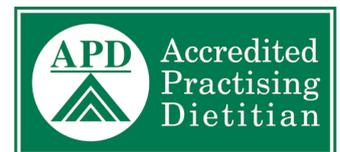




Literature Review: Latest Evidence on Food Security and Lifestyle Related Chronic Disease and How Flourish PYO Aims to Address These Issues in the Toowoomba Region.

October 2018

Anna Morgan
Accredited Practising Dietitian



What is Flourish PYO?

Flourish PYO is a Toowoomba-based Health Promotion Charity established in 2018.

Flourish PYO has several objects, including:

- 1. To improve food security for the entire Toowoomba community, particularly for families and individuals from low income backgrounds, by growing produce for picking, sale and distribution.*
- 2. To provide mentoring and education to the community to increase consumption of fresh healthy produce in their daily lives, consequently improving nutrition, to reduce the risk of developing chronic lifestyle-related health problems and conditions.*

The following literature review examines the latest evidence in relation to food security and the link between vegetable/fruit intake and chronic health problems and other health conditions which are prevalent in the Toowoomba region. This document also details how Flourish PYO aims to address issues of food security and how this may impact levels of chronic disease.

Flourish PYO Objective One:

To improve food security for the entire Toowoomba community, particularly for families and individuals from low income backgrounds, by growing produce for picking, sale and distribution.

What is food security?

According to the World Health Organisation, “there are three key components of food security:

1. Food access: the capacity to acquire and consume a nutritious diet, including:
 - The ability to buy and transport food
 - Home storage, preparation and cooking facilities
 - Knowledge and skills to make appropriate choices
 - And time and mobility to shop for and prepare food
2. Food availability:
 - Location of food outlets
 - Availability of food within stores and
 - Price, quality and variety of available foods
3. Food use: the appropriate use of food based on knowledge of basic nutrition and care.” (World Health Organisation, 2011, as cited in Rosier, 2011).

How many people experience food insecurity in Australia and what are the effects of being food insecure?

Conservative estimates suggest that upwards of 5% of Australians experience food insecurity (the inability to access enough food for an active, healthy life), 40% of at severe levels (Rosier, 2011).

Burns et al (2010) noted that “in developed countries, food insecurity is associated with a lower consumption of fruit, vegetables and meat” (Tarasuk, 2001, as cited in Burns et al, 2010, p 1), leading to a decreased nutrient and micronutrient intake (Cook, 2002 & Tarasuk, 1999, as cited in Burns et al, 2010). Booth and Smith (2001), indicate that those of lower economic status, who may experience food insecurity, generally consume less fruit, vegetables and fibre in general.

This population have a high incidence of dental cavities, obesity, hypertension, type two diabetes, heart disease, stroke and other health conditions. It is useful to note that “food insecurity is especially relevant to the current “obesity epidemic” amongst Australian children... as Australian data indicates that the risk of obesity is higher in those who experience mild to moderate food insecurity” (Gill et al., 2009 & Burns, 2004, as cited in

Rosier, 2011). This is usually because a higher amount of carbohydrate or high fat foods are chosen, given their satiating properties. Food insecurity is also linked to hunger and malnutrition in moderate to severe cases.

Who is most at risk of food insecurity?

Evidence suggests that certain groups in Australia are susceptible to food insecurity.

Unemployed and Lower Income Populations:

Twenty-three percent of unemployed people experience food insecurity regularly, while 20% of low income earners also experience this (Rosier, 2011). According to the Darling Downs Hospital and Health Service (2017), in 2016, 31% of the population fell within the first quintile when scored for socioeconomic disadvantage. Giskes, Turrell, Patterson, & Newman (2002) noted that “participants from low-income households consume a smaller quantity of fruit and vegetables. They were less likely to consume fruit and vegetables high in vitamin C, folate and vitamin A” (p.375). Single parent households (23%), rental households (20%) and young people (15%) are also at risk of food insecurity (Rosier, 2011). Kettings et al. (2009) found that “welfare dependent families needed to spend at least 33% of their weekly income to eat according to public health recommendations if they bought generic brands” (as cited in Rosier, 2011).

Culturally and Linguistically Diverse (CALD) and Indigenous Populations:

Twenty-four percent of Aboriginal or Torres Strait Islander people report experiencing food insecurity. Darling Downs Hospital and Health Service District (2017) also report that 4% of the population as identify as Aboriginal or Torres Strait Islander. Additionally, the population of CALD are at risk, with this region having 3% of the population that speaks a language other than English at home (Darling Downs Hospital and Health Service, 2017).

Aged Populations:

Seventeen percent of this region’s population are aged 65 years or older (Darling Downs Hospital and Health Service, 2017) and may experience mobility, strength or isolation issues that prevent them from being able to complete shopping or food preparation adequately. According to the Queensland Government Department of Health (2016), in Queensland, the percentage of those over the age of 65 is estimated to increase to 20% by 2036. Seven percent of the population of the region is without access to a car and may have to rely on public transport or transport services, walking or friends/family to access shopping facilities (Darling Downs Hospital and Health Service, 2017). These issues may also affect those who experience a disability. In a study (Rist, Miles and Karimi, 2012, p.46), it was found that 34.5% of elderly clients in the community (accessing nursing services) were at risk of malnutrition, with 8.1% actually being malnourished.

The major determinants of food insecurity include lack of financial resources and/or transport, lack of access to food due to geographic isolation, lack of access to nutritious food

at affordable prices and lack of knowledge or motivation about a nutritious diet (Rosier, 2011). Sharkey, Johnson & Dean (2010) reveal that the following objective and perceived measures of food security include increased distance to the nearest supermarket and access to food stores with a good variety of fresh and processed fruit and vegetables. These perceptions were associated with decreased consumption of fruit and vegetables.

What are the recommended intake of fruit and vegetables and are we meeting targets?

The Australian Guide to Health Eating (2013) details targets for all food groups across different age groups. For adults, the recommendation is to consume two serves of fruit and five serves of vegetables daily to meet key nutrients such as fibre and antioxidants.

The following is a summary of data in the 2018 report by the Queensland Government Department of Health entitled, “Are Queenslanders meeting the Australian Dietary Guidelines?”

Proportion of population meeting the recommended daily consumption of fruit and vegetables (including only healthy sources) by aged group		
Age Group	% meeting guidelines for fruit	% meeting guidelines for vegetables
2-4years	78%	3.4%
5-17years	35%	0.6%
18-64years	25%	3.8%
65+years	35%	6.2%

From the above data, it is clear that a very small percentage of the Queensland population, across all age ranges, are meeting the Australian Dietary Guidelines for the consumption of fruit and vegetables.

How can Flourish PYO improve food security for people in our region?

Flourish PYO aims to increase food security for those living in the Toowoomba region using a multifaceted approach to target food access, food availability and food use.

Strategies include but are not limited to:

- Community Gardens (addresses WHO food security components 1, 2 &3):
Working in partnership with the local community to build and maintain community gardens. The goal is to improve access to fresh fruit and vegetables, free of charge. Low socio-economic areas will be targeted. Long term, this may also include providing culturally appropriate produce for CALD groups to improve intakes. Nutritional education will be provided through recipe cards in this setting.
- Cooking Classes (addresses WHO food security components 1 &3):
Providing low cost cooking classes. For example, our “Cook, Feast, Flourish Cooking Class: skills for cooking delicious meals on a budget”. Classes include education from the Flourish Accredited Practicing Dietitian on topics such as the Australian Dietary Guidelines, saving at the checkout and food label reading.
- Health Promotion with a focus on healthy eating (addresses WHO food security components 1 &3):
Target groups include low socio-economic, Culturally and Linguistically Diverse and Indigenous populations, children and older Australians. For example, character book readings with a focus on healthy eating for children, and practical adult education sessions with CALD populations on healthy eating.
- In future, we may use a food van to travel to “hot spots” in our region, to provide cheaper/discounted (for those with a health care card/pension concession card) fresh fruit and vegetables to those at risk of food insecurity (addressing WHO food security components 1 &2). Examples of locations may include: areas of government housing, Indigenous medical centres, retirement villages etc. This will reduce the need for people to travel to a supermarket.
- Providing information regarding food hygiene and safe food storage.

By improving food security to the vulnerable in this area, our aim is to increase fruit and vegetable consumption and general nutrition of the population.

Flourish PYO Objective 2:

Provide mentoring and education to the community to increase consumption of fresh healthy produce in their daily lives, consequently improving nutrition, to reduce the risk of developing chronic lifestyle-related health problems and diseases.

What are the most common health conditions for residents in this region?

In Queensland, “in 2016, 84% of health loss was due to a disability or death caused by a non-communicable disease” (Queensland government Department of Health, 2017, p.4), referring mostly to chronic disease. The same source estimates that 36% of this loss may be prevented by modifying risk factors, (including lifestyle factors), with the burden associated by dietary factors the second largest cause, followed by high body mass. “Combined dietary factors were the second largest cause of death and disability in Queensland in 2011,2, and accounted for 15% of the health gap between Indigenous and non-Indigenous Australians.” (Queensland Government Department of Health, 2018, p.1).

DALY (disability-adjusted life year) is a measure of overall disease burden, referring to the number of years lost due to poor health, disability or early death. The following information is provided in “The health of Queenslanders 2016: Report of the Chief Health Officer Queensland” (Queensland Government Department of Health, 2016):

In 2011, it revealed the three highest total disease burdens (DALY) were:

- Cancer (17%)
- Cardiovascular disease (14%)
- Mental disorders (12%)

The three leading causes of disease burden in 2011 were:

- Coronary artery disease (7.8%)
- Chronic Obstructive Pulmonary Disease (COPD) (3.8%)
- Lung cancer (3.4%)

For 2014-2015, the five most common chronic diseases in the region were:

- Asthma (11% of the population)
- Hypertension (10%)
- Heart, stroke or vascular condition (5.5%)
- Diabetes (2011-2012 data – 5%)

By eating enough fruit and vegetables, can our residents reduce the risk of developing these conditions? What does the evidence say?

Cancer:

Terry, Terry & Wolk (2001) revealed that “several recent large prospective cohort studies and clinical trials have found no associations regarding several major cancers, including cancers of the colon breast and stomach” (p. 280). However, it was determined that those who consumed either very few fruit and vegetables or none at all were at risk of these cancers.

Additionally, a large cohort study in 2015 (Maasland, A Van den Brandt, Kremer, Goldbohm, & Schouten), discovered that low fruit and vegetable consumption was associated with increased risk of certain head and neck cancers, with a very strong link to oral cavity cancer.

For breast cancer specifically, Albuergue, Balter & Marchioni (2014) reviewed 26 studies and found that a Mediterranean pattern of eating reduced risk of breast cancer. The Mediterranean diet comprises largely of fruit, vegetables, fish and soy products. While difficult to link specifically to increased intake of fruit and vegetables, the advice to increase fruit and vegetable intake should be provided to women to meet minimum recommendations.

In a study with over 200, 000 participants, with >1700 of those with lung cancer, Wakai et al (2015) concluded that a “moderate level of fruit consumption is associated with a reduced risk of lung cancer, in men in Japan” (p.1057).

Therefore, evidence suggests that consuming adequate fruit and vegetables seem to have a positive correlation with reduced risk of some cancers.

Cardiovascular disease:

Hartley et al (2013), completed a Cochrane Review, looking at over 10 trials with 1730 participants. While there appears to be limited evidence regarding increasing fruit and vegetables for the primary prevention of cardiovascular disease, it suggests that advice to increase fruit and vegetables as a single intervention has favourable effects on cardiovascular disease risk factors. The study noted that more research was needed to confirm this finding. Additionally, increasing fibre can often assist with saturated fat absorption, reducing cardiovascular risk.

For heart failure, Rautiainen, Levitan, Mittleman & Wolk (2015) found “in this population-based prospective cohort study of women (34319 participants), higher total consumption of fruit and vegetables was inversely associated with incidence of heart failure” (p.20).

Chronic Obstructive Pulmonary Disease:

A systematic review in 2014 revealed that “an increase in intake of dietary fibre is consistently associated with decreased COPD risk, better lung function and decreased respiratory symptoms” (Fonesca Wald et al, 2013, p.176). Given that fruit and vegetables are a major source of dietary fibre, encouraging people to meet targets for these foods is sound.

Asthma:

Romieu et al’s (2006) study of over 6800 women discovered that the intake of some vegetables (tomatoes, carrots and leafy vegetables specifically) may decrease the risk of adult asthma.

A systematic review and meta-analysis by Hosseini, Berthon, Wark & Wood (2017), showed that most studies reported beneficial associations with risk of asthma with intake of fruit and vegetables. The study also showed mostly inverse associations between fruit and

vegetable intake and risk of prevalent wheeze and asthma severity. Most studies also showed a protective effect against either systemic or airway inflammation suggesting an increased immune response.

Diabetes:

A meta-analysis of prospective cohort studies in 2014 concluded that higher fruit or green leafy vegetables is associated with a significantly reduced risk of type 2 diabetes. (Li, Fan, Zhang, Hou & Tang, 2014).

Using results from 3 prospective, longitudinal cohort studies, Muraki et al (2013) concluded that “greater consumption of specific whole fruits, particularly blueberries, grapes and apples, is significantly associated with a lower risk of type 2 Diabetes” (p.1).

Hypertension:

A cross-sectional study in Japan in 2008 found that “high-level consumptions of fruits, vegetables, potassium and vitamin C are associated with a significantly lower risk of hypertension” (Utsugi, 2008, p 1435).

An analysis of over 28000 women concluded that “higher intake of fruits and vegetables, as part of a healthy dietary pattern, may only contribute a modest beneficial effect to hypertension prevention, possibly through improvement in body weight regulation” (Wang, Manson, Gaxiano, Buring & Sesso, 2012, p180).

Weight:

There is a clear link between excess body weight and risk of chronic disease. In 2016, 63.6% of Australian adults were classified as overweight or obese (Australian Bureau of Statistics, 2017, p1), while 24.6% of children were classified as the same. “Clinical evidence shows that combining advice to increase fruit and vegetable consumption with caloric restriction is an effective strategy for weight management” (Tohill, Seymour, Serdula, Kettel-Khan & Rolls, 2004, p. 365).

Additionally, Hart, Raynor, Jelalian & Drotar (2010, p.396) found that the fruit and vegetable consumption of infants and toddlers is significantly associated with maternal intake of these foods. This is compelling data that shows targeting mothers in nutrition education may improve consumption of fruit and vegetables in children.

Let's put it together:

The evidence is clear – by increasing fruit and vegetables to target levels set by the NHMRC, there is a real chance that the risk of most major health conditions experienced by those in the Toowoomba and Darling Downs region may be reduced. Flourish PYO plans to improve fruit and vegetable consumption by improving food security for those in this region. Strategies include improving access to fruit and vegetables and providing nutrition education about the benefits of eating enough fruit and vegetables, meeting other core food groups and achieving a healthy weight.

References:

- Albuquerque, R., Baltar, V., & Marchioni, D. (2014). Breast cancer and dietary patterns: a systematic review. *Nutrition Review*, 77, 1-17. Doi: 10.1111/nure.12080
- Australian Bureau of Statistics. (2015). *4364.0.55.001-National health survey: First results, 2014-2015*. Retrieved February 25, 2018, from www.abs.gov.au/ausstats/abs
- Australian Government, Department of Health. (2013). *Australian guide to healthy eating*. Retrieved February 20, 2018, from <http://www.health.gov.au/internet/publications/publishing.nsf/Content/nhsc-guidelines~aus-guide-healthy-eating>
- Booth, S., & Smith, A. (2001). Food security and poverty in Australia – challenges for dietitians. *Australians Journal of Nutrition and Dietetics* 58 (3), 150-156. Retrieved from, <http://daa.asn.au>
- Burns, C., Kristjansson, B., Harris, G., Armstrong, R., Cummins, S., Black, A., & Lawrence, M. (2010). Community level interventions to improve food security in developed countries. *Cochrane database of Systematic Reviews* 2010, 12. doi: 10.1002/14651858.CD008913
- Darling Downs Hospital and Health Service. (2017). *Strategic plan 2016-2020*. Retrieved February 25, 2018, from www.health.qld.gov.au
- Fonesca Wald ELA, van den Borst B, Gosker HR, Schols A M WJ (2013). Dietary fibre and fatty acids in chronic obstructive pulmonary disease risk and progression: a systematic review. *Respirology* 19 (2) 176-184. Doi 10.1111/rep.12229
- Giskes, K., Turrell, G., Patterson, C., & Newman, B. (2002). Socioeconomic differences among Australian adults in consumption of fruit and vegetables and intakes of vitamin A, C and Folate. *Journal of Human Nutrition and Dietetics*, 15, 375-385. doi: 10.1046/j1365-2777X.2002.00387.x

Hart, C., Raynor, H., Jelalian, E. & Drotar, D. (2010). The association of maternal food intake and infants and toddlers food intake. *Child: Care, Health and Development*, 26, 396-403. Doi: 10.1111/j.2214.2010.01072.x

Hartley, L., Igbinedion, E., Holmes, J., Flowers, N., Thorogood, M., Clarke, A., Stranges, S., Hooper, L., & Rees, K. (2013). Increased consumption of fruit and vegetables for the primary prevention of cardiovascular diseases. *Cochrane Database of Systematic Reviews* 2013, 6. doi: 10.1002/14651858.CD009874.pub2

Hosseini, B., Berthon, B., Wark, P. & Wood, L. (2017). Effects of fruit and vegetable consumption on risk of asthma, wheeziness and immune responses: a systematic review and meta analysis. *Nutrients*, 2017 Apr, 9 (4). Doi. 10.3390/nu9040341

Li, M., Fan, Y., Zhang, X., Hou, W. & Tang, Z. (2014). Fruit and vegetable intake and risk of type 2 diabetes mellitus: meta analysis of prospective cohort studies. *BMJ Open* 2014, 4(11). Doi. 10.1136/bmjopen-2014-005497

Maasland, D., A Van den Brandt, P., Kremer, B., Goldbohm, R., & Schouten, L. (2015). Consumption of vegetables and fruit and risk of subtypes of head-neck cancer in the Netherlands cohort study. *Int Journal of Cancer*, 36 (5). doi.10.1002/ijc.29219

Muraki, I., Imamura, F., Manson, J., Hu, F., Willett, W., Van Dam, R. & Sun, Q. (2013). Fruit consumption and risk of type 2 diabetes: results from 3 prospective longitudinal cohort studies. *BMJ* 2013, 347. Doi: <https://doi.org/10.1136/bmj.f5001>

Prevention and Population Health, Victorian Government Department of Health. (2010). *Getting children aged 5-12 years to eat more fruit and vegetables: An evidence summary*. Retrieved February 20, 2018, from www.health.vic.gov.au

Queensland Government Department of Health. (2016). *The health of Queenslanders 2016: Report of the Chief Health Officer Queensland*. Retrieved February 25, 2018, from www.health.qld.gov.au

Queensland Government Department of Health. (2017). *Burden of disease and injury in Queensland: Summary results for Queensland*. Retrieved February 25, 2018, from www.health.qldd.gov.au

Queensland Government Department of Health. (2018). *Are Queenslanders meeting the Australian Dietary Guidelines? Daily diets and total energy intake*. Department of Health, Queensland Government: Brisbane.

Rautiainen, S., Levitan, E., Mittleman, M. & Wolk A. (2015). Fruit and vegetable intake and rate of heart failure: a population-based prospective cohort of women. *Enr J Heart Failure*, 17, 20-26. Doi 10.1002/ejhf.191

Romieu, I., Varrasso, R., Avenel, V., Leynaert, B., Kauffmann, F. & Clavel-Chapelon, F. (2006). Fruit and vegetable intakes and asthma in the E3N study. *Thorax*. 2006 March, (3), 209-215. Doi 10.1136/thx.2004.039123

Rosier, K. (2011). *Food insecurity in Australia: What is it, who experiences it and how can child and family services support families experiencing it?* Australian Institute of Family Studies (Australian Government). Retrieved February 23, 2018, from www.aifs.gov.au

Sharkey, J., Johnson, C., & Dean, W. (2010). Food access and perceptions of the community and household food environment as correlates of fruit and vegetable intake among rural seniors. *BMC Geriatrician*, 10 (32). doi: 10.1186/1471-2318-10-32

Terry, P., Terry, J., & Wolk, A. (2001). Fruit and vegetable consumption in the prevention of cancer: an update. *Journal of Intern Medicine*, 250, 280-290. doi.10.1111/j1365-2796.2001.00886

Tohill, B., Seymour, J., Serdula, M., Kettel-Khan, L. & Rolls, B. (2004). What the epidemiological studies tell us about the relationship between fruit and vegetable consumption and body weight. *Nutrition Reviews*, 62, 365-374. Doi 10.1111/j.1753-4887.2004.tb00007.x

Utsugi, M. (2008). Fruit and vegetable consumption and the risk of hypertension, determined by self measurement of blood pressure at home: the Ohasama study. *Hypertens Res*. 2008 July, 31(7), 1435-43 Doi: 10.1291/hypers.31.1435

Wakai, K., Sugawara, Y., Tsuji, I., Tamakoshi, A., Shimazu, T., Matsuo, K., Nagata, C., Mizoue, T., Tanaka, K., Inoue, M., & Tsugane, S. (2015). Risk of lung cancer and consumption of vegetables and fruit in Japanese: A pooled analysis of cohort studies in Japan. *Cancer Sci* 106(8), 1057-1065. Doi. 10.1111/cas.12707

Wang, L., Manson, J., Gaziano, J., Buring, J. & Sesso, H. (2012). Fruit and vegetable intake and the risk of hypertension in middle-aged and older women. *American Journal of Hypertension*, 25(7), 180-189. Doi: Org/10.1038/ajh.2011.186

Rist, G., Miles, G., Karimi, L. (2012). The presence of malnutrition in community-living older adults receiving home nursing services. *Nutrition and Dietetics*, 69(1), 46-50. Doi: 10.1111/j.1747-0080.2011.01572.x