ALL ABOUT YOU AT AGE 20
ACKNOWLEDGEMENTS

We acknowledge the huge and wonderful contribution that Raine Study participants and their families have made to the Raine Study over the past 23 years, and especially to everyone who took part in the 20 year follow up.

We acknowledge the Raine Study Representative Group who have helped shape and develop the Raine Study.

We acknowledge the Raine Study Team and all the Raine Study researchers.

We acknowledge the National Heart Foundation and BeyondBlue Special Research Initiative for funding this booklet.

Suggested Citation
MESSAGE FROM PROFESSOR FIONA STANLEY

To all the Raine Study participants, a very big and heartfelt thank you for continuing to be part of the Raine Study and especially to everyone who participated in the 20 year Raine Study follow up.

This booklet is an overview of some of the tests and questionnaires you completed at the 20 year follow up, and again thank you for your effort and time in coming to the Lions Eye Institute and making a major contribution to one of the world’s leading research projects.

One of my highlights was the celebration of your 21st birthdays and 21 years of research at Government House in November 2011. It was wonderful to meet you and your families and to reflect on what the study has achieved. Again a big thank you for the extraordinary dedication and commitment from you all.

For me, the year has been eventful in other ways, particularly with my decision to retire as Director of the Telethon Institute for Child Health Research. However, having watched the Raine Study “kids” grow from babies into adults, and some into parents themselves — I will continue to follow with great interest and some pride the achievements of the Raine Study. The Institute’s new Director Jonathan Carapetis is a huge fan of the study and certainly values your ongoing contribution.

May I take this opportunity to commend you for your commitment to this amazing study and wish you success and happiness in your futures.

Warm wishes

Professor Fiona Stanley AC
Patron, Telethon Institute for Child Health Research

MESSAGE FROM THE RAINE STUDY DIRECTORS

Western Australia is not just a resource rich state in terms of minerals and energy, it also has The Raine Study - a truly unique West Australian Resource!

The value of information collected is well recognized by the international health and medical community. For example, over the past three years findings from the Raine Study have been published in over 150 international scientific and medical journals, many of which are the top international journals in their field. These studies have presented new discoveries and have resulted in changes in medical practice, provided normal ranges for fundamental measures such as height, weight and blood pressure and are beginning to reveal potential risk factors for many common human diseases.

On behalf of the Raine Executive, the Raine management team and the Raine research assistants we would like to thank each of the participants and their parents for their generous support of the study and its goals over the past 23 years.

We look forward to seeing each of you at the 23 year follow up which focuses on sleep, asthma and work.

Peter Eastwood (Current Scientific Director)
Leon Straker (Current Associate Director)
Craig Pennell (Immediate Past Scientific Director)
We are currently doing the 23 year follow up of the Raine Study focussing on sleep, asthma and work/study. We spend a third of our lives asleep and sleep affects every part of life, many people suffer from asthma and now is the time you are entering the workforce!

Please contact the Raine Study to participate.

9489 7794, 9489 7759
Mobile (text) 0447 863944
Email: raine@ichr.uwa.edu
www.facebook.com/rainestudy
A major focus of the 23 year follow up is sleep. Almost nothing is known about the characteristics of sleep in young adults (what is normal sleep?) or the presence of sleep disorders (is sleep apnea or snoring very common?). Most studies on sleep have focused on children and middle-aged and elderly adults. As well as providing new information on the sleep biology of young adults, the 23 year Raine follow up study will also represent the start, at a critical age between childhood and adulthood, of the first Australian “longitudinal sleep cohort”. The best way to comprehensively measure sleep is by a laboratory-based overnight sleep study. To do this UWA has recently built the Centre for Sleep Science, a new 5-bed sleep research and teaching facility located on its main campus. Thank you to those of you who have already stayed overnight – I hope that you learned something new about your own sleep patterns. I look forward to seeing many more of you at the Sleep Centre in the coming months.

Winthrop Professor Peter Eastwood
Professor of Sleep & Respiratory Physiology
Sleep Team Leader

It is believed that across the Western World sperm counts are decreasing, although the cause of this is unknown. There is some evidence that smoking, obesity and factors in environment may be partly responsible for this. Research up to now has been on very small numbers of men who have generally been seeking fertility treatment. The Raine Fertility Study is a world first, with a large number of healthy young adult men participating. We are very grateful to those guys who took part in the study. Over 400 guys participated which is an amazing 60% of those who did the 20 year follow up. Those who had the best sperm samples generally had a healthy lifestyle and had not been exposed to cigarette smoke. We will be doing further analysis to see what factors affect fertility in young men. Again a big thank you to everyone that took part.

Professor Roger Hart
Professor of Reproductive Medicine
Reproductive Health Team Leader

Asthma affects approximately 10% of Australians so nearly all of us will know someone who has asthma. For most people their asthma can be well controlled and it has a minimal impact on their lives. However, for some asthma is a big problem with many visits to doctors and hospitals. In 2010 (the latest figures) 416 people in Australia died from their asthma. For information on asthma – www.astmhawa.org.au.

Raine study participants have played a major role in improving our understanding of asthma in children and adolescents. The follow ups at 6 and 14 years had a big asthma focus. While many children grow out of their asthma, a significant number continue to have asthma as adults. Asthma is again the focus for the 23 year follow up and we hope to learn more about factors that contribute to the persistence of asthma throughout childhood and into early adult life as well as to try to understand why some young adults develop asthma. Thank you to all who have already done the 23 year asthma testing and also to those still to take part.

Professor Graham Hall
Head, Paediatric Respiratory Physiology
Project leader – 23 year asthma research study
RAINE STUDY SCIENTIFIC RESEARCH

Over the years research using the Raine Study has led to many new discoveries across many areas. The data collected from everyone in the Raine Study over the past 23 years is used all the time. Information has been collected ‘prospectively’ which means it was completed at the time and people are not trying to remember back to what happened years before. This makes the Raine Study extremely valuable, especially as the participants become older.

The Raine Study is the largest study that has measured lung function and bronchial responsiveness in preschool children. Measurements from Raine Study participants are used as the normal ranges that doctors now use when they measure height, weight and blood pressure in young children and teenagers, as well as measurements for blood tests including blood glucose, lipid levels and inflammatory markers. Raine Study genome wide association study data (genetic data) has contributed to the identification of new genetic loci, which is the location of a gene or DNA sequence on a chromosome, associated with a trait, e.g. short sightedness. Research using the Raine cohort has contributed to developments in research methodology. The Raine Study has confirmed many suspected risk factors, and identified new associations for health and disease.

These research results are published in scientific journals. Publishing journal articles allows the scientific and medical world to use the findings of Raine Study researchers to prevent and treat illness and disease. Raine Study publications can be found on the Raine Study Website http://www.rainestudy.org.au/research/resource/publications. You can also Google Raine Study Publications. There have been over 150 publications in the last three years.

SOME RECENT PUBLICATIONS

This paper is in the Medical Journal of Australia gives a clear history and overview of findings of the Raine Study over the past 20 years.

This paper showed that teenagers with eating disorders had different ways of thinking and thought processing. However it is not known whether this difference was there before an eating disorder developed or was as a result of having an eating disorder.

This research found that from early on in life various parental factors had a strong influence on a child’s body weight, from birth to adolescence.

This research found that the intake of B-Vitamins was associated with different types of moods and behaviours.

This research shows that at 17 years of age, generally boys have higher blood pressure than girls. Factors that affected higher blood pressure were body weight, high salt content in your diet, oral contraceptives (in girls) and high alcohol intake (in boys).

This research showed that lower back pain is a big problem in 17 year old teenagers and affects their daily lives. (Most people assume that back pain is an adult problem).

Young children who exhibited more externalizing behaviours (outgoing, aggressive type behaviour) were more likely to smoke at 17 year of age. Mothers smoking during pregnancy also increases the likelihood of a teenager smoking.
WHAT WERE YOU DOING AT THE TIME OF THE 20 YEAR FOLLOW UP?

7% of Raine Study participants had completed their University course and 21% had completed a course at TAFE, college or another educational institute. 27% of all participants were working full time.

<table>
<thead>
<tr>
<th>GUYS</th>
<th>GIRLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live With: Parents</td>
<td>76%</td>
</tr>
<tr>
<td>Partner</td>
<td>7%</td>
</tr>
<tr>
<td>Friends / flatmates</td>
<td>9%</td>
</tr>
<tr>
<td>Studying full time</td>
<td>41%</td>
</tr>
<tr>
<td>Working part time while studying full time</td>
<td>15%</td>
</tr>
<tr>
<td>Studying part time</td>
<td>6%</td>
</tr>
<tr>
<td>Working part time while studying part time</td>
<td>3%</td>
</tr>
<tr>
<td>Working part time not studying</td>
<td>7%</td>
</tr>
<tr>
<td>Working full time</td>
<td>27%</td>
</tr>
<tr>
<td>Apprenticeship</td>
<td>13%</td>
</tr>
<tr>
<td>Gap year</td>
<td>3%</td>
</tr>
<tr>
<td>Caring for children</td>
<td>0%</td>
</tr>
</tbody>
</table>

3% of Raine Study participants had a baby, and a further 1% were pregnant. 17% of participants were keen to have a child soon.

The role of a parent is wonderful and joyful and congratulations to everyone who has had a baby.

You can join our special parents group on the Raine Facebook page. Parenthood can also be challenging, don’t hesitate to find support if you feel you need it. Your GP or local community centre can advise you about local support groups.

The Raising Children Network (raisingchildren.net.au) and the Ngala Website (www.ngala.com.au) have good general information about parenting.
BODY WEIGHT

The Body Mass Index (BMI) is a useful estimate of the amount of body fat. If you are very athletic you may have a higher BMI due to having extra muscle. A DXA scan measures the actual amount of fat mass and lean mass (anything that is not fat or bone) – see page 7.

You can work out your BMI by the equation below. Many websites do this for you.

**BODY WEIGHT (KG)**

**HEIGHT (METERS) X HEIGHT (METERS)**

Generally your BMI score is interpreted as:

- **< 18.5** Underweight
- **18.5 > 24.9** Normal weight
- **25.0 > 29.9** Overweight
- **≥ 30.0** Obese

The majority of the Raine Study Participants (63%) were normal or healthy weight. Being a healthy weight can help you feel more energetic, look and feel healthier, feel more confident, happy, relaxed and sleep better.

For guys, your waist measurement should not be over 94 cm and for girls 80 cm. In the Raine Study, the average waist measurement for guys was 81 cm and for girls 74 cm, with 15% of guys and 31% of girls exceeding the healthy measurement.

Girls generally worried more about their weight.

<table>
<thead>
<tr>
<th></th>
<th>GUYS</th>
<th>GIRLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderately or very worried about weight</td>
<td>12%</td>
<td>38%</td>
</tr>
<tr>
<td>Consider themselves overweight</td>
<td>27%</td>
<td>47%</td>
</tr>
</tbody>
</table>

**ACHIEVING HEALTHY WEIGHT**

Factors that affect body weight include your genetic makeup, the amount of food and drink you consume (energy intake) and physical activity (energy expenditure). Energy intake should equal expenditure to maintain current weight. To lose weight, intake needs to be less than expenditure. Making healthy eating choices and increasing physical activity will result in weight loss.

However losing weight is not easy, as anyone who tries to lose weight will know. We are surrounded by large quantities of prepared food which are high in sugar and fat and easily and cheaply available. Portion sizes are larger. Our lives are hectic, we eat distractedly while doing other activities.

It is sometimes easier to lose weight with the help and assistance of others or joining a group to do this together. You can find support by consulting your GP, joining a weight loss programme or group, or joining a gym. Some helpful websites include:

- www.drawthelinewa.com.au
- www.measureup.gov.au
- www.plateofournation.com.au
- www.livelighter.com.au
- www.weightwatchers.com.au

Being overweight or obese can have a serious impact on your health. It increases your risk of developing health problems including heart disease, type 2 diabetes, high blood pressure, high cholesterol and/or joint problems. Carrying too much fat around your waist area (surrounding your internal organs) can increase your risk of health problems.
A DXA scan measures bone density (bone strength), and body composition (fat mass and lean mass). During the 20 year follow up 608 girls and 670 boys had a DXA scan.

Bone is living, growing tissue and is both strong and flexible. Throughout life, bone is constantly renewed with peak bone strength reached around the age of 20 years. Bone mass is determined by genetic factors, healthy body weight, adequate calcium intake, vitamin D status, regular exercise and a healthy lifestyle (don’t smoke or drink excessive amounts of alcohol).

Bone density at age 20

The majority of participants had good strong bones within normal ranges for 20 year olds. 16% of the guys and 2% of girls had bones that were much stronger than average!

The lean mass in your body consists of the muscles and the organs in your body, and fat mass is all the fatty tissue. Two people can have the same weight, but can have different amounts of lean mass, fat mass and bone mass. Girls typically have more fat mass than guys. The average total fat percentage of body mass for girls aged 20 is between 28% and 42% and for guys aged 20 is between 17% and 30%*. About a third of the Raine participants had a body fat percentage that was higher than these ranges.

Factors that influence your body composition

- Genetic predisposition: people have different inherited body types
- Age: Bone mass tends to reduce after teenage years and people generally develop a lower lean mass and higher fat mass after the age of 30
- Gender: women have a higher body fat percentage than men.
- Amount of activity: exercise increases muscle mass and bone mass
- Nutrition: eating too much or too little can both negatively affect body composition

RAINE EYE HEALTH STUDY

The Raine Study participants had a comprehensive eye examination at the Lions Eye Institute, including over 12 different eye tests, which determined the health of each section of the eye.

- 71% did not wear glasses or contact lenses
- 2 out of 3 participants who did wear glasses were myopic (short sighted); the rest were hyperopic (long sighted)
- Approximately 27% of those who wore glasses had astigmatism (where the eye is somewhat elongated similar to a football, rather than being perfectly round like a soccer ball)
- 3% were colour blind (which is more common in guys (6%) compared to less than 1% of girls)
- Ultraviolet photography revealed that 3 out of 4 participants (75%) had either mild or moderate signs of sun damage to their eyes or conjunctiva (the clear skin-like membrane that covers the white part of the eye)
- 2% of participants had developed a pterygium (where the skin of the conjunctiva grows onto the cornea – the clear window at the front of the eye)

RECOMMENDATIONS

Protect your eyes, you only get one pair!

Damage to the conjunctiva is common in eyes that are exposed to large amounts of ultra-violet (UV) light, as well as sand and wind. To prevent more damage (or any damage) to the eyes, **PROTECT THEM. WEAR SUNGLASSES** and a hat. The best sunglasses are those that wrap around to also prevent light from coming in from the side.

Take care in applying cosmetics, hairspray and other hair products

Washing hands can help keep your eyes free from germs and bacteria

See your GP or Optometrist if you notice a change in your vision or your eye is injured in anyway

You should avoid cosmetic contact lenses

Always wear safety glasses when hammering, grinding or mowing the lawn
A major contribution of the eye examination that the Raine Study participants did at 20 years of age has been the linkage with their genetic data to determine which genes are associated with particular eye measurements and disease.

Using data from both the Raine Eye Health Study and the Australian Twins Eye Studies we have identified genes that are associated with the structure, diameter, thickness and curvature of the cornea. The cornea is the clear window at the front of the eye and can be affected by a disease called Keratoconus. This genetic data has demonstrated a family of collagen genes associated with Keratoconus.

Also in combination with a large number of other international studies the Raine Eye Health study has helped identify several genes associated with myopia (near sightedness) and refractive error (the need for glasses of any power). Future analysis using information from the Raine Eye study will greatly help in our understanding of eye diseases. Thank you to everyone who participated.

Professor David Mackey
Professor of Ophthalmology
Ophthalmology Team Leader

**FIBROSCAN**

A fibroscan is a quick, painless procedure where a probe touches skin on the body above where the liver is situated and sends a mechanical pulse which measures liver stiffness. When the liver is damaged it causes scarring which makes the liver stiffer.

The Fibroscan is a new technology and measuring the Raine Study participants during the 20 year follow up for the first time established what levels of liver stiffness are normal in this age group.

During the 20 year follow up, 1241 participants were scanned.

We found that:

- Guys have a slightly higher liver stiffness than girls
- Only 4% of the participants had a liver that was stiffer than the normal range

Having a stiffer liver was associated with:

- Obesity
- High blood pressure
- Excessive drinking of alcohol

Severe scarring of the liver at this age group is relatively uncommon. Causes of long term damage to the liver include heavy alcohol intake, Hepatitis B, autoimmune liver disease (where the immune system attacks the liver) or an inherited genetic disorder such as Hereditary Hemochromatosis (where abnormally high levels of iron is deposited in the liver). The accumulation of scar tissue generally occurs over a long period. The liver is the only organ that can regenerate and improve, so improving lifestyle can make a big difference to the health of your liver.

**YOU CAN TAKE SEVERAL STEPS TO KEEP YOUR LIVER HEALTHY**

These include:

- avoiding or limiting the consumption of alcohol
- avoiding recreational drugs and toxic substances
- maintaining a normal body weight as well as eating a healthy diet and engaging in moderate exercise activities
Eating a healthy diet and engaging in regular physical activity will give us the best opportunity of avoiding health problems such as obesity, diabetes and heart disease, all of which are on the rise in Australia. Healthy eating is challenging because your lives at 20 (now 23) years of age are busy and changing, less time is spent at home and you may be working or studying. You also have lots of food choices. Restaurants, food and drinks on the go, vending machines and takeaway outlets are often easy options compared to preparing nutritious food at home, even though many young adults do plan meals and prepare food.

Eating a well-balanced, nutritious diet as well as regular physical activity affects your health and well-being both now and in your future life. What you ate as a child or teenager affects how you are right now. But you can always change your diet and lifestyle.

The food and diet information you provided at the 20 year Raine Study follow-up is crucial to our nutrition and lifestyle research. Combined with information on blood pressure, physical activity, DXA scans, lifestyle and health we are investigating how these aspects are connected to your past and current diet and your health and wellbeing in the future. Our unique research will be used to develop valuable recommendations for the wider community.

This ‘All About You at Age 20’ booklet is an overview of the results from the information and testing that you did during the 20 year Raine Study Follow up. We thank you for being part of the Raine Study and making it possible for us to explore the contribution nutrition plays in the health and wellbeing of all people.

Professor Wendy Oddy
Nutrition Team Leader, Raine Study
Telethon Institute for Child Health Research
<table>
<thead>
<tr>
<th>FOOD GROUP</th>
<th>NUMBER OF SERVES PER DAY</th>
<th>WHAT IS A SERVE</th>
<th>HOW TO INCLUDE IN YOUR DIET</th>
</tr>
</thead>
<tbody>
<tr>
<td>BREADS, CEREALS, PASTA, NOODLES</td>
<td>Men: 6 to 12       Women: 4 to 9</td>
<td>2 slices of bread, 1 bread roll, ½ cup cooked pasta, noodles or rice, ½ cup muesli, 1 cup cereal</td>
<td>Choose wholegrain, multigrain or wholemeal varieties, Include a food from this group at every meal</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Raine Average Intake</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guys: 5          Girls: 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VEGETABLES &amp; LEGUMES (PEAS, BEANS, LENTILS)</td>
<td>Men: 5            Women: 5</td>
<td>½ cup cooked vegetables, 1 cup raw salad vegetables, 1 small or ½ medium sized potato, ½ cup cooked lentils</td>
<td>Include salad in sandwiches, Snack on dried fruit, carrot &amp; celery sticks, Bulk up curries, casseroles, stir-fries with vegetables and legumes</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Raine Average Intake</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guys: 2            Girls: 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FRUIT</td>
<td>Men: 2            Women: 2</td>
<td>1 medium sized fruit (apple, orange), 2 small fruit (apricots, plums), 1 cup chopped or canned fruit</td>
<td>Have fruit on breakfast cereal</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Raine Average Intake</strong></td>
<td></td>
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<tr>
<td></td>
<td>Guys: 1            Girls: 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MILK, YOGHURT, CHEESE</td>
<td>Men: 2            Women: 2</td>
<td>1 cup of milk (250ml), 1 small carton of yoghurt (200g), 40g or 2 slices cheese</td>
<td>Choose reduced fat dairy products, Snack on yoghurt or healthy dessert, Have low fat milk with your cereal or as a drink</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Raine Average Intake</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guys: 2            Girls: 1½</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEAT, FISH, POULTRY, EGGS, NUTS &amp; SEEDS</td>
<td>Men: 1            Women: 1</td>
<td>65 – 100g cooked lean red meat, chicken or fish, ½ cup lean mince, 2 eggs, 1/3 cup peanuts</td>
<td>Choose lean cuts of meat, Limit or avoid processed meats (bacon, sausages, packaged ham, pepperoni), Add seeds to salads and cereals</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Raine Average Intake</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guys: 5            Girls: 2½</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXTRA FOODS</td>
<td>Men: 0 to 3        Women: 0 to 2</td>
<td>½ chocolate bar, 3-4 biscuits, 30g potato crisps, ½ pizza slice, 1 can of soft drink, 12 hot chips</td>
<td>Choose treat size, Choose low fat or reduced sugar varieties, Only have as a treat</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Raine Average Intake</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guys: 5            Girls: 3½</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
VITAMINS AND MINERALS

Healthy eating requires eating a variety of foods from various food groups to consume enough vitamins and minerals (micronutrients) to aid the body in staying healthy.

This graph shows the proportion of Raine participants whose diets met the recommended daily intake of nutrients. e.g. 40% of guys and 14% of girls consumed enough folate in their diets.

Generally diets did not include enough folate, magnesium, calcium, zinc, thiamine and iron (the following table gives examples of foods that contain these nutrients).
<table>
<thead>
<tr>
<th>NUTRIENT</th>
<th>WHAT WE NEEDED IT FOR</th>
<th>WHAT HAPPENS IF WE DO NOT HAVE ENOUGH?</th>
<th>WHERE CAN YOU FIND IT?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thiamine (Vit B1)</td>
<td>Breaks down carbohydrates, nerve function</td>
<td>Heart problems and mental confusion</td>
<td>Wholegrain cereals, wholemeal bread, brown rice</td>
</tr>
<tr>
<td>Riboflavin (Vit B2)</td>
<td>Helps the body produce energy from food and for fatty acid breakdown</td>
<td>Poor growth, sore cracks at the corners of the mouth, dermatitis, red itchy eyes</td>
<td>Breakfast cereals, pasta, yoghurt</td>
</tr>
<tr>
<td>Niacin (Vit B3)</td>
<td>Works along with B2 and helps the body produce energy from food and repair DNA</td>
<td>Depression, diarrhoea, inflamed skin when exposed to sunlight</td>
<td>Lean meat, fortified breakfast cereals, fish, dairy products</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>Important for a healthy immune system, healthy skin, healing cuts, burns, aids the absorption of iron from foods</td>
<td>Poor recovery from wounds, tiredness, bleeding gums</td>
<td>Citrus fruits; oranges, lemons, kiwi fruit, raw green leafy vegetables</td>
</tr>
<tr>
<td>Folate</td>
<td>Formation of red blood cells, brain and heart function and the immune system. Important before and during pregnancy</td>
<td>Weakness, depression, poor skin health and poor growth. Birth defects</td>
<td>Green leafy vegetables, spinach, asparagus, beans, lentils, mushrooms, lean beef, wholemeal bread</td>
</tr>
<tr>
<td>Calcium</td>
<td>Growth and maintenance of bones and teeth, muscle contractions, nerve impulses and regulation of heart beat</td>
<td>Osteoporosis (low bone density)</td>
<td>Milk, cheese, yoghurt, canned fish, spinach, broccoli, almonds</td>
</tr>
<tr>
<td>Iron</td>
<td>Forms haemoglobin to carry oxygen in red blood cells. Women require more iron than men.</td>
<td>Poor immune system, fatigue and weakness, difficulty in concentration</td>
<td>Lean red meat, liver, sardines, oily fish</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Essential for muscle and nerve function and help the body use stored energy</td>
<td>High blood pressure, heart disease, muscle weakness, irritability, depression</td>
<td>Seeds, nuts, beans, dark green vegetables and wholegrain cereals, tofu</td>
</tr>
<tr>
<td>Zinc</td>
<td>Used for growth and wound healing, to support the immune system and for reproductive health</td>
<td>Poor growth, delayed wound healing, hair loss and bad skin</td>
<td>Meat, fish, oysters, poultry, cheese, wholegrain cereals, nuts</td>
</tr>
</tbody>
</table>
Fats are the most concentrated form of energy for the body. Fat contributes to energy intake and helps you absorb vital vitamins. They are important for cell membrane formation and brain functioning. Good fats prevent high blood pressure, heart disease, arthritis and autoimmune diseases. A healthy diet should always contain a certain amount of fat.

<table>
<thead>
<tr>
<th>TYPE OF FATS</th>
<th>SOURCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>SATURATED FAT</td>
<td>Fatty meats (chops, spare ribs, pork belly), chicken skin, luncheon meats, salami, bacon, full cream milk, cheese, yogurt, cream, butter, lard, margarine, palm oil, fried foods</td>
</tr>
<tr>
<td>TRANSPARENT FAT</td>
<td>Cookies, crackers, pastries, pies, muffins, doughnuts, french fries made with partially hydrogenated or saturated fats. Avoid foods that contain “hydrogenated oils” or “partially hydrogenated vegetable oils”.</td>
</tr>
<tr>
<td>UNSATURATED FAT</td>
<td>Oils – olive, canola, peanut, macadamia margarines based on olive oil and canola avocado, peanut butter Nuts - peanuts, macadamia, cashews, almonds Seeds – sesame, pumpkin</td>
</tr>
</tbody>
</table>

### 1. Monounsaturated fats
These fats may help lower your blood cholesterol level when you use them in place of saturated and trans fats. They are important for brain function.

### 2. Polyunsaturated fats
Omega 3 and Omega 6 are considered essential fatty acids and need to be included in your diet

**a. Omega 3**
May help to reduce high blood triglycerides, reduce high blood pressure and reduce the risk of blood clots.

**b. Omega 6**
Lowers LDL cholesterol (the “bad” cholesterol), reduces inflammation and are protective against heart disease.

Polyunsaturated oils - sunflower, soybean, corn and grape-seed oil, polyunsaturated margarines, brazil nuts, walnuts, sunflower seeds
The current recommendation for adult fat intake per day is less than 30% of total energy intake (from all food and drink). This should be mainly from unsaturated fat sources and should include essential fatty acids (Omega 3 and Omega 6). The graph shows that the average daily fat intake of the Raine Study Cohort (38%) is above the recommended daily amount (30%) and on average, diets included too much saturated fat and not enough polyunsaturated fat.

**REDUCE YOUR SATURATED FAT INTAKE**
- Choose ‘low’ or ‘reduced’ fat ingredients
- Use skim milk not whole milk
- Limit take-away food and fried food
- Use olive or canola oil and low-fat spreads instead of butter
- Trim fat off meat and remove skin off chicken
- Eat more oily fish
**Fibre**

Fibre is essential for a healthy digestive system and also to maintain healthy blood sugar and cholesterol levels. Dietary fibre is found in plant-based foods. Insoluble fibre is found in beans, lentils, brown rice, fruit with edible seeds, lentils, corn, oats, wheat bran, wholegrain/wholemeal breads, wholegrain/wholemeal cereals, wholemeal pasta and wholemeal flour.

Soluble fibre can be found in all fruit and vegetables, particularly apples, pears, barley, citrus fruit, legumes, oats, strawberries.

Recommendations are that guys should eat 30g and girls should eat 25g of fibre every day. **80% of the Raine Study participants did not eat enough fibre every day.**

Find 30g of fibre a day! Remember if you are increasing your fibre consumption, **DRINK MORE WATER** as well.

<table>
<thead>
<tr>
<th>FOOD</th>
<th>AMOUNT</th>
<th>FIBRE (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bread</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rye</td>
<td>1 slice</td>
<td>2.3</td>
</tr>
<tr>
<td>Wholemeal</td>
<td>1 slice</td>
<td>1.6</td>
</tr>
<tr>
<td>White</td>
<td>1 slice</td>
<td>0.8</td>
</tr>
<tr>
<td>Pasta, cooked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wholemeal</td>
<td>1 cup</td>
<td>7.4</td>
</tr>
<tr>
<td>White</td>
<td>1 cup</td>
<td>2.8</td>
</tr>
<tr>
<td>Rice, cooked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown</td>
<td>1 cup</td>
<td>2.9</td>
</tr>
<tr>
<td>White</td>
<td>1 cup</td>
<td>1.6</td>
</tr>
<tr>
<td>Cereal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muesli</td>
<td>1 cup</td>
<td>8.6</td>
</tr>
<tr>
<td>All Bran</td>
<td>1 cup</td>
<td>7.3</td>
</tr>
<tr>
<td>Porridge</td>
<td>1 cup</td>
<td>4.0</td>
</tr>
<tr>
<td>Nutri-grain</td>
<td>1 cup</td>
<td>0.8</td>
</tr>
<tr>
<td>Legumes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red kidney beans, canned</td>
<td>½ cup</td>
<td>5.8</td>
</tr>
<tr>
<td>Chick peas, canned</td>
<td>½ cup</td>
<td>3.9</td>
</tr>
<tr>
<td>Fruit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pear</td>
<td>1 medium</td>
<td>6.4</td>
</tr>
<tr>
<td>Apple</td>
<td>1 medium</td>
<td>4.6</td>
</tr>
<tr>
<td>Orange</td>
<td>1 medium</td>
<td>3.1</td>
</tr>
<tr>
<td>Vegetables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peas</td>
<td>½ cup</td>
<td>5.3</td>
</tr>
<tr>
<td>Carrots</td>
<td>½ cup</td>
<td>2.4</td>
</tr>
<tr>
<td>Broccoli</td>
<td>½ cup</td>
<td>1.9</td>
</tr>
</tbody>
</table>

**Water**

It is generally recommended to drink six to eight glasses of water a day. How much you drink will be affected by how much exercise you do, the weather and your diet. Most of the Raine participants (89%) drank water every day, consuming on average 5.5 cups a day.

Our bodies are made up of 55% to 75% water, which is lost through breathing, sweating and excretion. It is important to drink water daily, even if you don’t feel thirsty.

**Soft Drinks, Diet Drinks, Energy Drinks**

- A can of soft drink contains around 10 teaspoons of sugar.
- Diet soft drinks use artificial sweeteners.
- Canned energy drinks contain from about 80mg (average cup of coffee) up to 300 mg of caffeine. Excess caffeine can cause heart palpitations, sleep difficulties, agitation, tremors, increased speech speed, irritability and tension. These drinks also contain the same amounts of sugar as regular canned soft drinks.
- Overall message, none of these drinks are healthy and they contain high amounts of sugar. They should be consumed occasionally, not as a normal part of your diet.
- The graphs on page 13 show the average consumption of these drinks in the Raine Study participants at 20 years of age.
**GENERAL INFO**

- Everyone is different, with different body shape and metabolic levels, appetites and tastes and different food preferences.
- If you are trying to lose weight, keep a record of what you eat and how much exercise you do. Set yourself limits and targets.
- You are what you eat and you should be aware of the nutrients (or not) that are contained in food.
- You should try to establish a healthy balanced diet, including the recommended amounts from all food groups.
- Everyone should do exercise in some form.
- Plan what you eat.
- Make a shopping list and don’t shop for food when you are hungry.
- Watch your portion sizes.
- You have the choice and responsibility for what you put into your body and this includes all food, drink, medicines, drugs and alcohol.

The Heart Foundation website ([heartfoundation.org.au](http://heartfoundation.org.au)) is a great source of information on diet, nutrition, health, recipes etc.
A standard drink contains 10 grams of pure alcohol (ethyl alcohol) which is the substance that causes intoxicating and psychoactive effects. Australian recommendations are to drink no more than two standard drinks a day.

Don’t drink any alcohol if you are pregnant or breastfeeding. Alcohol affects people in different ways and is influenced by factors such as gender, age, mental health, drug use, and existing medical conditions. There are significant health risks associated with alcohol, including liver damage, brain damage, high blood pressure, and an increased risk of cancer. Alcohol may also increase your risk of injury and accidental death through road trauma, violence and falls.

**SIGNS OF ALCOHOL POISONING**

Signs of an alcohol overdose include nausea, vomiting, falling into a coma, shallow breathing, pale skin and loss of bladder control. Other symptoms include no reaction to painful stimuli eg. pinching.

**STANDARD DRINKS**

- 1 bottle of full strength beer (375 ml) is 1.4 standard drinks
- 1 glass of red wine (150 ml) is 1.6 standard drinks
- 1 glass of white wine (150 ml) is 1.4 standard drinks
- 1 bottle of pre-mixed spirits or ‘alcohols’ (330 ml) is 1.2 standard drinks
- 1 shot of spirits is 1 standard drink

Most Raine Study participants were drinking on average less than two standard drinks per day. More guys (40%) than girls (26%) regularly drank more than this. 80% had drunk so much alcohol that they vomited and 20% had done this more than once. The most popular drink for guys was beer and for girls it was about the same for alcoholic soda, white wine and vodka (graph below).

FOR USEFUL INFORMATION ON ALL ASPECTS OF ALCOHOL

WWW(ALCOHOL.GOV.AU
**DRUGS - NOT GOOD FOR YOU**

41% of Raine Study participants had not used any drugs. Almost 60% had tried marijuana with approximately 15% using it regularly. Other drugs most commonly used were ecstasy and amphetamines. Drug use can have serious adverse consequences, again be aware of the signs of overdosing and summon help if necessary.

Overdose symptoms depend on the type of drug and the amount taken. General symptoms of a drug overdose may include:

- Vomiting
- Dizziness
- Fitting
- Drowsiness
- Confusion
- Coma
- Breathing problems

**SMOKING - NOT GOOD FOR YOU EITHER**

Smoking is a risk factor for many health problems including heart disease, stroke and cancer; it is expensive and makes you smell bad. At the 20 year follow-up, 16% of guys and 13% of girls were smokers.

Number of cigarettes smoked per day by people who said they smoked.

If you are finding it difficult to stop smoking, consult your GP for help and advice or visit www.quitnow.gov.au

**USEFUL WEBSITES**

www.turningpoint.org.au

www.counsellingonline.org.au
**SEXUALITY**

**HOW OLD WERE YOU WHEN YOU HAD YOUR FIRST SEXUAL RELATIONSHIP?**

At the 20 year follow up, 90% of participants reported they were heterosexual, and 10% were homosexual, bisexual or still a bit unsure.

**STDS**

2% of the group reported that they had had a STD in the past year. STDs are sexually transmitted diseases which if left untreated can affect your health and fertility. Be responsible, use condoms and don’t have loads of different partners. Be aware of symptoms and get checked out and seek treatment if you think you may have one.

**THINKING STYLES**

During the 20 year follow up, participants completed a questionnaire about their ‘thinking styles’. One of the interesting findings was the differences in ‘thinking styles’ between males and females. Guys were more likely to have difficulties in social situations but scored higher on ‘attention to detail’.
The term ‘mental illness’ describes a group of illnesses that affect the way a person thinks, feels, interacts with others and deals with the everyday challenges of life. One in every five people will experience a mental health disorder sometime in their life. The most common mental illnesses that affect young adults are mood disorders, such as depression and anxiety disorders. Other mental illnesses that may be experienced include schizophrenia, bipolar disorder, anorexia and bulimia, self-harm, obsessive compulsive disorder and personality disorders.

From the Raine Study 20 year follow up:

- 20% of guys and 30% of girls had symptoms of anxiety
- 15% of guys and 25% of girls had symptoms of stress
- 26% of guys and 33% of girls had symptoms of depression

These are high figures with about a quarter of the Raine Participants experiencing symptoms of anxiety and depression.

**ANXIETY**
Anxiety is a normal part of life, where we feel anxious about exams or a job interview. However, for some people, the feelings of anxiety can be much more extreme and continuous and disrupt daily life.

**DEPRESSION**
Everyone feels sad or miserable sometimes. You may be experiencing depression when these feelings are with you most of the time, you stop enjoying life and lose interest in normal activities.

**THERE ARE WAYS TO REDUCE STRESS AND ANXIETY IN YOUR LIFE, INCLUDING**

- Identify factors that cause you stress and avoid or resolve these issues
- Look after your health; eat a balanced diet and exercise
- Relaxation – work on ways to relax
- Sleep – make sure you are getting enough sleep
- Communicate your feelings with friends, relatives
- Avoid alcohol and drugs
- It is important to seek help. Your GP can advise you

**THESE WEBSITES ARE USEFUL FOR HELP AND FOR INFORMATION ON A VARIETY OF ISSUES**

- Lifeline – 13 11 14
- To find counseling and health services in your area www.justlook.org.au
- Headspace -www.headspace.org.au
- Beyond blue – www.beyondblue.org.au
- ReachOut.com – www.reachout.com
Eating disorders generally develop between early adolescence and early adulthood. Rates are usually higher in girls than in boys. Eating disorder symptoms include frequent dieting, fasting and binge eating, as well as purging behaviours such as self-induced vomiting and using laxatives. These behaviours are also risk factors for an eating disorder developing.

There are currently four main categories of eating disorders:

- **Anorexia nervosa**, characterised by very low body weight combined with a fear of gaining weight. Approximately 50% of individuals with anorexia nervosa also engage in binge eating and/or purging.

- **Bulimia nervosa**, characterised by repeated binge eating and purging behaviour combined with high levels of concern about eating, weight or shape. Individuals with bulimia nervosa are generally in the healthy weight range.

- **Binge eating disorder**, characterised by repeated binge eating combined with high levels of concern about eating, weight or shape.

- **Other eating disorders**, including purging without binge eating or ‘atypical’ anorexia or bulimia nervosa.

Eating disorders are associated with physical complications and can be accompanied by anxiety, depression, obsessive-compulsive traits, alcohol misuse and self harm.

In the Raine Study at 20 years of age, 3% of guys and 16% of girls had an eating disorder. Many more reported disordered eating symptoms, such as following a strict diet, fasting and over-exercising. Overall 16% of guys and 47% of girls reported a strong desire to lose weight.

If you have an eating disorder or think you may have one SEEK HELP! Eating disorders are serious and can lead to all kinds of health problems. In the Raine Study, fewer than 20% of participants with an eating disorder reported receiving help.

You don’t have to be underweight or experience anorexia or bulimia to seek assistance. Contact your GP for advice. The Butterfly Foundation is a good source of information - thebutterflyfoundation.org.au
PHYSICAL ACTIVITY

The Australian Physical Activity Guidelines recommend that adults

- Do at least 30 minutes of moderate-intensity physical activity (e.g. fast walking or cycling) or vigorous-intensity physical activity (e.g. aerobics, team sports, zumba) on most if not all days of the week

About 50% of the Raine Study participants met these guidelines; guys were more active than girls. It is important to do physical exercise and be aware of long periods of inactivity or sedentary behaviour.

For information on 30 minutes of physical activity, www.findthirtyeveryday.com.au

SEDENTARY BEHAVIOUR - SIT LESS!

“Sedentary behaviour” is not the same as not doing enough exercise. It refers to the time that you ‘sit’.

A lot of people sit all day at work, or whilst studying, watching television, playing video games, on the internet, in a car, etc. On average, Raine Study participants sat for 6 hours a day!

There are currently no guidelines, but it is suggested that you should not stay in a sedentary position for longer than 30 minutes at a time.

The graph below shows the proportion of Raine Participants who on average, sat for longer than two hours a day watching television or doing computer related activities. Remember to GET UP and MOVE!

BEING PHYSICALLY ACTIVE CAN:

- Improve your sleeping quality
- Help achieve a healthy body weight and prevent unwanted weight gain
- Reduce feelings of stress, anxiety and depression
- Improve bone, muscle and joint strength and lower risk of osteoporosis
- Help maintain healthy skin
- Reduce your risk of developing type 2 diabetes
- Help you feel better, have more energy, be more happy and relaxed
BACK PAIN

80% of people will experience back pain at some time in their life and for about 10% of people, back pain will have a major impact on their lives, with disabling pain preventing them from working or being involved in sport or leisure activities.

In the Raine Study, 58% of guys and 65% of girls reported that they suffered from back pain with 16% of males and 20% of females reporting back pain that stopped them from working or doing normal activities.

THE EXPERIENCE OF BACK AND NECK PAIN IS ASSOCIATED WITH MANY FACTORS:
- Physical factors (posture, fitness levels, weight)
- Lifestyle factors (computer and TV use, physical activity, diet, lifting)
- Psychosocial factors (depression, anxiety, stress)
- Other health conditions (sleep problems, migraine, injury, asthma and allergy)
- Genetics (genes linked to stress response and pain thresholds)

LOOK AFTER YOUR BACK

- Lose excess weight. The less extra weight you carry, the less the stress on the back.
- Keep fit. Exercise regularly to improve posture and increase muscle support of the spine.
- Sit and stand tall. Keep a good posture.
- Vary your posture. Don’t spend long periods of time sitting at a desk or driving.
- Take care. For lifting and carrying heavy loads, get help or use a trolley.
- Be calm. Try to minimise stress and anxiety as this can affect pain too.
- Think positive. Back pain is common and normally gets better quickly.
- If discomfort persists, see a health professional such as a physiotherapist to get back to normal activities quickly.

YOGA IS AN EXERCISE BOTH GUYS AND GIRLS CAN DO. IT CREATES BODY STRENGTH AND FLEXIBILITY, AND IT ALSO HAS A CALMING AND MEDITATIVE EFFECT ON STRESS AND ANXIETY. DOING A SOCIAL ACTIVITY IS BENEFICIAL TO ALL AGES.
**MALE FERTILITY STUDY**

Over 420 guys participated in the male fertility study which was amazing and we extend a big thank you to them all. Participants who had results that may have been below normal ranges, saw a specialist.

According to World Health Organisation standards, normal sperm count should be more than 40 million per sample. For the Raine Study, the average sperm count was 152 million. 16% of samples had a sperm count that was below 40 million. 25% of the cohort had counts of over 200 million!

**SPERM COUNT (MILLIONS)**

Sperm counts can be adversely affected by many factors including heat, being ill at the time of testing, physical injury, drugs (medicinal or other) exposure to the mumps virus, obesity, smoking and certain chemicals that you may come into contact with.

**ULTRASOUND RESULTS – PROPORTION OF GUYS WITH:**

The ultrasound examination checked for injury, any varicocele (enlarged veins), microlithiasis (calcium formation), epididymal cyst (general harmless swelling that can become painful). About a third of the guys were found to have one or more of these.

**GENERAL MEN’S HEALTH TIPS**

- You should check your body and be aware of any changes that may occur. If you experience any pain, find any lumps or have any bleeding, consult your GP.
- Adopt a healthy lifestyle, with a balanced diet and regular exercise. Try to reduce stress.
- Don’t smoke or use recreational drugs.
- Keep alcohol consumption within recommended limits.
- Try to avoid exposure to industrial and occupational hazards by following safety procedures and wearing protective clothing when provided.
- Avoid exposure to sexually transmitted diseases by adopting safe sexual practices, such as using condoms and reducing your number of partners.

Useful website for men's stuff: www.andrologyaustralia.org/your-health
THANK YOU ALL FOR PARTICIPATING IN THE 20 YEAR RAINE STUDY FOLLOW UP.

PLEASE STAY IN TOUCH
LET US KNOW IF YOU MOVE, CHANGE ADDRESS, GET A NEW EMAIL OR PHONE.

9489 7794, 9489 7759
(text) 0447 863944
raine@ichr.uwa.edu
www.facebook.com/rainestudy

SEE YOU AT THE 23 YEAR FOLLOW UP!