	NA	11%	-6%	64%	-1%	25%	-2%	9%	7%

**Key - Compliance**

0	Not at all
1	Partial
2	Significant

**Key - Health Factor Results**

	>25% worse
	1-25% worse
	no change
	1-25% improvement
	>25% improvement

*N/A - No compliance rating were forthcoming on follow up from these patients*

While the average change in Overall Health score was 14%, a third of participants reported a 24% or greater improvement in Overall Health scores, while more than half (59%) reported more than a 10% improvement in health. Overall, 24 out of 29 reported improvement in health, compared to five reporting a worsening of health scores. All of these five reported minor reductions in Overall Health score of 5% or less. There was a clear trend of improving health scores with improving compliance.

The average reduction in BMI was 1.6%, both for the group as a whole, and 2.4% for those defined as overweight, with an initial BMI of 25 or more. There was a trend towards greater weight loss with greater compliance. (The effects of nutrition interventions on weight loss are investigated in detail in the ONUK Survey on Nutrition and Weight Control, to be published in 2005.)

### 11.1.6 Summary

This small intervention trial shows a consistent pattern of an association between health ratings and diet status, consistent with the ONUK survey's findings of a strong association between diet and wellbeing. The consistent pattern of improvement in health with improvement in diet indicates the effectiveness of strategies designed to change people's nutrition habits. This particular intervention, a two day workshop, has proven highly effective at producing a significant improvement in both nutrition and health. However, the sample was small, self-selected and hence motivated. To what extent these results would be achieved in a broader sample of the population is worthy of further investigation.

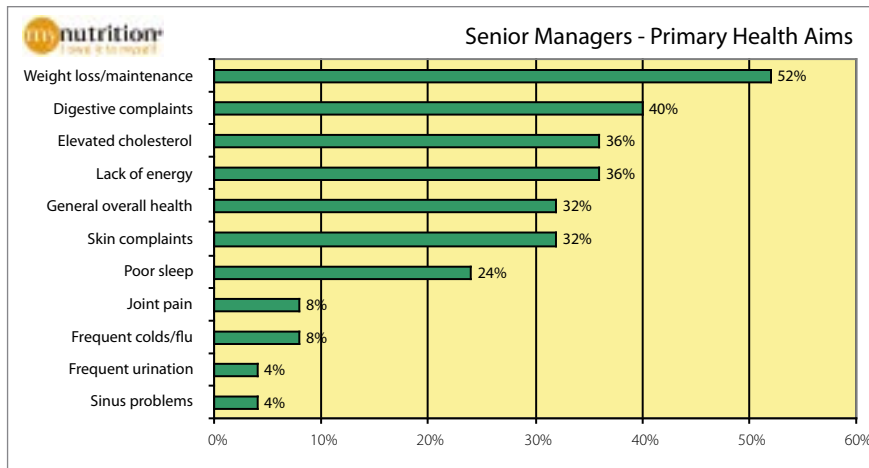
## 11.2 Cohort Intervention Study 2 – Senior Managers

### 11.2.1 Background & Research Design

A cohort of 25 directors and senior managers in a major global corporation were tracked over six months. Their jobs were high stress and in most cases, demanded frequent short and long haul travel. Each participant completed the MyNutrition questionnaire and had individual consultations with a MyNutrition nutritional therapist qualified at ION. Based on the results of blood tests and questionnaire analyses, they were each given personalised diet and supplement programmes to follow, as well as personal instruction in the company gym to encourage more exercise. They were followed up at three monthly intervals for six months.

### 11.2.2 Key Health Issues

Each participant was encouraged to have 3-5 clear health aims. Self directed aims and objectives as listed by participants are shown in this chart.



### 11.2.3 Individual Results

At the 6 month review results were logged based on qualitative self-assessed scores of change for each Key Health Factor on a 5 point scale shown below. This did not involve the MyNutrition questionnaire.

-2	Significantly worse
-1	Moderately worse
0	No change
1	Moderate improvement
2	Significant improvement

Weight and cholesterol were measured using scales and blood tests with a 5 point scale for improvement.

-2	10%+ worse
-1	1-9% worse
0	No change
1	1-9% improvement
2	10%+ improvement

Self-assessed compliance was rated on a three point scale, ranging from '0' being no compliance, to 2 indicating significant compliance in relation to their recommended dietary changes and nutritional supplement programme.

-2	Not at all
-1	Partial
0	Significant

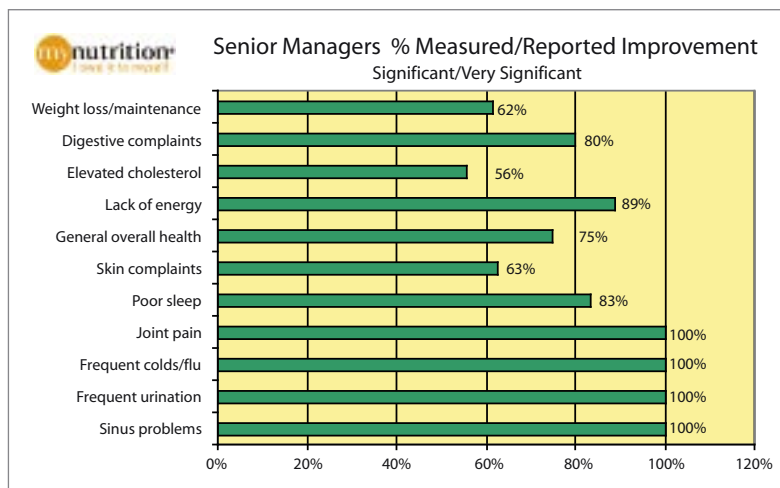
The following grid summarises the results by case. The coloured boxes represent the key health factors that were relevant for each individual.

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Please refer to page 34 for the key index.

Compliance		Main Aim Result										
Diet	Supps	Weight	Chol	Energy	Dig	Sleep	Skin	Health	C/Flu	Joints	Sinus	Urine
2	2	2										
2	2		2	2	1			1				
2	2				2		1		2	2		
2	2	1		1							1	
2	2	2	1	2								
2	2	2		1		0	1		2			
2	2			1	0	1						
2	2		2		2		0					2
2	2		2		2		0					
2	2	1	-1				2	2		1		
1	2	2										
1	2	1	2		2	2		1				
1	2	0	1	2	1		1					
1	2	0				1	0	-1				
1	2	0						1				
1	1			2								
1	1			0		1		2				
1	1			1								
1	1	2	-1		1		1	-1				
1	0		-2					1				
0	2	0			0							
2	0	-1	-1		2	2						

The overall trend indicates consistent health improvement, which was most marked in those who complied with both diet and supplement recommendations. The percentage of participants reporting (or measured) to have a moderate or significant improvement in the key health factors that were relevant to them are shown below.



It should be noted that this chart is based on very small samples. The 100% indicators represent just one or two individuals. The overall sample size was too small to warrant detailed statistical analyses. This makes the data anecdotal rather than representative. Nonetheless it indicates that this intervention had a perceived positive effect on the participant's health, cholesterol level and weight.

## Summary

This pilot intervention study shows a consistent pattern of improvement in health, weight and cholesterol, with improvement in nutrition; it indicates the potential effectiveness of strategies designed to change people's nutrition habits. This particular intervention, which involved individual consultation with a nutritional therapist to a small group of senior managers, has proven effective at producing both a marked improvement health. However, the sample was small. To what extent these results would be achieved in a broader sample of the working population is worthy of further investigation.

### 11.3 The MyNutrition.co.uk on-line questionnaire

#### Question

Do you suffer from headaches or migraine?

Do you get a furry tongue and/or a bitter taste in your mouth?

Do you have itchy ears, earache, ear infections, drainage from the ears or ringing in the ears?

Do you suffer from excessive mucus, a stuffy nose or sinus problems?

Does your tongue get sore?

Do you get mouth ulcers?

Do you get cracked lips?

Do you suffer from bad breath?

Do you get nosebleeds?

Do your gums bleed?

Do you have a poor sense of taste or smell?

Have you ever had acne?

Do you get skin rashes or hives?

Do you sweat a lot and have a strong body odour?

When you cut yourself does it heal slowly?

Do you get tiny red pimples on your arms or legs?

Do you bruise easily?

Have you had eczema or dermatitis?

Do you suffer from dry skin?

Have you developed stretch marks in the last two years?

Do your nails split easily?

Do you have white marks on more than two fingernails?

Do you get 'prickly' legs?

Do you suffer from greasy skin?

Do you have vertical ridges on your nails?

Is your hair greying prematurely?

Do you have dry hair or dandruff?

Is your hair dull or oily?

Have you lost or are you losing hair?

Do you have watery or itchy eyes?

Are your eyes red, swollen or do you have sticky eyelids?

Do you get dark circles or bags under your eyes?

Do you have poor night vision?

Do you ever have eye pains?

Do you get bloodshot, burning or gritty eyes?

Are you sensitive to bright lights?

Do you get muscle aches or pains?

Have you experienced broken bones?

Do you get joint pains e.g sore knees or wrists?

Do you experience joint stiffness?

Do you get backache?

Do you get burning feet or tender heels?

Do you have muscle weakness?

Do your muscles get sore or tender?

Do you get muscle twitches?

Do you get muscle cramps?

Do you take exercise that noticeably raises your heartbeat for at least 20 minutes more than three times a week?

Does your job involve vigorous activity?

Do you regularly play a sport? (football, tennis etc)

Are you in serious training for a sport or athletic event?

Do you spend more than four hours a day near a busy city or road?

Do you spend more than an hour a day in heavy traffic?

Do you live or work in a smoky atmosphere?

Do you generally eat organic produce?

Do you spend a considerable amount of time in front of a TV or VDU?

Do you usually drink unfiltered tap water?

Do you exercise (job, cycle, play sports) by busy roads?

Do you have a low energy level?

Is your energy less now than it used to be?

Do you need more than 8 hours sleep a night?

When you wake up in the morning do you feel alert and refreshed ?

Do you need something to get you going in the morning e.g. tea, coffee or cigarette?

Do you crave tea, coffee, cola/sodas at regular intervals during the day?

Do you have sweet foods or cigarettes regularly during the day?

If you haven't eaten for 6 hours do you get headaches, dizzy or irritable?

Do you get excessively thirsty?

Do you get stomach pains?

Do you have loose stools or get diarrhoea?

Do you strain when having a bowel movement?

Do you feel nauseous?

Do you suffer from indigestion or heartburn?

Do you suffer from flatulence?

Do you experience abdominal bloating?

Do you have at least one bowel movement per day?

Have you suffered from food poisoning or gastric infection in the last five years?

Did you experience any of your symptoms following foreign travel?

- Do you remember your dreams?
- Would you describe yourself as generally nervous or hyperactive?
- Do you suffer from mood swings ?
- Do you suffer from depression?
- Do you suffer from anxiety?
- Do you get irritable easily?
- Do you generally feel apathetic and unmotivated?
- Have you had a drop in your motivation or drive?
- Do you have difficulty concentrating or easily become confused?
- Do you have a poor memory or difficulty learning?
- Is your pulse after 15 minutes rest above 75 beats per minute?
- Have you experienced varicose veins?
- Do you have high blood pressure?
- Do you have high blood lipids (cholesterol or triglycerides)?
- Do you have an irregular or rapid heartbeat?
- Do you experience shortness of breath when sitting or resting?
- Is there a history of heart disease or diabetes in your family?
- Do you have more than two infections (e.g. colds, flu, ear, throat or chest) in a year?
- Do you find it hard to shift an infection (cold or otherwise)?
- Have you taken antibiotics in the last two years?
- Are you prone to cystitis?
- Have you had an inflammatory disease such as eczema, asthma or arthritis?
- Do you suffer from allergy problems (e.g. hayfever, food allergy, eczema)?
- Is there a history of cancer in your family?
- Do you find it hard to lose weight (or gain weight if underweight)?
- Are you gaining weight?
- Have you had problems affecting your reproductive organs (prostate or testes)?
- Do you suffer from reduced libido or loss of interest in sex?
- Do you suffer from impotence?
- Do you have difficulty maintaining an erection?
- Have you used the contraceptive pill?
- Do you experience cyclical water retention?
- Do you crave particular foods premenstrually (e.g. chocolate)?
- Have you had problems affecting your reproductive organs (ovaries/womb)?
- Do you have fertility problems, difficulty conceiving or a history of miscarriage?
- Do you suffer from breast tenderness?
- Do you experience menstrual cramps ?
- Have you suffered from PMS/PMT?
- Are your periods often irregular or heavy?
- Do you suffer from reduced libido or loss of interest in sex?
- Are you prone to thrush?
- Do you have menopausal symptoms?
- Do you feel guilty when relaxing?
- Do you get anxious or tense easily?
- Do you have a strong need for recognition or achievement?
- Are you unclear about your goals in life?
- Are you especially competitive?
- Do you work harder than most people?
- Do you easily become angry?
- Do you feel you have too much to do?
- Do you become impatient if people or things hold you up?
- Do you have difficulty sleeping or sleep restlessly?
- Do you get tension headaches or migraines?
- Have you had a major personal loss in the last year?
- How many times a day do you eat dairy produce (e.g. milk, cheese, butter or yoghurt)?
- How many times a day do you eat wheat products (e.g. bread, rolls, pasta or cereal)?
- How many times a day do you add salt to food or eat food salted in processing/cooking?
- How many sugar based snacks (Choc bars, cakes, candies) do you eat each day?
- How many times a day do you eat white rice, bread, flour or other refined foods?
- How many cups of tea, coffee and cola do you consume each day in total?
- How many times a week do you eat in restaurants or consume pre-processed meals
- How many alcoholic drinks or units of alcohol do you have a week?
- How many teaspoons (or equivalent) of sugar do you add to food or drinks each day?
- How many times a week do you eat red meat (e.g. Beef, pork, lamb)?
- How many pieces of fresh fruit do you have a day?
- How many servings of fresh (raw or lightly cooked) vegetables/salad do you have a day?
- How many glasses/cups of pure, fresh water do you drink a day?
- How many times a week do you eat fresh oily fish (e.g. Salmon, mackerel, sardines, herring)?
- How many times a day do you eat fresh, raw nuts and or seeds (not roasted/salted!)?
- Do you smoke cigarettes & if so how many?



### INSTITUTE FOR OPTIMUM NUTRITION

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**MyNutrition t:** 01372 470 730 **e:** drew@mynutrition.co.uk **w:** www.MyNutrition.co.uk,

**PATRICK HOLFORD** is founder of the Institute for Optimum Nutrition, director of the Brain Bio Centre and author of over 20 books on nutrition and health, including the international best-seller, the Optimum Nutrition Bible. A psychologist and nutritionist by training, Patrick Holford is widely regarded as Britain's leading spokesman for optimum nutrition. He contributes regularly to scientific and media debates on new aspects of nutrition and its impacts on health.

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