Australians' usual egg consumption

Analysis of the CSIRO Healthy Diet Score 2016

October 2016

Prepared by: Gilly Hendrie, Danielle Baird, and Manny Noakes

Report Contents

1 Executive Summary

Australian egg consumption

Results from 86,000+ adults who have completed the CSIRO Healthy Diet Score

Eggs are a natural source of high quality protein containing 11 vitamins and minerals as well as Omega 3 fats

Key results

On average adults consume **0.82 eggs** per day or **5.77** eggs per week

Almost one quarter of Australians consume at least **1 egg** per day

Gender matters: Men are eating more eggs than women

18-30 year old males have the highest egg consumption (**1 egg** per day)

Amongst females, **31-50** year olds have the highest egg consumption (**0.86 eggs** per day)

Consumption by generation

0.87/day high to low 0.69/day

Generation X (~31-50 years) consume the most eggs

Generation Y (~18-30 years) come in a close second

Baby boomers (~50-70 years) consume less than the Australian average

Silent generation (~71+ years) consume significantly less than younger generations (21% less)

Consumption by state

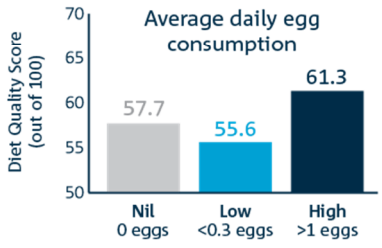
1.NT
2.QLD
3.TAS
4.WA
5.NSW
6.SA
7.ACT
8.VIC

Australians that consume a high number of eggs reported the highest overall diet quality, meaning their diets are most compliant with the Dietary Guidelines

High egg consumers

Diet quality is higher in high egg consumers (61.3 out of 100) than all other consumption sub-groups including the non-egg consumers

People who consume a high number of eggs eat more vegetables and less discretionary foods than those that eat fewer eggs



2 CSIRO Healthy Diet Score

2.1 Background

The Australian Egg Corporation Limited (AECL) is preparing to launch a new campaign with a creative logo to promote eggs as *"OK every Day"* for consumption. Through this campaign, AECL are aiming to:

- Establish an environment of credibility and trust in the "*OK Every Day"* program; and
- Progress the "myth busting" of outdated nutritional beliefs

> The launch of the OK Every Day campaign aims to provide a platform to provide expert insight to break through the confusion and provide credible interpretation of the Australian Dietary Guidelines and communicate a core narrative around the role – and permissibility – of eggs being eaten every day. It also provides an opportunity to promote the consumption of whole foods against the backdrop of increased consumption of junk food, according to latest ABS figures.

The target audiences for the campaign are health care professionals and consumers. Specifically the campaign aims to:

- Remind **Dietitians/nutritionists** that eggs can be eaten every day. The launch of *"OK every Day"* program provides an opportunity for fresh "news", engagement and to keep the healthiness of eggs top of mind.
- Encourage **General Practitioners** to think about eggs as a healthy food. GPs are busy, and many have poor training in the latest nutrition guidelines. GPs knowledge of eggs is variable and for many don't think to recommend eggs to patients as part of a healthy diet.
- Promote to **Consumers** the permissibility of egg consumption every day.

2.2 Eggs in the context of the Dietary Guidelines

The *Australian Dietary Guidelines* (2013) encourages consumers to enjoy a wide variety of nutritious foods from the five food groups every day, including lean meats and poultry, fish, eggs, tofu, nuts and seeds and legumes/beans. These foods are a good source of many nutrients including protein, iron, and zinc.

In particular, the Guidelines state that eggs provide a low cost, easy to prepare source of protein and other nutrients.

The evidence based documentation supporting the Guidelines also states that since the 2003 edition of the *Dietary Guidelines*, the evidence associating egg consumption with health outcomes has not changed greatly and that there does not appear to be any increased health risk associated

with the consumption of eggs. There is recent evidence to suggest that consumption of eggs every day is not associated with increased risk of coronary heart disease.

The Dietary Guidelines recommend that women consume 2-2½ serves and men consume 2½-3 serves of protein foods per day. Consumers can achieve this daily allowance with a range of food s include eggs, lean meats, poultry, fish, nuts and seeds and other vegetarian alternatives.

Examples of one serve of protein foods:	
65g of cooked meat	2 large eggs (120g)
80g of cooked poultry	1 cup of cooked lentils
100g of cooked fish	170g of tofu

2.3 CSIRO Healthy Diet Score

In May 2015, CSIRO launched the CSIRO Healthy Diet Score and since then over 100,000 people completed the survey. The survey is freely available to all Australians to complete.

The CSIRO Healthy Diet Score is based on a scientifically validated online tool which assesses an individual's self-reported food intake against the Dietary Guidelines. The unique tools provides individuals with a personalised Healthy Diet Score and feedback on how to improve their score.

An individual's score reflects their overall compliance with age-gender specific Dietary Guideline food group intake targets. The Australian Dietary Guidelines provide Australians with specific advice on the quantities of core and noncore foods to consume on a daily basis, based on their age and gender. To reflect these guidelines as best as possible, the CSIRO Healthy Diet Score assesses the quantity, quality and variety of foods consumed. Quantity components: Total amount of fruit, vegetables, breads and cereals, meat and alternatives, dairy and dairy substitutes, and discretionary foods is compared to age and gender specific recommendations. Quality components: frequency of wholegrains consumption, reduced fat dairy consumption, frequency of trimming meat, fat type of spreads used and water consumption (as a proportion of total fluids) is assessed. Variety of foods consumed within each core food group is also scored.

The CSIRO Healthy Diet Score can range from 0-100, where 100 reflects greater compliance with the Guidelines and a higher diet quality.

The CSIRO Healthy Diet Score survey includes a two part question specifically on egg consumption. The survey asks individuals to report:

- How often do you eat eggs? Include boiled, poached, and fried eggs as well as omelettes, quiche or egg based frittata. [Response options: Daily, weekly, monthly, never]; then
- In total, how many serves of eggs do you usually eat in the selected timeframe above? 1 serve = 2 large eggs, 120g quiche or egg based frittata.

From this, total consumption was calculated, and reported as usual daily and weekly egg consumption.

2.4 Objectives of this report

This report will use data from the CSIRO Healthy Diet Score survey database to examine the self-reported egg consumption of Australians. It particular it will provide information on:

1. Average number of eggs Australians are consuming per day and per week.
2. Average number of eggs Australians are consuming stratified by:
    - Gender
    - Age group
    - State
    - Occupation
    - Weight status
3. Relationship to diet quality as assessed by the CSIRO Healthy Diet Score

The significance of the differences in reported consumption between population sub-groups will be tested. As a consequence of the large sample size, many of these differences between groups will be statistically significant. In discussing the results we will consider statistical significance however will preference a meaningful difference of 10% of a serve (or approximately 12g) over a statistical significant finding.

3 Data Collection Process

3.1 Database characteristics

This sample is comprised of 86,611 Australian adults who have visited the CSIRO Healthy Diet Score website (https://my.totalwellbeingdiet.com/healthy-diet-score) since May 2015 and completed the survey. The majority of the sample who have completed the survey are female (72.9%). There is a relatively even distribution of people in the 18-30 (25.5% of the total sample), 31-50 (37.6%), 51-70 (32.8%) year age groups, but only 4% of the sample is aged 71 year and older (Table 1).

Using self-reported height and weight, it is estimated that half the sample is overweight or obese (50.2%), and 47.3% are in the normal weight category. The survey is completed online, and therefore has attracted a national sample of participants. Almost one third of people who have completed the survey live in Victoria, and another 25% in New South Wales. Between 10-12% of the remaining participants reside in Queensland, Western Australia or South Australia (Table 1).

Table 1 Characteristics of the CSIRO Healthy Diet Score sample (n=86,611)

SAMPLE CHARACTERISTICS	COUNT	PERCENTAGE OF SAMPLE (N=86,611)	AUSTRALIAN POPULATION (N=21,507,719)
Gender			
Male	23506	27.1%	49.4%
Female	63105	72.9%	50.6%
Age group			
18-30 years	22090	25.5%	13.8%
31-50 years	32607	37.6%	28.1%
51-70 years	28443	32.8%	22.6%
71+ years	3471	4.0%	9.7%
Weight status			
Underweight	2165	2.5%	1.7%
Normal weight	40937	47.3%	35.5%
Overweight	26587	30.7%	35.3%
Obese	16922	19.5%	27.5%
State or territory			
New South Wales	21328	25.0%	32.2%
Queensland	10658	12.5%	20.1%
Australian Capital Territory	3376	4.0%	1.7%
Northern Territory	772	.9%	1.0%
Tasmania	2626	3.1%	2.3%
Victoria	27805	32.6%	24.9%
Western Australia	8658	10.2%	10.4%
South Australia	9997	11.7%	7.4%

*Population estimates of the Australian population were taken from the 2011 Census data, available from the Australian Bureau of Statistics.

4 Key Findings

4.1 Self-reported usual egg consumption

Within this sample of Australian adults, 11.2% reported to consume eggs each day, 67.4% reported to consume eggs each week, 15.3% reported to consume eggs monthly and 6.1% reported that they did not usually consume eggs (Figure 1).

Non egg consumers were significantly younger than egg consumers (37.5 vs 44.3 years, p<0.001), and had a slightly lower self-reported BMI (25.0 vs 26.2, p<0.001).

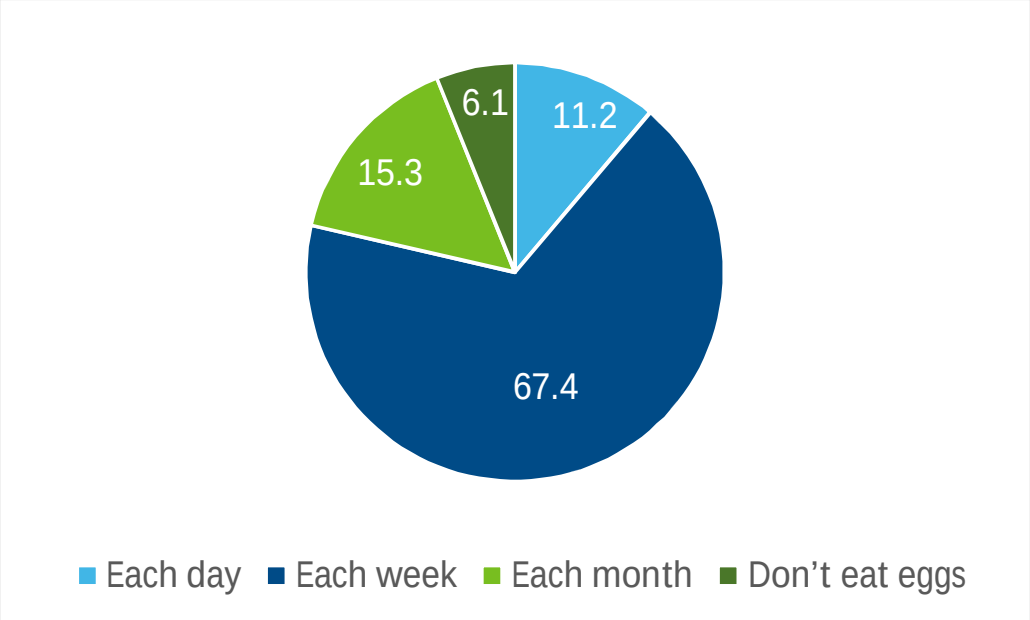


Figure 1: Self-reported frequency of egg consumption

On average, this sample of Australians reported to consume 0.82 eggs per day which equates to 5.77 eggs per week. When divided into quintiles based on level of consumption, the lowest consumers reported to consume 0.12 eggs per day compared to the highest consumers who reported to consume 2.41 eggs per day (Table 2).

Among consumers only (n=81,324), the average reported consumption was 0.88 eggs per day or 6.15 eggs per week.

Table 2 Self-reported usual egg consumption (Mean±SD) per day and per week

EGG CONSUMPTION	COUNT (% TOTAL SAMPLE)	CONSUMPTION STATISTICS	
		Daily	Weekly
Average		.82 (1.45)	5.77 (10.12)
Quintiles of consumption			
Low consumption	14473 (16.7%)	.12 (.08)	.87 (.54)
Low-Medium	19666 (22.7%)	.33 (.06)	2.33 (.46)
Medium consumption	15356 (17.7%)	.57 (.01)	3.99 (.08)
Medium-High	14317 (16.5%)	.85 (.09)	5.93 (.65)
High consumption	17512 (20.2%)	2.41 (2.62)	16.88 (18.33)
Non consumer	5287 (6.1%)	-	-

Overall, 23.2% of this sample of Australians reported to consume one or more eggs per day. This percentage was slightly higher in males than females (24.3% vs 22.7% respectively, Table 3).

Table 3 Percentage of the sample reporting to consume one egg per day, by gender

EGG CONSUMPTION	**MALE**	FEMALES	TOTAL
Less than one egg per day	75.7%	77.3%	76.8%
One or more eggs per day	24.3%	22.7%	23.2%

4.2 Egg consumption in population sub-groups

The average self-reported egg consumption was 0.88 eggs per day for men and 0.80 eggs per day for women. The difference in consumption between men and women was small but significantly significant (Table 4, $p<0.001$).

Egg consumption was highest in the 31-50 year age group (0.89 per day), followed by the 18-30 year age group (0.83 per day). These age groups are colloquially characterised as Generation X and Generation Y, who reported higher consumption than other generations. Interestingly, young males aged 18-30 were the only age/gender sub-group who reported to consume one egg per day. The oldest age group, or the 'Silent Generation', reported to consume fewest eggs, with an average of 0.69 eggs per day. The difference in consumption between all age groups was statistically significant ($p<0.05$), but it was greatest between the 18-30 year old and 71+ year old males (1.03 vs 0.66 eggs per day; difference 0.37 eggs; Table 4).

Generally egg consumption increased with weight status – that is obese individuals reported to consume more eggs per day than overweight individuals, and overweight individuals more than

normal weight individuals. This difference in consumption by weight status was consistent across males and females, except for underweight males who reported the highest consumption of all gender/weight status sub-groups (1.04 eggs per day). Intake in the gender/weight status sub-groups ranged from 0.62 to 1.04 eggs per day, and the differences between all the gender/weight status groups were statistically significant ($p<0.01$, Table 4).

Table 4 Self-reported daily egg consumption (Mean±SD) by population segment

DEMOGRAPHIC CHARACTERISTIC	MALE	FEMALE	TOTAL
Gender	.88 (1.59)	.80 (1.39)	.82 (1.45)
Age group			
18-30 years	1.03 (1.77)	.77 (1.38)	.83 (1.49)
31-50 years	.96 (1.74)	.86 (1.43)	.89 (1.52)
51-70 years	.76 (1.32)	.77 (1.36)	.76 (1.35)
71+ years	.66 (1.17)	.71 (1.19)	.69 (1.19)
Generation			
Silent generation	.66 (1.17)	.71 (1.19)	.69 (1.19)
Baby boomers	.76 (1.33)	.76 (1.36)	.76 (1.35)
Gen X	.92 (1.60)	.85 (1.43)	.87 (1.48)
Gen Y	1.04 (1.87)	.79 (1.39)	.86 (1.53)
Weight Status			
Underweight	1.04 (2.24)	.62 (1.20)	.68 (1.40)
Normal weight	.83 (1.34)	.77 (1.28)	.78 (1.29)
Overweight	.89 (1.65)	.83 (1.45)	.85 (1.52)
Obese	.98 (1.84)	.88 (1.58)	.91 (1.65)

The highest egg consumption was reported by participants living in the Northern Territory (0.95 eggs per day) and Queensland (0.92 eggs per day). Interesting Victorians reported egg consumption was 0.76 per day, which was about 10% lower than the other big population state of New South Wales (0.85 eggs per day, Figure 2 and Table 5).

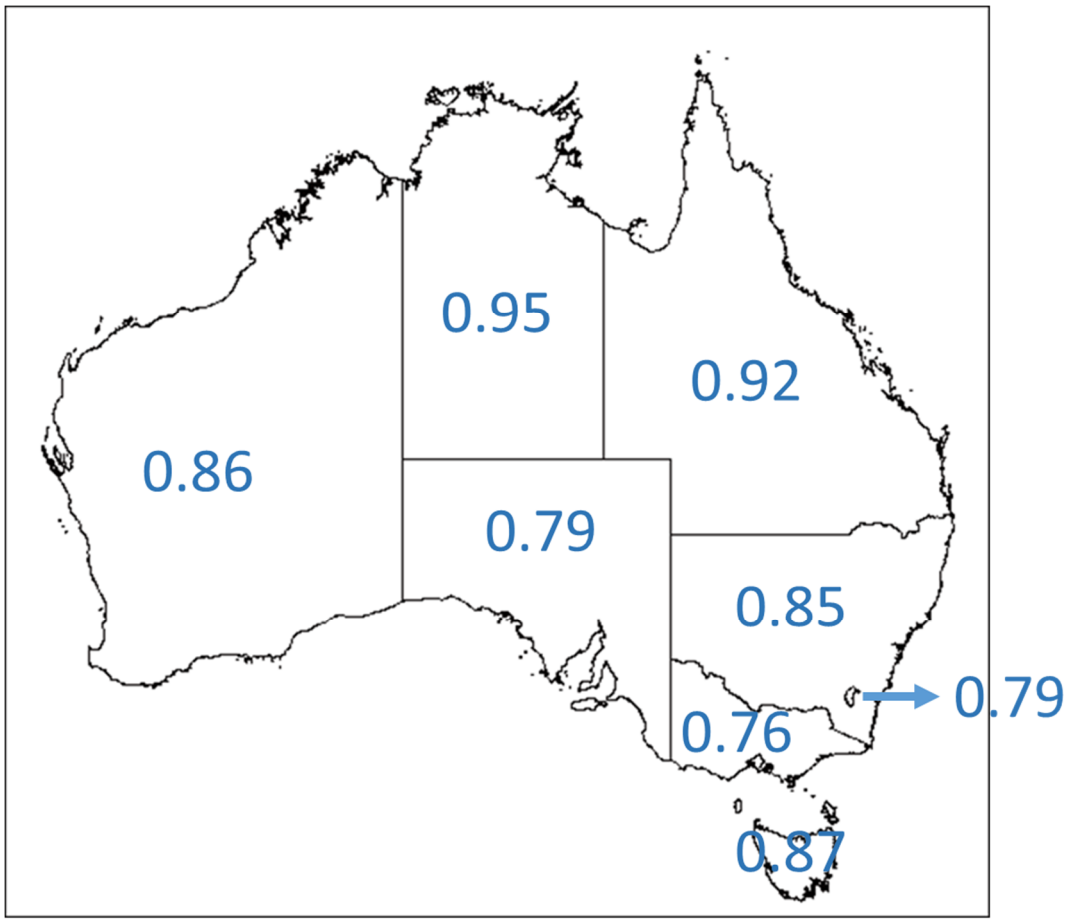


Figure 2 Self-reported daily egg consumption by Australian state

Table 5 Self-reported daily egg consumption (Mean±SD) by Australian state

AREA CHARACTERISTICS	MALE	FEMALE	TOTAL
State			
New South Wales	.93(1.73)	.82(1.45)	.85(1.53)
Queensland	.96(1.48)	.90(1.41)	.92(1.43)
Australian Capital Territory	.79(1.41)	.78(1.20)	.79(1.26)
Northern Territory	1.10(1.82)	.89(1.53)	.95(1.62)
Tasmania	.90(1.46)	.85(1.59)	.87(1.55)
Victoria	.82(1.57)	.74(1.29)	.76(1.37)
Western Australia	.89(1.38)	.84(1.53)	.86(1.49)
South Australia	.88(1.64)	.76(1.34)	.79(1.43)

Examining self-reported egg consumption by occupation, we observed that construction workers reported the highest consumption, at almost 1 egg per day. Also among the highest egg consumers were Public servants/Real Estate agents, people working in Media/Arts, Sales/Distribution and Customer/Food Service (consumption 0.9 eggs per day or above, Table 6).

Retired individuals reported the lowest egg consumption of all occupation groups (0.73 eggs per day, Table 6). In particular, retired men had the lowest egg consumption of all groups (0.70 eggs per day). This was almost half an egg less than men working in the health industry – who had the highest average consumption (1.14 eggs per day).

Table 6 Self-reported daily egg consumption (Mean±SD) by occupation

EMPLOYMENT CHARACTERISTICS	MALE	FEMALE	TOTAL
Occupation			
Construction	1.01(1.63)	.85(1.07)	.99(1.57)
Public servants / Real Estate	.91(1.69)	.95(1.82)	.94(1.78)
Media / Arts	.92(1.84)	.94(1.62)	.93(1.68)
Sales / Distribution	.95(1.87)	.84(1.76)	.91(1.83)
Customer / Food Service	1.08(1.90)	.85(1.50)	.90(1.60)
Homemaker	.74(.85)	.89(1.62)	.89(1.61)
Sales / Marketing / PR	.92(1.53)	.87(1.47)	.88(1.49)
Health industry	1.14(2.08)	.83(1.41)	.87(1.52)
Administration	.83(1.20)	.83(1.57)	.83(1.55)
Unemployed	.87(1.35)	.79(1.43)	.82(1.40)
Management / Finance	.84(1.47)	.80(1.30)	.81(1.36)
Education / Research	.89(1.66)	.76(1.28)	.79(1.38)
Science / Programming	.81(1.50)	.74(1.14)	.78(1.35)
Student	.98(1.76)	.72(1.25)	.78(1.39)
Retired	.70(1.35)	.74(1.31)	.73(1.32)
Other	.94(1.55)	.83(1.29)	.86(1.38)

4.3 Eggs in the context of diet quality

Overall diet quality score increased in a step wise manner with increasing egg consumption. The diet quality score of the lowest egg consumers was 55.6, and this increased to 59.7 in medium egg consumers and 61.3 in high egg consumers. The high egg consumers reported the highest overall diet quality score, meaning their diet quality was most compliant with the Dietary Guidelines; higher than all the other consumption sub-groups including the non-egg consumers (Figure 3).

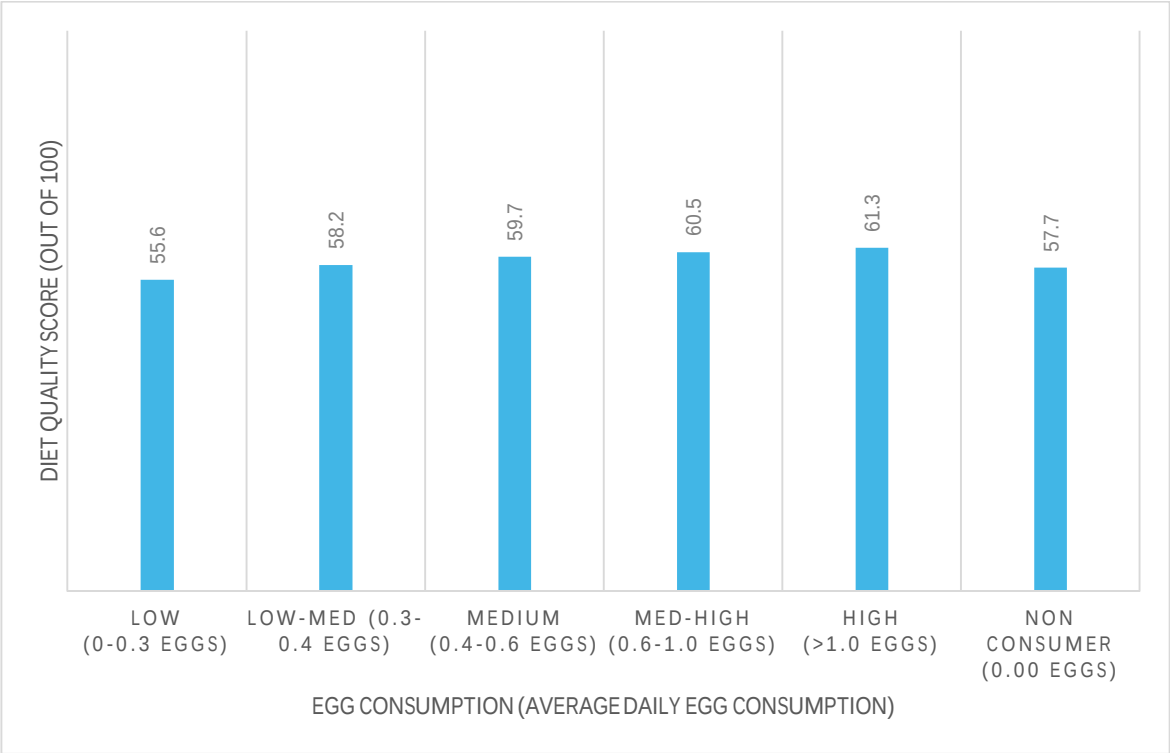


Figure 3: Complinace with the Dietary Guidelines (Total Diet Sore) for low, medium and high egg consumers.

Figure 4 examines three sub-components of the diet quality score – fruit, vegetables and discretionary foods, by level of egg consumption. There were no differences in the fruit scores by level of egg consumption. The low, medium, and high egg consumer sub-groups, as well as the non-egg consumers, all achieved similar scores for their compliance with the fruit guideline (to consume 2 serves per day). There were however, some differences in compliance with the vegetables and discretionary foods guidelines.

High egg consumers scored highest on the vegetable component of the diet quality scoring, meaning they were most compliant with the vegetable recommendations in the Dietary Guidelines ($p<0.001$). In terms of discretionary foods, the high egg consumers scored better than all other egg consumer sub-groups ($p<0.001$), but not better than non-egg consumers (Figure 4 and Table 7).

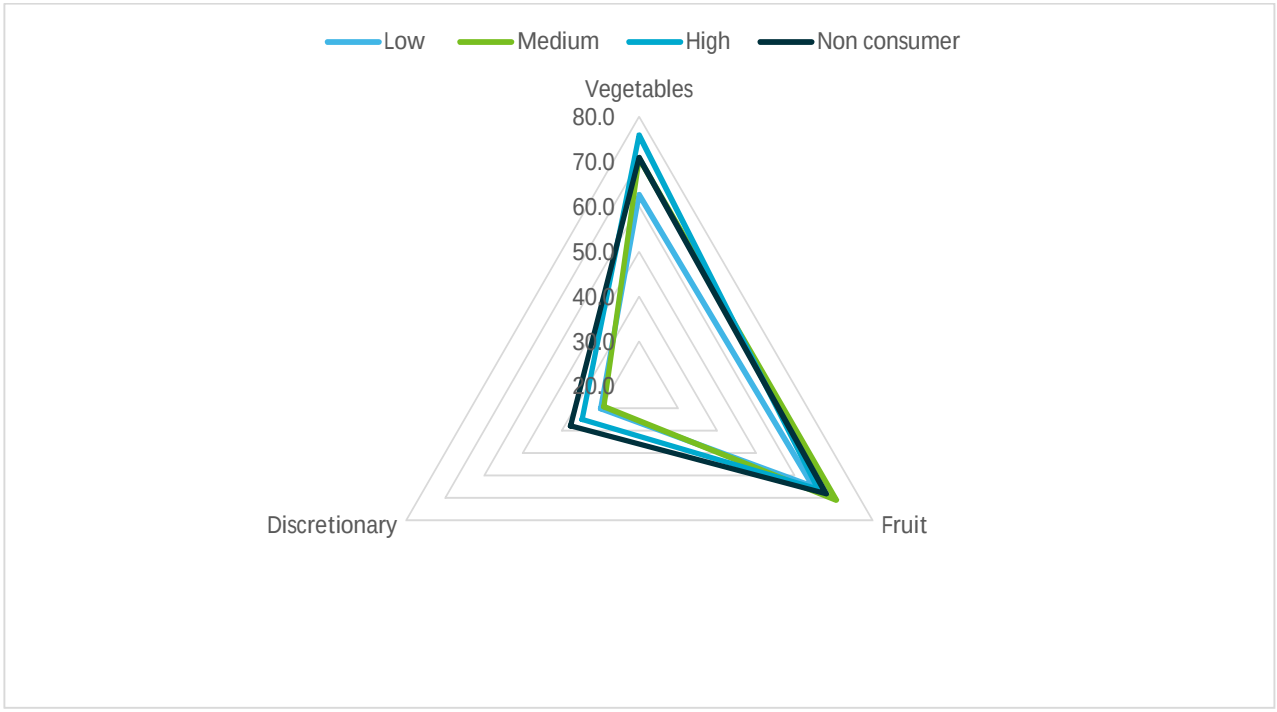


Figure 4: Complinance with the fruit, vegetable and discrtionary food guidelines for low, medium and high egg consumers.

5 Summary

This report describes the usual egg intake and diet quality of 86,000+ Australian adults who have completed the CSIRO Healthy Diet Score survey. This self-reported data suggests that on average, adults report to consume 0.82 eggs per day, and 23% of Australians are currently consuming 1 or more eggs per day. While there was evidence of variation in intakes between age, gender and other demographic sub-groups of the population, individuals' intakes would need to increase by about 20% or a little over one extra egg per week, to reach the "one egg a day" target.

Eggs provide a low cost, convenient source of protein and other key nutrients. Our results suggest their inclusion in the diet is associated with a higher diet quality, in particular higher consumption vegetables and lower consumption of discretionary foods.

Table 7 Diet quality component scores (out of 100) for the five core food groups and discretionary foods, by egg consumption sub-group

Egg consumption sub-group	Vegetables		Fruit		Breads and cereals		Meat and alternatives		Dairy		Discretionary foods	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Low	62.7	30.6	64.8	37.0	60.2	24.3	53.2	25.8	47.8	26.9	29.9	32.3
Low-Med	66.7	28.5	69.5	34.9	64.3	22.3	60.5	23.9	49.6	25.9	29.5	31.5
Medium	70.8	28.2	70.7	34.7	64.8	22.7	68.6	22.1	51.1	25.7	29.2	31.2
Med-High	73.1	27.6	70.4	34.7	63.1	23.4	75.5	20.5	50.0	26.1	30.0	31.6
High	75.9	27.5	66.1	36.2	56.7	27.7	89.4	15.3	46.1	27.0	34.8	34.0
Non consumer	70.8	31.8	68.0	37.7	57.7	27.4	54.7	29.9	39.5	29.1	37.6	36.0

CONTACT US

t 1300 363 400
+61 3 9545 2176
e csiroenquiries@csiro.au
w www.csiro.au

AT CSIRO, WE DO THE EXTRAORDINARY EVERY DAY

We innovate for tomorrow and help improve today – for our customers, all Australians and the world.

Our innovations contribute billions of dollars to the Australian economy every year. As the largest patent holder in the nation, our vast wealth of intellectual property has led to more than 150 spin-off companies.

With more than 5,000 experts and a burning desire to get things done, we are Australia's catalyst for innovation.

CSIRO. WE IMAGINE. WE COLLABORATE. WE INNOVATE.