AN EXPLORATION OF THE SOCIAL INEQUITIES UNDERPINNING NUTRITIONAL INTAKE IN HIGH RISK COMMUNITIES

A Thesis submitted by

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Abstract

The evidence is clear that poor fruit and vegetable consumption is linked with higher obesity rates. This doctoral project began with an aim to improve fruit and vegetable consumption in the researcher's community. The Ipswich region has a low intake of fruit and vegetable consumption, high obesity rates and corresponding rates of non-communicable disease burden. An exploratory, mixed-methods research program, using a qualitatively driven, sequential research design, was chosen to develop a progressive, nuanced understanding of the problem within a social model of health. The findings of this doctoral project demonstrated that a clear understanding of socio-economic factors leading to food system insecurity is necessary before a community food strategy can be developed.

In the first phase of this research, semi-structured interviews with key stakeholders within the Ipswich community were conducted, to explore their perceptions of the barriers and enablers of fruit and vegetable consumption in their community. Analysis of these interviews revealed participants were at the beginning of their journey in understanding these barriers and enablers in their region. This was followed by semi-structured interviews undertaken in the Toronto region (Canada), which is recognised as a world leader in implementing strategic initiatives to shape the nutritional intake within their community. These interviews revealed the strategic response undertaken in Toronto to address nutritional disparities, focused on addressing food system inequity.

The second phase of this research aimed to understand if food insecurity risk factors, identified as a key issue in Toronto influencing nutritional intake, were also present in Ipswich. A detailed characterisation of the Ipswich population, analysing food insecurity risk factors through cross-sectional and longitudinal modelling was undertaken. Findings confirmed that the Ipswich community had a significant number of food insecurity risk factors.

The outcomes of this study reinforce that a detailed analysis of a population must be undertaken to identify groups experiencing social inequity, so that social model health responses can be customised and prioritised to create an equitable food system. Current social health policy and associated initiatives in Ipswich do not currently achieve this.

Certification of Thesis

This Thesis is entirely the work of Aletha Ward except where otherwise acknowledged. The work is original and has not previously been submitted for any other award, except where acknowledged.

Principal Supervisor: Professor Cath Rogers.

Associate Supervisor: Associate Professor Amy Mullens.

Student and supervisors signatures of endorsement are held at the University.

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There have been so many people who have supported me on this journey. Family, friends, mentors, guides … these roles were critical to the success of my ability to complete this doctorate. Words cannot express my appreciation to all who have assisted me. To my supervisors, please accept my sincere gratitude for your guidance in shaping this PhD. Cath, you have been a mentor to me for so many years now, I am so appreciative of you. You have given me your guidance and support, both personally and professionally throughout the many challenges I have experienced over the past five years. You assisted in creating an extremely rich learning environment for me, through this journey. My loved ones have also come on this journey with me. I feel truly grateful that you have given me the time, support and encouragement to go on this journey, regardless of the many challenges in our lives. I know the research I undertook during this PhD has significantly changed the health and wellbeing trajectory of family and friends who have been on this journey with me. I am also aware of the toll it has taken at times – particularly, to have the courage to stand up against the social norms that were shaping our health previously. At times, seeing the fundamental changes in our health and wellbeing has been my primary motivator on this PhD journey. I acknowledge the Australian Commonwealth Government who supported this research through the Research Training Scheme. I acknowledge Elizabeth Black who proofread and edited this thesis. This PhD is not mine alone. To the Ipswich community in which this PhD was based, my hope is that this piece of work can be a catalyst for change. Change that lets our community take control of our own health and wellbeing journey, for future generations.

Glossary of Terms

‘At risk’ community
A community that has a higher than average rate of obesity and non-communicable disease burden.

Barriers and enablers
The factors that support or do not support a function or outcome.

Behavioural economics
A division of economics that explains the psychological influences on decision making with an economic outcome, within individual and/or community environments.

Biomedical model of health
A conceptual framework of health that focuses on the cause and treatment of disease.

Body Mass Index (BMI)
A measure of obesity used around the world and is calculated by an individual’s weight in kilograms, divided by their height in metres, squared. A BMI of 25 to less than 30 is overweight and a BMI of 30 or more is classed as obese.

Choice architecture
The built, social and cultural environment that impact the choices people make.

Community-Based Food Strategies
Strategies that have been formulated to influence a specific community via community engagement and action, to influence the nutritional outcomes of that community.

Community Champions
Community members who actively advocate to address and provide leadership to positively influence the nutritional inequities within their community.

Community engagement
How a community is consulted, integrated and engaged within a specific strategy, initiative or program.

Detailed characterisation of population
An analysis of certain characteristics, in particular food insecurity risk factors that can be found within the population of a community.

Food Council
A coalition of key stakeholders who provide overall strategy and leadership in the community to support the creation and sustainability of an equitable food system.

Food Charter
A document or strategy that provides an overall strategic vision on a healthy and secure food system within a community.

Food Environment
The built, social and cultural environment that shapes a food system that is easily accessible to and inclusive of community members.

Food security
The ability for individuals and families to easily access food which is culturally appropriate, nutritious and affordable.

Food Insecurity Risk Factors
Social determinants including gender, education level, unemployment, single parent status, Indigenous heritage and young people (under the age of 25 years).

Food Insecurity, Obesity Paradox.
The correlation between mild to moderate food insecurity and higher rates of obesity.

Food Sensitive Planning and Urban Design
An overall strategy within a built, cultural, economic and social environment that creates an opportunity for community members to meet their food needs without difficulty.

High Risk Communities
Those communities that have a number of food insecurity risk factors and socio-economic disparities within their population characterisation.

Key stakeholders
People identified within a community that are actively or have the potential to directly or indirectly influence policies, strategies, initiatives or programs that aim to support an equitable food system.

Longitudinal and cross-sectional analysis
Data analysis conducted of the same, multiple variables (food insecurity risk factors) across multiple periods of time.

Mixed-methods
The use of both qualitative and quantitative research methods.

Non-communicable disease
Chronic disease burden not caused by an infectious agent – ‘associated non-communicable disease’ includes chronic diseases that are correlated with obesity risk such as stroke, heart disease, Type 2 diabetes and some cancers.

Nudging
The manipulation of choice architecture to influence the choices and behaviours of the individual.

Nutritional disparities
Nutritionally based inequities occurring within a community such as a low consumption of fruit and vegetables.

Obesity
A BMI of 30 or more.

Oligopoly
Where a small number of sellers are operating within a market, resulting in limited economic competition.

Prioritisation and customisation of policy
Identification of priority areas and tailoring a policy to address a specific area of need or people within a community, most at need of policy intervention.

Social inequities of health
The social, cultural and economic inequities influencing health and wellbeing outcomes.

Social health policy
Policies that are created with the aim of reducing social inequities that may be occurring within a community.

Social model of health
A conceptual framework of health that takes into account broader influences on health and wellbeing including social, cultural and economic factors in the environments in which people live.

Social justice framework
A philosophy based on addressing social inequities to ensure all members of a community can have the same opportunities around health, education, income and other social determinants.

Social norms
The social and cultural characteristics displayed and embedded within a community that determines behaviour and culture.

Socio-economic
Social and economic factors occurring within a population group.

Soft policy
Also known as a nudge, these are policy approaches that do not preclude choices, however influence an environment which makes choices easy.

1. Chapter 1: Introduction

1.1. Introduction

This thesis explores how a community with high rates of obesity and associated non-communicable disease could address nutritional inequities. This thesis began with the premise that increasing access to and consumption of fruit and vegetables would positively influence the health of individuals within Ipswich, a large Australian regional community. As this exploratory research evolved, it became evident that the solution to decreasing obesity and the associated non-communicable disease rates was not as simple as increasing access to, and consumption of, fruit and vegetables. Through the evolution of this research, it became apparent that an in-depth understanding of social factors driving low fruit and vegetable consumption and high rates of obesity was needed, before a strategy that influenced the nutritional intake for a community could be devised.

This evolving focus lead to an exploratory, mixed-methods research design, with an exploration of Ipswich community key stakeholder perceptions of what could be done. Interviews with key stakeholders of the Toronto region (Canada), which has had long and successful record of implementing a food strategy to improve nutritional disparities, were then undertaken to understand what was occurring in other communities with nutritional disparities and how a response had been formulated and implemented. The final phase of this research emerged from these findings and identified the food insecurity risk factors influencing the food inequities and the nutritional intake of the Ipswich community. The findings of this research challenge the notion of individual responsibility for nutritional intake and provide the foundation for community-based policies, strategies and initiatives which more effectively respond to the social inequities underpinning poor nutritional intake.

This chapter introduces the doctoral thesis titled ‘An exploration of the social inequities underpinning nutritional intake in high risk communities. This chapter presents the background of this research, as well as the context – Ipswich, in South East Queensland, Australia. The purpose, significance and scope of this research are also outlined. Finally, this chapter describes what will be included in the remaining chapters of this doctoral thesis.

1.2. Background

Low fruit and vegetable consumption has been strongly associated within the literature to high levels of obesity and obesity related non-communicable disease (Australian Institute of Health and Welfare [AIHW], 2016; Centers for Disease Control, [CDC] 2009). Low fruit and vegetable consumption and obesity is a challenge for both individuals and communities. The significant rise in obesity rates in the past twenty years has caused concern at a global, national and local level (World Health Organisation [WHO], 2018a). Obesity has been identified as a causal factor for a multitude of non-communicable diseases in Australia and other Western countries (AIHW, 2011). The ramifications of these non-communicable diseases are felt by individuals, communities and the health care system.

The high incidence of obesity internationally is contributing to rising demand for health care and increases pressures on resources within health care systems (Morgan & Dent, 2010). Addressing this rise in obesity levels has been identified as a World Health Assembly global target (WHO, 2018a). This public health challenge is one of the factors leading to significant increases in rates of chronic diseases such as coronary artery disease, type 2 diabetes and stroke, in many regional areas in Queensland, (Australia) and throughout the world (AIHW, 2012). Ipswich, a regional city in South East Queensland with a population of 323, 069 residents (ABS, 2016), is like many areas around Australia and the world which are experiencing an increased burden of chronic disease, driven by increasing obesity rates and high consumption of nutrient-poor food and low fruit and vegetable consumption (CDC, 2009; Hendrie, Baird, Golley, & Noakes, 2017).

Some regions within Queensland are having difficulties developing effective nutritional responses to the high obesity rates (AIHW, 2011; Department of Infrastructure and Regional Development, 2016). This is particularly evident in lower socio-economic regions, such as the Ipswich region. The Ipswich region is over-represented in obesity-related non-communicable health diseases and has one of the lowest intakes of fruit and vegetable consumption per person in Queensland and Australia (Darling Downs and West Moreton Public Health Network [DDWMPHN], 2017; Department of Health, 2013). Evidence suggests (AIHW, 2016; CDC, 2009) that inadequate intake of fresh fruit and vegetables, is contributing to poorer health

and increasing pressure on the West Moreton Hospital and Health Service, the public health care service provider in the Ipswich region (Department of Health, 2013). This is reflected by increased health care resource usage and allocation within the region to treat chronic disease and associated risk factors (CDC, 2011; Queensland Health, 2016), which is contributing to poor optimisation of limited health resources and services.

In the Ipswich community, a large regional area in Queensland, the West Moreton Hospital and Health Service receives over $600 million dollars of funding each year to deliver public hospital and health care services (Queensland Government, 2018a). The West Moreton Hospital and Health Service has experienced an 88% increase in expenditure over the past ten years, more than triple that of the population growth (Queensland Government, 2018b). Health expenditure in Queensland comprises one-third of the total state budget (Queensland Health, 2016). Due to increasing impacts that ageing, disability and non-communicable chronic disease have on delivery of health care services in the Ipswich region, the West Moreton Hospital and Health Service's Strategic Plan identifies a population health management approach as a key initiative (Queensland Health, 2016). This approach is an attempt to respond to high non-communicable disease rates in the Ipswich region, with a 42% higher rate of obesity than the national average and ranking as the fourth poorest out of eighty-seven regions in Australia for heart-related hospital admissions (Queensland Health, 2016). With a population expected to grow by 51% by 2026 (Ipswich City Council, 2017), and an age standard mortality rate four percent higher than the rest of Queensland, the West Moreton Hospital and Health Service is repositioning itself to attempt to build a sustainable health model, that is fiscally responsible and sustainable (Queensland Health, 2016).

The traditional approach to obesity has typically focused on an individual perspective, with an emphasis on health behaviours of an individual, with one or both foci: nutrition and exercise (MacPhail, Mullan, Sharpe, MacCann, & Todd, 2014). A focus on how much exercise each individual is required to undertake daily to improve rising obesity rates, has been central in the national obesity response within Australia (AIHW, 2016). Whilst exercise rates are slowly increasing in many communities, obesity rates are not abating (AIHW, 2016; Glasson, et al., 2011). The goal to increase exercise rates is slowly becoming embedded in local planning

and social health policy in many parts of the world, to increase the health and wellbeing of a community. Paths, outdoor gym equipment and local exercise events have been developed in many council areas around Australia, to encourage increased exercise levels among community members (Department of Infrastructure & Regional Development, 2016). Ipswich has also experienced this social health policy initiative, with an extensive network of bike and walking paths, sporting fields and outdoor exercise equipment being built in new sub-divisions as part of those new developments (Ipswich City Council, 2010). Whilst this infrastructure development has seen an increase in exercise levels for people living close to them, such developments have not yet been shown to be effective in reducing obesity levels (AIHW, 2016; DDWMPHN, 2017).

Nutritional guidelines and recommendations have historically been one of the cornerstones of the national response to high obesity rates in Australia (AIHW, 2016). The goal has been to increase individual health literacy regarding nutritional guidelines and recommendations (MacPhail, et al., 2014). Several nutritional policy responses have been initiated, particularly at federal and state levels, in an attempt to decrease obesity rates and associated non-communicable disease rates in regions around Australia (AIHW, 2012). This includes an emphasis on nutritional education, with additional funding allocated to Hospital and Health Service providers for dietician reviews for individuals, and the inclusion of nutritional information for all commercially sold food including from large takeaway chains menus and packaged food sold at grocery stores (Food Policy Index, 2017). These initiatives have been aimed particularly at increasing health literacy and responding to the chronic disease burden (Glasson, et al., 2011). However, as evidenced by increasing rates of obesity experienced in Australia, this has not, as yet, been effective in curbing either the obesity rates nor associated non-communicable disease rates (AIHW, 2011, 2016).

Fruit and vegetable consumption is a fundamental part of a nutritionally-balanced diet and is associated with healthy weight range (Hendrie, et al., 2017). Nutritional guidelines and nutrition-based policies have had a limited impact on obesity rates, with the large majority of people not consuming sufficient fruit and vegetables (CDC, 2009). Nutritional guidelines vary across institutions and countries, and can produce conflicting advice (Brug, 2009). However, a significant increase in fruit and

vegetable consumption is a constant, evidence-based recommendation to achieve a healthy weight range (Hendrie, et al., 2017).

The literature provides evidence that fruit and vegetable consumption is related to socio-economic status. A number of studies have described the association between socio-economic drivers and poor food habits. One large systematic review conducted by De Irala-Estevez and colleagues (2000), indicated that those from poorer socio-economic areas in Europe had lower consumption of fruit and vegetables due to multi-factorial social inequities. This is supported by literature that is explored in Chapter Two which establishes socio-economic risk factors are associated with higher rates of obesity (Charlton, 2016). There is limited recent research exploring why some lower socio-economic communities are at higher risk of inadequate fruit and vegetable consumption and the implications for a strategic response addressing significant social disparities, barriers and structures that may be driving the obesity rates in such communities (Martin, Shuckerow, O'Rourke, & Schmitz, 2012).

A 'social model' of health, which takes into account broader influences of social, cultural and economic factors in the environment in which people live, has been recognised as fundamental to health and wellbeing for many decades. The World Health Organisation, through the formation of the Ottawa Charter in 1986, determined the need for community level interaction to address health and wellbeing outcomes (WHO, 2018b). Three out of the five action areas of the Ottawa Charter comprise community and social-based approaches including 'strengthening community action', 'creating supportive environments' and 'building healthy public policy' (WHO, 2018b). However, decades after the Ottawa charter was signed, the public health response to one of the largest health challenges in the 21st Century (WHO, 2018b) – obesity - is still focused on individual behaviour management rather than enhancing social support and community environments (Friel, Hattersley, & Ford, 2015). Friel and colleagues (2015) argue that an effective and sustainable response to increasing levels of obesity must include both broader structural approaches and community action.

Referring to the World Health Assembly Global Obesity Target, Huang, and Drescher (2015) recommended that broadening the evidence base for community

interventions is crucial for empowering communities to prioritise and customise a response to the social inequities occurring within a region. Furthermore, Huang and Drescher stated that evaluation of the effectiveness of such community-based initiatives and policy is essential to address the large non-communicable disease rates that are now affecting a large portion of the developed world (Huang & Drescher, 2015). However, this is difficult to customise, prioritise and implement without a thorough analysis of key social factors that may be leading to food system inequity within a specific 'at risk' community, as well as an exploration of the key stakeholders' understanding of the barriers and enablers to increasing fruit and vegetable consumption and improving high obesity levels.

1.3. Context

The Ipswich community, a large regional community in South East Queensland, Australia (Ipswich City Council, 2017), has been selected as the focus of this study because people residing in Ipswich experience a disproportionately high level of obesity, do not consume adequate amounts of fruit and vegetables, and have a higher incidence of non-communicable chronic diseases such as diabetes, heart disease, stroke and cancer (DDWMPHN, 2017; Department of Health, 2013). Settled over many thousands of years by the Jaggera, Yuggera and Ugarapul Indigenous peoples, European settlement began in the Ipswich area due to its limestone deposits and Ipswich became known as a mining town for limestone, and later, coal (Ipswich City Council, 2017). Now well beyond those mining days, the Ipswich community in the 21st century, with a population of over 300, 000, is diverse and dynamic. Significant change has occurred due to the major growth experienced and predicted, both in the built environment and community migration (ABS, 2016; Ipswich City Council, 2017).

One of the most significant of these changes is the extent of growth expected within the Local Government Area (LGA), with a population projected to grow by 147% by 2041 (Department of Infrastructure, Local Government and Planning, 2017). Ipswich has experienced a 16.1% growth rate in the population from 2011 – 2016 (Australian Bureau of Statistics [ABS], 2017). This population growth has predominately been seen in areas outside of the traditional Ipswich community that was first established in 1827 (Ipswich City Council, 2017) and is being built on the fringe of the LGA. The

‘City of Ipswich Community Plan i2031’ (Ipswich City Council, 2010), identified significant corridors for growth within the region, which will bring a shift in infrastructure demand and delivery, including the delivery of health care services (Department of Infrastructure and Regional Development, 2016).

Newer suburbs that have experienced significant growth on the fringe of Ipswich, have a much higher socio-economic demographic profile than more established parts of Ipswich (ABS, 2018; DDWMPHN, 2017). The socio-demographic composition of the population in Ipswich, in general, is heterogeneous. Ipswich has a high rate of young people and young families (ABS, 2017a), resulting in unique challenges and opportunities for the health and well-being of the community. Furthermore, 45% percent of the Ipswich population report they were born overseas or have at least one parent who was born overseas (ABS, 2017a) resulting in a highly multi-cultural population. This substantial growth and diversity, coupled with documented health and social challenges, could continue to adversely impact future generations of Ipswich, if not effectively addressed. This means that it is an ideal time to develop and refine community-based, social health policy to address the significant non-communicable disease burden.

Ipswich does not have well developed social model responses to obesity within the community. The West Moreton Hospital and Health Service outlines a clinical response to high obesity rates in its strategic plan, including treating varied non-communicable diseases caused by obesity, and does provide clinical services to the community including dietician reviews for those experiencing nutritional disparities and obesity (Queensland Government, 2016b). Whilst a ‘Jamie Oliver Ministry of Food’ has set up a base in the Ipswich region, this not-for-profit organisation is the only identified example of an initiative strategically set within the Ipswich community to attempt to influence nutritional intake through food literacy and use (The Good Foundation, n.d.).

A number of communities around the world, such as Toronto (Canada), have designed and implemented a long-term, strategic, community-centred response, which encourages an increased consumption of easily accessible nutritious food. These initiatives have been driven from a social model of health which has been designed to improve specific social inequities experience by the population (Toronto

Public Health, 2010a). This includes the creation of a 'Food Council' and 'Food Charter' implemented through significant consultation with members of the public, including the Youth Food Council and not-for-profit organisations such as 'Food Share' (Mah & Thang, 2013).

These local social health policy responses have been driven by clear community leadership demonstrated within the Toronto region by the formation of councils, steering groups and members of the public called 'Food Champions' who embed the overall strategy back into their community neighbourhoods (Toronto Public Health, 2018). Those who have been successful in influencing nutritional intake of the community, have embraced a multi-level strategic approach that provided benefits to the community, including an overall focus on economic growth, sustainable long-term programs and engaging with the community. The focus has been on improving social inequities, rather than solely focusing on individual health behaviours and literacy for nutritional intake (Toronto Public Health, 2010b).

1.4. Purpose

This doctoral program aimed to understand why the Ipswich community had a lower rate of fruit and vegetable consumption and corresponding higher rates of obesity and associated non-communicable disease rates, via three sub-aims. The first was to explore the barriers and enablers, to increase fruit and vegetable consumption in Ipswich, as identified by key stakeholders within the Ipswich community. The second aim was to ascertain if the Ipswich community perspectives were similar to, or divergent from, the views of key stakeholders in a community with a long and successful history of implementing community-based food strategies.

The final aim of the study was to assess the prevalence of food insecurity risk factors in the Ipswich population that are associated with food system inequity and obesity levels. This aim emerged from the findings discovered after the first two aims of the research were conducted, to explore these results. This formed the quantitative phase of this study which utilised a longitudinal, cross-sectorial analysis of the identified food insecurity risk factors within existing census data collected by the Australian Bureau of Statistics (ABS). The AIHW, in the 'Australia's Health' report (2016), identified longitudinal data trends, particularly in specific groups that need to

be further researched to provide more information into populations that are vulnerable to obesity.

This research project aims to understand:

- What are the perceptions of key stakeholders in the Ipswich region, of the barriers and enablers to increasing fruit and vegetable consumption in the community?
- What is the experience of the barriers and enablers to changing the nutritional intake of a community, from another community who had implemented community-based food strategies?
- What is the prevalence of food insecurity risk factors that may influence low fruit and vegetable intake in the Ipswich community?

1.5. Significance, Scope and Definitions

Many communities around the world, particularly in developed countries, face comparable challenges due to rising obesity levels and non-communicable disease rates (AIHW, 2016; CDC, 2009). Additionally, many of these same communities appear to have similar social inequities and socio-economic drivers, and low rates of fruit and vegetable consumption (Charlton, 2016). Whilst the scope of this study was contextually based within the Ipswich community, the significance and future implications of the research outcomes of this doctoral project are transferable to other similar communities. This research aimed to understand the barriers and enablers shaping low fruit and vegetable intake within the Ipswich community. This was achieved through a detailed characterisation of the Ipswich population by utilising longitudinal data from the Australian Bureau of Statistics and by undertaking semi-structured interviews with key stakeholders, both in Ipswich and in a community (Toronto, Canada) that has successfully implemented long-term initiatives to influence nutrition within their community.

This study used a mixed-methods, qualitatively driven sequential design utilising a critical, exploratory approach. This approach enabled the exploration of why the Ipswich community was experiencing nutritional disparities. The critical paradigm, which seeks to understand social and political forces shaping specific phenomenon with a community (Denzin & Lincoln, 2008), coupled with an exploratory approach, enabled the researcher to broadly explore issues and themes that emerged

(Mosavel & Simon, 2010) and is the foundation of this doctoral thesis. The key terms and concepts discussed in this thesis are defined in the glossary of terms at the beginning of this document.

1.6. Thesis Outline

Chapter Two in this thesis explores the rising obesity rates in the developed world and the associated rise in the non-communicable disease burden. It critically analyses the current literature regarding the role of fruit and vegetable intake in shaping the obesity risk and the impact of obesity on the non-communicable disease outcomes within a community. The review then analyses the concepts within the literature regarding why some communities with specific socio-demographic characters may be at higher risk of obesity than other communities', by defining concepts around the 'Food Insecurity Obesity Paradox'. The literature review then explores and discusses key strategies and concepts that have been implemented elsewhere in the world to improve nutritional challenges, within a social model of health.

Chapter Three in this thesis describes the methodological underpinnings of this research and the design of the research phases by explaining and defining the methodology utilised. This chapter forms a narrative regarding how this exploratory, sequentially driven, mixed-methods program of research evolved and outlines the overall methodology, research design, research phases and research setting. Additionally, this chapter outlines the process of obtaining ethical approval and the quality of the research undertaken in this doctoral study.

Chapter Four presents Phase One of this study which was a qualitative phase, designed to explore the understanding of key stakeholders within the Ipswich community, of the barriers and enablers to increase fruit and vegetable consumption. A further part of Phase One was undertaken to contextualise and synthesise findings from the Ipswich region with the Toronto community in Canada, that had implemented strategic food initiatives designed to influence nutritional intake of their community. This chapter outlines the purpose of this phase, the methods used for data collection and analysis, and the results of this qualitative phase, which formed the first part of this sequentially driven, mixed methods explorative, critical enquiry undertaken in this thesis.

Chapter Five presents Phase Two of this study which conducted a detailed characterisation of the Ipswich population to examine the prevalence of food insecurity risk factors within the community. This phase evolved from the findings concluded from the semi-structured interviews conducted in Phase One, particularly from the findings from the Toronto cohort, who articulated that the initiatives to influence the nutrition within their community were based on improving social inequities and resulting food insecurity. Hence, this phase sought to understand if food insecurity risk factors were present in Ipswich and if there were certain subsets of the population at high risk of experiencing these food system inequity drivers. This chapter presents the purpose, methods and results of this phase of the doctoral research.

Chapter Six critically discusses the overall key themes of the research conducted as part of this doctoral research. Analysing and synthesising these findings, this chapter discusses how the social inequities in the Ipswich community may be contributing to nutritional intake, and the levers that may be utilised within the community to formulate an appropriate strategic response.

Chapter Seven concludes this doctoral study by discussing overall implications of this research, including how findings from this thesis can to influence local social health responses to increase fruit and vegetable consumption in Ipswich. It presents a model which may be relevant to, and utilised for, other high-risk communities around the world and concludes by discussing strengths and limitations of the research, and recommendations for future research.

1.7. Conclusion

This chapter introduced the research context and aims, and explored the background to this doctoral research. The aims, significance and scope of this research have been outlined in this chapter and the thesis structure has been presented.

The following chapter presents an extensive review of literature to demonstrate the associations between fruit and vegetable intake and obesity rates, and how social inequities shape health outcomes including obesity risk. The literature available on the ‘Food Insecurity Obesity Paradox’ is analysed and examples of how a community

could respond to inequitable food systems and shape the nutritional intake of that community are explored.

2. Chapter Two: Literature Review

2.1. Introduction

This chapter presents a review and analysis of published, peer-reviewed research on the key concepts that form the foundation of this doctoral research. This literature review will establish the association between obesity rates and non-communicable disease outcomes and the role of fruit and vegetable consumption in influencing obesity risk. Additionally, literature focused on how social inequities influence obesity risk and food consumption patterns, the 'Food Insecurity Obesity Paradox' and how the factors influence obesity risk, is described. This chapter concludes by reviewing how some 'at risk' communities have shaped their responses to food within a social model of health, by exploring the literature in relation to community-based food strategies and analysing how local governments can influence the food environment through social policy, including concepts such as 'nudging' and 'Food Sensitive Planning and Urban Design'.

2.2. Rising obesity and non-communicable disease rates

Many communities around the world are facing what the World Health Organisation states is one of the biggest health challenges of the 21st century (WHO, 2018a). Obesity is driving non-communicable chronic disease rates higher across the world and as a result, is putting enormous fiscal and resource pressure on health care systems (Morgan & Dent, 2010). In 2016, a study published in the Lancet (Di Cesare, et al., 2016), demonstrated that Body Mass Indexes (BMI) are increasing in over 200 countries included. Di Cesare, et al., (2016) predicted that, global obesity prevalence will reach 18% in men and surpass 21% in women by 2025. This study utilised multiple different, credible data sources from national and international organisations and provided the most comprehensive study to date using longitudinal, cross-sectional analysis to demonstrate trends in BMI's (Di Cesare, et al., 2016).

Rates of obesity in the developed world, however, are significantly higher, with countries in the European Union reaching rates of overweight and obesity of 47% in women and 64% in men (World Obesity Federation, 2018). McPherson, Marsh and Brown (2010) from the University of Oxford, published a report that presented data trends analysed by strong methodology including a cross-sectional, longitudinal BMI

modelling and regression analysis that suggested that obesity rates have been significantly increasing in the UK since the mid-1980s and were showing no evidence of slowing. The authors predicted further growth of obesity rates through to 2050 with an expected corresponding increase in chronic disease rates such as diabetes, coronary artery disease, some cancers, osteoarthritis and stroke resulting in significant costs to healthcare services and society (McPherson et al., 2010). The authors further demonstrated that in 2007, obesity related disease was costing the National Health Service (NHS) in the UK £17.4 billion per year (McPherson et al., 2010). They projected that if current obesity level increases are sustained, the cost on the NHS will rise to £22.9 billion per year by 2050 (McPherson et al., 2010).

Australia has also experienced rapid and sustained increase in obesity levels, recording obesity rates in excess 63% of the adult population (ABS, 2015). This is an increase of 7% over a ten-year period, with an average weight gain of 4.4kg for both men and women in Australia (AIHW, 2011). The increasing obesity rates are causing a significant resource drain on the Australian health care system. The AIHW in the 2011 Australian Burden of Disease Study, state that 31% of Australia's disease burden is directly preventable and is commonly linked to a high Body Mass Index (BMI) (AIHW, 2011). The largest burden of disease in Australia includes cancer, cardiovascular diseases, chronic musculoskeletal conditions, chronic obstructive pulmonary disease and stroke (AIHW, 2011). This study utilised fatal and non-fatal disease categories to analyse the burden of disease within Australia, utilising a National Mortality database and disease burden statistics from the Australian Institute of Health and Wellbeing using multiple, complementary analysis to achieve a comprehensive demonstration of disease burden correlated to BMI (AIHW, 2011). Obesity is implicated as a risk factor for the majority of these disease burdens (AIHW, 2011). The 2016 Australia's Health report from the AIHW further demonstrated a steady increase in non-communicable disease rates with chronic diseases accounting for two-thirds of the overall disease burden in Australia (AIHW, 2016). These diseases are directly or indirectly linked to obesity.

The ABS in the 2014-2015 National Health Survey, reported that over 1, 020,000 people in Australia identified that they had Type Two Diabetes (ABS, 2015). The associated link between Type Two Diabetes and obesity in the research literature is clear. The Australian Heart Disease Statistics, published by the Heart Foundation in

2015, presented comprehensive data and discussion that demonstrated evidence that those who identify as being overweight or obese, are eight times more likely to develop Type Two Diabetes than those who are of a 'normal' BMI score (Nichols, Peterson, Herbert, Alston, & Allender, 2015). The authors utilised trends in age-standardised death and disease rates to analyse the correlation between this significant disease burden in Australia and BMI (Nichols, et al., 2015). The correlation between obesity and Type Two Diabetes is significant because diabetes was recorded as a contributor to 10% of all deaths in Australia in 2013 (AIHW, 2011). This is expected to increase over the next decade (AIHW, 2011).

The association between obesity and cardiovascular disease was also well established in the Australian Heart Disease Statistics report. Nichols and colleagues (2015), identified almost 70% of men and 56% of women in Australia who experience cardiovascular disease were overweight or obese based on BMI. Further, 60% of men and 66% of women with cardiovascular disease had a high waist circumference measurement, which is directly linked to increased cardiovascular risk (Nichols, 2015). It is therefore evident that increasing rates of obesity is resulting in increased levels of cardiovascular disease in Australia's burden of disease.

Cancer has recently surpassed coronary heart disease in Australia as the largest contributor to deaths (AIHW, 2016). Australia has experienced more than a doubling of cancer rates in the past thirty years (ABS, 2015). Colorectal cancer is the second most commonly diagnosed cancer in Australia and has a strong correlation with obesity risk and low fruit and vegetable consumption (AIHW, 2016). An increase in rates of specific cancers, including bowel, oesophageal, liver, pancreatic, uterine, renal and breast cancer is linked to higher BMI, as reported by the International agency for Research on Cancer (Azvolinksy, 2016). Researchers have attributed a causal link between obesity and specific cancers since 2002, and this has been reaffirmed several times, including by the International Agency for Research on Cancer where a special working group has reviewed over 1000 epidemiologic studies, published in the New England Journal of Medicine concluded that a person who limits their weight gain, will have an associated decrease in the risk for many types of cancer (Lauby-Secreten et al., 2016). Therefore, it is evident that the rise in BMI's is resulting in the rise in the incidence of many types of cancer, making obesity a significant and increasing health priority.

The Health of Queenslanders 2014 report (Queensland Health, 2014b) utilising data and analysis from the Australian Institute of Health and Welfare stated that the rising obesity rates are a state priority. In 2014, 1.1 million Queensland adults were obese. If this trend continues, by 2021, five million adults in Queensland will be obese (Queensland Health, 2014b). This report also states that obesity rates are of higher prevalence in disadvantaged areas represented by lower socio-economic status of the community (Queensland Health, 2014b). In fact, adult obesity rates in Queensland were up to 80% higher in these communities (Queensland Health, 2014b). Queensland also rated approximately 10% higher in obesity rates than the rest of Australia (Queensland Government, 2016).

As reflected in the information presented by the Queensland Government, some demographic subsets within Australia are faring worse in terms of obesity rates. The Aboriginal and Torres Strait Islander Health Performance Framework (AIHW, 2008) report showed Aboriginal or Torres Strait Islanders were much more likely to be obese (34% compared to 18% of the remainder of the population). This report provided a detailed analysis of the state of health within the Aboriginal and Torres Strait Islander population by utilising data collected from the Australian Institute of Health and Welfare and various national data sources and conducting a time series analysis using linear regression analysis to give a clear indication of the trends occurring within this population group between 1991 and 2006 (AIHW, 2008). This obesity trend has continued in the Aboriginal and Torres Strait Islander population within Australia and Queensland, with 70% of adults from this community estimated as overweight or obese (AIHW, 2016), versus 65% within the non-Indigenous population. Sixty-one percent (6,000) of all deaths in the Aboriginal and Torres Strait Islander population in Australia, in the five-year period between 2009 and 2013 have been classified by the National Healthcare Agreement 2015 Standards as ‘avoidable’ and consist of non-communicable, obesity-driven mortality outcomes (AIHW, 2016). The Aboriginal and Torres Strait Islander population in Australia is 3.5 times more likely to experience Type Two Diabetes, a non-communicable disease linked to obesity rates, than the non-Indigenous population and 4 times more likely to die from diabetes (ABS, 2013).

The cost of this disease burden is high. Whilst obesity increases morbidity and mortality rates and, hence, has adverse health outcomes for individuals, it also has a

flow on effect in society. A 2010 study (Colagiuri et al., 2010), evaluated the health costs for Australians who were overweight and obese compared to those who were not. This study which analysed a 5 year follow up from the Australian Diabetes, Obesity and Lifestyle data which consisted of a large participant sample size, found that annually, the direct health costs associated with a high body mass index (BMI) was $21 billion in 2005 in Australia (Colagiuri et al., 2010). This study provided a strong, comprehensive indication of the cost of overweight and obesity in Australia by analysing direct and indirect health costs associated with a BMI higher than the normal weight range (Colaguiri et al., 2010). This also does not take into account the larger, social cost of obesity on productivity, mental and physical chronic health conditions and family and relationship stress (Morgan & Dent, 2010). The chronic disease rates from the non-communicable disease burden are increasing the economic pressure on the health care system to unsustainable levels. In Queensland, the Queensland Government reports the direct cost of the delivery of healthcare services has increased 85% in the past ten years, which is three times the rate of the population increase (Queensland Health, 2016). Whilst this is driven by a number of factors, the Queensland Government states that obesity, a recognised national priority by the AIHW in 2008, is a significant driver of this increase in cost of care within its Hospital and Health Services (Queensland Health, 2016).

The West Moreton region, where Ipswich is located, has a 14% higher rate of obesity than the rest of Queensland (Queensland Health, 2016). The 2016 Regional Year Book (Australian Department of Infrastructure Regional Development, 2016) stated that 78.3% of the Ipswich population are overweight or obese. This is an increase from 71.7% in 2007. This is the second highest rate of obesity of any community in Queensland and fourth highest in Australia (Department of Infrastructure and Regional Development, 2016). The West Moreton Hospital and Health Service has identified obesity and non-communicable chronic disease burden as a strategic priority to sustainably address the delivery of healthcare services in the community (Queensland Government, 2018b).

2.3. Role of fruit and vegetable consumption in shaping obesity and non-communicable disease risk

Traditionally, within a biomedical model of health, strategies used to attain and maintain a healthy BMI have been twofold - a nutrition focus and a physical exercise focus for the individual (CDC, 2009). This consists of exercise guidelines, nutritional information and literacy, dietary guidelines, and the rise in surgery that limits the portion of the food consumed, such as gastric surgery (AIHW, 2016). There has been a significant amount of nutritional information available to the community regarding the appropriate intake of suitable food to maintain a healthy BMI. However, some of this information is conflicting and new nutritional guidelines are released every ten years by the National Health and Medical Research Council (NHMRC) (2013). However, one constant feature in the nutritional guidelines, in Australia and internationally, has been a strong emphasis on a significant intake of fruit and vegetables required in a diet to maintain a healthy diet (NHMRC, 2013).

The Australian Dietary Guidelines recommend that people should consume at least two serves of fruit and five serves of vegetables per day (NHMRC, 2013). One serve of fruit comprises one piece or 150g of fruit and one serve of vegetables comprises half a cup or 75g of vegetables (NHMRC, 2013). However, there is mounting evidence that this should be an absolute minimum consumption guideline of fruit and vegetables for the maintenance of health and wellbeing and a decreased risk of adverse health outcomes, such as development of non-communicable diseases (Aune, et al., 2017). A systematic review of over 95 studies and a dose-response meta-analysis analysing the relationship between fruit and vegetable intake and risk of cardiovascular disease, cancer and mortality was undertaken and the authors recommended people should be consuming up to ten serves of fruit and vegetables per day for optimal health and wellbeing (Aune, et al., 2017).

The CSIRO established an online survey to estimate adherence with the Australian Dietary Guidelines (NHMRC, 2013) and ascertained that there is a direct correlation between those who had a high level of fruit and vegetable intake and those who had a BMI within the healthy weight range (Hendrie et al., 2017). This online survey utilised a large sample size with more 180,000 people in Australia completing the survey over two years reporting self-reported food intake (Hendrie et al., 2017).

This is further supported by epidemiology research that has showed self-reported higher consumption of fruit and vegetables was strongly correlated with a healthy weight range and is consistent with evidence-based guidelines (Rolls, Ello-Martin, Tohill, & Carlton, 2004; Tohill, Seymour, Kettel-Kahn, & Rolls, 2004).

In a survey conducted by the Queensland Government as part of the 'Two and Five' initiative, which encourages people to eat two serves of fruit and five serves of vegetables a day, the majority of respondents were aware of the fruit and vegetable recommendations but less than 9% of the population reported that they consumed those serves each day (Queensland Health, 2014b). A 2013 report from the Department of Health (2013), outlined the self-reported health status for Queenslanders within LGAs. This report collected survey information through computer assisted telephone interviewing through contacting one person over the age of 16 years via a random household selection within Queensland (Department of Health, 2013). The report was commissioned by the Queensland Government to analyse LGAs in regards to chronic disease and health behavioural risk factors (Department of Health, 2013). The findings in the report outlined that only 8.2% of people within the Ipswich LGA consumed at least five serves of vegetables per day, and only 6.5% of the Ipswich population consumed the combined recommended fruit and vegetable intake per day (Department of Health, 2013). This is less than the state average of 8.3% (Department of Health, 2013). The report also demonstrated a correlation between LGAs that had higher rates of a healthy BMI and areas that had a higher level of fruit and vegetable consumption (Department of Health, 2013). Further supporting this finding, health maps presented within the report demonstrated those LGAs that reported a lower intake of fruit and vegetable consumption, also had higher levels of chronic disease health indicators (Department of Health, 2013).

The trend occurring in Queensland is reflected throughout Australia. A 2014 survey conducted by the ABS indicates that consumption of adequate amounts of fruit and vegetables is still an issue in Australia (ABS, 2015). Only 5.1% of Australians over the age of 18 self-reported that they consume the recommended daily consumption of fruit and vegetables which consists of 2 or more serves of fruit and 5 or more serves of vegetables (ABS, 2015). This has slightly improved since the 2011 national survey which indicated 4.2% of Australians met the fruit and vegetable

consumption guidelines (ABS, 2015). It is worth noting that both of the Queensland and Australian surveys consisted of self-reported data and utilised different methodologies, which may impact on accuracy, validity and representativeness.

The importance of higher fruit and vegetable consumption as an effective weight management tool has also been supported by the Centers for Disease Control and Prevention in the United States (2011). The 'CDC Guide to Strategies to Increase the Consumption of Fruits and Vegetables', was released in 2011 and stipulates that low rate of fruit and vegetable consumption is linked to high rates of obesity (CDC, 2011). The CDC recommends replacing energy-dense foods with fruit and vegetables as an important strategy to maintain a healthy weight (CDC, 2011). The relationship between a high fruit and vegetable consumption, which the CDC describes as two serves of fruit and four serves of vegetables per day, and weight management, has been well supported by peer-reviewed literature (CDC, 2011). Rolls, Ello-Martin and Tohill found in 2004 that dietary intervention for people who were described as obese (BMI as over 30) by increasing fruit and vegetable consumption, resulted in weight loss and weight maintenance within a healthy BMI range. This was also supported by a later epidemiological meta-analysis conducted by Tohill, Seymour, Serdula, Kettel-Kahn, and Rolls (2004) who established that people who self-identified as having a higher intake of fruit and vegetable consumption were more likely to maintain a healthy weight range.

The evidence suggests that maintenance of a healthy weight range decreases the rate of obesity-related chronic diseases such as heart disease, stroke and diabetes and can be achieved by eating a diet high in fruit and vegetables (Aune et al., 2017; He, Nowson, & MacGregor, 2006; Hu, 2003). Hu (2003) established, in a meta-analysis of studies including the Nurses' Health Study, one of the largest longitudinal studies undertaken to ascertain risk factors for chronic disease in women, that plant-based foods prevented cardiac disease. He, Nowson and Macgregor (2006) established the link between a lower incidence of stroke with high consumption of fruit and vegetables in a meta-analysis of cohort studies. In a recent systematic review and meta-analysis conducted by Aune and colleagues (2017), 95 studies were analysed which definitively indicated that an estimated 7.8 million premature deaths worldwide in 2013 may be attributable to a poor fruit and vegetable intake. The authors utilised a random effects model to estimate the mortality burden

globally, specifically analysing cardiovascular disease and total cancer risk (Aune, et al., 2017). They concluded that there was a 28% reduction in relative cardiovascular disease, a 12% reduction in total cancer risk, and a 25% reduction in all-cause mortality with 600g of fruit and vegetable consumption per day (approximately five serves) (Aune et al., 2017). In 2004, Montonen and colleagues conducted a study that strongly demonstrated that a diet high in antioxidant intake, utilising a plant-based diet consisting of high intake of fruit and vegetables, decreased BMI and significantly decreased risk of developing Type Two Diabetes (Montonen, Knekt, Jarvinen, & Reunanen, 2004).

In summary, there is clear evidence that consumption of more fruit and vegetables lowers obesity risk. However, this does not explain why some people consume more energy-dense food and fewer fruit and vegetables. Whilst the biomedical model of health dictates that being overweight or obese occurs when an individual consumes a higher ratio of calories than those burnt through activity, there is an assumption that this is an individual choice. However, the social model of health explains that the context in which people live directly influences health behaviours (Rumbold & Dickson-Swift, 2012).

2.4. Social inequities and poor health outcomes

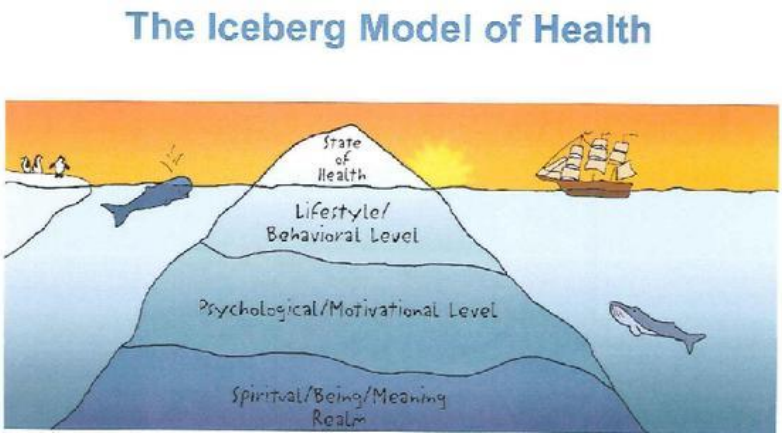
The biomedical model of health is fundamentally focused on the provision of clinical services to treat existing diseases (Willis, Reynolds, & Keleher, 2016). This asocial model of health does not take into account social or cultural factors as a primary cause of disease, and rather focuses on individuals. This is a significant contrast to the social model of health, which recognises the social and cultural factors that may be directly influencing health outcomes. Talbot and Verrinder (2010) suggest the biomedical model of health promotes ‘victim blaming’, focusing solely on the role of the individual and their behaviour, and not on the wider social and structural forces that influence how individuals make food choices and develop and maintain health-promoting behaviours.

Social determinants are circumstances in which we grow up in, live or work in and can include economic, education, environment and political factors that can influence the overall health of individuals (Rumbold & Dickson-Swift, 2012). The influence of these social determinants on the health and wellbeing of individuals is well

researched, including concepts such as the ‘social gradient of health’ stipulating that the further down the socio-economic scale an individual is, the higher rate of diseases and a shorter life expectancy is experienced (Talbot & Verrinder, 2010).

Social epidemiological research has been undertaken to identify socio-economic risk factors that may be associated with specific disease processes or health outcomes, including the prevalence of obesity. However, whilst these risk factors may coincide with disease processes, due to the complexity of multi-faceted factors, behaviours and determinants, this does not infer a direct causal relationship (World Health Organisation, 2003). The health ‘iceberg model’ (Talbot & Verrinder, 2010) attempts to model how social determinants may contribute to health and demonstrate that whilst contributing factors such as lifestyle behaviours and social determinants are often not measurable, they often combine in a complex manner to build a causal foundation of disease processes, as shown in Figure 1. The ‘state of health’ referred to in the top section includes disease states that are able to be measured or determined, however it shows the health outcomes, not the causes of the disease states. Under the water level, behavioural and lifestyle factors such as nutritional intake and exercise, contributes to the health state. The bottom sections of the iceberg demonstrate that the foundation to health outcomes include social determinants that influence psychological and motivational levels and our founded on the meaning of health and well being of that person, and indeed a community.

Figure 1. The Iceberg model of health



Travis & Ryan, 1998

The aim of social epidemiology research has been to understand the significant health inequity in communities, including in developed nations. Health equity can be defined as “the absence of systematic disparities in health (or in the major social determinants of health) between social groups who have different levels of underlying social advantage/disadvantage” (Rumbold & Dickson-Swift, 2012, p. 190). A focus on social inequity is reflected in the United Nations Millennium Development Goals (United Nations [UN], 2015) which aim to address the broadening inequities in health, to ensure that good health is a universal goal. The UN recommends that improvement of daily living conditions and addressing inequitable distribution of resources (including money and power) will make a significant contribution to improve health inequities and overall health outcomes (UN, 2015).

Research undertaken by Egen and colleagues in United States of America (USA), using median household incomes, demonstrated a link between socioeconomic disparities and significant differences in rates of obesity and life expectancy (Egen, Beatty, Blackely, Brown, & Wykoff, 2017). This comprehensive, longitudinal study found that the more social economic stressors a household was under such as low household income, higher rates of obesity and lowed life expectancy was experienced (Egen, et.al., 2017). This finding is supported by large sample size, longitudinal, multiple logistic regression model analysis utilising data from the California Health Interview Survey, research undertaken by Cook, Tseng, Tam, John & Lui (2017), who established that Asian-American children and adolescents who were from a low SES ethnic group were significantly more likely to be overweight than those in the high or middle SES group. A significant increase in the obesity trend in lower socio-economic areas is evidenced among children across the world. The United Nations (2015) stated that more than 2/3 of children who are overweight reside in low to middle income countries. Di Cesare, et al., (2016) argued that if these trends continue, there is no possibility of reaching the 2025 global obesity target set by the World Health Organisation (WHO, 2018b).

In Australia, the AIHW (2016b) reported that adults living in lower socio-economic areas were more likely to be overweight or obese, with an 8% increase of obesity rates within those communities. Additionally, those who reside in the lowest 20% of the socio-economic areas in Australia, are 1.6 times more likely to have two or more non-communicable chronic diseases than the rest of the country (AIHW, 2016).

Researchers have attempted to theorise why obesity is associated with lower socio-economic populations. Whilst these correlations between social determinants and higher obesity rates are clear, the specific causation is much more complex, which reinforces the need to undertake further research that explores obesity within a social model of health lens, rather than a biomedical model of health. One theory that outlines the link is the 'Food Insecurity Obesity Paradox', which describes how low to moderate food insecurity is linked to high obesity rates.

2.4.1.1. Food Insecurity Obesity Paradox

One example of applying a social model of health lens to nutritional consumption is the 'Food Insecurity Obesity Paradox'. There are four pillars of food security. These include availability of food, access to food, affordability of that food, and the use of food (Charlton, 2016). The United States Department of Agriculture further describe food security as being able to access nutritionally adequate food and being able to acquire foods in a socially acceptable and sustainable manner (Bickel et al., 2000). Charlton (2016, p. 73) defines food security as "the physical, social and economic ability to access sufficient, safe and nutritious food". Auckland, King, Murray and Saunders (2015 p. vii) however, attempt to define food security in a much broader sense as being when "all citizens obtain a safe, personally acceptable, nutritious diet through a sustainable food system that maximizes health choices, community self-reliance and equal access for everyone". This latter definition of food security takes into account the broader social and cultural context of food choices, accessibility, use and availability in an equitable food system.

Food insecurity occurs when there is a perceived or actual uncertainty or some other limitation around being able to acquire nutritionally adequate foods due to one of these four pillars (identified by Charlton, 2016), not being met. There are varying degrees of food insecurity. Franklin and colleagues statedthat food insecurity can range from hunger, to mild food insecurity (Franklin et al., 2012)Bickel and colleagues (2000) identified that food insecurity is mild-to-moderate when food can be accessed most of the time, however this may not be the most nutritional food for the household. Bickel et al., (2000) described severe food insecurity as resulting in hunger where there is an involuntary lack of access to food. The understanding of mild to moderate food insecurity is paramount to the 'Food Insecurity Obesity

Paradox' that states mild to moderate food insecurity greatly increases the risk of being overweight or obese (Burns, 2004). The 'Food Insecurity Obesity Paradox' states that those who are experiencing food insecurity, not driven by hunger, but rather social and cultural constructs that are determining their food choices, are more likely to experience obesity (Ramsey, Giskes, Turrell., & Gallegos, 2011b).

Research clearly indicates that mild to moderate food insecurity is directly associated with an increased risk of being overweight or obese (Burns, 2004; Dinour, 2007; Franklin et al., 2012; Ramsey et al., 2011b). This is the premise of the 'Food Insecurity Obesity Paradox'. Martin and Ferris (2007) demonstrated in a cross-sectional retrospective study, that mild-to-moderate food insecurity is directly related to obesity rates and implications of their work focused on the need for obesity policies and prevention programs to be directly related to food insecurity risk factors, addressing broad social drivers that have been linked to food insecurity within a social model of health (Martin & Ferris, 2007).

In a 2012 literature review, Franklin and colleagues reviewed 65 studies conducted between 2005 and 2011 specifically investigating the links between obesity and food insecurity. Thirty percent of these studies showed a positive correlation between obesity and food insecurity (Franklin, et al., 2012). These authors also indicated there is a strong relationship between women who experience food insecurity and obesity, particularly among households where women were single parents (Franklin, et al., 2012). This gender risk was associated from the stage of adolescence onwards (Franklin et al., 2012). Their literature review did however demonstrate that there was often not a linear relationship between obesity and food insecurity, particularly in children, however the authors did not clearly define or focus on mild food insecurity as opposed to moderate or severe food insecurity.

Multiple studies from within Australia, the USA and the UK, strongly demonstrate the link between challenging socio-economic drivers, mild to moderate food insecurity and obesity (e.g., Burns, 2004; Ramsey, et al., 2012b; Rosier, 2012). There is further evidence suggesting that this is particularly prevalent among women, with one study demonstrating women from food insecure households were up to two BMI units heavier than women from food secure households (Martin & Ferris, 2007). The risk

of women being in food insecure households was directly related to single parent status, renting, lower income and lower educational attainment, resulting in women within Australia experiencing a higher percentage of not just one, but multiple food insecurity risk factors (Martin et al., 2017; McDonald, 2011).

A complex relationship between poverty and food insecurity has been demonstrated broadly within the literature. The risk factors of food insecurity are well established. Research from USA and the United Kingdom reflect food insecurity following a socio-economic gradient (Burns, 2004). In addition to gender, children are also at higher food insecurity risk (Martin & Ferris, 2007; Ramsey et al., 2012a). Martin and Ferris (2007) demonstrate that both women and children are at a higher risk of obesity due to the 'Food Insecurity Obesity Paradox'. Additionally, after analysing socio-economic characteristics for both adults and childhood obesity within food insecure households, Martin and Ferris (2007) found that girls are at two times the risk of being overweight or obese than boys, if their parents are obese. This results in significantly higher levels of obesity in food insecure households for both women and girls.

The 'Food Insecurity Obesity Paradox' was identified by Burns in 2004, as a 'hidden crisis' occurring within Australian communities. Further to gender risks identified within the literature, the Australian National Health Survey (ABS, 2013) and the Aboriginal and Torres Strait Islander Health Performance Framework (AIHW, 2008) clearly establish food insecurity risk factors within Australia. These findings and frameworks were supported by a literature review conducted by Burns (2004) analysing over 60 peer-reviewed journal articles which established that food insecurity risk factors in Australia include poverty related socio-demographic drivers including people from an Aboriginal and Torres Strait Islander heritage; unemployed people; single parent households; low income earners; rental households; and young people. The literature however does not provide clear rationale as to why mild-to-moderate food insecurity leads to obesity. Whilst the correlation exists, researchers have been attempting to identify what specifically may be leading to this phenomenon.

The 'Healthy Food Access Basket Surveys' is conducted by the Queensland Government every two years and publishes food costs within major cities, inner and

outer regional and remote areas within Queensland (Queensland Health, 2014a). These surveys track the affordability of a group of core foods that typically represent healthy food choice purchases for community members. However, to date, there have been no known food insecurity measures or surveys conducted within the Ipswich region or correlation of food insecurity risk factors. Ramsey, Giskes, Turrell and Gallegos (2011a) have completed the most comprehensive food insecurity measurements within socio-economically disadvantaged suburbs within Queensland and found that 34% of the households were influenced by mild-to-moderate food insecurity. This was further linked to households with children, particularly those from single parent households (Ramsey et al., 2011a). This research may provide an insight into how food insecurity which causes obesity, may be related to the cost of healthier food.

Data for food insecurity in regional Australia is sparse and incomplete. It is apparent from this body of research, that the 'Food Insecurity Obesity Paradox' is prevalent in many lower, socio-demographic areas around the world. As the drivers of the 'Food Insecurity Obesity Paradox' are clustered within and determined by, the social demographics occurring within that community, the literature indicates that the most effective responses to increasing the nutrition of a community, must be strategically delivered within that environment and tailored to meet the community's needs (Burns, 2004; Friel et al., 2015; WHO, 2003). It is evident that the current asocial models of healthcare delivery, which address the individual only, may not be adequately addressing the risk factors identified as contributing to the 'Food Insecurity Obesity Paradox' or co-creating a partnership with the community to improve obesity levels.

2.5. Addressing nutritional disparities within a social model of health

Literature has demonstrated several key drivers to successful social health policy implementation that address the nutritional intake, socio-economic inequities and food insecurity risk factors within a community. A number of studies have

demonstrated that local government involvement and prioritisation of suitable policy, is essential in formulating, implementing and sustaining effective social health reform (Huang & Drescher, 2015; Krebs & Pelissero, 2010; Muntaner, Chung, Murphy, & Ng, 2012). A number of peer reviewed publications have outlined strategies where communities have responded to poor nutrition with a number of strategic social health policy reforms (Hardman & Larkin, 2015; Toronto Public Health, 2010b). One pivotal example is Toronto, Canada. Toronto has strategically influenced the nutritional intake of their community for over thirty years and is continually monitoring their community demographics, to ascertain shifts in social and food system inequity risk factors (Tarasuk, Mitchell, & Dachner, 2016; Toronto Public Health, 2010a, Drescher Australian communities have utilised tools and frameworks such as 'food policies', 'food connections' as well as concepts such as 'Food Sensitive Urban Design and Planning' to encourage and shape communities' access to, use, affordability and availability of food, that meets the overall health requirements of that community (Community Food Centres Canada, 2015; Donovan, Larsen, & McWhinnie, 2011; Mah & Thang, 2013).

2.5.1. Community-based food strategies

Toronto, a large metropolitan city in Canada, established a food strategy almost thirty years ago as a strategic response situated within a social model of health, designed to improve the availability and accessibility of healthy food across their community. This strategy involved the formation of a 'Food Council', 'Food Charter', food advocacy groups and a 'Food Connections Strategy'. The Toronto Food Council (2010a) created a model based on formal and informal community education (including food literacy), economic development, urban agriculture and building community capacity including addressing key social indicators such as poverty through the provisions of employment opportunities. Food Strategies such as the 'Food Charter' and 'Food Connections' implemented in Toronto, support key outcomes including poverty reduction leading to physical, social and mental health wellbeing, which is essential to the health promotion of the region (Donovan, et al., 2011). It invites partnerships between a wide range of community members, culminating in the community working together to improve the health of the community. Toronto Public Health term 'Food Connections' is an approach to the development of a food strategy that identifies the components and key stakeholders

in a community, including local government, residents and organisations, that can "inspire action toward a health-focused food system" (Toronto Public Health, 2010a, p. 4). The 'Cultivating Food Connections' strategy from Toronto has a broad connected approach inclusive of many initiatives including, but not limited to supporting growth of community gardens and kitchens, food security grants and school food gardens (Toronto Food Policy Council, 2010b).

Strategies that connect a community to food, particularly food such as fruit and vegetables, benefits the community in a variety of ways including facilitating economic growth, creating sustainable long-term solutions, improving the health and wellbeing of residents and engaging the community (Donovan et al., 2011). These initiatives that have been identified and implemented within the Toronto community have been the culmination of strategic activity occurring in the community for over thirty years, specifically designed to address the social inequities occurring within the community (Baker, 2013; Hardman & Larkin, 2014; Mah & Thang, 2013; Toronto Public Health, 2010a). To date however, research tracking health outcomes concurrently with the food system changes have not occurred in Toronto, so it is difficult to clearly and directly determine the effect of this long-term, strategic model.

In Tasmania, significant research has been funded by The Heart Foundation and the Tasmania Medicare Local to conduct research to gain an understanding of food security within the state. This research has been undertaken by the University of Tasmania and specifically seeks to understand key components of a secure, local food system (Auckland, et al., 2015). This work consisted of mapping the LGAs of Tasmania, to identify where food was produced and accessed, followed by thematic analysis of a large number of semi-structured interviews with key stakeholders (Auckland, et al., 2015). Additionally, the authors identified that key recommendations and implications such as broad social health policy reforms including employment, poverty reduction and increasing local food system access and productivity (Auckland, et al., 2015). However, the researchers did not focus particularly on a regional area comparable to Ipswich, which has a high rate of population growth, low socio-economic demographics, high obesity health indicators and a recorded low intake of fresh fruit and vegetables', although many areas of Tasmania are diverse and have their own unique socio-economic and cultural challenges. One of the key recommendations of this research is that food strategies

need to be tailored to address the specific needs of each community rather than being an overarching approach, which reflects a contemporary and responsive social model of health (Auckland, et al., 2015). Tasmania however, unlike Toronto, has conducted limited application of these approaches within their community to date. Conversely, Toronto has applied a comprehensive and integrative approach, sustained over three decades that directly addresses food insecurity within their community.

A small number of social model community-based food strategies have been implemented in Australia. Some success has been achieved at a local level by implementing simple strategies, to enhance food security and hence, access of a community to their nutritional requirements. Three local governments that have collaborated to form the Illawarra Regional Food Strategy have identified that the role of local government is essential to influence the adoption of activities that support a secure local food system (Shellharbour City Council, 2014). In Devonport in the North of Tasmania, the local council has instigated the Devonport Food Connections project that is set up to achieve 3 objectives:

1 "Healthy food choices are made easily by improving the skills amongst community members to access and use nutritious affordable food" (Devonport City Council, 2019);

2 "Maximise the supply and distribution of affordable local produce" (Devonport City Council, 2019); and

3 "Strengthen institutional and network capacity to support a culture of healthy eating" (Devonport City Council, 2019).

Whilst the Devonport Food Connections project is in its infancy, it is founded on the model from Toronto and will be used to identify key stakeholders, build strategy and collaboratively improve access to a secure food system (Devonport City Council, 2014; Toronto Public Health, 2010b). The strategy is based within a social context of health, considering the specific needs and characterisation of that community. Further grassroots activities linking and connecting local food sources are occurring in other communities in Australia, such as farmers markets and food co-operatives.

In Melbourne, the South East Food Hub is one of the 38 regional food hubs on the Open Food Network in Australia (Open Food Networks Australia, 2015). This network is designed to give communities easy, fair and affordable access to locally grown fresh fruit and vegetables (Open Food Networks Australia, 2015), which is based on the principle of food security and is founded within a social model of health.

As identified earlier in this section, Auckland and colleagues (2015) defined a community as being food secure, when community members can access suitable nutritious food within a sustainable and local food system leading to health, community self-reliance and equity within that food system. This concept is at the core of a broad, multi-faceted food strategy for a community and as demonstrated by the literature, must address socio-economic characterisations of a community if equity is to be obtained. The research undertaken (Brown & Jameton, 2000; Donovan et al., 2010; Murray, Ahuja, Auckland, & Ball, 2015) has formed the development of a theoretical model of food system equity, however further research is needed to evaluate the outcomes of how communities can influence the nutritional and health outcomes of their communities by undertaking such local initiatives, particularly in regions with significant social inequities.

2.5.2. Shaping the food environment

This section reviews relevant research outlining social factors influencing the built and social environment that influences food choices for individuals within a community. These objectives are enabled by policy and political prioritising, particularly at local government level and can also include broader ways to manipulate food choices including ‘nudging’ consumer nutritional choice by policy or other strategies aimed at changing social and cultural norms around food intake. Additionally, a broader Food Sensitive and Urban Planning strategy to ensure that the built environment is designed to increase food security is also explored in the literature and is discussed in the following section.

2.5.2.1. Local government and political prioritising

Social health policies influence health outcomes by attempting to address and influence social inequities. They attempt to influence the inequities experienced by some communities, to ensure that the community is better supported to make beneficial health and wellbeing decisions (Muntaner, et al., 2012). Huang and

Dresher (2015) identified a number of enablers at a local government level that support local social health policies to prevent obesity. Local governments legislate and enforce zoning by-laws, land use regulations and local environment plans which Donovan and colleagues, (2011) identified influences whether a local community environment is conducive to equitable access to fresh fruit and vegetables. Huang and Dresher (2015) also established that more structured planning and urban design, in the form of planning policies, zoning laws and supportive legislation at local government level, could be either barriers to or enablers of the formation, adoption and implementation of social health policy to address rising obesity levels in a community. For example, the ability of influence the built environment by providing opportunities for urban agriculture or direct selling of fruit and vegetables from farmers to consumers, may influence the access to and cost of nutritional food within urban areas.

There is a significant volume of literature exploring the role of local government policies in enabling a social health response (e.g. Huang & Dresher, 2015; Krebs & Pelissero, 2010; Muntaner, et al., 2012). Caroline Mills identified, as part of her extensive literature review, that planning legislation in Australia "operate largely without regard to public health goals" (Mills, 2014, p. 179). Mills further explains that local government has limited influence over the establishment of planning priorities and, hence, legislation formed by the state governments (2014). By shaping and amending these documents and legislation to support production of and local access to, more nutritionally appropriate food such as fruit and vegetables, significant gains can be achieved resulting in influencing healthy food in a community (Thompson & Maggin, 2012).

Influencing the number of outlets where fresh food is available and limiting the availability of take-away food has positively influenced food intake and decreased obesity levels in communities (O'Dwyer & Coveney, 2006). A study undertaken in the USA has shown that residents' intake of fruit and vegetables is considerably higher in areas that have more supermarkets and less take-away options (O'Dwyer & Coveney, 2006). Martin and colleagues (2012) also found that easy access to fresh fruit and vegetables in a neighbourhood did positively influence consumption of this food for the residents. Mills (2014) indicates that many Australian neighbourhoods lack access to convenient fresh fruit and vegetables, particularly

those in low socio-economic areas, where take-away and fast food options are prevalent. The literature clearly demonstrates that policies and legislation can and should be adapted and adopted at a local government level to positively influence the quality of food available in communities and, hence, influence rates of obesity and associated non-communicable disease rates (Auckland et al., 2015; Gnomes, Gomes, & Liddle, 2010). For example, Hardman and Larkin (2014) state that the establishment of government policies such as a food charter that supports urban agriculture, could increase access to and the consumption of fresh fruit and vegetables.

The role of local governments in the prioritisation of access to nutritionally sound food that benefits overall health and wellbeing, such as fruit and vegetables, is demonstrated in the literature as a significant enabler to the adoption of a social health model response to obesity within a community (Auckland, et al., 2015; Brown & Jameton, 2000; Thompson et al., 2012). In the research conducted by Auckland and colleagues in Tasmania, many participants framed the local governments role as one of a "broker or facilitator" in the process of providing a strong, secure local food system (Auckland, et al., 2015, p. v). Auckland et al., (2015) identified that nearly one quarter of those interviewed believed the role of local government should be a source of support and advice to enable key relationships and opportunities to occur that strengthen a local food economy and in turn, lead to greater food security for that population. Gnomes and colleagues (2010) identified through their research that if local government did not overtly support an environment which encourages food security, the likelihood of adoption is extremely slim.

Local governments are however, under political influence which shape their policy initiatives and commitments. Muntaner, Chung and Murphy (2012) identified that a significant barrier to the adoption of an environment which promotes food security, is the extent and accuracy of the information key political influences receive in relation to promoting a positive food environment. In their analysis of power imbalances, political and economic barriers leading to health inequities, Muntaner and colleagues (2012) found that research and research knowledge is not in general, contributing to health equity policy change and the adoption of approaches which shape the nutritional intake of a community. Rather, they discovered that the ideological values of political parties and influences on key policy makers within a local government

determine which policy approach is adopted (Muntaner, et al., 2012). Muntaner and colleagues (2012) further claim that prioritisation of private economic interests over public needs can be adopted by local government, leading to a reluctance to adopt such public health strategies.

Policy vacuums at both local and state government level were identified by a group of key stakeholders in Victoria, Australia, who reviewed the Australian context and identified that there is “no explicit recognition of planning for food” (Donovan et al., 2011, p. 9). However, the Victorian Heart Foundation, in consultation with key stakeholders, have suggested that opportunities do exist for the establishment of public health and wellbeing plans at a local and state government level, that would assist in supporting an environment that encourages an intake of nutritionally suitable foods such as fruit and vegetables in Australia (Donovan et al., 2011).

Despite these recommendations, currently in Australia, Tasmania is the only state with an established local food policy. Whilst a small number of local governments are initiating regional food strategies, policy documents at a state level are not as prevalent (Auckland, et al., 2015). It is therefore clear that the policies, laws and legislation in existence in Australia, and indeed the lack of them (policy vacuums), often provide significant barriers to shaping the nutritional intake of a community.

In summary, local governments have been identified in the literature as the conduit between the local community and their involvement is critical when trying to successfully and sustainably implement a social health model response to a health challenge (Schuster, Kubacki, & Rundle-Theile, 2016; Swanton, 2008). Public advocacy and community support are other key enablers in the implementation of a social health policy approach and engagement of the local government (Huang & Drescher, 2015). Hardman and Larkin (2014) found in the Toronto area, that unless the community was supportive of and found value in the adoption of a strategy around nutritional consumption such as a community-based food strategy, it was challenging to adopt.

Consumer purchasing behaviour as a whole is changing however, which is also leading to community support for a more suitable food environment. The increase in the popularity of farmers’ markets with more than 165 located across Australia, is demonstration of the increased community support of key urban food planning and

security principles (Mok et al., 2014). Auckland and colleagues (2015) supported this finding by observing in their semi-structured interviews, that consumer engagement in the local food system was identified as a significant part of securing a sustainable, food system. This groundswell of support is the key to the adoption of strategic food approaches within a community.

In summary, local governments support of planning legislation has been an enabler or barrier to the implementation of such strategies (Auckland, et al., 2015). This clearly indicates that local government commitment and influence is required to change and shape the food environment for a community within a social health model context. Shaping the food environment to ensure it is easy to make good food choices, significantly influences the nutritional intake of individuals, families and communities. Strategies such as 'nudging' have been demonstrated to have success in influencing nutritional choices (Australian Government, 2018; Guthrie, Mancino, & Lin, 2015; Quigley, 2013).

2.5.2.2. Nudging

Some success has been demonstrated in local communities adopting a social model of health approach by developing 'soft policy' approaches such as nudging. A nudge is "an aspect of choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their incentives" (Quigley, 2013, p. 695). Choice architecture is the built, social and cultural environment that impact upon the choices that people make (Sunstein, 2014). There have been many studies conducted to ascertain whether this less formal, paternalistic approach may be as effective as more formalised policies, particularly regarding food choices and obesity and in shaping the food environment for a community (Sunstein, 2014; Voyer, 2015). For example, if it is much easier for a person to access fresh food than a takeaway outlet, the person is more likely to opt for the more nutritious option. Quigley, (2013) suggests the busy and stressful lives that people in society now often lead, can result in exhaustion and sub-optimal decision-making capacity, particularly in lower socio-economic areas where economic and other stressors may be especially high.

To change choice architecture and 'nudge' citizens towards beneficial health choices, soft policy approaches can make decisions on food choices 'easier'. In fact,

nudging has been instrumental in key policy changes in Britain, with the British government setting up the Cabinet Office of Behavioural Insights Team (COBIT) (also known as the 'nudging unit') in 2010 to address a multitude of social concerns around public health including diet, smoking, organ donation, alcohol intake and physical activity (Quigley, 2013). Significant gains were seen in many of these areas such as significantly higher rates of organ donations, lower smoking rates, higher physical activity rates in communities where 'nudges' were implemented through 'soft policy' approaches around the world (Australian Government, 2018; Quigley, 2013). This included building walking paths and exercise equipment in urban areas and community parks and making smoke free zones in workplaces and public places (Australian Government, 2018; Quigley, 2013).

Other examples of nudges that have been implemented around the world include ensuring some check outs in supermarkets are confectionary free (Voyer, 2015). Giving parents the option to take their families through those check outs, which decreases the temptation of confectionary for their children. The nudge premise dictates that if the children are not as exposed to confectionary within their environment, they are less likely to want to consume it and the parents are less likely to purchase it (Sunstein, 2014). COBIT had significant success increasing the organ donation rates in Britain by making organ donation as 'opt out' system, rather than an 'opt in' system. Research demonstrated that most people were in favour of organ donation, however, were not motivated enough to partake in the actions needed to ensure that they were registered to do so (Voyer, 2015). Instead, the government mandated that everyone would be registered as an organ donor, unless they undertook actions to 'opt out' of this option. The corresponding significant increase in organ donation ensued (Voyer, 2015).

In Australia, the 'Behavioural Economics Team of the Australian Government' (BETA) was founded in 2015 in an attempt to utilise the premise of behavioural economics to improve policy outcomes and address inequality (Australian Government, 2018). Behavioural economics is a field which explains why a 'nudge' can change choice architecture and consumer choices (Quigley, 2013). In the USA,

in support of the CDC recommendations of five servings of fruit and vegetables per day in 2010, a broader social health policy strategy was utilised to 'nudge' consumers to healthier food choices by starting and expanding community supported agriculture programs, farmers' markets and ensuring access to fruit and vegetables in workplaces, schools and community events (CDC, 2009). This approach reduces the need for complex decision making and nudges individuals within a community towards more nutritionally sound food choices (Mullainathan & Shafir, 2013).

The literature is conflicting as to whether researchers see a 'nudge' as something inclusive of policy and regulation, or a 'softer' approach. Many believe that a nudge is an anti-regulatory, approach designed to complement regulation (Oliver, 2013). Sunstein (2014, p. 584) states that nudges, which he also refers to as soft paternalism, should be "transparent and open rather than hidden and covert". Some researchers however, have been critical of the nudging approach, believing that it is manipulating citizen behaviour (Oliver, 2013; Voyer, 2015). Thaler and Sunstein (2003) call the nudging approach 'Libertarian Paternalism' which they argue is 'soft' paternalism. However, as Quigley (2013, p. 605) points out, "whether we have reasons to prefer choice architecture that results from countless random influences or that, which has been deliberately designed" should in fact be a conscious decision by leaders, influencers and policy makers for public health benefit.

Quigley (2013) argues that nudging is already occurring from influencers such as supermarkets and fast food restaurants that 'nudge' us to negative and unhealthy food choices, particularly in communities that are over represented in the number of fast-food options and have social and cultural norms that do not encourage good nutritional choices. He states that private industry "manipulate behaviour in ways that maximize the consumption of harmful products and increase the incidence of significant personal and social harm, such as obesity, hypertension, cancer, violence and addiction" (Quigley, 2013, p. 613). Oliver (2013) also reflected that the private sector, such as supermarkets, make changes to choose architecture for capital benefit and perhaps the government may need to 'counter nudge' this behaviour. This supports the notion that government entities, such as local governments, should develop social health policies that 'nudge' community members to make better food choices. A local community is in an ideal position to influence social norms and nudge its citizens to make healthier food choices as different communities have

different social and cultural norms that influence food choices (Thompson et al., 2012). However, Quigley (2013) further suggests that people may feel uncomfortable with the knowledge that the government is influencing their choices. Whether this is reflective of people's perceptions around the role of a government or not, it is apparent that by using 'nudging' principles, a social model of health approach could be undertaken to address inequities in nutritional intake within a community.

The literature further demonstrates that the notion of 'soft policy' may need to be considered to effectively assist some communities specifically those who are experiencing significant socio-economic challenges (Hawkes, et al., 2015; Guthrie, et al, 2015; Mills, 2004). Guthrie and colleagues (2015) believe that social health policy implemented at a community level can affect food choices by 'nudging the marketplace' through a variety of policy initiatives that can include encouraging food producers, food manufacturers and food marketers to make healthy food choices more easily available. Hawkes and colleagues argue that a combination of psychology, economics and public health approaches to social health policy are required "to lead to positive change to food, social and information environments and systems that underpin them" (Hawkes, et al., 2015, p. 241). However, many researchers are still unsure as to whether it is the role of the Government to shape our default choices and there are some discrepancies as to whether this fits within local government remit or a broader political agenda at a state, national or international level (Mills, 2014).

2.5.2.3. Food sensitive planning and urban design

One specific strategy that utilises local government policy and other strategies to 'nudge' a community towards better food choices and shape nutritional intake through a social model of health, is 'Food Sensitive Planning and Urban Design' (FSPUD). FSPUD is "an approach to planning and design that explicitly addresses the way food is produced, moved, processed and consumed, to create places that make it easy for people to meet their food needs" (Donovan, et al., 2011, p. 5). This approach can be used to either 'nudge' a community or use legislation and urban planning laws to encourage the community to choose better food choices, within a broad social model of health and wellbeing. FSPUD was designed from

collaboration of key stakeholders in Victoria and is a broad framework of key principles. The core of this framework is to ensure that healthy, convenient, fresh food is available to a community to support community members' health needs (Donovan, et al., 2011). This is achieved by utilising space and productive land, as well as the creation of resilient food systems within a region (Donovan, et al., 2011). This enables food to be easily grown, produced and shared within that community. Examples of FSPUD include engaging the community in community gardens to grow their own produce, provide a community somewhere to gather to swap, share and sell local produce and to ensure vacant land in highly populated areas can be utilised to grow food. FSPUD is a strategic approach that benefits the community in a variety of ways including facilitating economic growth, creating sustainable long-term solutions, improving health and wellbeing of residents and engaging the community (Donovan et al., 2011), and its foundation underpins a broad, social model of health. Huang and Dresher (2015) researched the experiences, challenges and opportunities of planning in urban agriculture, in relation to the key concepts of FSPUD. Through a qualitative study including a series of semi-structured interviews with key stakeholders to understand the experiences, challenges and opportunities of planning for urban agriculture in Canada, researchers found that local governments and social planners can facilitate a food system that shapes a food environment by adopting a social policy approach (Hawkes et al., 2015). Thus, tools such as policy statements, planning frameworks and the creation of inventories of vacant or underutilised land that could potentially be used for food development would integrate the ability to use urban spaces for food production and hence FSPUD principles within a community, that could shape the broader food environment (Huang & Drescher, 2015).

The Victorian Heart Foundation, Victoria Health and the Victorian Innovation Lab recommend a number of planning strategies and tools that would be useful to the adoption of FSPUD principles. This is inclusive of the development of plans and strategies encompassing housing, subdivisions, transport, recreation, rural land and public health plans (Donovan, et al., 2011). This includes a more structured planning and urban design approach in the form of local government planning policies, zoning laws and supportive legislation at local and state government levels, which supports previous literature around the importance of local government in

shaping a food environment. Huang and Dresher (2015) identified policies and zoning regulations as significant barriers and Auckland and colleagues (2015), have also identified that political policies and legislation directly influences health equity in urban areas. Donovan and colleagues (2011) also identified these issues in the Australian context in Victoria. Zoning by-laws, animal related laws, official policy documents, land use regulations and local environment plans, were all identified by numerous literature sources as potential and real barriers that can prevent FSPUD principles from being embedded in a community (Muntaner et al., 2012). This literature reveals that governments need to review what social model policies exist to shape a food environment and the potential of this to decrease obesity levels and associated non-communicable disease rates within a 'high risk' community. However, to date limited research exists on how these initiatives directly influence obesity levels, with further research needed to support this premise. This does demonstrate however, that a detailed characterisation of a community is required to ensure that a suitable strategic food response based on social equity, can be customised, prioritised, applied and evaluated in an effective manner.

2.6. Conclusion

AIHW (2016a) states that more research needs to be completed to better understand why some population groups are at higher risk of obesity. If work within population groups such as the Ipswich region is undertaken, and an understanding of the obesity drivers is collated, an effective social health policy response can be developed, implemented and evaluated at the community level. The World Health Organisation (2018a), recommends that an improvement in community understanding and social norms, in relation to appropriate nutritional intake and supporting the regulation of food marketing within a community, is essential to curb the rising obesity rates.

The evidence of the correlation between poor fruit and vegetable intake and high obesity levels is mounting. The literature clearly demonstrates the correlation between high obesity levels and high levels on non-communicable disease rates within a community. Researchers have demonstrated that these high obesity rates and non-communicable disease rates are much more prevalent in communities with

significant socio-economic disparities and inequities, which explains concepts such as the ‘Food Insecurity Obesity Paradox’.

It is clear that fruit and vegetable consumption is linked to a healthy weight range, and a number of strategies have been utilised around the world to shape the food environment to encourage an increase in fruit and vegetable consumption. These strategies include local government engagement to shape broad community-based planning policies and further ‘soft’ policies to ‘nudge’ community members towards a healthier, more sustainable food environment. It is evident however, that a multi-faceted social model of health approach needs to be tailored to specific communities, to shape food choices, and health-promoting behaviours.

3. Chapter 3: Design and Methods

3.1. Introduction

This chapter discusses the methodological underpinnings for the inquiry undertaken in this doctoral research. Adoption of a critical, exploratory methodology enabled this study to evolve through two phases. Key decisions made at each phase of the research are described in this chapter. This chapter further discusses the justification of why these critical methodological underpinnings are the most appropriate approach for this research, when attempting to understand social and economic factors that may be influencing the nutritional phenomena occurring within the Ipswich community.

As outlined in section 3.3 of this chapter, the decision trail in relation to the evolution of this research of this project is outlined. This chapter then discusses how the insights gained from the qualitative phase of this research influenced the next phase of this thesis, to ensure a comprehensive, overall understanding of the social, structural phenomenon occurring in the Ipswich region. The analysis of the qualitative phase raised further questions that needed to be explored about the Ipswich region. This formed the basis of Phase Two of this research, as outlined in the decision trail in Section 3.3 of this chapter.

This chapter then concludes, by discussing the research setting, ethics and research quality for each phase. The data collection including participants and data analysis for each phase of this thesis is outlined in Chapter Four for the qualitative phase (Phase One) of this research and in Chapter Five, for the quantitative phase (Phase Two).

3.2. Methodology

This doctoral study is positioned within an exploratory, critical paradigm. Holloway and Galvin (2017) established that critical theory is a “critical study of social phenomena and institutions, including their power structures’ with its aim to change society in order to assist marginal and powerless groups to become emancipated” (p. 290). Critical research aims to change key issues in society by creating awareness of inequities and power differentials that may exist through social, political, gender, economic or cultural forces (Denzin & Lincoln, 2008). Critical

theory recognises that powers embedded in cultural and social systems reinforce conventional approaches and prevent new approaches from being adopted, despite good evidence that may support the new approach (Denzin & Lincoln, 2008); whilst exploratory theory enables the researcher to further explore concepts as they arise and build this within the research foundation (Creswell & Clark, 2017). The next section explains why this methodological approach is appropriate for this study.

3.2.1. Critical and exploratory research

Specifically, this thesis is situated within the critical paradigm as it seeks to understand the social phenomena shaping high rates of obesity and low fruit and vegetable intake within one large regional community and aims to change and influence the understanding and political agenda surrounding this issue (Denzin & Lincoln, 2008). By developing a critical understanding of the socio-economic determinants that influence nutritional intake within communities, regions such as Ipswich may be better informed about policy responses to reduce the high obesity rates and obesity driven non-communicable disease burden. This has significant implications because the findings of this study may demonstrate how social health policies can be customised and prioritised to address the cause of a significant public health issue for communities' that have significant social, cultural and economic drivers (Mills, 2014).

Critical research has emerged from sociological theory, in particular the seminal work of Karl Marx who reflected on how social institutions and social structures influence the working class within society (Denzin & Lincoln, 2008). Marx believed that if these social institutions and structures could be understood, navigated and changed, liberation and self-determination of the working class within society could be achieved (Denzin & Lincoln, 2008). Thus, a critical paradigm is often used in research with communities that are underrepresented in socio-economic equity (Denzin & Lincoln, 2008). This is evidenced by previous research in relation to the implementation of a community public health strategy [e.g. Huang & Drescher, (2015); Auckland, et al., (2015)] that has been conducted within a critical perspective to understand what social, economic, cultural and political structures were influencing the food system in Tasmania (Auckland, et al., 2015). Whilst the

structures and constructs influencing the food system in Tasmania were identified, no significant or integrative longitudinal approach implemented to address this.

Critical research is often conducted in conjunction with other paradigms to refine the focus of the purpose and outcomes of the research which is undertaken (Denzin & Lincoln, 2008). Critical research is often used in conjunction with an exploratory paradigm lens when attempting to understand the undefined factors and structures that are influencing the population that is being researched. Akkerman, Admiraal, Brekelmans and Oost (2008) suggest that an exploratory lens is recommended when considering complex issues. Stebbins (2001, p. 3), defines exploratory research in social sciences as "a broad-ranging, purposive, systematic and prearranged undertaking designed to maximize the discovery of generalizations leading to description and understanding of an area of social or psychological life". Exploratory research is particularly useful when new phenomena needs to be understood by the researcher, particularly those involving health inequities and social justice (Mosavel, & Simon, 2010).

The exploratory approach is broad in focus, as it attempts to understand key issues, themes and variables that may influence a phenomenon that is occurring within a community. Many policy-orientated researchers make the error of defining a policy, then attempt to support it with evidence gathered from their research (Harvard University, n.d.). A stronger approach is to use an exploratory, theoretical foundation to understand and explore the key themes, issues and variables that influence policy formulation, implementation and overall effectiveness (Harvard University, n.d.). This view lends itself to what the researcher discovered early on in this doctoral journey, that understanding the high rates of obesity in the Ipswich community is complex and formulating a strategic response to this would necessarily have to be multifactorial. Hence, the use of the exploratory approach within this doctoral thesis complemented the critical paradigm to fully explore and understand these issues within the Ipswich community.

As identified in the literature review, unique, complex, inter-related socio-cultural determinants shape obesity rates and nutritional intake within a given community. The AIHW identified that people who live in lower socio-economic communities, were

more likely to be overweight or obese (AIHW, 2011). The Australian Food and Nutrition report (AIHW, 2012), as outlined in the literature review in Chapter Two, outlined a number of social determinants such as income, housing status, education status and single parent status that influenced obesity risk, leading to the 'Food Insecurity, Obesity Paradox'. The exploratory approach used in this thesis, reflecting on the findings of Phase One of this research, therefore led to a mixed-methods approach to explore if these food insecurity risk factors were prevalent within the Ipswich community which may be influencing both fruit and vegetable consumption and high rates of obesity.

The research design in Section 3.4 of this paper details the adoption of the mixed-methods, critical, exploratory, qualitatively driven, sequential research design for this thesis. Quantitative and qualitative approaches are both supported within the critical, exploratory research paradigm. Stebbins (2010) argues that ideas emerge from data within qualitative exploratory research, which can then be further explored and explained by utilising quantitative methodology. Greene (2008), has acknowledged the significant increase in the use of mixed-methods approaches in social science research in fields such as nursing and O'Cathain, Murphy and Nicholl (2010) explain that the mixed-methods approach is an effective way within social science, of integrating data to adequately capture a holistic view of the research. When concepts of equity and justice need to be explored, research utilising a mixed-methods design can extrapolate macro socio-demographic data, as well as a contextual understanding of the lived experience of the phenomenon (Greene, 2008). This is particularly useful in critical, exploratory research where social and cultural perspectives are sought to assist in the understanding of data.

A qualitative approach is the most appropriate and suitable choice for the initial phase of the doctoral study, as it relies on processes and meanings (Denzin & Lincoln, 2008) and heavily on the articulation of the participants' perceptions (Liamputtong, 2013). Qualitative research is interested in personal and collective meanings within the participants' social context and is the preferred research method for human sciences, as it attempts to understand through interpretation, description and analysis (Welsh, 2002). Cameron (2009), explained that exploratory research often uses qualitative research methods initially, then quantitative methods to explain key themes that has emerged in the qualitative data. Unlike the quantitative

research undertaken in Phase Two of this research, which relies heavily on statistical analysis and interpretation, Phases One, focused on the key stakeholders' perceptions and understanding of the issues surrounding fruit and vegetable consumption and obesity rates in the Ipswich community. Semi-structured interviews were utilised for the qualitative phase of this doctoral study design and can be effective when an exploratory element is needed to be examined within the research (Holloway and Galvin, 2017). This then assists the researcher to further explore and understand the phenomenon that is occurring.

3.3. Exploratory sequential design and decision trail

This doctoral work has evolved from my initial interest in exploring how community members in the Ipswich region, with obesity related non-communicable disease burden, can increase access to and consumption of fruits and vegetables. As a resident of the Ipswich community and having a daughter with Type I diabetes, I was seeking to easily access fresh, nutritious food, particularly fresh fruit and vegetables on a regular basis, in order to support the health and wellbeing of my family. I was also very interested in understanding why so many people in the community were not eating enough fruit and vegetables, as reflected in the self-reported fruit and vegetable consumption data (Department of Health, 2013). As a Registered Nurse with many years of experience in the public health sector and particularly in the cardiac health area, I was also very aware of the significant and ongoing public health challenges in the Ipswich community which are obesity and dietary related. Working in a senior nursing role within West Moreton Hospital and Health Service at the conception of this thesis, it was clear to me that the current model of health care provision was fiscally unsustainable, if the obesity driven chronic disease outcomes were not addressed.

The Ipswich region is grossly overrepresented with obesity-related health drivers and non-communicable disease health outcomes (Schirmer, Yabsley, Mylek, & Peel, 2016) and has the fourth poorest rate of heart related hospital admissions compared to other regions in Australia (Queensland Health, 2016). Chronic health management from non-communicable disease is a strategic focus of the West Moreton Hospital and Health Service, as this is a large driver of health service provision in the region (Queensland Health, 2016). However, during a change in the

state government in 2012 in Queensland, significant funding cuts to health resulted in public health and preventative health programs being closed, to focus on 'frontline' services such as emergency department and surgery resources (Helbig & Miles, 2012). These services have not been replaced.

Despite having a comparatively high degree of health literacy and health education, my own personal experience was, that there was conflicting nutritional advice from a variety of sources, and that highly processed foods were easily available and heavily promoted by the food industry to the Ipswich community and consequently had the potential to form a high percentage of the community's dietary intake. This seemed to be at odds with the clear nutritional message that was coming from health advisors both within the district, and in the wider community within Australia and around the world, which was the importance of consuming higher rates of fruit and vegetables (CDC, 2011; Hendrie, et al., 2017).

As a Registered Nurse, with the personal and professional philosophy of and commitment to the principles of equity, empathy and empowerment, I felt that the obesity issue within the Ipswich community has traditionally been addressed from both a biomedical health and an individual perspective, attempting to change behaviours of individuals, to treat disease. This individualised obesity response within the Ipswich community was also demonstrated by a strategic focus within the local health service on health education, about the nutritional content food and psychological approaches around why people do not comply with the recommended intake of fruit and vegetables and dietician reviews (DDWMPHN, 2017). Yet, even with significant resources invested in this approach, the rates of people who are overweight or obese in Ipswich region and in many communities in Queensland, Australia and indeed around the world have increased. This individualised response to obesity, did not allow for the exploration of any social, cultural or economic factors that may have been influencing the community's nutritional intake.

Initially, after broad reading of literature, policy and local health indicators, I sought to understand how the environment could be shaped to ensure that good food choices were made 'easy' for community members, aimed specifically at increasing fruit and vegetable consumption. Evolving from a concept called Food Sensitive Planning and Urban Design (FSPUD) a framework developed from collaboration between the

Victorian Government, The University of Melbourne and The Victorian Heart Foundation, FSPUD attempts to manipulate the built environment to influence an increase in access to and consumption of, fresh food (Donovan, et al., 2011).

This made me question whether a strategy such as FSPUD could be utilised in the Ipswich region to directly influence the low rates of fruit and vegetable consumption, and hence address the rates of people who were overweight or obese. Within this context, I began to explore how the structure of the environment in Ipswich may be influencing food choices and how it could be designed to increase the consumption of fresh food (primarily fruit and vegetables). I began by conducting an informal scan of the Ipswich environment to see if fresh food could be accessed and purchased in different parts of Ipswich and also the availability of processed and takeaway food across the region. This involved determining what new areas of Ipswich were planning and undertaking in regard to building their structural environment and if this design facilitated healthy food access. Focused informal discussions with members of the Ipswich City Council and the developers of the newer Springfield and Ripley Valley regions were undertaken, to ascertain if a research topic may be viable with this focus. Springfield and Ripley Valley areas are within the Ipswich region and are the major contributors to significant actual and forecasted population growth in Ipswich and form major areas of urban development in this region (Department of Infrastructure and Regional Development, 2016).

Whilst there are many opportunities within the FSPUD framework to influence built environments to encourage good food choices, this is not something that was explicitly considered in the Ipswich region, including by the developers of the region. Although the concept of FSPUD was quite well developed, no known communities to date have fully undertaken the significant adoption of this design method. Speaking with developers in the Ipswich region, they indicated their initial interest would be to help them develop some minor strategies that would assist them in marketing the new communities to families. It appeared that they did not have an intention to utilise FSPUD to make a significant contribution to increase access to good food choices and increase the rates of fruit and vegetable consumption for the Ipswich population.

I then contacted key representatives from within the Ipswich City Council. These representatives did not understand how the FSPUD concept would be useful for the Ipswich community and instead wanted to use my doctoral work to ascertain and map current community resources around food as a focus for economic development for the region. For example, they sought to map how many supermarkets, restaurants and food suppliers were within a given area. The Council appeared to have minimal interest in adopting any change in the built environment, nor initiatives to encourage community members to access good food choices that would support better health outcomes. In fact, in the initial stage, representatives from the Council articulated to the researcher, that they did not see the health and wellbeing of their community within their remit, as they felt that this was the responsibility of the health care services overseen by the state government. This was echoed during discussions with various local government representatives throughout the duration of this thesis.

I began to realise that to increase fruit and vegetable consumption in the Ipswich community, a larger conversation was required around increasing access to a range of healthy food options as a part of a multi-factorial strategy to address significant non-communicable disease impacts of obesity within the community. I realised at this time that a policy approach such as the implementation of FSPUD could not simply be structured around an existing community to attempt to influence nutritional intake without a broad understanding of what was actually driving low rates of fruit and vegetable consumption and high rates of obesity and non-communicable disease burden.

This time of initial exploration using the FSPUD framework raised some key understandings of the food system within the Ipswich community. When conducting an informal environmental scan of the Ipswich region, it became clear that fruit and vegetables may actually be quite accessible within this region, particularly due to a large number of supermarkets throughout the region. Whilst there was also a very high number of processed food and takeaway food options, most were all in close proximity to supermarkets where fruit and vegetables could be purchased. I started questioning whether access to fresh, nutritious food was the main problem.

Access to food is defined as the availability of nutritionally adequate food at all times and the ability to obtain that food in a socially acceptable way (Smith & Booth, 2001). This access to fruit and vegetables within the community can also be addressed in various ways, not just through supermarkets, but also access to fresh food by attending farmers markets, community gardens, community supported agriculture and those concepts supported by FSPUD (Donovan, et al., 2011). To ensure equitable access to nutritious food for all people in the community, these also needed to be located near public transport to ensure access for all, including those who may not have access to private transportation. I recognised that cost might also be a barrier to nutritious food access, however I also wanted to understand if there were other factors influencing the consumption of and access to nutritious food, particularly fruit and vegetables. I was attempting to understand, why higher levels of fruit and vegetable consumption was not occurring, even though it did seem that this was accessible to most community members in the Ipswich region.

I also explored concepts around 'nudging' some have criticised as a 'liberal paternalistic' approach (Thaler & Sunstein, 2003). This approach is aligned with the FSPUD framework in many ways, as it is based on the inference that if one's environment supports healthy behaviours, those behaviours are more readily adopted (Quigley, 2013). An example of the nudging concept is found in supermarkets, where some checkouts are 'confectionary free' so that parents do not have to be concerned that their children will see the confectionary, and then want them to purchase it. This concept resulted in further exploration of how the field of behavioural psychology could influence food choices. This concept was discussed in the literature review in Chapter Two of this thesis.

It became clear to me that I had already commenced on a critical exploratory research study. Due to this exploration, I started the first phase of this doctoral research by conducting initial semi-structured interviews with participants within the Ipswich community to ascertain the perceptions of why the community had a low intake of fruit and vegetables and high obesity levels and non-communicable disease burden. At this stage, I was unclear about what those factors were that were driving the lack of fruit and vegetable consumption within the Ipswich community. It became evident that access to fruit and vegetables alone may not have been the sole contributor to low levels of consumption. I wanted to understand why there was a

perception within the region that community members were choosing to spend their food budget on foods that was low nutrient, high fat, high carbohydrate and heavily processed food that was readily available in the region and not on fruit and vegetables. Additionally, I questioned whether this was primarily driven by low levels of health literacy, health education and other individual factors, or conversely, broader social, political and cultural structures such as access and affordability.

Whilst the results are presented in Chapter Four and a detailed analysis and discussion of the interview data will be presented in Chapter Six of this thesis, my initial impressions whilst undertaking the interviews was that the participants in the Ipswich region had identified general themes about community action. I felt that the key themes that resulted from these interviews were not specifically applicable to the food system nor the poor fruit and vegetable intake in Ipswich and did not assist me to understand the cultural and socio-economic issues that were occurring within the Ipswich region that may have been influencing the food choices of the community. The participants were not certain what was influencing poor fruit and vegetable consumption however they did think that an overall comprehensive food strategy may benefit the region and influence nutritional intake. Consequently, I decided to explore other communities that had successfully implemented a strategic response to influence the nutrition of their community. I wanted to understand if what I had discovered in Ipswich was significant or relevant.

I consulted the literature to look for examples of communities addressing significant nutritional disparities for their residents and identified Toronto, Canada, as a community which has embedded best practice. For example, literature indicated that Toronto had adopted a multi-faceted approach and implemented a range of programs for over thirty years to influence nutritional intake within their community (Mah & Thang, 2013; Toronto Public Health, 2010b). Toronto is the largest city in Canada, comprising of approximately 2.8 million residents and has a diverse migrant population (Mah & Thang, 2013). Over a long period of time, these diversities and social structure challenges led to increased rates of food insecurity, which the community addressed with a number programs, aimed at addressing broad social inequities such as poverty, education levels and employment (Mah & Thang, 2013; Toronto Public Health, 2010a). Whilst I had identified that the Ipswich and Toronto communities were different on many levels such as population, city structure and

health services, I noted some potential similarities within the socio-economic demographics I sought to explore, such as the diverse cultural background and the socio-economic demographics of the population.

I determined that a research visit to Toronto would be of great value in understanding the foundation and strategic intent of the programs that were designed to increase access to nutritional foods within that community. This was a fundamental turning point in this doctoral research in regard to synthesising key concepts and meanings and formed the second part to Phase One of the research study. In semi-structured interviews with four community-based food program co-ordinators and managers within the Toronto region, a very clear social model of food, nutrition and health was outlined as the overarching approach to improving nutrition in the Toronto area.

When undertaking the interviews in Toronto, one term that was used by every participant a number of times and formed a key theme was 'food security'. This formed an important foundational concept within this doctoral research. The participants in Toronto were motivated to empower their community members to form an equitable food system by addressing food insecurity that was occurring for their region. Based within the exploratory research design, I realised this was a concept I needed to explore. It was important to understand what social factors may be influencing the food security and nutritional intake of the Ipswich community.

Due to the emphasis on addressing food security within the Toronto region, I further explored this concept within the literature. The Australian National Nutrition Survey (ABS, 2015) and the Aboriginal and Torres Strait Islander Health Performance Framework (AIHW, 2008) identified six groups whom are at high risk of food insecurity. These include Indigenous Australian people, unemployed people, single-parent households, low income earners, rental households, and young people. In addition to this survey and framework, other groups identified as being susceptible to food insecurity include those who misuse alcohol and tobacco, people who are disabled, unwell or frail as well as those with a lower level of education, women and children (AIHW, 2008; Cook, et al., 2017; Friel, et al., 2015; Martin & Ferris, 2007; Ramsey et al., 2012a). From the experience of living in the Ipswich community for several years, I had identified that the community did seem to have demographic

features consistent with a large number of these risk factors. However, I found it difficult to understand how food insecurity could specifically lead to obesity. It seemed that community members had capacity to access food it also seemed however, to be food of poor nutritional quality. This included food that was highly processed, high in fat and carbohydrates and insufficient consumption of fruit and vegetables. With no data in the Ipswich region presenting the rates of food insecurity, I found it difficult to understand how this could be linked.

I started questioning whether the socio-economic food insecurity risk factors that I had identified in the research, were occurring within the Ipswich community, and if that may be increasing obesity rates within the region. It became evident that I needed a detailed understanding of the characterisation of the Ipswich demographics, consistent with these socio-economic food insecurity and obesity risk factors. This became Phase Two of this exploratory, sequentially designed, mixed-methods study.

Historically, Ipswich is regarded in Queensland and Australia as a lower socio-economic demographic area, as indicated by 'Socio-Economic Indexes for Areas' (SEIFA) collected by the Australian Bureau of Statistics which reflects socio-economic disadvantage and education and occupation data (ABS, 2018). However, an in-depth characterisation of the population in line with food insecurity and obesity risk factors has not previously been done. Utilising the exploratory critical methodology used within this study, it became clear to me that this detailed characterisation was required to understand the drivers behind the nutritional challenges confronting this community. Further, as a Registered Nurse working within the Ipswich community, it was apparent that the individualised nutritional and health literacy and education response from dieticians and policy driven nutritional initiatives, were not making an impact on obesity rates or the escalating obesity related non-communicable disease rates. It became apparent, that a further quantitative exploration of the socio-economic demographics and the influence of these inequities were needed, to assist in the understanding of the obesity phenomena that was occurring within the Ipswich community.

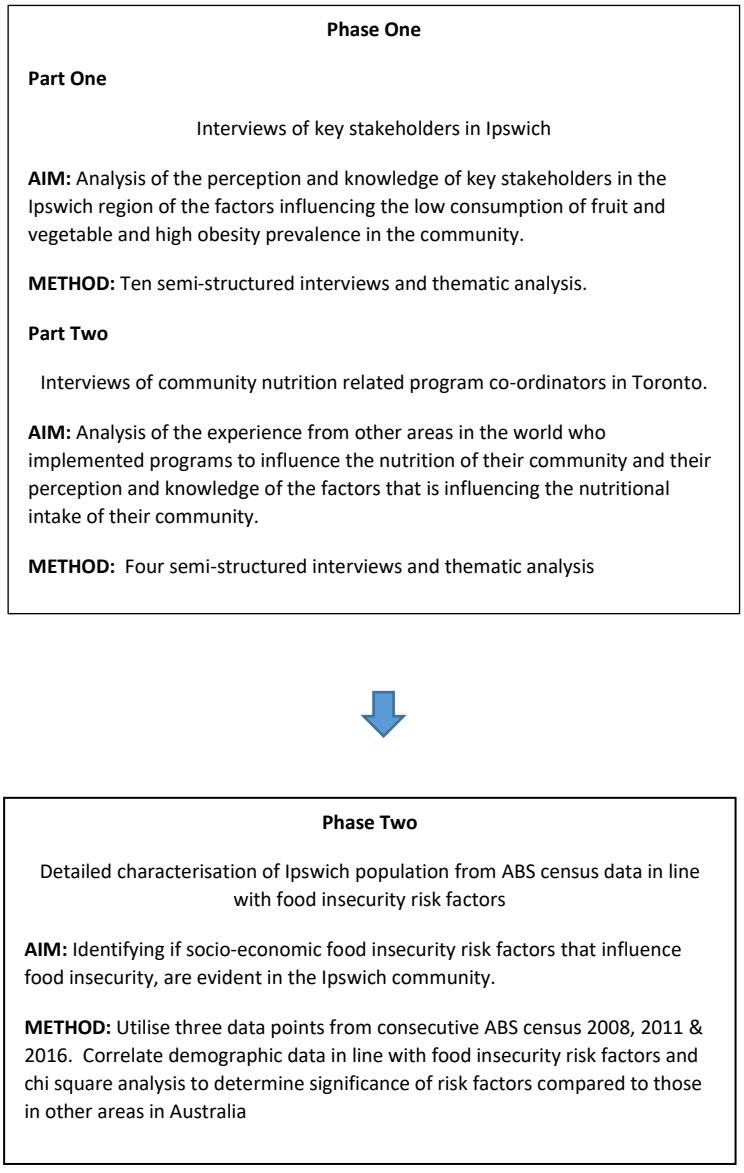
My personal journey throughout this doctoral research has been transformative for the health and wellbeing of myself, and of my family. It has made me identify the

social and cultural constructs that were shaping our own food environment, food choices and health behaviours. As a result of this, it enabled me and my family to make informed, meaningful decisions, based on an intention to ensure that fruit and vegetable consumption was a priority. It led to a key understanding that will shape my future career and wellbeing, regarding how social, cultural and political forces shape our behaviours, resilience and mindset.

3.4. Overview of Phase One and Two methods

The data collection and analysis techniques utilised for each phase will be discussed comprehensively, in Chapter Four, for Phase One (qualitative) and Chapter Five for Phase Two (quantitative) of this thesis. The following gives an overview of the research design including the aim and method used for each phase of this research as outlined in **Figure 2.**

Figure 2 - Research Design



As demonstrated in Figure 2, Phase One aimed to explore broad concepts and understandings from participants around fruit and vegetable consumption and obesity rates within the Ipswich region, in line with the critical exploratory

methodological approach that this thesis employed. This phase was designed to critically and thematically analyse perceptions from key stakeholders in the Ipswich region around barriers and enablers to the increasing consumption of fruit and vegetable intake within the community. This is congruent with the importance of fruit and vegetable consumption on healthy weight ranges as identified by the CSIRO and the reasoning for the focus on solely fruit and vegetable consumption is further discussed in the literature review in Chapter Two of this thesis (Hendrie, et al., 2017). The CSIRO and CDC state there is a direct link between fruit and vegetable consumption and obesity levels (CDC, 2011; Hendrie et al., 2017).

This stage also explored whether participants were aware of the social factors that may be influencing the intake of fruit and vegetable intake within the region. The second part of Phase One explored the key themes from interviews with program co-ordinators in the Toronto region in Canada, who had significant experience in undertaking public health initiatives to influence nutritional intake in their community. This part of Phase One also consisted of semi-structured interviews to explore the understandings and insights of the participants within a critical, exploratory research approach.

Phase Two utilised existing longitudinal and cross-sectional data from the Australian Bureau of Statistics from the 2006, 2011 and 2017 census (ABS 2017a, 2017c, 2017d) to characterise the Ipswich population consistent with significant socio-economic risk factors that were identified through a literature review on food insecurity and the 'Food Insecurity Obesity Paradox'. Statistical significance of these risk factors was calculated using chi-square analysis and compared to the same risk factors averaged across Australia.

3.4.1. Phase One

The semi-structured interviews were conducted within the critical, exploratory paradigm and attempted to empower participants through raising their level of knowledge (Minichiello, Axford, Sullivan, & Greenwood, 2003). These interviews also assisted to answer the key research question of this phase and key themes were attained regarding the perceptions and knowledge that participants held in regard to factors that may have been influencing the low consumption of fruit and

vegetable consumption in the Ipswich region. These interviews were thematically analysed using both NVivo and a thematic analysis manually to ensure rigour.

The aim of this data collection was to establish an understanding of what the key stakeholders and key influencers in the Ipswich region identified as the barriers and enablers to increasing fruit and vegetable consumption for the members of the Ipswich community. The research question this phase answered included:

What is the perception and knowledge of key stakeholders in the Ipswich region, of the factors influencing the low consumption of fruit and vegetables in the community?

The interview, as per the participant consent form, consisted of five questions:

1. Do you think there is a role for a community to work towards improving access to fresh fruit and vegetables?
2. What if any, would you see as the benefits of such initiatives?
3. Do you have any knowledge of existing community initiatives in the Ipswich region, or anywhere else to increase the accessibility of fresh fruit and vegetables?
4. Do you have any ideas about what a community initiative in Ipswich could look like?
5. What do you think would be the barriers and enablers to these initiatives?

As identified in the literature review, Toronto is a community that has effectively implemented community-based nutritional strategies and a strong policy approach to address its' significant nutritional disparities and inequities over a long period of time (Mah & Thang, 2013; Toronto Public Health, 2010a, 2010b). A number of programs and projects have been undertaken in Toronto over the past three decades to attempt to directly influence food insecurity and increase the nutritional outcomes of the Toronto community (Toronto Public Health, 2010a). Participants who have implemented and maintained these programs were interviewed to contextualise and synthesise the responses from the Ipswich region in Phase One. The knowledge and perceptions from the participants in the Ipswich region were not based on the actual application of a response to the issues, as the Ipswich region has yet to successfully implement such programs, particularly on a large scale. It was therefore important to explore the understandings of key participants in another

region that has implemented a long-term strategic response to gauge the understanding and the significance of the findings from the Ipswich participants. The research question this Phase answered was:

What is the experience from the key stakeholders in the Toronto region when engaging in strategies, programs and initiatives designed to influence the nutritional outcome of the community?

The questions asked of the participants in the Toronto area included:

1. What do you see are the barriers or enablers of your project/program for implementation and long-term success?
2. How did you engage the community into your program/project and was it critical for your success?
3. Do you believe that your project/program is useful in increasing public health outcomes in Toronto, specifically around nutrition related disease?

These interviews were also thematically analysed using both NVivo and a thematic analysis manually to ensure rigour.

3.4.2. Phase Two

Phase Two utilises a cross-sectional, longitudinal quantitative analysis to undertake a detailed characterisation of the Ipswich community in line with food insecurity risk factors. Data from the Australian Bureau of Statistics (ABS) community profile was utilised from the 2006, 2011 and 2016 census to analyse trends of these risk factors across the community (ABS, 2017a, 2017c, 2017d). Cross-sectional, longitudinal research of quantitative data, analyses information regarding a population at a certain point in time (Cameron, 2009). Longitudinal research analyses changes and trends in that data and the research must be repeated at different points in time (Cameron, 2009). Utilising data across time points enables the identification of trends over time (Bethlehem, 1999). Cameron (2009), states this data collection and analysis technique is a systematic way to explore relationships between variables and is particularly useful within social science research. These variables were identified through Phase One of this doctoral research consistent with the critical, exploratory, qualitatively driven, sequential mixed-methods design that was used.

The detailed characterisation of the Ipswich community conducted in Phase Two, analysed social demographic factors associated with food insecurity risk factors. This unique data set had not been collated and analysed for the Ipswich community previously and it showed some data trends of great significance.

The research question this Phase of research aimed to answer was:

What is the socio-economic characterization of the Ipswich community associated with food insecurity risk factors?

The risk factors analysed included:

1 Indigenous people
2 Unemployed people
3 Single parent households
4 Low income earners
5 Rental households
6 Young people
7 Education level

Additionally, as presented in Chapter Two, literature indicated that females were at higher risk of food insecurity (Franklin, et al., 2012; Martin & Ferris, 2007; Ramsey, et al., 2012b). When this data was available, this was also analysed for the Ipswich region. The findings from this phase of the research are presented in Chapter Five of this research study and discussed further in Chapter Six.

A synthesis of the information from Phase One and Two of this doctoral research is discussed in Chapter Six, which presents an in-depth discussion of the overall key themes and outcomes from this research, and the significance of these outcomes in relation to social health policy reform and program implementation in the Ipswich region and communities with similar nutritional disparities and socio-economic drivers.

3.5. Research setting

This thesis was situated in the Ipswich community, in South East Queensland, Australia (with one arm of the research conducted onsite in Toronto, Canada). The Ipswich community is a large, geographically diverse regional, outer

metropolitan city of 323,069 residents and is in a stage of significant population growth (ABS, 2017a; Ipswich City Council, 2010). Approximately thirty minutes away from the Queensland capital city (Brisbane), Ipswich is one of the oldest towns in the state with strong working-class origins, with a significant history in mining (Ipswich City Council, 2010; Ipswich City Council, 2017). As outlined in Chapter One, Ipswich has significant obesity related non-communicable disease burdens and a high rate of people who were overweight or obese compared to many other regions in Australia and Queensland and experiences a heterogeneous socio-cultural demographic profile (DDWPHM, 2017; Department of Health, 2013). Significant data suggests that the Ipswich region has a very poor consumption of fruit and vegetables and has one of the lowest self-reported consumption levels in Queensland (Department of Health, 2013). Ipswich has the fourth highest rate of people who are overweight or obese in any region in Australia and experiences an age standard mortality rate four percent higher than the rest of Queensland (Queensland Health, 2016).

The health services provided to the Ipswich community includes a large secondary hospital and community health services, which are provided by the West Moreton Hospital and Health Service, an independent statutory authority established in July 2012 and a number of private health care providers. In the latest Strategic Plan for the West Moreton Hospital and Health Service (Queensland Government, 2018b) a new focus on population health management has been released to attempt to address the increasing number of significant lifestyle related non-communicable disease rates.

The second setting for Phase One of this research program is the Toronto region (Canada). Toronto is different to Ipswich in many ways, particularly in relation to the large population within the Toronto area. As the largest city in Canada with a population of over two and a half million, Toronto experiences high rates of food insecurity and has addressed this over the past thirty years with some significant programs, projects and policy initiatives (Toronto Public Health, 2010a, 2010b). These have been designed to engage the citizens of the city in nutrition and socio-economic based programs aimed at addressing the results of food insecurity whilst building social equity (Mah & Thang, 2013). They have achieved this by developing a Food Council and Food Charter to directly influence social public policy (Toronto Public Health, 2010a, 2010b). Toronto was used as a setting to learn more about

how a food strategy is devised and implemented into a community. The Toronto Food Strategy which was seen as desirable, due to the longevity of the suite of embedded programs in the community.

Further details of the method for both phases of this research are presented at the commencement of Chapter 4, for Phase 1 and Chapter 5, for Phase 2.

3.6. Ethics

All stages within this thesis follows the guidelines provided by the National Health and Medical Research Council (NHMRC) on human research. The 'Statement on Ethical Conduct in Human Research' (NHMRC, 2018) guides all research conducted with human subjects within this thesis, as required by the University of Southern Queensland Human Ethics Research Committee. The semi-structured interviews undertaken in Phase One of this research, both within Ipswich and Toronto locales, were ethically approved by the Human Ethics Research Committee at the University of Southern Queensland, with approval number H15REA162. The ethics approval and the participant information sheets are included in the Appendices of this thesis.

The first phase of this program of research, conducted both in Ipswich and Toronto, followed the University of Southern Queensland Human Research Ethics Committee guidelines and was approved prior to contacting any participants or undertaking any research. Once potential participants were identified, the researcher emailed them a letter of invitation, the participant information sheet and informed consent form for their consideration. The researcher then re-contacted them within two weeks of the invitation via telephone, to ask if they have been able to review the invitation and consent form. If they chose to participate at that time, the researcher booked an interview at a mutually convenient time. If the stakeholder chose not to participate at that time, the researcher thanked the potential participant for their consideration and no further contact was made.

Whilst there was no direct risk of benefit to participants for being involved in the research undertaken, it was important that the research was designed to limit any risk and maintain confidentiality and anonymity of the participants as per NHMRC research guidelines (NHMRC, 2018). Prior to the interview being conducted, consent for participation was obtained as per Appendix A. The participant was then allocated a random number by the researcher between one and fourteen. This was

to ensure all recorded data was non-identifiable. The interviews were semi-structured following a list of questions as outlined in section 3.4.1 and an audio recording was conducted on a digital recording device on the researchers' password protected phone. The recording was downloaded and deleted from the phone and transferred to the researchers' computer. The transcription of the audio recording was completed by the researcher and the audio recording and transcribed data was stored on a password protected computer and in a locked filing cabinet in the researchers' office at the University of Southern Queensland.

The recorded interviews were conducted by a single, face to face, semi-structured interview with each of the participants, which took approximately thirty to fifty minutes. The interviews were held at a place and time that was suitable for the participant; however, the researcher also ensured that the interview location was private, so that the audio recording was as clear as possible and confidentiality assured. The researcher provided the participant with an opportunity to debrief after the interview concluded and the audio recording was finished. The researcher was also available after this time to provide an informal chat or debrief if the participant chose to take this option. The participant was emailed a transcript of their interview within two weeks of the interview data to enable them to edit any information on the transcript prior to the inclusion of the interview in the research data and analysis. There was no incentive provided to participate in the interview. Participant identification and selection methods are described in Chapter 4.

3.7. Research quality

The mixed-methods, qualitatively driven, sequential approach assisted with research quality, as the use of both a qualitative and quantitative approach ensures integrity of findings and provides a contextual understanding of the data in addition to improving the usability of the research findings for those wanting to apply this knowledge in practice (Greene, 2008). A mixed-methods approach is becoming increasingly popular in health research to ensure a high quality and relevancy of research outcomes. This approach has gained momentum and popularity particularly in applied social science fields as it ensures a broad approach to ensure high quality research outcomes for complex issues (Cameron, 2009; Greene, 2008). Cameron (2009), argues that this design can embed an iterative and exploratory approach

within a doctoral program, where the different mixed-methods interact and complement each other bringing strength to research design and outcomes. Coupled with the evolving nature of the exploratory approach in this research project, the mixed-methods design enabled the triangulation of data, by verifying the results of the qualitative phase by undertaking the subsequent quantitative phase. Greene (2008) states that a mixed-methods approach strengthens research quality by enabling an explanation of research data, particularly cultural influences on socio-economic factors occurring within a community. The mixed-methods, exploratory design enabled the researcher within this research project, to explore how socio-economic inequities may have been underpinning the nutritional intake in the Ipswich community.

There are a number of components of research quality identified within the literature. Mantzoukas (2004) has identified overall key components of qualitative research quality as including the concepts of consistency, reliability, dependability and auditability. Validity and reliability are also reoccurring key themes in the literature around qualitative research quality. Consistency refers to the evaluation of the analytical examination of the research data and that it is consistent across all of the research data and methods in this thesis (Morse, 2012). The qualitative phase of this research used both NVivo analysis and a thematic analysis manually, to consistently and methodically analyse key themes for the semi-structured interviews undertaken in both Ipswich and Toronto. Dependability can also be seen as reliability particularly within quantitative research and can refer to the stability of data over time (Denzin & Lincoln, 2008). The audio recordings and the transcripts from Phase One of the audio recordings were kept in a secure place to ensure this doctoral study is reliable, dependable and auditable.

Auditability describes the documentation of the decision-making trail in the research design (Denzin & Lincoln, 2008). Documentation of the decision-marking trail demonstrates that the research process utilised is suitable for the research undertaken. Due to the research design and the utilisation of tools such as NVivo for a thorough and structured thematic analysis of the qualitative phase included in this thesis, auditability is achieved. Welsh (2002) argued that for thorough effective thematic analysis of data such as interviews, a software program such as NVivo adds rigor to the research process. Computer assisted qualitative analysis can

assist in ensuring that the data is consistent, reliable, dependable and auditable (Welsh, 2002). This also assisted with making sense of themes and the validity and reliability of the research content. The use of NVivo directly assists with the auditability of the thematic analysis which is often not transparent if a computer assisted qualitative analysis program is not used (Welsh, 2002). The analysis of the qualitative data was also undertaken manually; post the NVivo analysis, to ensure the context of meaning and accuracy was achieved.

In Phase One of this thesis, the participants were provided with a transcript of their interview within a two-week time frame, to ensure that the information contained within that transcript was a true reflection of their intention. One participant took the opportunity to make minor amendments to their transcript, which did not change the meaning of their statements. These transcripts can be compared with the audio recordings for credibility and the consent forms that have been signed by all participants prior to their participation in the research program. This ensured a quality process and research fidelity.

The data used within the quantitative phase of this research was accessed from the ABS community profiles from the 2006, 2011 and 2016 census, which is considered to be the highest quality socio-demographic data available in Australian (ABS, 2017a, 2017c, 2017d), leading to credibility of the data source. Credibility of research can also refer to reliability and validity and refers to if the results are believable and trustworthy (Denzin & Lincoln, 2008). The ABS adhere to research quality standards as identified in (ABS, 2017b) as timeliness, accuracy, coherence, interpretability and accessibility. Only minimal changes may be made to census questions over the five-year periods for consistency of data, however, the 2011 census represented some significant changes made to geographical units (ABS, 2017b). However, with the release of the 2016 census data, the ABS have integrated time series profiles into the suite of information available to ensure that the same areas are covered for the data capture for the 2006, 2011 and 2016 census (ABS, 2017b). Additionally, the analysis of this data was conducted by using basic statistical analysis as outlined in Chapter 5 of this thesis, and this can be easily replicated by another researcher to assure auditability and credibility of the quantitative phase.

To ensure timeliness in the quantitative data, the ABS ensures data is collected every five years and has done so since its inception in 1961 (ABS, 2017b). All data is obtained at a point in time determined by the ABS which is one specific night, 'census night'. All Australians need to fill out the information applicable to that night (ABS, 2017b). The data from each census is released in stages, as per the ABS release schedule for each census (ABS, 2017b). The ABS address accuracy in their data and data collection by ensuring a high quality of census from design, collection and processing. Prior to 2016, this form was distributed in person or via mail (ABS, 2017b). In 2016, an electronic system was utilised as the primary source of data collection, with some paper copies still distributed to those in person, who would not be able to access the internet for a variety of reasons (ABS, 2017a). A non-response rate for people in Australia for the Census has fallen to below 4% (ABS, 2017a) which provides a strong representation of the Australian population. A data quality statement is available for each census that has been conducted by the ABS outlining the non-response rate for each variable (ABS, 2017a). Additionally, the analysis of this data was conducted by using basic statistical analysis that can be easily replicated and is outlined in Chapter Five of this thesis.

There are, however, limitations to the ABS data quality for this doctoral study. The LGA includes a number of very diverse sub regions with significant differences in socio-economic indices. For example, the Springfield region that accounts for 34, 000 of the total 323, 069 population and a socio-economic index (SEIFA) of 1053 compared to inner Ipswich at 939 and East Ipswich at 923 and 916 for Redbank which accounts for a large number of the Ipswich population (ABS, 2016; ABS, 2018). This has potentially skewed the socio-economic data to look less severe than what is occuring in the majority of the Ipswich population.

Coherence within the ABS data is obtained by the fact that comparable and compatible census information has now been collected and collated every five years (ABS, 2017b). Australian standard classifications are used where possible to ensure coherence of this data (ABS, 2017b). The ABS releases census data on their website by using a range of platforms including a table builder and a guide to ascertain the users' data requirements (ABS, 2017b). This includes definitions of classifications and a glossary of definitions. This ensures the interpretability of the census data is at a high standard. Accessibility of the census data is maintained by

the ABS by an online portal that can access a large number of data sets (ABS, 2017b). This is further complemented by table builders and release of important community profiles post census (ABS, 2017b).

The cross-sectional, longitudinal data analysis undertaken within the qualitative stage and the semi-structured interviews conducted in the qualitative phase of this thesis does demonstrate high research quality. The methods conducted and results from the analysis can be clearly and easily audited, replicated, and demonstrate consistency and reliability in the research process.

3.8. Conclusion

In conclusion, this chapter has explained the reasoning and evolution of thinking behind the researchers' use and choice of the critical and exploratory methodological paradigms and the qualitatively driven, sequential, mixed-methods utilised for this doctoral study. The decision trail that the researcher undertook to explore the topic and results, as they emerged, was discussed. The research methods were also outlined including the research setting, ethical process and research quality for both the qualitative and quantitative phase.

The next chapter, Chapter Four, will detail Phase One of this doctorate which forms the qualitative phase of this research. This chapter will outline the purpose and aims of the qualitative phase of research, as well as the data collection, data analysis and results of this phase.

4. Chapter 4: Phase One Qualitative Semi-Structured Interviews

4.1 Introduction

This chapter explains the purpose, aims, data collection, data analysis and results of the qualitative phase of this thesis. Research design, setting, quality and the ethics processes utilised for this qualitative phase is outlined in Chapter Three of this thesis. The qualitative phase of this research included two parts. The first part involved semi-structured interviews with key community stakeholders in the Ipswich community, a large regional community in Queensland, Australia. The responses and key themes from these interviews are explored in Section 4.4.1 of this chapter.

The second part of the qualitative phase for this thesis was undertaken in Toronto, Canada which was identified in the literature as being one key community that has been working to improve the nutritional intake of their population for over thirty years. The purpose of these interviews was to understand Toronto participants' perceptions of the barriers and enablers to implementing a successful food strategy to influence a community's nutritional status, from the lens of their own experiences in doing so. The results of this part of the qualitative research are presented in Section 4.4.2 in this chapter.

The semi-structured interviews in Toronto were undertaken to deepen the understanding of the key themes that emerged from Ipswich and to understand how another community responded to nutritional disparities. Participants were key stakeholders who had been involved in strategic community-based food initiatives and policy approaches to influence nutritional intake in Toronto. The key themes and insights from Toronto informed Phase Two of this thesis work and resulted from the exploratory, sequential study design utilised for this doctoral research. Discussion and analysis of these findings are explored in Chapter Six of this thesis.

4.2 Purpose of the study

Phase One of this doctoral research began with the exploration of the understandings, perceptions and knowledge of key stakeholders in the Ipswich region, of how to increase fruit and vegetable consumption within their community. As outlined in Chapter One, the background to these questions was the low consumption of fruit and vegetables, higher rates of obesity and associated non-communicable disease rates reported in the Ipswich region (DDWHPHN, 2017; Department of Health, 2013). Using a critical exploratory lens, the aim of the semi-structured interviews was to explore stakeholders' knowledge and perceptions of what the barriers and enablers are to increasing fruit and vegetable consumption in the Ipswich region and the potential strategies that may be able to be utilised to address this nutritional disparity.

The decision to conduct similar semi-structured interviews in Toronto, Canada (the second part of Phase One – Part B) emerged following a preliminary thematic analysis of the Ipswich interviews. The initial analysis of the Ipswich interviews revealed an overall understanding of how the community may be able to implement a community-based response; however, it also demonstrated that the participants were at the start of their journey in understanding what may be causing the low fruit and vegetable consumption. As outlined in Chapter Three of this thesis, Toronto has demonstrated international leadership for its work in implementing strategic community-based initiatives to address significant nutritional disparities within their community (Mah & Thang, 2013; Toronto Public Health, 2010a, 2010b). Travelling to Toronto to interview leaders of these initiatives was in an effort to contextualise and synthesis the findings from Ipswich and to understand how a community could respond effectively to shape nutritional intake.

4.3 Method

In Phase One of the research, semi-structured interviews were conducted with key stakeholders identified within the Ipswich region as key influencers of local government planning, public health and community development. Ten semi-structured interviews were conducted to ensure breadth of key stakeholder experiences and backgrounds, which is consistent with the approach taken by Huang and Dresher (2015), who conducted research to explore the understandings

of key stakeholders within a community setting. The aim of this data collection was to establish an understanding of what the key stakeholders and key influencers in the Ipswich region identified as the barriers and enablers to increasing fruit and vegetable consumption for the members of the Ipswich community. The research question this Phase answered included:

> What is the perception and knowledge of key stakeholders in the Ipswich region, of the factors influencing the low consumption of fruit and vegetables in the community?

As per Liamputtong (2013), the number of participants is dependent on the saturation required to ascertain key themes, however round numbers such as ten are used frequently in PhD studies. Should the researcher believe that key themes have not reached the saturation point required to ascertain clear themes, more than ten interviews would be undertaken after an initial review of data. The ten interviews undertaken in Ipswich, gave clear trends of key themes within the research participant group, with a thematic saturation point attained.

Through the researchers' extensive community and health contacts within the Ipswich region, potential key stakeholders were identified. Additionally, the use of snowball sampling was used which is a technique where by existing participants identify other possible connections that may be able to fit the inclusion and exclusion criteria (Denzin & Lincoln, 2008). From twelve potential participants identified, ten of the key stakeholders chose to participate in the study. These participants were selected because they have the potential to either directly or indirectly influence the prioritisation, customisation, adoption or implementation of a strategy to influence the nutritional intake of the Ipswich community. All relationships with participants were of a professional nature and the researcher did not know any key stakeholders in a personal capacity. The key stakeholders included urban and social planners from the Ipswich City Council and public health specialists and were identified through purposive and snowball sampling. Inclusion criteria to participate in the study included:

1. Adults over the age of 18;
2. Members of the nominated key stakeholder groups,
3. English speaking participants; participants with knowledge of the Ipswich area.

The semi-structured interviews, as per the Participant Consent Form, consisted of five questions:

1 Do you think there is a role for a community to work towards improving access to fresh fruit and vegetables?

2 What if any, would you see as the benefits of such initiatives?

3 Do you have any knowledge of existing community initiatives in the Ipswich region, or anywhere else to increase the accessibility of fresh fruit and vegetables?

4 Do you have any ideas about what a community initiative in Ipswich could look like?

5 What do you think would be the barriers and enablers to these initiatives?

The semi-structured interviews collected in the Toronto region, in part two of this phase, included key stakeholders who were all directly involved in the customisation, prioritisation, adoption or implementation of programs, initiatives or strategies which aimed to positively influence the nutritional intake of that community. These participants included program directors, public health officials and members of the Toronto Food Policy Council. Four interviews in total were conducted in this phase. The potential participants in Toronto were identified through key Toronto Food Policy Council contacts and public health contacts that the researcher identified in the literature review. Snowballing was also used as a technique to identify potential participants.

The inclusion criteria to participate in the study included:

- Adults over the age of 18;
- Members of the nominated key stakeholder groups;
- English speaking participants;
- Participants with knowledge of the Toronto area.

All relationships with participants were of a professional nature and the researcher did not know any participants in a personal capacity.

The interview, as per the Participant Consent Form, consisted of three questions:

1 What do you see are/have been the barriers or enablers of your project/program for implementation and long-term success?

2 How did you engage the community into your program/project and was it critical for your success?

3 Do you believe that your project/program is useful in increasing public health outcomes in Toronto, specifically around nutrition related disease?

The researcher conducted a thematic analysis of the responses of the interviews conducted in both Ipswich and Toronto. These interviews were thematically analysed using the NVivo software package, version 10. Braun and Clarke (2006) argue that thematic analysis of qualitative research form a flexible but thorough approach in social science fields for analysis. The use of NVivo as a computer analysis tool assisted the researcher to identify key themes and enables the auditability of the research results (Welsh, 2002) and was utilised throughout Phase One, both in the Ipswich and Toronto interview analysis. The thematic analysis was then additionally undertaken manually, to increase consistency, reliability and dependability of the analysis undertaken (Mantzoukas, 2004) which complemented the NVivo analysis. The analysis and results were extensively reviewed with an experienced qualitative researcher, who was the Principal Supervisor of this thesis. The use of a second, experienced qualitative researcher ensures quality of thematic analysis (Braun & Clarke, 2006).

The transcripts from the interviews in Ipswich were initially thematically analysed prior to conducting interviews in the Toronto region. Consistent with the critical exploratory lens within a qualitatively driven sequential methodology adopted for this study, it was important to understand the key themes that had emerged from the Ipswich interviews, to enable the researcher to further explore these key themes with the Toronto participants. Thematic analysis attempts to identify themes from focus groups or interviews through careful analysis (reading and re-reading) of the interview transcripts (Liamputtong, 2013). Attempting to understand challenges and opportunities within a community to increase the consumption of fruit and vegetable intake, key themes were identified through criteria such as relevance, breadth, depth and practicability (Auckland, et al., 2015).

Key themes from the Ipswich participants started to emerge during the thematic analysis undertaken by the researcher which resulted in the following thematic division:

- Identifying the problem?
- Engaging the community;
- Leadership and collaboration - bringing it all together and
- Planning for the future?

These key themes are further explored in Section 4.4.1 of this chapter.

Post the initial data analysis of the interviews conducted in Ipswich, the interviews within the Toronto region were conducted. These interviews from Toronto were then thematically analysed, using the same methods used in the Ipswich interviews. These interviews were analysed in isolation of the key themes that were identified within the Ipswich region.

A theme which emerged from the Toronto data, but was not present in the Ipswich data, was a clear focus on how social inequities leading to food insecurity within their communities influenced the nutrition and consequently, that health status of vulnerable groups. Participants in Toronto articulated a consistent dialogue around an understanding that food insecurity built on social inequity was the key problem they were addressing when attempting to influence the nutritional intake of their community and when planning, implementing and evaluating their policies, strategies, programs and initiatives.

The themes that were identified within the Toronto data included:

- Understanding and working with your community;
- A healthy food system;
- Funding, partnerships and collaboration.

These key themes are further explored in section 4.4.2 of this chapter.

4.4 Results

4.4.1 Part A - Ipswich interviews

The key themes from the Interviews from the Ipswich key stakeholders emerged through the comprehensive thematic analysis. During this process the following themes emerged:

- **Identifying the problem?** This key theme included how key stakeholders explored their understanding of the problem occurring within the Ipswich region and whether the low rates of fruit and vegetable consumption was a multi-factorial socially driven problem. This key theme was further broken down into 'access' and 'market forces' which participants believed may be key drivers behind the issue of low fruit and vegetable consumption in the Ipswich region;
- **Engaging the community.** Participants articulated a clear need for community engagement to ensure the uptake, sustainability and leadership of any effective strategies that may increase the consumption of fruit and vegetables within the Ipswich region;
- **Leadership and collaboration – bringing it all together.** This included the need for collaboration, including the creation of funding partnerships for potential strategies and where leadership could be derived from. The participants further identified local government and schools having key leadership roles in any community-based strategy to increase fruit and vegetable consumption.
- **Planning for the future?** This key theme included participant awareness of existing strategies within the community and those strategies that participants proposed may be effective to increase fruit and vegetable consumption.

The key themes that were identified in the semi-structured interviews conducted with Ipswich participants are demonstrated in the following table. This table outlines the number of participants (out of ten) who mentioned the themes and the number of times the key theme was mentioned within all of the interviews conducted. This table demonstrates that the key themes discussed by participants included what may the cause of the nutritional disparities occurring in Ipswich, what potential strategies may include and the importance of community engagement and leadership when implementing these strategies.

Figure 3 Key themes from Ipswich Interviews.

Phase One, Part A:

Key Theme	Number of participants (out of ten) who mentioned this theme	Accumulative number of times key theme mentioned
Identifying the problem ?		
Understanding the issue	8	22
Access	5	15
Market forces	6	17
Engaging the community	10	119
Leadership and collaboration – bringing it all together		
Collaboration	5	7
Funding	4	4
Leadership	6	27
Planning for the future?		
Existing strategies	7	11
Proposed strategies	6	12

Whilst the above table represents a numerical count of each of the key themes, these have been carefully drawn from comments from each of the Ipswich participants through a thorough manual and NVIVO analysis. A thorough manual analysis was initially undertaken, followed by the NVIVO analysis which provided the numerical count demonstrated in the above table. Subsequently, a further manual analysis was undertaken to confirm the NVIVO analysis and add further rigour to the analysis.

4.4.1.1 Identifying the problem.

Ipswich participants spoke about what they believed may be the foundation to the issue of low fruit and vegetable consumption in Ipswich throughout their interviews. Some sub-themes emerged where participants discussed whether this issue was driven by lack of access to affordable fruit and vegetables or whether it was the

broad market forces behind the food system shaping consumer behaviour. Initially however, broader social and cultural structures were being identified as potential causative factors behind the public health issue in Ipswich and it was clear that the key stakeholders within the Ipswich region were at the start of their journey to understand if socio-economic factors were causing food system inequities. Eight of the ten participants articulated how they were attempting to understand if it was individual or broader social and cultural influences shaping food consumption behaviours in the Ipswich region. However, the responses included a number of participants' who saw the Ipswich community as "them" and outside of themselves and that individual behaviours and factors were potentially also a source of the problems experienced with low fruit and vegetable consumption in the Ipswich region.

One participant identified that fruit and vegetable consumption was a social issue that was causing the health burden that Ipswich was experiencing by articulating the following:

> *"health is a medical issue, but it is also a social issue. So, if people are unwell and do not have access to fresh fruit and vegetables, their health is compromised. That is actually a social issue, and when you have enough people who are struggling to have fresh food and to be able to access that and create their own health in that way, you actually then get a rising tide of un-wellness and that in turn changes the social structure and the way people behave and engage and all of those sorts of things."*

Another participant explored that the social and cultural norms around food consumption needed to be understood in the Ipswich who reflected:

> *"I think the question is, who is the community? Who are the communities in Ipswich? Finding out what their passion is around food. If there is anything I have learned, whether it is changing behaviours around health or changing behaviours around alcohol consumption with multicultural or other communities', it is really understanding the meaning of food."*

The importance of how the community perceives food, food behaviours and health outcomes were explored by another participant, who at the same time, was questioning if individual behaviours were determining a healthy lifestyle. This was reflected by the following statement:

> *"Yes, well I suppose it is defining what community is, a community is an individual, their family, that social circle and that all combines to be the community I believe. If we are talking in those terms then we all individually, we all want a healthy lifestyle don't we? We feel better and financially we are not spending so much money on the health system and we are not so much of a drain on the health system. Yes, I think as a community we do have a responsibility. Look at all the rates of obesity Australia has got over all these countries over the world - it's crazy. Such a short time too. So I think it is about us identifying that and then accepting that and yes we have to embrace this and then want to change and then as individuals we start changing and then like rivers in a pond and start influencing other behaviours as well".*

This was an interesting reflection as the participant identified not only social factors influencing food consumption patterns, but on a number of occasions articulated the importance of shifting behaviour on an individual level, however they based the example within a social context. This perception was also identified by another participant who reflected on

> *"I would revert back to the individual. You know if we are healthier and we are feeling better, we are more active socially, that is what we are. Humans being are such a social animal if we are a bit more active we feel better we interact better.*

One participant reflected on the socio-economic demographics in the Ipswich region and whether this would influence a nutritional response:

> *"I would want to know about low socio-economic background people and what's the meaning behind food for them is. Is it*

about survival or convenience? "I don't have time", "I don't have the money", but yet they can go out and buy fast food".

There is an important undercurrent to this comment, where the people from the 'low social economic background' were identified by that participant as people who were seen as different, and belonging to a different group from themselves, by referring to "them".

Another participant identified Ipswich as a lower socio-economic region when reflecting on what the potential drivers to low fruit and vegetable consumption may be:

"you have cheap renting (in Ipswich). It's attracting your low social economic families, so you get concentrated disadvantage."

Another participant identified the shift in social and cultural structures influencing food consumption patterns in Ipswich and that socio-economic demographics may be influencing food consumption patterns:

"Do communities actually value healthy eating or are we about convenience now at the cost of eating whatever we want or is healthy eating a phenomenon with your rich, middle or upper middle class where you can afford organic foods? I would want to know about low social economic back ground people what's the meaning behind food for them is it about survival or convenience, "I don't have time", "I don't have the money", but yet they go out and buy fast food so if I can understand that then I would do a really good community development program stratify different types of the community and build different initiatives."

Once again, this quote demonstrates that another participant saw themselves as different to the people in the community from a lower socio-economic background by referring to "them". It also demonstrated that this participant was attempting to understand what was driving the low fruit and vegetable consumption in people with a lower socio-economic background, as they were not familiar with this themselves

and were at the start of their journey in understanding what was the cause of the nutritional disparities occurring within the Ipswich region.

This social and cultural shift towards convenience and shifting norms in relation to food consumption was also identified by another participant who stated:

> *"Depends I think, that another part of the problem is people don't eat fruit and vegetables. You know what I mean? We eat fruit and vegetables and stuff but in the week you, you've got pizza night or Fridays takeaway. You know, that sort of thing. Our eating culture has changed, and we don't cook so much for ourselves:*

The cause of the cultural shifts and food consumption were identified by many participants as a perception that people are disconnected from their food sources, whether that be the origin of food or the use of food. This was identified by a number of participants who stated:

> *"Probably a disconnect that occurred in more recent times between the growing of food and where it is grown and where people access it and use it for cooking purposes. I grew up on a market garden, so I knew about growing of food and had my own vegetable garden as a five year old, growing things.".*

Another participant reflected on these cultural shifts regarding fruit and vegetable consumption and food literacy by explaining a perceived lack of understanding of the source of food. This started a key sub-theme around food and health literacy of an individual by the following statement:

> *"I think if people have a better understanding of fresh fruit and vegetables and where they come from and how they grow and what the benefits are of having it fresh and not being kept in a cool store for months on end or weeks on end. I think it's probably the education to the community to know what the benefits are to help with, obviously one is obesity and then other diseases from obesity. I don't think people are aware of the*

benefits of having those fresh fruit and veggies every day".

This statement, whilst exploring the cultural shifts in fruit and vegetable consumption also reflected how individual behaviour and health/food literacy was an influence for consumption patterns.

Other reflections from the interviewees regarding food literacy for an individual were identified by a number of participants and reflected the loss of time, knowledge and skill regarding food preparation. One participant reflected:

> *"I think some people, not everyone, but some people, have forgotten how to cook and I know myself when you go into a shop and oh I bought bag of polenta months ago and I don't have clue how to cook it you know and because it is different you don't have time to muck around ….I suppose you are changing your habits and I think if you want people who don't eat well to change their habits it going to be difficult. But I think part of it is people don't know how to use food and fresh produce to be included in something that they can eat."*

This theme of individuals having poor food and health literacy was repeated in the responses to the semi-structured interviews by a number of participants and included:

> *"I think a lot of people have so much convenient food available that I think some people have forgotten how to cook the fresh fruit and veg you know ….. I think there needs to be some more programs like that (Jamie Oliver Ministry of Food), so that people have a better understanding of how to cook vegetables and make them taste nice without all the preservatives and all that sort of thing. It's more the education than anything else".*

Food and health literacy for an individual was identified again by another participant, however this participant also identified that potentially price, access and variety may influence food preference with the following statement:

> *"Well I think the first one is people's awareness I think a lot of people don't think fresh fruit and vegetables are important I think they would rather go and get take away, that's a big one and part of that habit is that people don't know how to use fresh fruit and vegetables you know I suppose they probably think of vegetables, they think of something like, well let's say, carrots and mashed potato. Yes, I think the first thing would be where is people's knowledge of fresh produce and the second one would be of course the most obvious ones and that is price, access and variety. But I would go back to, do the people actually appreciate the importance of fresh food."*

This participant also articulated their response in a way that demonstrated that they saw the Ipswich community as "them" and those consuming low fruit and vegetables potentially outside of their own socio-economic group.

Access to food was identified as an important subtheme by half of the participants when attempting to understand the factors that were influencing the poor rates of fruit and vegetable consumption in the Ipswich region. The need to improve access to both fresh fruit and vegetables along with access to food literacy and food use programs that would assist individuals, emerged from the Ipswich interviews:

> *"Providing them free access to learn how to cook good, nutritious food and food that is not going to cost a lot, simple recipes that they can then pass onto other family members".*

This participant also saw the problem in Ipswich as one outside of themselves referring to the Ipswich people as "them".

Another participant echoed this response by reflecting on the importance of being able to affordably learn skills around food use, in what they had identified as one of the few community-based responses that exist within the Ipswich region by stating:

> *"The Ministry of Food which is helping people in Ipswich learn how to cook better food for themselves and at a reasonable cost".*

Participants also identified broader access issues as a potential problem to the low fruit and vegetables consumption patterns occurring in Ipswich and discussed how they access this food:

> *"I just don't think they know how to or where to start. I think if you had a place that they could go to, like you have got your fruit and veggie shops and that sort of thing, but not a lot sort of locally where people can access it."*

The question of where the community can access fruit and vegetables was raised by another participant who discussed why supermarkets were often seen as the only source of fruit and vegetables when Ipswich is geographically close to the Lockyer Valley, which locals call the 'salad bowl' due to its large number of vegetable farms. One participant stated:

> *"You can go to the supermarket and that sort of thing, but you are not always sure you are getting local produce and I think if you could have access and we live in the salad bowl area as they say, we should be able to access the fruit and veg from those farmers which I don't think we are."*

One participant reflected on whether the community were accessing fruit and vegetable markets within the larger region with the following comment:

> *"We have markets around and you have got the Fernvale market, so that you can go and get your fresh fruit and vegetables….But within the community here locally, I don't think it is that easy to access".*

The financial considerations regarding whether access to fruit and vegetables were affordable for members of the Ipswich community was reflected by another participant who stated:

> *"So financially things need to be cost effective and affordable, so I think it is just primarily around ease of access and affordability, are probably two of the key things to start to look at".*

Overall, participants in Ipswich were not entirely certain whether access was an issue and were not certain where the community were sourcing their fruit and vegetables and if this was an affordable option. The emergence of a significant sub-theme occurred when exploring this concept with the participants of market forces within the Ipswich community controlling the supply of fruit and vegetables to consumers. One participant reflected:

> *"The question is, can you get access to fresh fruit and vegetables and around here, where we live, you have got a fruit and vegetable shop up the road there, you have got Woolworths over the road ….. I think that is because places like Woolworths they dominate the market."*

This market dominance of fruit and vegetable supply that was shaping access to this food was identified by a number of participants. Many participants reflected on the large supermarkets within the region controlling fruit and vegetable supply and how these supermarkets were perceived by many Ipswich community members as the prime source of fruit and vegetables. One participant directly stated:

> *"You know Coles and Woolworths, there's more to purchasing produce than just going to Coles and Woolworths, so are people aware of that?"*

These market forces were further explored by a number of participants. One participant identified why they believed Coles and Woolworths had an oligopoly in Ipswich in food supply by stating:

> *"Coles and Woolworths have a certain convenience you have a one stop shop."*

Another participant spoke about the fact that only two or three very large retailers were supplying the majority of the market place in Ipswich with fresh fruit and vegetables and commented:

> *"Now, in the case of fresh fruit and vegetables, we have now got to the stage with the retail end of food distribution and sale that we have an oligopoly where there are two or three very large providers or sellers in the market place and the decisions that*

they make are the ones that are most important for what is available for people to be able to access".

This oligopoly was further explored by the same participant in regard to how these suppliers were shaping the cost and quality of product, who stated:

"I think if you want cheaper or better quality you have to get Coles and Woolworths out of the market or at least knock their share down because I think, like I said, the two small, independent fruit and veg shops, I think they find it hard to compete because they don't have control of the market".

This reflected a number of participants' beliefs that fruit and vegetables were easily accessible in the Ipswich area, however generally this was accessed through the major supermarkets in the region. The larger, economic forces occurring within the market providing Ipswich with fresh fruit and vegetables was also identified by another participant who concluded that:

"I think it is because access to fresh fruit and vegetables is really not all that dissimilar to a whole range of other things in the society which the market largely controls. People are simply treated as consumers."

One participant also reflected on the broader market forces influencing access to and pricing of fruit and vegetables within the Ipswich community, with the following statement:

"There is a commercial side behind it and there will be a commercial side. But the commercial side is not going to work if the community is not going to support that demand. It is a supply and demand situation… they have to put the demand there to be met".

Reflecting on the market influences and the corresponding ability to make a profit whilst providing access to the nutritional intake needs in the Ipswich region, one participant who surmised:

"Looking at food and the what we are consuming and how we are consuming and looking at health in recent years there has

been such a rise in lactose free, gluten intolerant, paleo, there are all of these different issues but they are sparked by health issues….. So, there is starting to be the awareness that we need. So, if they can't access it, they need to build it. Or they need to put the demand there so that commercial businesses can supply them. You look in Ipswich. Wray organics have a beautiful store out there, and you think, 'What the?' Where did that pop up from, but that is there because there is a need for it. And the community has built that. Someone has answered the call for it and there is a huge role for them to develop and all that." [1]

Overall, the key theme of participants grappling with whether the issue of low fruit and vegetable consumption in the Ipswich region was due to broad social, cultural or market structures and changes, or individual health behaviours, were evident. The social and cultural structures that influenced this, were identified by some participants as access to fruit and vegetables and broad market structures that influence the supply of and access to, fruit and vegetables within the community. It was also identified by the Ipswich participants, that the financial viability and profitability of solutions to be implemented into the community to increase fruit and vegetable consumption, was paramount if long term, solutions were to be sustained.

It is important to note in the data analysis, that many participants referred to the Ipswich community as "them" or "they" and reflected the fact that they saw themselves as not being part of the problem of low fruit and vegetable consumption in the Ipswich region. This suggests a stratification of the community in relation to attitudes and behaviours in relation to food, at least from the perspective of the participants.

4.4.1.2 Engaging the community.

Community engagement formed the most prevalent theme in the interviews conducted with the key stakeholders within Ipswich. This theme was mentioned by all ten participants on 119 different occasions. Community engagement was defined

[1] Both Wray Organics and the Farmers market experienced considerable financial stress in Ipswich, with the Farmers market ceasing to exist in 2016 and Wray Organics placed into liquidation in 2018 due to financial stress.

within this key theme to include concepts and terms such as community engagement, an engaged community, involving the community in a nutritional response, and a sense of belonging to a community. All ten participants concluded that a response needed to engage the community if the initiatives are to be successful and fully integrated within the Ipswich region. The strategies in which the participants wanted to engage the community in, are discussed in Section 4.4.1.4 of this Chapter, 'Planning for the future'.

When defining the Ipswich community, one participant asked what the community is:

> *"I suppose it is defining what community is, a community is an individual, their family, that social circle and that all combines to be the community I believe".*

Many participants explored the role of community engagement as a strategic response to increasing fruit and vegetable consumption. One key stakeholder from the local government identified the importance of communicating with the community to ensure they feel like a valued, informed part of the process of any initiative based on influencing the nutritional intake of the region. This was reflected in the following statement:

> *"A more engaged community in things like this, helps us to have greater channels of communication and gives those people greater channels of communication back to us. ….We need to find ways to have our community better engaged, so that they feel that they are valued, that they are part of the community and that their thoughts and views are valued, not scorned."*

The concept of inclusivity of the community when both planning and implementing a strategy within the Ipswich region was reflected on, time and time again, within the Ipswich key stakeholder group. One participant reflected on this by identifying:

> *"I think with any community, if you are wanting to enable them to change their behaviour or to do anything you want them to do, you definitely have to involve them".*

As both a resident and leader of the Ipswich community, this participant again referred to the Ipswich community as "them" and identified themselves as being outside of that community when speaking.

One participant discussed how to engage a community and surmised that potentially it's not realistic to try to engage a community over dialogue on health and nutrition but rather integrating opportunities for participation within that community. This participant believed these opportunities for participation needed to be initiated and created by the people who live within that community.

> *"To engage with the community, you have to have a purpose … I can't just engage with the community over food and nutrition. You might have an information seminar and that is one form of engagement … if you have got a number of ways in which this is reinforced in the community in different ways, then you are more likely to have ongoing commitment from people, because you have your community garden, your pizza oven to cook something in the park or a barbeque area, or you have a food festival. There is a number of ways you are reinforcing it. …It is not up to you and me to start thinking about them because ….people are the best generators of the new ideas."*

One key stakeholder spoke about a community garden in another South East Queensland community that was deemed unsuccessful, due to poor take up and lack of sustainability of the initiative. The participant reflected that this was because it did not involve the community from the start, with the following statement:

> *"So, it really was not from within the community - it really has to start with that".*

This concept around the importance of, and the opportunity for, community engagement in implementing food initiatives was also identified by another participant. However, the participant was explaining that this should be for the purpose of local economic development rather than specifically for increasing fruit and vegetable intake and stated:

> *"You can actually use community engagement in growing food, or distributing food or in eating food, food festivals and the like as a tool for community development. A tool for local economic development"*.

Whilst it is evident that the motivator behind community engagement was diverse for many participants, the importance of engaging the community to plan and initiate a strategic response was a key theme. The following participant reflected on the importance of agency and empowerment of the community by reflecting that sometimes the community needs assistance such as a community development worker to engage them:

> *"So, I think in terms of a community – is it important that they are involved … I think when institutions deliver something to communities, there is a very different result from when the communities actually develop agency and engage in that. I think there is also a role for assistance because sometimes that level of agency is not actually there to start with. So sometimes, that's why we have community development workers. Sometimes people actually need to be found and empowered and engaged and given permission almost to change the way they do things".*

The power of community engagement to develop ownership of strategies initiated within their region, was recognised by yet another key participant. However, this participant also identified barriers to community engagement by stating:

> *"…the community are always best served to, best placed to serve their own interest. So, if afforded the opportunities to do something that will benefit themselves, then yes. Then probably the only limitation I would probably think of in that regards is that if you have a very disconnected community, rather than a community that is used to work and collaborate together in projects or having good neighbourly relations."*

Whilst community engagement was undoubtedly the most significant key theme that resulted from the Ipswich interviews, and most participants identified the importance of community engagement to mount a successful strategy to address the nutritional

inequities occurring within the region, some participants also identified further barriers to community engagement, particularly from the local government platform.

A participant within local government reflected on the purpose of community engagement and how the local government perceives this by stating:

> *"Sometimes my colleagues worry about the idea that if you have to engage a community that can be just as big a trouble for you. I don't know who said the phrase, but I say it occasionally just for me, self-mocking rather than belief, I don't believe in it, but it is self-mocking: the democracy is a great thing till people have a say. You know so and it is just a bit like that it is almost like saying the job would be perfect if it wasn't for the people."*

Some conduits to community engagement were identified by a number of different participants with a sub-theme emerging where four participants stated that schools and two participants identified churches as a conduit to an engaged community. This participant stated:

> *"I sort of believe that schools, churches, as I mentioned before, are probably or other community's groups like that - you have not only have willing participation, you have basically got a captured, directed, almost enslaved group of kids to work on, and then hopefully that will bring their parents in to it as well. Because the school is the centre piece for the community, well they are not too far away, but churches are virtually the same sort of thing. So, I think that this is where these things need to start, and they will build from there."*

Another participant spoke of the importance of both schools as reflected in the following comment:

> *"I think we identified local institutions that are enduring. Are they to stay for a very long time? Schools, the community centre and I think the Baptist church is another one, so they are there for the long run."*

More participants identified schools as an integral part of engaging the community, particularly families. One participant stated:

> *"I suspect schools would be the best entry way to include families because it's the young community as well".*

One participant identified that they worked with schools in other communities for the purpose of engagement and gave some suggestions of how to use schools to engage the community with food with the following reflection:

> *"One of the things I have worked with has often been in terms of getting schools involved. We have done a lot of work in the community in terms of building within the schools' programs that give kids a strong appreciation the importance of food and fresh food at that. So, you run initiatives where kids can grow their own things. So, a lot of schools now, particularly new schools, are beginning to have community gardens and school gardens where they grow things and again it gets back to sometimes the expertise and the willingness and desires of the teachers that are leading it, whether those things are sustained in the long term…. But that is always a positive thing if you can get schools to become involved or childcare centres to become involved in it".*

Overall, the key theme of engaging with the community to ensure they are involved in a range of strategies to address the low fruit and vegetable consumption in Ipswich was a strong one. Schools, churches and local government were identified as potential conduits to engage the community.

4.4.1.3 Leadership and collaboration - bringing it all together

The importance of building partnerships was identified, with over half of the participants within the region acknowledging that collaborative partnerships and leadership was an important element to any strategic effort to increase fruit and vegetable consumption in the Ipswich region. Four participants also identified that funding of any proposed strategies may be an issue and hence collaboration and leadership needed to be sought within the region to support this. Building on the key theme of community engagement, two participants acknowledged that schools and

church could be conduits to the community and provide an element of leadership, however many participants identified that leadership would also be needed from the local government.

Seven participants identified that small initiatives were occurring within the region but there was no overall strategic vision or response, and this ensured that these activities occurred often in isolation to each other. One participant reflected:

> *"Well one of the interesting things is that when you look at the range of things over the past and that we are still involved with, and other things that are happening around the traps, there is no tying together of all of these activities."*

This view was reinforced by another participant who identified that small initiatives were occurring within the Ipswich region; however, there was a lack of an overall strategic vision and collaboration in regard to increasing fruit and vegetable consumption for the region. This participant stated:

> *"There are a lot of groups around doing small things, but if it could be focused in one larger strategic program that would be great".*

One participant wondered how to harness the small groups of people who were already influencing fruit and vegetable consumption in the region:

> *"How do you reach everyone, how do you get them all together, engaged? How do you understand who wants to be involved, how do you engage them? How do you mobilise them, how do you keep them connected and focused on a vision whilst they all still have other major agendas?"*

Participants clearly identified the need to understand and collate what strategies were occurring within the Ipswich region in regard to addressing poor consumption of fruit and vegetables:

> *"I think the first step would probably be a bit of an environmental scan to see what is going on out in there and work out if there are any gaps … I would say there is a lot going on that probably needs a more coordinated approach, so as we have been*

discussing, like a bit of a food strategy for the Ipswich region would be great I guess kick start that. So start looking at what we are doing, what others are doing, so that benchmarking stuff and then what is really relatable and practical for Ipswich and what the outputs and outcomes would be with something like that".

Participants reflected that a cross-sectional involvement and collaboration was required at a strategic regional level to increase fruit and vegetable consumption. One participant was reflecting on the fact that many organisations in the region would need to work together collaboratively, each having an important role in a strategic response to the nutritional disparities experienced by the Ipswich region by stating:

"If you don't have the organisational involvement, at a cross-sectional regional level committed to it, it just won't happen. Because each of them has a role to make those things happen".

Three participants did reflect on how it was possible to start the collaborative process and identify the organisations involved. One participant commented that engaging the organisations who were willing to be engaged was important, to then create an overall strategic response to increase fruit and vegetable consumption:

"There will be other organisations that it is beneficial for and I think there is a lot of knock on effects for a lot of organisations, but they may not recognise it. So, I think you start with, who are the 'coalition of the willing' to quote, who can we draw a direct line of benefit around for participating in this and can they see the value and start with the willing."

The notion of collaboration also extended to working together for the purpose of funding. Finding the financial resources to undertake a strategic approach was identified by four participants as problematic and collaboration was identified by all participants as a possible solution to this. Some participants were focused purely on fiscal resources; others were more interested in in-kind support. One participant reflected:

> *"…money is always an issue, but often when there is a great idea and it is developed well, you actually find the money. So, I think it is about the enthusiasm and developing a really solid idea that is growing and having a good chance at working. I think essentially for that, you really need collaboration".*

Another participant reflected financial restrictions influence an overall strategic response:

> *"Honestly the financial (barriers), like obviously not everything is going to be funded or free, so financially things need to be cost effective and affordable."*

Other key stakeholders, particularly within the local government, reflected that assistance and support could be provided apart from funding. Participants spoke about initiatives occurring within the region:

> *"Councils obviously getting behind those sort of things, funding is an issue clearly and Council can perhaps assist with that. Councils can assist with ingenuity. …. we can do (different things) to help facilitate or enable some projects to happen".*

The participants spoke in great depth about the need for collaboration and also, specifically regarding the leadership required within a collaborative effort. An important sub-theme emerged in the Ipswich data that identified local government as an important enabler to providing leadership and collaborating to increase fruit and vegetable consumption in the Ipswich region. Eight of the ten participants mentioned twenty-three times that leadership and collaboration was needed from local government and other organisations involved in the community. Four participants mentioned twenty-one times that leadership would need to come from these sources.

One participant was reflecting on how local government was the main conduit to civic engagement when speaking specifically about how a strategy to increase fruit and vegetable consumption could be led within the region. This participant commented:

> *"I mean at the end of the day, local government is, you know, they don't have the monopoly on, on civic engagement or*

community engagement but they are generally the facilitators for most civic engagement".

A number of participants identified local government leadership as a key enabler and barrier to the implementation of a successful strategy to increase fruit and vegetable consumption in the region, even though traditionally, health policy and services are viewed as the remit of the state government and local statutory health authorities, such as the West Moreton Hospital and Health Service which provides health services to the Ipswich region. Interestingly, no participants mentioned the importance of leadership from the health authorities or state government, including the key stakeholders who worked for these organisations. One participant directly identified the role of local government in shaping the communities' health behaviour stating:

"I think Council probably will be a key player in how we are building a city, especially for communities to change their behaviours and how they live in spaces and places, healthy places".

This response was from a participant who did not have strong ties to local government. Those with strong ties to or from within the local government, reflected on the role of local government in various ways. One participant from the local government was reflecting on the role local government has taken to date, to shape the nutritional intake of the region by commenting:

"We have done I think, some useful things here in relation to consumption and preparation of food. So, the Council for example supported the Jamie Oliver, good food, good cooking program".

Another participant identified the local government as a barrier and enabler to providing further access to fruit and vegetables in the region when discussing the local farmers market:

"Thankfully the Council out there saw the need (for this initiative). They were very receptive. Economic development out there were (sic) really great. But there have been barriers.

There is a local law that says you can't put roadside signage up. That is a huge barrier".

A different participant articulated the importance of planning and development policy within the local government service in the Ipswich region to support an environment that was conducive to an increased fruit and vegetable consumption in the region by commenting:

"I guess in terms of Council it would probably be in terms of planning and development taking a much more strategic view on making sure with new developments that there is access with new retail. All that sort of stuff you know with smaller and smaller lot developments people are wanting to grow their own fruit and vegetables and where is that going to happen if they cannot do that in their own back yard? So, those sort (sic) of things, I think need to be addressed at the government level".

The sub-theme that started to emerge around planning and development policy from within the local government was further explored by a number of participants. One participant from within the Council, reflected on local governments role in influencing urban planning to create 'healthier cities', that supported an increase in fruit and vegetable consumption:

"In our urban planning, we could do better in designing healthier cities, but that is not so much us per se, it is the planning and development people that we probably need to influence to have better outcomes in our urban planning".

A further participant from within the Council could see leadership could be exerted by local government by influencing urban design with the extensive increase in city development occurring within the region:

"I think Council probably will be a key player in how we are building a city especially for communities to change their behaviours and how they live in spaces and places, healthy places. We could be a barrier or an enabler".

It was clear from the thematic analysis that a strong theme emerged around the role for local government to influence and lead the community in developing a response and environment that will increase fruit and vegetable consumption.

One participant reflected that whilst local government was needed to lead a strategic response to increase fruit and vegetable consumption within the region, the community also needed to drive this response, reinforcing the key theme of community engagement:

> *"I think (these things) need to be addressed at the government level but then also there is a community driver from people as well that's pushing for that from what I can see."*

Therefore, in addition to engaging the community via local government involvement and leadership, many participants reflected that key community members or 'champions' were needed to provide leadership around increasing fruit and vegetable consumption in the region.

> *"The challenge is to actually work out you are going to do because you need to have drivers and people with interest and passion. You need champions to do any of these. If you don't have a community champion, that champions this kind of food initiative and is willing to bring on others to do it and help, it is never going to work. It can't be done by one single person who has a passion and desire, it can be done at a local level. It can be done by a group of residents who work together, but at a regional level, it requires a lot of organisations working in that area to come together to make it happen.*

The concept of having drivers or 'champions' or key people as leaders within the community was further emphasised by one participant who commented:

> *"Leaders, civic leaders or, those people who find themselves in leadership roles within a community, also have a role to help facilitate those outcomes, so whatever they may be".*

However, one participant reflected on barriers regarding this, as they believed Ipswich had a transient population:

"I do think at the end of the day it does need a group, a really solid group of people to be the power behind it, you need the engine to keep it going. One of the biggest problems that we have in Ipswich is that there is quite a bit of a transient population, so you know and that is because of the style of homes we live in these days aren't necessary made for families of the future".

The interviews conducted in Ipswich clearly identified key themes around how collaboration could be achieved, to provide a strategic response to increasing fruit and vegetable consumption in the region. Additionally, sub-themes emerged regarding local government having an important leadership role in this collaboration in addition to harnessing leadership from community members.

4.4.1.4 Planning for the future.

Many participants in Ipswich did not clearly identify what specific strategies, programs or initiatives could be undertaken to increase fruit and vegetable consumption in Ipswich and indicated they were at the start of the journey in understanding what was causing the nutritional disparities within the region and therefore, what an appropriate strategic response may involve. The participants did identify a small number of existing initiatives that were influencing the nutritional intake of the Ipswich region and narrowly identified some potential strategies and initiatives that could be undertaken. The majority of participants asked the researcher, prior to starting the interview, what other places either within Australia or around the world were doing, and hence a conversation exchange regarding an overall strategic food strategy or Food Council ensued, which the researcher explained was occurring in other parts of the world. However, the details around this were not discussed and this was reflected in the very general responses given by most participants regarding what could be done to influence the fruit and vegetable intake of the Ipswich community.

Firstly, existing strategies were identified by a number of participants. Most participants identified Jamie Oliver Ministry of Food as a strategy that had been implemented into the Ipswich region to increase food literacy and cooking skills for the community. One participant reflected on the value of learning cooking skills and

accessing this training and food at an affordable price through the Jamie Oliver Ministry of Food initiative.

> *"So, it is great… it is more than learning to cook. It's learning kitchen habits, traits, knife work, how to use knives. So, it is teaching you everything but not only that (sic) kitchen skills, unless you can cook, but not only that, you cook a meal and take it home and it will feed up to four people. So, I mean, you get 10 meals for $30 well spent."*

A small number of participants also raised some initiatives that are being undertaken by schools or community groups. One participant reflected on how a school implemented a community garden:

> *"West Ipswich State School having (sic) raised $30,000 to start their community garden and how that was very successful. And it was a great deal of time and effort and investment by the parent community to actually do that".*

Another participant identified both the Stephanie Alexander Kitchen Garden project that had been implemented in a "couple" of schools within the Ipswich region and another initiative in which a large state school in the region had implemented a curriculum with gardening and food production. This participant acknowledged the importance of learning about health at school and taking that knowledge home to share with their parents.

> *"The Stephanie Alexander Kitchen Garden project is another one I think. We have in a couple of schools now that are involved in that program and we probably need to have a look at some of their evaluations on how that is going but I have not been privy to that to date. They are keen to work with Council on future initiatives so that's good to hear. There is also a school down at Collingwood Park … where they actually do a lot of their learning outside in the garden. So, they have gardens that they will learn math's out in the garden measuring things out. They have got composting. They've got chickens. They've got all this other stuff going on about health outcomes but they are actually*

learning their curriculum through that delivery. They've got walking buses and like when I heard the Principal talk to them, I thought if I had children I would want them to go this school like it is a just a different way of learning and as we know everyone learns differently. So the health outcomes is that the kids are then going home to the parents and all that sort of stuff."

More commercial strategies to increase fruit and vegetable consumption were also identified, by a number of participants. One participant when they were asked to identify existing strategies, reflected on how 'Wray Organics' in Ipswich, a store that offered organic food to the Ipswich region, was influencing the access to and supply of fruit and vegetables to the Ipswich region by meeting consumer demand by commenting:

"…Wray Organics are obviously there, and they are doing well. …. If they (people) can't access it, they need to build it. Or they need to put the demand there so that commercial businesses can supply them."

However, it is important to note that Wray Organics was marketed to the more affluent socio-economic demographics of the Ipswich community and may have been cost prohibitive to those within the lower socio-economic demographics of the region.

The financial viability of solutions that would increase fruit and vegetable consumption in the region was an important sub-theme that continued in the interviews. One participant stated:

"And I mean that is why I set up the farmers market. When I did my research and thought, is this going to be financially viable … I guess if the farmers knew there were enough people who wanted to access these vegetables, these fruit and vegetables, I reckon that would be an incentive for them to sort of make their produce available. I guess a lot of it goes elsewhere around Australia and the state, so I think it's just having someone know what they are about as well and what they need. How they can

get that fruit and veg to everyone else apart from the big supermarkets".

One participant reflected that any strategy to increase access to fruit and vegetables such as markets, needed to be a commercially profitable initiative. They stated:

"The community gardens are a volunteer thing, so you need people to volunteer to be and engage with the idea. But the markets profitability I think that means the Councils would set it up I suppose and say we will close off the street to setup the stalls to encourage the sellers to setup and to come in but at some point, it has to sustain itself financially. So, I think that is more profit driven - that will drive it, if they make a profit."

Commercial strategies were further explored, particularly by one participant who had a number of suggestions regarding what would be both financially viable from a business perspective but also identified strategies that they believed would increase fruit and vegetable consumption in Ipswich. The participant reflected on how they believed farmers markets were "done and dusted" and what other strategies may influence the access to fruit and vegetable consumption based around food literacy:

"So, the farmers markets are done and dusted. There is (sic) 67 farmers markets on a Saturday morning in Brisbane. The model is old, it's boring and whilst people are accessing fresh fruit and vegies, it is not exciting. It is not sustainable. … So, what we have decided to do is turn it on its head. I have already hired a full-time chef to develop and speak with the community and to become an ambassador for the market but last week we got a phone call from the lady who runs the Gold Coast Food and Wine expo. She is looking at doing group cooking classes. It is all cooked up, packed up and at the end of the day you split it up and take it home. So, to get people there, spending the time and educating them, is to me, you are not doing the right thing if you are not educating. It should be a constant thirst for learning, that is why people want to access food. That is why they are discovering new ways to eat particularly different to what they

have been given before. It is teaching them this is what it means to be grain fed, this is what it does."

The participant continued to give further suggestions regarding viable business options that they believed would influence an increase in fruit and vegetable consumption in Ipswich. This comment however was in relation to a business opportunity that this participant was considering, appealing at the upper-middle class demographics of the Ipswich population:

"We are looking at a paddock to plate for breakfast lunch and dinners, and we will be doing paddock to plate fine to dine stuff. So, we will get breweries and wineries from Stanthorpe involved and get people to experience that. It might be $35 a head or something like that or get a table. Our chefs will cook a meal, or what we will actually do is getting them to help cook the meal and inviting a local chef from a local restaurant. So, he gets to plug that, and you are getting a reach and advertise that way. So, they are the sort of programs we want to put in and develop in Ipswich".

Another participant who is associated with the large amount of development that is occurring within the region discussed the incentives behind attempting to build a community that encouraged connection with food and an increase of fruit and vegetable consumption. They initially discussed how planning could be influenced at a community level to influence access to fruit and vegetables by commenting:

"At a master planned community level where the designers of that master planned community can start integrating in its' overall design plans a whole raft of opportunities for people to be able to access fresh fruit and vegetables in different ways. Whether it is by (sic) eatable landscapes and orchards, right through to designing community gardens or layers of vertical gardens or rooftop gardens."

This participant then went on to further identify that an increase in sales in the residential development from a community that wanted this functionality, would be what drove that initiative:

> *"Well, that is one thing that would increase the uptake and that is sales. If at the end of the day, what one developer does along these particular lines and if that's got a huge impact on increasing sales and there is feedback that says that one of the reasons we have come to the community is because of your fresh food policy and all of the things you are doing, and that gets replicated a fair bit, then I bet your bottom dollar that others would start it."*

It was evident that some participants believed that a commercial response would be the main driver behind the implementation of key initiatives that they believed would increase fruit and vegetable consumption.

Fresh fruit and vegetable markets were identified by a small number of participants as being a viable initiative to increase fruit and vegetable consumption in the Ipswich region and created a sub-theme. One participant identified a specific area in the Ipswich region that due to cultural influences, they believed markets may be successful. They speculated:

> *"Well maybe I think, if we setup a market in Ipswich, I think if you are going to do that somewhere like Goodna it would be a good place, because culturally we don't have that in Australia. We have the supermarket trail and convenience shopping".*

One participant reflected on how growers could link directly to consumers by strategies such as farmers markets, perceiving that this would increase access to fruit and vegetable consumption commenting:

> *"That involves things like liaising directly with the growers and market gardener growers and bringing some of that food in through various markets that might be held at a central regional location, you know, within that particular region. And so, you know about town markets and farmers markets to increase access".*

Whilst farmers markets were identified by a number of participants as already occurring within the region, there was not a great deal of discussion regarding

whether this was in fact influencing the consumption of fruit and vegetables for the Ipswich community. One participant commented:

> *"Yes, well, they used to have a farmer's market with stalls on the side of the road and then you have got your markets on a Sunday down on the show grounds and we go there sometimes and get our fruit and veggies. …(it is), very affordable and local."*

Half of the participants proposed strategies that could be undertaken to increase fruit and vegetable consumption in the Ipswich region. One key theme in this response was the potential of community gardens. One participant discussed examples from within Ipswich (Goodna) that was not successful at the time.

> *"Well there are a few things you could do I suppose you could get some community gardens scheme going where people come to grow their own vegetables, although only some people would benefit from that. So, I have seen something like that in Goodna. They did a redevelopment of the park by the highway and they put in a community garden, but I think that fell flat on its nose because I don't know. I think that sort of thing has to come up from grass roots rather than Ipswich City Council saying, "oh we are going to put in a community garden here" because it never really took off."*

Other participants thought that a community garden may increase fruit and vegetable consumption in the Ipswich region. One participant articulated that a community garden would assist community members to grow and access vegetables by commenting:

> *"Even to have, maybe like a community garden. There are plenty of areas within Ipswich where you can have that, so that people can help to grow the vegetables and access the vegetables as well. Different ones all-around, so that people can get to them easily and help out with them."*

Another participant was reflecting on where this was done previously (outside of the Ipswich region), and the benefits to, not only an increase in fruit and vegetable

consumption, but other health benefits such as social, mental and physical health. When discussing a friend who accessed the community garden, they stated:

> *"Rochedale has a community garden just down the road from me. She said, she went there and met the guy and said 'I just want to show my son where food comes from'. She said she left with bags and bags and bags of produce. Because they can't use it all. She said they ate for weeks out of a community garden. That everyone goes and does their little bit. They get fresh produce and get time to do things and not only that, the mental health – the impacts on getting in and putting your hands in soil is huge. So, when they change their mental health as well, by accessing or doing something for themselves such as accessing fresh food in a community garden, and in the end they are working and they are physically fit. It can get old people physically active and giving them something to do and even socially, mental health is there. There are so many benefits from it."*

This same participant however reflected on whether a community garden is a middle-class phenomenon and if it is suitable to the socio-economic demographics of the Ipswich region:

> *"I don't know, maybe you can tell me, is a community garden a middle-class phenomenon? If so, then where does that fit in with our community of communities in Ipswich?"*

A participant who was linked to the local government reflected on a slightly different concept than a community garden, around planting food producing trees in the streetscape. This participant reflected on what they perceived were the challenges involved in that:

> *"There is an idea that has gone around on Facebook - the idea of putting fruit trees in suburban streets. Can I say, that I actually think that is not a good idea and the reason for this is, who would who would manage them? And it might not be the resident outside the house where that tree is outside, you might end up*

with all the fruit on the ground rotting. So really, it is one of those sorts of things you want to pick and choose what type of fruit".

Furthering the concept regarding the possibility of influencing the built environment, one participant reflected that they would like to see, food producing green walls around the central business district in Ipswich by giving an example of how they thought this may work:

"I would like to see little green walls around the CBD (central business district). For instance, at this café I go to, if there was a green wall of vegies that grew out there, the café would say take overall responsibility." "You don't actually have to commit to a great big plot (In a community garden), but we somehow raise farms and have little green wall gardens everywhere with little fruit and vegetables and people who are located close by say 'I will make sure it does not die off'. And, people can actually go and pick some or participate and actually start to get people interested in that. …. That's what I would like to see – a small scale soft entry all over the place".

Whilst a number of participants believed community gardens, farmer's markets and a commercially viable response would be suitable to increase fruit and vegetable consumption in the Ipswich region, some participants identified a 'strategic response'. A consensus on a narrow, detail deficient 'strategic' response was articulated by five out of the ten participants interviewed. One participant explored what a food and nutrition plan for the community would look like and reflected on what could be done on a more regional level, particularly regarding increasing access to fruit and vegetables:

"How does a region like Ipswich design a food and nutrition plan? Where would it locate its fresh fruit and vegetables centre and food markets, so it is being brought into the community? If it is not already there, providing a base for collection and dissemination from there, or how do we encourage people who have grown fruit and vegetables in the surrounding areas to

have an opportunity to sell it to people in the community? How would that be done within a more regional, more strategic level?"

A number of limited comments about how a strategy could be formed were articulated by seven participants. One participant reflected that a short-term and long-term strategy was required to achieve an increase in fruit and vegetable consumption in the region, however, did not provide further information regarding what this could include. They stated:

"So, I think local communities we have to have a long-term plan and a short-term plan of the things you want in some sort of timeline with an overall objective in mind about what it is that you are trying to achieve".

Another participant also held this view with a move towards a larger, strategic Food Council grouping, which was discussed prior to the interview when the participant had asked the researcher who the world leaders were in shaping the nutritional intake of their community and what it was that they were doing. This reflects what the Toronto region in Canada had undertaken:

"Well, I think there might be one or two intermediate points along the way towards some sort of strategic level, broad Food Council grouping".

Whilst a small number of existing strategies were identified, and some potential strategies were suggested by the Ipswich participants, they did not articulate any detail, in terms of those strategies. Whilst one participant questioned whether the community garden strategy may be a middle-class phenomenon, no other participants identified which segment of the socio-economic demographics these strategies were attempting to influence.

4.4.1.5 Part A conclusion

Overall, the Ipswich interviews identified important key themes which demonstrated the participants' understandings of the barriers and enablers to increasing fruit and vegetable consumption in Ipswich. The participants discussed whether access, market forces, supply and demand or cultural considerations around individual's food consumption patterns was behind low fruit and vegetable consumption in the region.

All participants identified the need for leadership and collaboration to form a strategic response to influencing nutritional intake in Ipswich, with an important sub-theme emerging of local government leadership. A number of strategies were identified, many formed around individual health and food literacy, as well as ensuring easy access to fresh fruit and vegetables including farmers markets in the region.

There were a number of tensions in the data identified, including whether the financial cost of potential strategies could be balanced and justified to accommodate the socio-economic pressures that may be influencing fruit and vegetable consumption in the region. The data also revealed tensions in regard to how economic development and growth needed to be tempered with solutions to support the food system inequity that was identified in the region. Additionally, there were further tensions regarding the responsibility of the Council to support the health and wellbeing of the residents of Ipswich, as opposed to the responsibility of the State Government which is funded to provide health care to the community. This is further explored in Chapter Six in the discussion and future implications of these findings.

4.4.2 Part B Toronto interviews

The purpose of undertaking the interviews with the key stakeholders identified within the Toronto region was to understand their experience in the implementation of key strategies, policies and initiatives that were designed to address nutritional disparities within a community. The Toronto interviews were analysed in isolation from the Ipswich interviews conducted in Part A.

The analysis of the Toronto interviews resulted in the key themes of:

- **Understanding and working with your community:** Understanding and contextualisation of the nutritional challenges within the Toronto region;
- **A healthy food system:** Basing a strategic response on principles of equity, shaping the food environment, policy and building an accountable, sustainable and professional response;

- **Funding, partnerships and collaboration:** Building partnerships and leadership within the community and partnering with a variety of key stakeholders which includes funding opportunities.

These key themes were then broken down further into sub-themes which were identified within the analysis of these interviews. This is demonstrated in the following table which outlines the key themes that were identified in the semi-structured interviews conducted with Toronto participants. This table outlines the number of participants who mentioned the themes (out of four) and the number of times the key theme was mentioned within all of the interviews conducted.

Figure 4 Key themes from Toronto semi-structured interviews.

Phase One, Part B:

Key Theme	Number of participants (out of four) who mentioned this theme	Accumulative number of times key theme mentioned
Understanding and working with your community	3	12
A healthy food system		
Equity	4	24
Shaping environment	3	27
Policy	3	22
Accountable, sustainable and professional	2	4
Funding, partnerships and collaboration		
Community	4	21
Public health	4	12
Local government	3	26
Funding	4	9

4.4.2.1 Understanding and working with your community

When undertaking the thematic analysis for the Toronto participants, understanding the issues that were occurring, and their context, was the foundation of three of the four interviews. This was articulated in many ways including conducting a community needs assessment, understanding fruit and vegetable consumption patterns of the community and considering the impact of the programs and initiatives that were already embedded in the community. Participants noted that this understanding informed strategy and initiatives around influencing the communities' nutritional intake. These strategies included the work undertaken by Toronto Food Policy Council, Toronto Youth Food Policy Council, Food Share, Toronto Public Health initiatives, Food Champions initiatives and Community Food Centres.

A number of participants mentioned food insecurity as a driving factor informing overall strategy and initiatives to address nutritional intake in their community. However, understanding exactly what was occurring in their community and whether the issue is based on access or cost was an important foundation on which their strategy was formed. This was reflected by the following participant who discussed the need for a community to undertake their own needs assessment:

> *"So, every community that we work with of the 36 public health clinics is responsible for doing their own community needs assessments which I am sure you have you done in your own communities to identify what are the needs. And so, some are better off than others in terms of access to food or really the indicator we are currently is, is the food security indicator. So, how many people in your community are marginally food insecure or are moderately food insecure? So, every company collects that data and then they use another data set that helps them form the picture is called the nutritious food basket and it is the tool that people may have mentioned this in your travels already… So those are the tools that have been used right now to assess food security and access to food."*

One participant discussed how they gained information about the people who need to use their programs and reflected on the value of community level data:

> *"So, it's a pretty sustained, deep dive, into looking at some communities, then there will be an evaluation to go with that. But again, we might just get healthy weight and get some data (at a state health level). At the community level that's where the rich data will be".*

The same participant reflected on how important, yet difficult it is, to find reliable data and indicators to ascertain if initiatives are needed in a community and then demonstrate if they are effective. In fact, this participant reflected that this was an important part of her current remit within her role:

> *"So that's our challenge, we find we don't have the indicators. We have, we can define indicators, but you might not have the data and it might not be reliable data. It may be reliable data, but it may not be year over year over year, so then you can't imply the trends. Are we having an impact? …. So, the challenge is always going to be data and who collects what and how much data we can access".*

Distinct from the indicators that the participant articulated regarding childhood obesity rates, broader food system indicators were discussed. Knowing the fruit and vegetable consumption patterns of the community was an important factor in understanding the nutritional drivers of the community and complement health outcome data on a regional level, as reflected by the following comment:

> *"Like food system indicators, I know our governments got a lot of indicators like our ministry of agriculture and food is probably the only one that can track sales data. They can track sale of fruits and vegetable and things like that, whereas mostly we track in health. We track how many dollars are spent on different procedures and hospital days."*

Understanding how the community can access food was an integral part of one participant's remit to assist them in forming programs and policy to influence the nutritional consumption of their region. This was often undertaken in the form of food access mapping, where access points to food were mapped around the city. This participant reflected:

> *"So, what guided our intervention a lot, was our food access mapping projects. That is in our board report and there are maps. … And when we were for example, talking to our planners and saying, you know, access to food is as important, as access to green space and access to schools and that it is a new concept. But you know, and they could get it at one level but what we were able to do. So, we did this, we had this database and we mapped the city in terms of geographic access to food and then we realised that some of the richest areas of the cities would be classified as food deserts right. Because people have to travel far away, and we said that is not terribly helpful to guide us. So, we laid it on more demographic information and access to public transit and things like that so we got a more granular sense and then we were able to share with the planners, you know what are the pockets of the cities that have the least access to good food and low and behold they are the lowest income communities, with the least access to many other things right and it started to resonate for them".*

One participant who manages a large, very successful strategy, which provides comprehensive, strategic food initiatives into communities within twelve large geographical locations in Canada, was reflecting on how they know if they are needed within a specific community and what initiatives they need to deliver. This participant stated that community consultation was a cornerstone of that process:

> *"There are so many variables, it is almost hard to answer that question even. Every organisation that we partner with, so we work with a local partner, we bring resources, they bring resources, we do a community consultation."*

It was evident from the responses of all participants in the Toronto region, that participants took a great deal of time and effort to understand the demographics and food consumption patterns including access, availability, use and affordability within their community. This then informed programs, policy and overall food strategy for the Toronto region.

4.4.2.2 A healthy food system

The participants from the Toronto region had significant insights about the foundation of a healthy food system – one that provided nutritionally appropriate food to all members of the community. This included a detailed understanding by the Toronto participants of the components that were shaping a successful nutritional response for their community including a focus on equity, shaping the food environment, key policy initiatives and the importance of building a sustainable, professional and accountable model of delivery. The key themes and insights that emerged from these interviews were based on the actual experiences of the participants, founded on a strategic food response that has been undertaken over the past thirty years within the Toronto area. The participants gave specific examples of how their strategic focus was embedded into the programs they worked on and were based on creating an equitable food system.

A broad understanding of the components of a comprehensive food strategy, aimed at creating an equitable and healthy food system, was well articulated by one participant who stated:

> *"So, the whole idea of the food and nutrition strategy is to try and work together and recognise that you all have a role to play in promoting a healthy food system. What does a healthy food system look like? And how can we work together? And so, it's slow, I mean it's really slow. And it's a big comprehensive strategy".*

This comprehensive strategy included significant components based on social equity and included concepts regarding food security principles such as access, food literacy and socio-economic drivers. One participant from Toronto questioned the researcher about the Ipswich community, asking if the researcher was aware if there were food security issues occurring within the community:

> *"I don't know how big your food security issues are you know… do you have a lot of very low-income people?"*

The strong articulation regarding socio-economic disparities occurring within the community amongst the Toronto participants was pronounced and mentioned by all participants on over twenty-four separate occasions. Solutions to address inequity

within the broad food system, was identified by participants as being at the very core of their strategic response. One participant stated:

> *"You can't just be like, here's a poster on how you should eat right … you should do that…. why don't you do that? If people don't have money or even people who do have money, it is a longer process, so given how much we spend downstream in healthcare costs, some of these upfront investments to work with people in a more nuanced way, are probably worthwhile … easily worthwhile."*

This same participant discussed how their program was addressing nutritional intake of their community by understanding what may be contributing to the disparities. The program that is being offered through the Community Food Centres includes but is not limited to a broad social health model response including after-school programs, food budgeting and intergenerational food literacy and food skill programs:

> *"One of our basic principles is meeting people where they are at and creating multiple points of connection for people with the food centre depending on where they are at in their lives. So, some of our programs, literally there are a lot of people who come to 'The Stop' for example, who have mental health issues, drug addictions (or) might be homeless."*

This participant further stated that providing an opportunity where people can link in with an equitable food system was transformative in addressing broader social inequities, rather than just providing emergency food:

> *"So, that why our slogan is 'Good food is just the beginning'. The idea that someone might come in the door if we have a food bank … they might come for a hamper … only a few of our food centres have food banks now, but most of them have community meals, so lots of people come for a meal and come look around and there is a bunch of other things happening. They can join, again depending on their level of preparedness to do so, their*

interest, they can join a whole bunch of different things …. This is transformative I believe. Those can change lives, they are much more intensive interventions."

A large amount of dialogue occurred from the Toronto participants regarding poverty reduction and basic income guarantee. Whilst the premise of the interviews and conversation was around the provision of food initiatives and strategies, the participants saw this as the foundation of their work.

"So, I think broadening that conversation, unless specifically around poverty reduction, is about the community, in showing the opportunity beyond this really narrow conversation around what food sometimes is, I think has made them successful in terms of building it out and has allowed people say yeah, this is great. I think at a very conceptual manner it is part of that".

From the concept of poverty reduction that the previous participant identified, a key theme was starting to emerge from participants based on a social justice perspective recognising socio-economic inequity, which the participants believed was the cause of food insecurity and the foundation of their food-based programs. In fact, all four participants mentioned food insecurity or food insecurity drivers over twenty-four times accumulatively. One participant reflected that whilst her remit was providing an overall food strategy to Toronto, their focus was poverty reduction:

"So, thinking about ways to link food into a much bigger conversation, whether that is around health, whether that is around poverty reduction, I think they have been very successful".

The principle of poverty reduction was further articulated by another participant who was reflecting that if a basic income support was introduced for the community, access to food may be influenced:

"*So, what happens is, they go from not having enough money to eat and pay their housing and transportation but all of a sudden, yes, now we have enough money to eat better. I mean they still may have access problems to get (food), you know, if they don't*

have a car or whatever. It depends where they live and how much access to healthy food they have".

The food security concept was also reflected by another participant who identified food security in a broader, cultural context, describing what food people feel they need to access to attain overall wellbeing:

> *"Lots of people think about food security in different ways, not only just accessing food but it's about the right type of food and…. perhaps it is more about wellbeing rather than health."*

A very interesting principle of the Toronto Youth Food Council was the 'anti-oppression policy' identified by one participant. This participant identified this as a key principle, guiding the work of the Toronto Youth Food Council:

> *"Something I think that the Youth Council is really top notch at and I honestly think we have taught the Toronto Food Policy Council about, is, we have a really strong anti-oppression policy about the diversity of actors we have on our Council, about where they are from, about how we make decisions, about our hiring process, about how we even vote, about all of our decisions and I think that seems like a bigger side note but I think it has been critical in guiding the success of our work and is why we are able to connect with so many different people, because we make a real effort to consider some of the barriers for different kinds of people to participate."*

Many participants spoke about a food strategy that did not only provide food, and also addressed wider social factors such as employment opportunities for the community. This supports the social equity principles that formed the basis of many of the participants' insights regarding the foundation of their strategy and initiatives. This was articulated by one participant who reflected that the goal of many food initiatives in the region was not simply to increase food literacy or food skills, but also increase employability and income levels:

> *"I think you hear a lot more information about, it about integrating food literacy food skills, food safety and some basic employment skills. And so, people are getting the food handler certification*

in a community kitchen, cooking healthier food and they have some very basic employment skills and, and they have this piece of paper as a graduate and the chances of getting a job are much higher than someone who doesn't and they also gain self-esteem."

Another participant was reflecting on an initiative that had been implemented within the Toronto region where students would grow, then sell food that they prepared in a cafeteria, gaining valuable employment experience. The participant reflected:

"There is an importance of being able to grow your own food. Actually, in my opinion, the most successful (strategy), has been using food as an employment opportunity."

A further sub-theme emerged from the Toronto interviews that were shaping their overall strategies and programs around food. Shaping their built and social environment to encourage healthier food choices was articulated by many participants. This included shaping the environment that people work or study in.

A collaborative effort between the Food Councils and the public health department in Toronto was utilised to influence a healthy eating environment in the city. This was an important factor in influencing nutritional intake for the community. One participant reflected on the partnership:

"So, the whole focus was on, how do we build a healthy eating environment, so it makes it easy for people to eat good food? I think in some ways this is a big roundabout. It's like building this big environment and these tools for people to make good choices."

A number of participants identified that through the provision of 'good food' at meetings, at sporting events and in government-funded buildings, this shaped the food landscape and assisted in the consumption of nutritious food. The importance of providing good food choices at schools and day care centres was also articulated:

"But then as far as the public is concerned, we're really concerned with making sure any government funded building is selling and offering healthy food choices. So, we started here in

> *Ontario on PPM150 which (provides) healthy foods and beverages to serve in schools. So, there's guidelines around what you can serve in school and what you shouldn't be. We are now looking at student nutrition guideline revisions, again to look at making sure that the healthiest foods possible are being served as part of these school breakfast and snack programs. And then we got our childcare act that's under revision now".*

An example of the provision of student nutrition programs, administrated by the Public Health Department was articulated by one participant who reflected:

> *"They do student nutrition programs at high schools and I run one of them. So, it is also about providing breakfast, lunch and dinner for young people. And it is all healthy, so it is administrated by Toronto public health as well. So, they come in and make sure it is balanced. So, when a kid every day is used to eating a breakfast that looks like this, what do they want to eat … a breakfast that looks like this. What do they expect? A breakfast that looks like this. What are the things they might replicate? The things that they have seen.*

A participant was reflecting on the fact that they believed it was an important initiative to provide a nutritious meal for people who attend the Toronto Youth Food Council meetings by stating:

> *"So, it is really important for us to have a real meal at our meetings. We provide a meal that is healthy, accessible, nutritious and culturally relevant."*

Another participant reflected on community events that occur in the Toronto region and the importance of shaping that food environment with nutritious food. They commented:

> *"I also imagine that you know even like having events, serving good food versus serving junk wets people's attitudes for those things."*

One participant described an example of how public policy, influenced by the Public Health Department and the Food Councils in the Toronto region, influenced food provision at a large public gathering (the Pan Am Games). The participant stated:

> *"We just had the Pan Am Games here, which is North America and South America… And I thought they did a really good job at some venues. Instead of the usual hotdog (available for purchase), they had, because we are very multicultural society and a lot of South Americans were coming, we had like tacos and burritos and empanadas, and there was this vegetarian option, and you know there was still the sugary beverages. We are trying to get rid of those. So, you know when you have these policies and you're looking at venues and what foods are offered, we should all kind of work on the same guidelines."*

Another key theme involving nutritional policy emerged when discussing overall strategy in relation to their food initiatives. Policy was driven in a number of ways in the Toronto region. This included the formation of the Food Charter and Food Council that was established in 1991 (Mah & Thang, 2013) in Toronto, which was identified as a significant driver within that community and established as a partnership between the community, local government and health providers. All participants in the Toronto interviews, referred to this policy group. One participant proudly reflected on the longevity of the Council and that it has formed a template for other places around the world to create their own food policy Councils:

> *"So, you know, the Food Policy Council has been going for 25 years and there are Food Policy Councils popping up all over."*

An overall strategy has been established by this group, that has now been in existence for over twenty-five years and that works with a diverse range of stakeholders to shape a collaborative effort to influence the nutritional intake and food consumption patterns in Toronto. This group feeds into other Councils such as the Toronto Youth Food Policy Council that has been instrumental connecting the youth in Toronto with the local government. One participant was reflecting on one of the tools used to create a conduit between the youth of Toronto and policy makers within the local government:

> *"We created a template, like a toolkit to actually give and empower those different groups to approach their Councillor on the issues there and facilitate conversations between regular residents, community agencies and their Councillors. We had that across all of the wards. So, it was something that was less formalised, and gave people tools and kind of gave them the agency to do that. So here was an example of grass root engagement".*

Further strategies to influence policy makers at the local government level were implemented by the Toronto Youth Food Policy Council and included:

> *"I also think a really key part of it was, like when we did our training around how to engage your Councillor, we brought on city staff. ….. So, building these relationships are (sic) actually super strategic and actually some of the people don't really consider it. Thinking about what's the best way to approach them (the Councillors) and have information sit. And these were like once again really simple tips but like very important when we are thinking about empowering individuals or even agencies who were like "I have been emailing them, I don't know what to do". I think we also provided strategies around cc-ing other people. Cc-ing further Councillors, so well, so and so has agreed to meet with me and like that pressure and I think another huge part of this is we have been really smart about social media."*

The use of partnerships with academic research to inform public policy was also mentioned from three of the four participants in the semi-structured interviews conducted in Toronto. One academic driven research partnership with an organisation called PROOF (a food insecurity research policy team) was initiated to research the relationship between basic income provision and food insecurity in Canada:

> *"So, there is this organisation called PROOF… It is very well known for bringing together statistics around food security in*

> *Canada… So, building up the narrative around food security and health. So, like, what that means on a bigger scale. So, it is all about income – there just needs to be a basic income or a guaranteed working wage… is the solution around that."*

PROOF has been instrumental behind the social health policy trial rolled out in 2017 to provide a basic income to some low-income people in Toronto. Food security is one of the indicators tracked in this trial (Mah, 2018).

The last sub-theme that emerged regarding how to build a healthy food system was the importance of providing an accountable, sustainable and professional response. One participant described the model that is used within the Community Food Centres as being built on appropriate funding and accountability:

> *"So, our argument is, we are still a pretty low cost and frugal intervention, but we are a lot more stable than that. We believe in having paid staff, they can be accountable. They can be transparent, who can be hired along the values of our centres and having a minimum budget, so the food can be decent, outcomes measured and all of the things."*

This participant was reflecting on other less sustainable models that have provided emergency food supplies within the Toronto region, which this participant believed was not sustainable, accountable or professional:

> *"A lot of those food banks range from large to small, and some of them are operating on a micro mini shoestring. They are run by volunteers. Who knows the quality of the volunteers? The worst-case scenario is you have to pray for your food. I don't think many people are made to do that anymore, but you know the judgement. They are open on Fridays this month but not next month. They are running out of food. Sometimes they have food, sometimes they do not have food".*

This participant further expressed the minimum requirements needed for what that organisation believed was a sustainable, accountable and appropriate model of a food initiative within a community:

> *"A lot of people will come to us and say we have a network, a garden kitchen. We just want to bring everyone together and have a bit of a hub. We are like no. We need one lead partner, we need a space and we need 5 staff members minimally".*

Another participant reflected on how the strategies aimed at building a healthy food system were influenced by large forces, potentially outside of their control. This participant stated:

> *"There is a lot of profit motive trying to prevent all the good things that I am talking about. It is a very controlled industry - so that is why we have to do as many of these things against the giants".*

The key themes articulated by the participants in Toronto reflected that their approach was founded on the principles of social equity to address food insecurity risk factors. They believed they were achieving this by shaping the built and social environment to influence good food choices, influencing public policy, particularly at local government level and utilising an accountable, sustainable and professional model for establishing a healthy food system in the Toronto region.

4.4.2.3 Funding, partnerships and collaboration

All of the Toronto participants identified many important partnerships, leaders and collaborations needed to successfully implement a strategy to influence the nutrition of their community. This took the form of collaboration and engagement with the community, finding community 'champions' or leaders, partnerships with the Department of Public Health and the local government. Finally, conversations regarding funding and partnerships took place as a key enabler to the success of a food-based strategy and initiative.

The importance of identification and engagement of 'community champions' were identified both in the respect to individuals and organisations that provided leadership around nutritional programs and interventions in the Toronto semi-structured interviews. One participant stated:

> *"You go with where the energy is to be honest. We facilitate as much as we can, but you always find champions in various*

places, so you find partner organisations or grass roots community groups".

Engaging and mobilising the community for an effective response to the nutritional disparities that exist within Toronto, formed the foundation of their food strategy. This was identified by another participant, who was reflecting on engaging community members to be advocates and champions for an effective nutritional response for their community. This participant stated:

"Then, actually concrete listing out, here are the ways you can participate. Which one works for you? Whether it is just coming to the launch and showing Councillors, all of the bodies in this room, about this issue and this cause. Who feel like food is an important thing in this city? So, there are lots of different ways for people to plug in, and like giving them this formal title. Like, I am a "Food Champion" or I am on the Food Policy Council. And it sounds funny, but I think like, it is really empowering for people. And people who have been well established in this area have jumped behind it and I think that is really encouraging. I think, that something else that has been really brilliant about this, has also been the way that we have been able to tell the bigger story about the successes in the city".

Another participant discussed how they implemented food-based programs and initiatives within different communities by reflecting on broader community engagement to inform strategic initiatives:

"So, if I were to describe our approach, what we do is simultaneously top down and bottom up, so we do community engagement on all of the initiatives."

The Toronto participants identified the Department of Public Health as one of the key enablers of the overall food strategy and initiatives. This formed a significant sub-theme regarding leadership and collaboration. It was evident through several responses that the Department of Public Health was an organisation that worked in collaboration with other partners, to assist in resource allocation, provision and

overall leadership. In fact, the overall Toronto Food Strategy sat within, and is funded by, Toronto Public Health Department. This was reflected by one participant who worked within the Public Health department who was reflecting on the Food Strategy:

> *"It really makes sense for us, for a food strategy, to be located inside Toronto public health because food can reside in many different departments and you know in some jurisdictions it sits in the Mayor's office and in some jurisdictions, it sits in planning".*

The importance of leadership from within the Department of Public Health was reflected by a number of participants. The Department of Public Health was identified as being instrumental in forming and encouraging partnerships to look at key strategic initiatives that could influence the broad food system within Toronto. A participant within the Department of Public Health argued that their job was to prevent and reduce the health inequities within the Toronto region, including within the food system:

> *"Certainly, from public health, that's where our mandate is. Reducing health inequities and promoting population health. Food is an issue there and also, you know chronic disease prevention - so obesity."*

Other stakeholders within the public health domain were also utilised to mount a strategic response to the food inequities in Toronto. One participant explains a program that exists within a chain of supermarkets, which provides a dietician to give overall nutrition advice within the supermarket. Loblaw's Guiding Stars program was the first of its kind in Toronto; however, a similar program has been implemented by the other two main supermarket chains in the Toronto region. One participant described this as:

> *"The Loblaw's model, they started quite a few years ago with putting registered dieticians in their stores to work on with the community, I think they are associated with their pharmacy department, so you can go in and book an appointment you can have a grocery store tour. A lot of grocery stores have now opened demonstration kitchens where community groups can*

actually book the kitchen and do an event…. But the dieticians are more there I think to be available to consumers, to book an appointment with, to get some advice on their needs. And I think there are quite a lot of them now about 70."

Three participants mentioned the need to engage with and have leadership and resource allocation from within local government. One participant was very focused on engaging the local government, seeing this as a remit of the Toronto Youth Food Council, mentioning local government Councillors on 14 separate occasions. This participant reflected on how the Toronto Youth Food Council provided a toolkit for members of the public to be able to engage with their Councillor of issues regarding food:

"We created a template, like a toolkit to actually give and empower those different groups to approach their Councillor on the issues there and facilitate conversations between regular residents, community agencies and their Councillors."

This participant went on to describe how they have developed other lines of communication to influence local government, rather than focusing solely on engaging with the Councillor:

"Sometimes you think that the Councillor is always the person you would want to have their ear. In reality, the staff is (sic) just important, they are the ones writing the brief or the paper, they are the ones answering the call. They are the ones putting the stuff in front of the Councillors on the desk. So, building these relationships are (sic) actually super strategic and actually some of the people don't really consider it. Thinking about what's the best way to approach them and have information sit."

The participant from the Public Health Department also reflected on the importance of engaging with local government, noting that a staff member had just been hired for the sole remit to liaise with the local government to address both food policy and other public health priorities:

"The new staff person for the Council, she is a member of our team, so it sort of, facilitate (sic) communication (to) keep going

back and forth you know. So, it is all very positive goodwill stuff but distinct and it's very useful on some levels because we can see things that the bureaucrats can't."

Funding was certainly identified as a barrier from the Toronto participants, however they shaped their response in a way that suggested that partnerships with community or other organisations, was a potential means to raise funds and in-kind support. One participant directly identified money as a barrier or enabler to what was occurring within the Toronto region:

"Of particular (response to) the question of barrier and enabler, call me crass, is about money. It is about the availability of resources. You cannot, and a big part of our theory of change and what we stand for is about resourcing work properly, relative to the outcomes that you expect."

Funding was identified by many of these participants as an integral aspect of a successful strategy. The potential of funding was a foundation that drove professional collaboration and partnerships that were formed within the broader food strategic response. One participant reflected on the need for the community to raise funds to be able to operate a Community Food Centre:

"So, money is a huge barrier, if you don't have it. And some communities are much, much harder to raise money. So, we do national fundraising. We bring start-up funds…but the local partners have to be able to fundraise as well and they have to have an environment that enables them to be able to raise some money".

Another participant identified other collaborations and sources of funding that provided the fiscal resources necessary to run their food-based initiatives:

"We had a few significant government grants, but our big success and the thing that has really enabled us to get started is (sic) some significant investments from individuals. So, we had one five-million-dollar investment, a couple of other million-dollar investments from families, family foundations and major gifts."

There was no commentary from the Toronto participants about the commercial viability of food strategies, but rather the focus was on social financing and other funding options. One participant reflected on using potential social financing options as purchasing power:

> *"We are exploring potential social financing options, as well as straight up government grants…. we are at a catch 22 where we need certain volume of purchasing to leverage the pricing in the private sector and to get the pricing you need, you know, so we have (to provide food for) some student nutritional programmes on board right now.*

It was clear from the thematic analysis of the Toronto interviews, that the participants did identify a number of partnerships and collaborations were needed to deliver resources, both fiscal and other, to form an effective strategic response around nutrition in the Toronto region.

4.4.2.4 Part B conclusion

The interviews in Toronto provided valuable insight to how this community was shaping the nutritional intake of their region and led to the evolution of the thesis, consistent with the exploratory, sequential research design. Participants identified that by understanding their community demographics, they were focused on building a food system that was based on equity within a social justice framework. Their responses were focused around the food insecurity that was occurring within the region and provided strategies that directly influenced these risk factors such as poverty reduction, anti-oppression policies and food access. They were clear that strategies such as food literacy alone, would not effectively or sustainably address the issue their community was experiencing. Rather they provided opportunities for their community members to advocate for a fair food system and engage other key stakeholders to force policy and social change.

4.5 Conclusion

This chapter outlined the purpose, data collection, data analysis and results of Phase One of this thesis. Using a critical, sequential, exploratory research approach, the

findings from this qualitative phase formed the foundation for Phase Two of this research.

Both the Ipswich interviews and the Toronto interviews provided understandings on key components of implementing a community-based strategy to influence nutritional disparities. The Ipswich participants did propose some strategies and explanations as to what was occurring within the Ipswich community, however it was clear that they were on the start of their journey exploring if broad social factors may be influencing food system inequity. However, the Toronto participants clearly identified a range of socio-economic factors driving food system inequity in their community and discussed how the strategies, policies and initiatives that they were working on, were situated within a social health model and focusing on reducing social inequities. This experience was based on a community with over thirty years of attempting to influence the nutritional intake within their region.

This was a significant finding in the doctoral research and led to the formation of specific research questions about whether socio-economic factors were causing food insecurity in the Ipswich region, which was explored in the quantitative phase of this thesis. Further to this, emerging sub-themes regarding social, economic and structural forces shaping food systems, which formed the premise of the methodological paradigms for this doctoral research, became very evident during this phase.

5. Chapter 5: Phase Two

5.1 Introduction

This chapter outlines the methods and findings of Phase 2, the quantitative phase of this doctoral research. This phase of research evolved from the interviews that occurred in the Toronto region, which indicated key stakeholders believed that social inequity was driving nutritional outcomes in their community, resulting in food insecurity. The majority of key stakeholders interviewed in the Ipswich region, had a beginning understanding of the potential for social inequities to influence the nutritional intake of the community, but did not have a detailed understanding of the social demographics of the region. Therefore, the aim of this phase of research was to provide a basis for understanding the food insecurity risk factors which may be influencing the nutritional intake within the region.

The phase utilised longitudinal, cross-sectional data for the Ipswich region, from the Australian Bureau of Statistics (ABS) gathered during the 2006, 2011 and 2016 census periods (ABS, 2017a, 2017c, 2017d). Chi-square analyses was undertaken to ascertain any significant association between food insecurity risk factors and certain locational (i.e., living in Ipswich) and demographic factors (i.e., Indigenous Australians), as identified in the literature review in Chapter Two (AIHW, 2008; Cook et al., 2017; Friel et al., 2015; Martin & Ferris, 2007; Ramsey et al., 2012a). The aim of this analysis was to examine if there was an overrepresentation of people with food insecurity risk factors within the Ipswich population, when compared to the overall population in Australia. Data from all three census data years was used.

This chapter outlines the purpose of the study, the methods used, including the sample, data collection and data analysis. These results are further presented in table form, with an overall description following each table. The overall analysis and discussion will form Chapter Six of this thesis and the future implications of this work will be discussed in Chapter Seven of this doctoral research.

5.2 Purpose of Phase Two

Phase Two consists of a detailed cross-sectional, longitudinal characterisation of the Ipswich population, analysing the prevalence of food insecurity risk factors, as identified in the literature and outlined in Chapter two of this thesis. Reflecting the

explorative, qualitatively driven, sequential mixed-methods research design, this phase builds on the thematic analysis undertaken in Phase One of this research, as the key theme of social inequity leading to food insecurity was identified amongst all of the participants interviewed in Toronto. As demonstrated by the literature review in Chapter Two, mild to moderate food insecurity is associated with high obesity rates, consistent with the 'food insecurity obesity paradox' (Burns, 2004; Dinour, 2007; Tanumihardjo et al., 2007). As discussed in Chapter 2, the Australian Health Survey (ABS, 2013) and the Aboriginal and Torres Strait Islander Health Performance Framework (AIHW, 2008) identified six groups whom are at high risk of food insecurity. These include Australian Indigenous people, unemployed people, single-parent households, low income earners, rental households, and young people. In addition, other groups that were identified as being more susceptible to food insecurity include people with a lower level of education (Friel, et al., 2015; Ramsey et al., 2011b) and females (Franklin, et al., 2012; Martin & Ferris, 2007). These same social determinants are discussed in the literature which shape overall health outcomes (Rumbold & Dickson-Swift, 2012).

Stage Two of this program of research utilised ABS census data. This included census data from the years 2006, 2011 and 2016 (five year intervals). Due to these data sets being publicly available, no ethics clearance was required for this phase of the research. The ABS do, however, comply with stringent ethical, legal and quality standards regarding accessibility, storage and accuracy of data (ABS, 2017b). The ABS will not release any data that may be identifiable through names, addresses or household information (ABS 2017b). In this phase of the study, socio-economic characteristics associated with food insecurity have been analysed in relation to the percentage of the Ipswich population experiencing a risk factor, then benchmarked against the Australian average. Additionally, a Chi-Square analysis was calculated to determine the relationships between food insecurity risk factors and population variables within the Ipswich community and compared to the overall Australian population.

The purpose of Phase Two is to determine the percentage of the Ipswich population with one or more of the following food insecurity risk factors: education level; level of unemployment; single parent households; rental households; Indigenous population and young people. Due to the data set available through the ABS, both the

Indigenous population and young people were able to be analysed consistent with other risk factors (such as unemployment and single parenting), providing an overview of the percentage of the population whom were at risk for multiple food insecurity risk factors. Additionally, when the ABS data set was available, gender differences were also analysed for the Ipswich region. The gender analysis was completed only for the Ipswich region, due to the literature discussed in Chapter 2 literature review, which indicated the relationship between gender and relative disadvantage in lower socioeconomic areas (Franklin, et al., 2011; Martin & Ferris, 2007; Ramsey et al., 2012b). The inclusion of three consecutive ABS census data collection points was designed to demonstrate trends in the data. Thus, this phase of this doctoral research provides a clear indication of how many members of the Ipswich population have a food insecurity risk factor, how this data is trending over a 10 year period and how these results compare against the overall Australian population.

5.3 Methods

5.3.1 Sample

The sample utilised was from the census community profile data collection from 2006, 2011 and 2016, which represents the three most recent census periods (ABS, 2017a, 2017c, 2017d). The community profile for the LGA of Ipswich was extracted from the ABS website (ABS, 2017a). The 2016 census data included 200,123 people and a geographical land area of 108,497.8 hectares (ABS, 2017a). This population rose from 140,182 people in 2006, with an increase of 42.76% over the ten years (ABS, 2017d). The boundaries of the LGA of Ipswich did not geographically change over this period of time.

5.3.2 Data collection

The data were collected from publicly available ABS data, available from the community profile from the ABS website for 2006, 2011 and 2016 (ABS, 2017a, 2017c, 2017d). The community population profiles contain data for a LGA provides specific data about Aboriginal and Torres Strait Islander peoples, time series, place of paid work, social community data and working population data (ABS, 2017b). These profiles allow researchers accessing the data to compare and contrast LGA's and overall comparative Australian statistics.

5.3.3 Data analysis

Initially, the relevant food insecurity risk factor population data was extracted from the ABS community profiles for Australia and Ipswich. The data was 'cleaned' to ensure that a population would not be counted twice (Abbott, 2016). For example, when ascertaining the relevant data for the Indigenous population variable for Ipswich, the number of Indigenous people in Ipswich was subtracted from the overall population for Ipswich, so that the Indigenous population was not counted twice.

The Chi-Square test including the *p* value was then calculated within a Microsoft Excel 2016 spreadsheet using the Chi-Squared formula (Abbott, 2016). This was done by the following steps:

a) Finding the variables of interest (e.g., Indigenous Australians and the other population of Australia) within the ABS Community Profiles;
b) Extracting the relevant data (i.e. the number of persons within the populations who do and do not have certain food insecurity risk factor);
c) Chi-Squared test of independence were then calculated (see below for formula), with *p* values of < .05 used as statistically significance was calculated using excel spreadsheet. The expected count was also calculated;

$$\chi^2 = \sum \frac{(Observed - Expected)^2}{Expected}$$

d) This was replicated for the 2006, 2011 and 2016 census data points to evaluate for trends over time.

An additional consideration with large sample sizes is that of Type I error, i.e. the inaccurate rejection of the null hypothesis or "false positive" (Nickerson, 2011). When examining relationships and differences when using large samples, statistically significant results are often found that do not reflect a practical significance (Khalilzadeh & Tasci, 2017). In order to provide a more accurate interpretation of significant results, effect sizes need to be utilised in result interpretation. However, due to the complex measurement that is often involved in social science, studies with large samples sizes often report smaller effect sizes, making accurate assessment of practical significance difficult (Levine, Asada, & Carpenter, 2009; Slavin & Smith, 2009). As such, to compensate for both shortcomings in significance and effect size,

the odds ratio (i.e., the odds of an outcome across conditions) was used as a measure of effect size in this analysis (Levine et al., 2010).

5.4 Results

The results are presented in this chapter according to the identified food insecurity risk factors including education level, level of unemployment, single parent status, renting status and Indigenous population and young people. Additionally, when data was available to represent gender, the gender comparison for the Ipswich region has also been presented within the corresponding section.

5.4.1 Overall percentage analysis results

The initial analysis determined the percentage of the population within Australia and Ipswich with at least one food insecurity risk factor, over the three previous census point data collections. Table 5.1 displays these percentages. Overall, it is clear from the percentage data represented in Table 5.1, that Ipswich had a higher percentage of the population who were experiencing these food insecurity risk factors. These percentages were higher than the national average in almost all categories over the three census dates. However, further analysis was required to understand the statistical significance and the relationship between these variables, hence, the Chi-Squared test and *p* value was calculated and is presented and discussed in section 5.4 of this chapter.

Table 5.1 Percentage of population with food insecurity risk factors in Ipswich and Australia

Food insecurity risk factors	***2006***		***2011***		***2016***	
	Ipswich N=241,707	*Australia N=19,855,287*	*Ipswich N=281,788*	*Australia N=21,507,719*	*Ipswich N= 323,069*	*Australia N=23,401,892*
Single Parent Households	19.84%	15.61%	20.52%	15.64%	20.92%	15.56%
Male	3.49%	2.72%	3.66%	2.86%	3.72%	2.95%
Female	16.34%	13.35%	16.86%	13.38%	17.20%	13.29%
Indigenous	3.37%	2.29%	3.84%	2.55%	4.35%	2.77%
Male	1.66%	1.13%	1.90%	1.26%	2.18%	1.38%
Female	1.72%	1.16%	1.94%	1.29%	2.17%	1.40%
Young people (0-24)	38.57%	33.45%	38.67%	32.60%	37.85%	31.42%
Male	19.70%	17.12%	19.69%	16.70%	19.31%	16.08%
Female	18.86%	16.33%	18.98%	15.90%	18.54%	15.34%
Rental Households	30.62%	19.38%	36.84%	20.87%	39.67%	20.97%
High School (Less than Y12)	55.26%	47.88%	48.87%	42.25%	42.75%	37.41%
Male	27.60%	23.52%	24.45%	20.95%	21.47%	18.72%
Female	27.67%	24.36%	24.42%	21.30%	21.28%	18.69%
Unemployed	3.17%	3.16%	4.57%	3.46%	5.63%	4.14%
Male	1.51%	1.69%	2.40%	1.84%	2.90%	2.22%

Female	1.67%	1.47%	2.16%	1.61%	2.73%	1.92%
Not in labour force	31.97%	33.11%	31.41%	33.00%	30.65%	33.08%
Male	12.28%	12.96%	12.39%	13.27%	12.52%	13.86%
Female	19.69%	20.16%	19.02%	19.72%	18.13%	19.22%
Total not working	35.14%	36.28%	35.98%	36.45%	36.27%	37.22%
Male	13.78%	14.65%	14.79%	15.12%	15.41%	16.08%
Female	21.36%	21.63%	21.19%	21.33%	20.86%	21.14%

This table demonstrates that all food insecurity risk facts, except 'not in labour force' and 'total not working' demographics were higher in the Ipswich region, than the national average. This trend was relatively stable across all three data collection points. This demonstrates that there was a higher level of the food insecurity risk factors in the Ipswich community that may have been influencing the nutritional intake of the community. [2]

[2] NB. The percentages do not add up to 100% overall because individuals could belong to more than one category[2].

5.4.2 Chi-Square test and percentage difference results

A Chi-Square test of independence was calculated on the following variables outlined below, to examine the statistical significance between these variables (Abbott, 2016). The aim of this analysis is to ascertain if the Ipswich population had a higher proportion of people with food insecurity risk factors, than the general population in Australia. This is presented in table form, to demonstrate relationships of expected and actual population counts and includes the Chi-Squared analysis value, the *p* value and the odds ratio value.

5.4.3 Education level

Table 5.2 High school education attainment for the overall Ipswich population and the overall Australian population

	2006		***2011***		***2016***	
	Ipswich	*Australia*	*Ipswich*	*Australia*	*Ipswich*	*Australia*
Year 12 not completed	58886	7562666	59377	6968259	60343	6766733
(Expected)	(51170)	(7570382)	(51558)	(6976078)	(52902)	(6774174)
Year 12 completion	37423	6685801	52257	8136358	68567	9740481
(Expected)	(45139)	(6678085)	(60076)	(8128539)	(76008)	(9733040)
Test Statistics						
χ2	2499.17*		2219.59*		1789.11*	
Odds Ratio	1.39 (1.37-1.41)		1.33 (1.31-1.34)		1.27 (1.25-1.28)	
(95% CI)						

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between the completion of year twelve education and the Ipswich population compared to the Australian population. The relationship between these variables was significant across all selected census years from 2006, 2011 and 2016, respectively, with χ^2 (1) = 2499.17, p <.001; χ^2 (1) = 2219.59, p <.001; and χ^2 (1) = 1784.11, p <.001. Persons residing in Ipswich were 1.39 times, 1.33 times, and 1.27 times more likely to not have finished year 12 than the Australian population, in 2006, 2011 and 2016 respectively. This trend has decreased slightly over the three census years. Level of education was identified in the literature as a key food insecurity risk factor and therefore, these results

indicate that the Ipswich community had a higher rate of this risk factor, when compared against to the overall Australian population.

Table 5.3 High school education attainment for the Female and Male population in Ipswich

	2006		***2011***		***2016***	
	Female	*Male*	*Female*	*Male*	*Female*	*Male*
Year 12 not completed	29482	29404	29671	29706	30046	30302
(Expected)	(29991)	(28895)	(30365)	(29012)	(31028)	(29320)
Year 12 completion	19568	17855	27418	24839	36234	32331
(Expected)	(19059)	(18364)	(26724)	(25533)	(35252)	(3313)
Test Statistics						
χ2	45.22*		69.36*		120.18*	
Odds Ratio (95% CI)	0.91 (0.89-0.94)		0.90 (0.89 – 0.94)		0.88 (0.87 -0.90)	

*Note: * p* <.001.

A Chi-square test of independence was calculated to examine the relationship between year twelve completion and non-completion and male and females within the Ipswich population. The relationship between these variables was significant across all selected census years from 2006, 2011 and 2016, respectively, with *χ2* (1) = 45.22, *p* <.001; *χ2* (1) = 69.36, *p* <.001; and *χ2* (1) = 120.18, *p* <.001. This table demonstrates that males in Ipswich were 9%, 10% and 12% more likely to not have completed year twelve (in 2006, 2011 and 2016), compared to the female population in Ipswich.

5.4.4 Level of unemployment

Table 5.4 Ipswich population employment status compared to the Australian population employment status

	2006		***2011***		***2016***	
	Ipswich	*Australia*	*Ipswich*	*Australia*	*Ipswich*	*Australia*
Not working	37443	5737479	45718	6283724	53617	7031435
(Expected)	(38657)	(5736265)	(46320)	(6283122)	(55012)	(7030040)
Working	69111	10074043	81353	10952901	94197	11858028
(Expected)	(67897)	(10075257)	(80751)	(10953503)	(92802)	(11859423)
Test Statistics						
χ^2	60.21*		12.41*		56.75*	
Odds Ratio	0.95 (0.94-0.96)		0.98 (0.97-0.99)		0.96 (0.95-0.97)	
(95% CI)						

*Note: * p* <.001.

The parameters used for unemployed were a combination of 'not in workforce', 'not looking for work' and 'not looking for work in the next four weeks' within the ABS census data. A Chi-Square test of independence was calculated to examine the relationship between the employment status of the Ipswich population compared to the employment status of the Australia population. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 60.21, p <.001; X^2 (1) = 12.41, p <.001; and X^2 (1) = 56.75, p <.001. Persons residing in Ipswich were 5%, 2%, and 4% more likely to be employed than the national population in Australia, in 2006, 2011 and 2016, respectively. This trend has been relatively stable across the three census years. Employment status was identified in the literature as a food insecurity risk factor

and these results indicate that this risk factor was not as prevalent in the Ipswich region, compared to the overall Australia population.

Table 5.5 Employment status for the Female and Male population in Ipswich

	2006		***2011***		***2016***	
	Female	*Male*	*Female*	*Male*	*Female*	*Male*
Not working	22756	14687	26921	18797	30833	22784
(Expected)	(18502)	(18941)	(22563)	(23155)	(26203)	(27414)
Working	31146	37965	37436	43917	44745	49453
(Expected)	(34150)	(34961)	(40151)	(41202)	(46034)	(48164)
Test Statistics						
χ2	2397.36*		1939.01*		1368.81*	
Odds Ratio (95% CI)	1.89 1.84 -1.94)		1.68 (1.64 – 1.72)		1.50 (1.46 -1.53)	

*Note: * p* <.001.

A Chi-square test of independence was calculated to examine the relationship between employment status and male and females within the Ipswich population. The relationship between these variables was significant across all selected census years from 2006, 2011 and 2016, respectively, with *χ2* (1) = 2397.36, *p* <.001; *χ2* (1) = 1939.01, *p* <.001; and *χ2* (1) = 1368.81, *p* <.001. This table demonstrates females in Ipswich were 1.89 times, 1.68 times and 1.50 times more likely to be not working, compared to the male population in Ipswich, in 2006, 2011 and 2016 respectively. This trend has decreased over the three census years however it does demonstrate that this food insecurity risk factor for females in the Ipswich region is more prevalent than for males.

5.4.5 Single parent households

Table 5.6 Ipswich single parent households compared to Australian single parent households

	2006		***2011***		***2016***	
	Ipswich	*Australia*	*Ipswich*	*Australia*	*Ipswich*	*Australia*
Single Parent	7220	799748	8795	859174	10473	908655
(Expected)	(5682)	(794066)	(6704)	(861265)	(7789)	(911340)
Other families	29179	429386	34075	4648567	39587	4988497
(Expected)	(30717)	(4292298)	(36166)	(4646476)	(42272)	(4946226)
Test Statistics						
χ^2	496.49*		779.32*		1105.13*	
Odds Ratio (95% CI)	1.34 (1.31 – 1.38)		1.40 (1.36 – 1.43)		1.44 (1.41 -1.47)	

*Note: * p* <.001.

The parameters of 'other' refers to parents who have not been identified as 'single' parents in the ABS census data.

A Chi-Square test of independence was calculated to examine the relationship between single parent households in Ipswich compared to single parent households in the rest of Australia. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X2 (1) = 496.49, *p* <.001; X2 (1) = 779.32, *p* <.001; and X2 (1) = 1105.12, *p* <.001. Persons residing in Ipswich were 1.34 times, 1.40 times, and 1.44 times more likely to be a single parent than the Australian population, in 2006, 2011 and 2016, respectively. This trend increased over the three selected census years. As

single parent status was identified in the literature as a food insecurity risk factor, these results indicate that the Ipswich community had a higher rate of this risk factor, compared to the overall Australian population.

Table 5.7 Single parent households for the Female and Male population in Ipswich

	2006		***2011***		***2016***	
	Female	*Male*	*Female*	*Male*	*Female*	*Male*
Single Parent	5949	1271	7227	1568	8612	1860
(Expected)	(3568)	(3652)	(4341)	(4454)	(5118)	(5354)
Other families	47953	51381	57130	61146	66966	70377
(Expected)	(49084)	(50250)	(58373.36)	(59902.64)	(67119)	(70224)
Test Statistics						
χ^2	3135.05*		3756.94*		4364.90*	
Odds Ratio	5.01 (4.71 - 5.33)		4.93 (4.67 – 5.12)		4.87 (4.62 -5.12)	
(95% CI)						

*Note: * p* <.001.

A Chi-square test of independence was calculated to examine the relationship between single parent status and male and females within the Ipswich population. The relationship between these variables was significant across all selected census years from 2006, 2011 and 2016, respectively, with χ^2 (1) = 3135.05, p <.001; χ^2 (1) = 3756.94, p <.001; and χ^2 (1) = 4364.90, p <.001. This table demonstrates that females in Ipswich were 5.01 times, 4.93 times and 4.87 times more likely to be a single parent than the male population in Ipswich, in 2006, 2011 and 2016 respectively. This trend has decreased slightly over the three selected census

years however it does validate that this food insecurity risk factor is more pronounced for females in the Ipswich region, than for males.

5.4.6 Rental households

Table 5.8 **Ipswich population rental status compared to Australian population rental status**

	2006		***2011***		***2016***	
	Ipswich	*Australia*	*Ipswich*	*Australia*	*Ipswich*	*Australia*
Renters	14566	1087529	20751	1246414	25256	1304694
(Expected)	(9220)	(1092875)	(11754)	(1255411)	(13347)	(1316603)
Non Renters	32999	4550294	35577	4769803	38405	4975064
(Expected)	(38345)	(4544948)	(44574)	(4760806)	(42272)	(4946226)
Test Statistics						
χ^2	3876.94*		8784.08*		13580.85*	
Odds Ratio (95% CI)	1.85 (1.81 – 1.88)		2.23 (2.19 – 2.27)		2.51 (2.47 -2.55)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between the rental population in Ipswich and the rental population in the rest of Australia. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X2 (1) = 3876.94, *p* <.001; X2 (1) = 8784.08, *p* <.001; and X2 (1) = 13580.85, *p* <.001; Persons residing in Ipswich were 1.85 times, 2.23 times, and 2.51 time more likely to be renting than the Australian population, in 2006, 2011 and 2016, respectively. This trend has increased over the three selected census years. Rental status was identified in the literature as a food insecurity risk factor, hence these results indicate that the Ipswich community had a higher rate of this risk factor, compared to the overall Australian population. No data in relation to gender was available for this food insecurity risk factor.

5.4.7 Indigenous population

The following table represents a percentage comparison between the food insecurity risk factors the Indigenous population in Ipswich compared to the food insecurity risk factors for the Indigenous population of Australia. It demonstrates that the Ipswich Indigenous population had a higher percentage of food insecurity risk factors than the overall Indigenous population in Australian across many variables, including single parent, rental, younger people and youth unemployment. These trends have stayed relatively stable over the time.

Table 5.9 Ipswich Indigenous population risk factor percentages compared to Australian Indigenous population risk factor percentages

Indigenous population with Food insecurity risk factors	***2006***		***2011***		***2016***	
	Ipswich N=4,729	*Australia N=450,301*	*Ipswich N=6,417*	*Australia N=541,953*	*Ipswich N= 8,429*	*Australia N=640,742*
Single Parent Households	37.76%	33.87%	37.78%	33.36%	36.38%	32.18%
Rental	61.64%	60.25%	63.63%	59.36%	64.33%	57.34%
Young people (0-24)	62.89%	56.50%	61.62%	55.21%	60.81%	53.01%
Male	32.16%	28.78%	31.31%	28.14%	31.76%	27.17%
Female	30.73%	27.73%	30.31%	27.07%	29.08%	25.84%
Young People 15-24 yrs	17.89%	18.90%	19.99%	19.27%	21.52%	19.06%
Male	9.56%	9.57%	10.29%	9.80%	10.99%	9.75%
Female	8.33%	9.33%	9.71%	9.46%	10.51%	9.31%
Not completed year 12	64.64%	68.15%	58.59%	64.23%	54.30%	59.15%
Male	29.74%	32.69%	27.46%	30.92%	36.93%	28.93%
Female	34.90%	35.46%	31.14%	33.31%	27.78%	30.22%
Unemployed	8.23%	7.98%	10.22%	8.67%	11.46%	9.44%
Male	4.12%	4.23%	5.71%	4.85%	6.03%	5.22%
Female	4.12%	3.66%	4.51%	3.82%	5.47%	4.22%

Not in labour force	41.96%	42.74%	42.05%	44.38%	39.93%	44.34%
Male	17.00%	17.68%	18.17%	19.06%	17.07%	19.95%
Female	24.96%	25.06%	23.88%	25.31%	22.93%	24.39%
Total not working	50.19%	50.72%	52.27%	53.05%	51.40%	53.79%
Male	21.12%	22.00%	23.88%	23.91%	23.10%	25.18%
Female	29.08%	28.72%	28.39%	29.14%	28.39%	28.61%
Unemployed 15-24	13.00%	10.71%	14.81%	12.16%	16.76%	13.33%
Male	6.26%	5.88%	8.65%	6.92%	8.93%	7.49%
Female	6.74%	4.83%	6.16%	5.24%	7.83%	5.83%
Not in workforce 15-24yr	42.91%	46.45%	46.30%	49.46%	43.66%	47.61%
Male	21.28%	21.30%	22.60%	23.38%	21.83%	23.54%
Female	21.63%	25.16%	23.69%	26.08%	21.89%	24.06%
Total not working 15-24yr	55.91%	57.16%	61.11%	61.62%	60.42%	60.93%
Male	27.54%	27.17%	31.25%	30.30%	30.76%	31.04%
Female	28.37%	29.99%	29.85%	31.32%	29.71%	29.89%

5.4.7.1 Overall Indigenous population

Table 5.10 Indigenous population in Ipswich and Australia compared to non-Indigenous population

	2006		***2011***		***2016***	
	Ipswich	*Australia*	*Ipswich*	*Australia*	*Ipswich*	*Australia*
Indigenous	4729	450301	6417	541953	8429	640742
(Expected)	(3213)	(451817)	(4255)	(544115)	(5374)	(643797)
Non-Indigenous						
(Expected)	135452	19264805	160487	20798862	185304	22567417
	(136968)	(19263289)	(162649)	(20796700)	(188359)	(22564362)
Test Statistics						
χ^2	737.79*		1135.49*		1800.90*	
Odds Ratio (95% CI)	1.49 (1.45 – 1.54)		1.53 (1.50 – 1.57)		1.60 (1.57 – 1.64)	

*Note: * p <.001.*

A Chi-Square test of independence was calculated to examine the relationship between Indigenous population in Ipswich and the overall Indigenous population in Australia. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 737.79, p <.001; X^2 (1) = 1135.48, p <.001; and X^2 (1) = 1800.89, p <.001; Persons residing in Ipswich were 1.49 times, 1.52 times and 1.60 times more likely to be Indigenous, than the Australian population. This trend has increased over the three selected census years. As reflected in the literature review in Chapter Two,

Indigenous heritage is a food insecurity risk factor and hence, the Ipswich community had a higher population that identified with this risk factor within all of the time periods analysed.

The following section analyses the Indigenous population in combination with education, rental, single parent, and employment and youth age food insecurity risk factors. This analysis has been undertaken to determine if two food insecurity risk factors were prevalent in the Ipswich Indigenous population and comparisons made to the overall Australian Indigenous population when analysing each risk factor.

5.4.7.2 Indigenous education

Table 5.11 Year twelve completion for the Indigenous Australian population compared to the Non-Indigenous Australian population

	2006		***2011***		***2016***	
	Australian Indigenous	*Australia Non - Indigenous*	*Australian Indigenous*	*Australia Non - Indigenous*	*Australian Indigenous*	*Australia Non - Indigenous*
Year 12 not completed	193480	7428072	209591	6818045	234485	6592591
(Expected)	(132070)	(748982)	(134466)	(6893170)	(147063)	(6680013)
Year 12 completion	55094	6668130	81556	8107059	123877	9809048
(Expected)	(116504)	(6606720)	(156680)	(8031934)	(211299)	(9597749)
Test Statistics						
χ^2	61997.71*		79512.87*		90077.41*	
Odds Ratio (95% CI)	3.15 (3.12 – 3.18)		3.06 (3.03 – 3.08)		2.78 (2.76 -2.80)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between Indigenous Australians who have completed year twelve education as opposed to the Non-Indigenous population in Australia that have completed year twelve. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 47582.4, p <.001; X^2 (1) = 65906.9, p <.001; and X^2 (1) = 81814.66, p <.001; Indigenous people in Australia were 3.15 times,

3.06 times and 2.78 times less likely than the non-Indigenous population in Australia to have not completed year twelve, in 2006, 2011 and 2016 respectively. This trend has slightly decreased over the three selected census years. This finding indicates that the Indigenous population in Australia, may have had more than one food insecurity risk factor occurring.

Table 5.12 Year twelve completion for the Indigenous Ipswich population compared to the Non-Indigenous Ipswich population

	2006		***2011***		***2016***	
	Ipswich Indigenous	*Ipswich Non - Indigenous*	*Ipswich Indigenous*	*Ipswich Non - Indigenous*	*Ipswich Indigenous*	*Ipswich Non - Indigenous*
Year 12 not completed	1680	57206	1991	57386	2502	57841
(Expected)	(1409)	(57477)	(1625)	(57752)	(2049)	(58294)
Year 12 completion	625	36798	1064	51193	1875	122002
(Expected)	(896)	(36527)	(1430)	(50827)	(1513)	(122364)
Test Statistics						
χ^2	137.05*		181.14*		195.02*	
Odds Ratio (95% CI)	1.73 (1.58 – 1.90)		1.67 (1.55 – 1.80)		1.54 (1.45 -1.64)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between the Indigenous Ipswich population who have completed year twelve education as opposed to the Non-Indigenous population in Ipswich. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X2 (1) = 94.73, *p* <.001; X2 (1) = 132.26, *p* <.001; and X2 (1) = 259.65, *p* <.001; These results demonstrate that the Indigenous population in Ipswich were 1.73 times, 1.67 times and 1.54 times more likely to not have completed year 12 than the non-Indigenous population in Ipswich, in 2006,

2011 and 2016 respectively. This trend has decreased slightly over the three selected census years. Education level and Indigenous heritage were both identified as food insecurity risk factors in the literature, as presented in Chapter Two of this thesis and both of these risk factors were more prevalent in the Ipswich region, than the overall Ipswich population.

Table 5.13 Year twelve completion for the Indigenous Ipswich population compared to the Indigenous Australian population

	2006		***2011***		***2016***	
	Ipswich Indigenous	*Australia Indigenous*	*Ipswich Indigenous*	*Australia Indigenous*	*Ipswich Indigenous*	*Australia Indigenous*
Year 12 not completed	1680	193480	1991	207600	2502	231983
(Expected)	(1794)	(191686)	(1064)	(207392)	(2864)	(231621)
Year 12 completion	625	54469	1064	80492	1875	122002
(Expected)	(511)	(54583)	(856)	(80700)	(1513)	(122364)
Test Statistics						
χ^2	33.06*		71.13*		133.99*	
Odds Ratio (95% CI)	0.76 (0.70 – 0.84)		0.73 (0.67 – 0.78)		0.70 (0.66 -0.75)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between people who are Indigenous from Ipswich who have completed year twelve education as opposed to people from the Indigenous population in the rest of Australia. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X2 (1) = 14.86, *p* <.001; X2 (1) = 47.42, *p* <.001; and X2 (1) = 45.50, *p* <.001; These results do indicate that people who are Indigenous in Ipswich are 24%, 27% and 30% more likely to have completed year twelve, as opposed to the Indigenous population in Australia.

This trend has increased across the three selected census years. This result indicates that these food insecurity risk factors, as identified in the literature, are not as prevalent in the Ipswich community compared to the rest of Australia.

Table 5.14 Year twelve completion for the Indigenous population - Female compared to Male in Ipswich

	2006		***2011***		***2016***	
	Female	*Male*	*Female*	*Male*	*Female*	*Male*
Year 12 not completed	907	773	1058	933	1257	1241
(Expected)	(911)	(769)	(1070)	(921)	(1315)	(833)
Year 12 completion	343	282	584	480	1047	833
(Expected)	(339)	(286)	(572)	(492)	(989)	(891)
Test Statistics						
χ^2	.15		.85		12.41*	
Odds Ratio (95% CI)	0.96 (0.80 – 1.16)		0.93 (0.80 – 1.08)		0.81 (0.71 -0.91)	

Note: $*p < .001$.

A Chi-square test of independence was calculated to examine the relationship between year twelve completion and non-completion and male and females within the Ipswich Indigenous population. The relationship between these variables was significant only within the 2016 census year. Variables from 2006, 2011 and 2016, respectively, were χ^2 (1) = .15, p =.70; χ^2 (1) = 69.36, p =.36; and χ^2 (1) = 120.18, p <.001. This table demonstrates that Indigenous males in Ipswich were 19% more likely to have not completed year 12, then the Indigenous male population in Ipswich in 2016. This trend has increased over the three selected census years and does demonstrate that this food insecurity risk factor is more prevalent for the Indigenous male population.

5.4.7.3 Indigenous rental status

Table 5.15 Australian Indigenous population rental status compared to Australian Non-Indigenous population rental status

	2006		2011		2016	
	Australian Indigenous	*Australian Non – Indigenous*	*Australian Indigenous*	*Australian Non - Indigenous*	*Australian Indigenous*	*Australian Non - Indigenous*
Renting Household	100408	1001687	124099	1153066	150832	1179118
(Expected)	(32306)	(1069789)	(143622)	(1223543)	(55147)	(1274803)
Non – Renting household	66251	4517042	84950	4720430	112205	4901264
(Expected)	(134353)	(4448940)	(165427)	(4639953)	(207889)	(4805580)
Test Statistics						
χ^2	183455.73*		194305.36*		219143.53*	
Odds Ratio (95% CI)	6.83 (6.77 – 6.90)		6.03 (5.99 – 6.09)		5.59 (5.54 -5.63)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between Indigenous population and rental status. The relationship between these variables was significant in 2006, 2011 and 2016 respectively with X^2 (1) = 183455.73, p <.001; X^2 (1) = 194305.36, p <.001; and X^2 (1) = 219143.53, p <.001; This table demonstrates that Indigenous Australians are 6.83 times, 6.03 times and 5.59 times more likely to be living in rental households, than the overall Australian population, in 2006, 2011 and 2016, respectively. This trend decreased over the three selected census years. As both rental status and Indigenous heritage

were identified in the literature as food insecurity risk factors, this finding indicates that there may have been two risk factors occurring for the Indigenous population in Australia. No data in relation to gender was available for this food insecurity risk factor.

Table 5.16 Ipswich Indigenous population rental status compared to Ipswich Non-Indigenous population rental status.

	2006		***2011***		***2016***	
	Ipswich Indigenous	*Ipswich Non - Indigenous*	*Ipswich Indigenous*	*Ipswich Non - Indigenous*	*Ipswich Indigenous*	*Ipswich Non - Indigenous*
Renting Household	1144	13422	1653	19098	2319	22937
(Expected)	(568)	(13998)	(958)	(119793)	(1430)	(23826)
Non – Renting household	712	32287	945	34632	1286	37119
(Expected)	(1288)	(31711)	(1641)	(33936)	(2174)	(36231)
Test Statistics						
χ^2	874.43*		839.86*		970.54*	
Odds Ratio	3.87 (3.51 – 4.25)		3.17 (2.92 – 3.44)		2.92 (2.72 -3.13)	
(95% CI)						

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between Indigenous population of Ipswich rental status and the Non-Indigenous population of Ipswich rental status. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 874.43, p <.001; X^2 (1) = 839.86, p <.001; and X^2 (1) = 970.54, p <.001; This table demonstrates that the Indigenous Ipswich population are 3.87 times, 3.17 times and 2.92 times more likely to be living in rental households, than the overall Ipswich population, in 2006, 2011 and 2016, respectively. This trend has decreased over the three selected census years. As both Indigenous heritage and rental status were identified in the literature as

food insecurity risk factors, these results demonstrate that the Indigenous population in Ipswich, may have had more than one risk factor present within the community. No data in relation to gender was available for this food insecurity risk factor.

Table 5.17 Ipswich Indigenous population rental status compared to Australian Indigenous population rental status

	2006		***2011***		***2016***	
	Ipswich Indigenous	*Australian Indigenous*	*Ipswich Indigenous*	*Australian Indigenous*	*Ipswich Indigenous*	*Australian Indigenous*
Renting Household	1144	100408	1653	124099	2319	150832
(Expected)	(568)	(32306)	(958)	(43622)	(1430)	(55147)
Non – Renting household	712	66251	945	84950	1286	112205
(Expected)	(1288)	(134353)	(1641)	(165427)	(2174)	(207889)
Test Statistics						
χ^2	1.51		19.81*		72.90*	
Odds Ratio (95% CI)	1.6 (0.97 – 1.17)		1.20 (1.11 – 1.30)		1.37 (1.26 – 1.44)	

*Note: *p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between the rental status of the Indigenous population of Ipswich and the rental status of the Indigenous population of Australia. However, the relationship was not significant in 2006 with X^2 (1) = 1.51, p= .021; The relationship between these variables was significant in the census years from 2011 and 2016 respectively with X^2 (1) = 19.81, p <.001; X^2 (1) = 72.9, p <.001. These results indicate that Indigenous people who live in Ipswich were 1.2 times and 1.37 times more likely to rent compared to Indigenous people throughout Australia in 2011 and 2016, respectively. This trend increased over the three census periods. As the literature demonstrates that Indigenous heritage and renting status are two food insecurity risk factors, these results indicate that the Indigenous population of Ipswich may have had

more than one risk factor present, compared to the Indigenous population throughout the remainder of Australia. No data in relation to gender was available for this food insecurity risk factor.

5.4.7.4 Indigenous single parents

Table 5.18 Australian Indigenous single parent households compared to the Australian non-Indigenous single parent households

	2006		2011		2016	
	Australia Indigenous	*Australia Non - Indigenous*	*Australia Indigenous*	*Australia Non - Indigenous*	*Australia Indigenous*	*Australia Non - Indigenous*
Single parent Household (Expected)	45874 (21146)	753874 (778602)	56247 (26368)	811722 (841601)	67528 (32648)	851600 (886480)
Other household (Expected)	89579 (114307)	4233436 (4208708)	112377 (142256)	4570265 (4540386)	142313 (177193)	4846184 (4811304)
Test Statistics						
χ^2	35194.91*		41389.23*		45756.79*	
Odds Ratio (95% CI)	2.88 (2.84 – 2.91)		2.82 (2.79 – 2.85)		2.70 (2.67 – 2.73))	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between people who were in single parent households in the Indigenous population of Australia as opposed to the Non-Indigenous population of Australia. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X2 (1) = 35194.91, p <.001; X2 (1) = 41389.23, p <.001; and X2 (1) = 45756.79, p <.001; This result indicate that Indigenous people in

Australia were 2.88 times, 2.82 times and 2.70 times more likely to be a single parent compared to non-Indigenous people throughout Australia in 2006, 2011 and 2016, respectively. This trend has decreased slightly over the three census periods. These results demonstrate that Indigenous people who live in Australia, were more likely to be a single parent than Non-Indigenous people who live in Australia. This trend was relatively stable across all three selected census years. As Indigenous heritage and single parent status were both identified as food insecurity risk factors within the literature, these results indicate that the Indigenous population may experience multiple risk factors. No data in relation to gender was available for this food insecurity risk factor.

Table 5.19 Ipswich Indigenous single parent households compared to Ipswich Non-Indigenous single parent households

	2006		***2011***		***2016***	
	Ipswich Indigenous	*Ipswich Non - Indigenous*	*Ipswich Indigenous*	*Ipswich Non - Indigenous*	*Ipswich Indigenous*	*Ipswich Non - Indigenous*
Single parent Household (Expected)	606 (318)	6614 (6902)	844 (458)	7951 (8337)	1116 (642)	9357 (9831)
Other household (Expected)	999 (1287)	28180 (27892)	1390 (1776)	32685 (32299)	1952 (2426)	37635 (37161)
Test Statistics						
χ^2	339.13*		430.78*		471.84 *	
Odds Ratio (95% CI)	2.58 (2.32 – 2.87)		2.50 (2.28 – 2.73)		2.30 (2.13 – 2.48)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between people who were in single parent households in the Indigenous population of Ipswich as opposed to the Non-Indigenous population of Ipswich. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 339.13, *p* <.001; X^2 (1) = 430.78, *p* <.001; and X^2 (1) = 471.84, *p* <.001; These results demonstrate that Indigenous people who live in Ipswich, were 2.58 times, 2.50 times and 2.30 times more likely to be a single parent than Non-Indigenous people who live in Ipswich, in 2006, 2011 and 2016 respectively. This trend decreased over all three selected census years. As Indigenous heritage

and single parent status were both identified as food insecurity risk factors within the literature, these results indicate that two food insecurity risk factors may have been occurring concurrently for the Ipswich population. No data in relation to gender was available for this food insecurity risk factor.

Table 5.20 Ipswich Indigenous single parent households compared to Australian Indigenous single parent households

	2006		***2011***		***2016***	
	Ipswich Indigenous	*Australia Indigenous*	*Ipswich Indigenous*	*Australia Indigenous*	*Ipswich Indigenous*	*Australia Indigenous*
Single parent Household (Expected)	606 (318)	45874 (21146)	844 (458)	56247 (26368)	1116 (642)	67528 (32648)
Other household (Expected)	999 (1287)	89579 (114307)	1390 (1776)	112377 (142256)	1952 (2426)	142313 (177193)
Test Statistics						
χ^2	10.97*		19.92*		25.1 *	
Odds Ratio (95% CI)	1.19 (1.07 – 1.31)		1.22 (1.11 – 1.33)		1.21 (1.12 – 1.30)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between people who were in single parent households in the Indigenous population of Ipswich as opposed to the Indigenous population of Australia. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 10.97, p <.001; X^2 (1) = 19.92, p <.001; and X^2 (1) = 25.1, p <.001; These results demonstrate that Indigenous people who live in Ipswich, were 1.19 times, 1.22 times and 1.21 times more likely to be a single parent than Indigenous people who live in other geographical areas of Australia, in 2006, 2011 and 2016, respectively. This trend was relatively stable across all three selected census years. As both

Indigenous heritage and single parent status were identified in the literature as food insecurity risk factors, these results indicate that more than one risk factor may have been occurring for the Indigenous population of Ipswich. No data in relation to gender was available for this food insecurity risk factor.

5.4.7.5 Indigenous employment

Table 5.21 Australian Indigenous employment status compared to Australia non-Indigenous unemployed status

	2006		***2011***		***2016***	
	Australia Indigenous	*Australia Non -Indigenous*	*Australia Indigenous*	*Australia Non - Indigenous*	*Australia Indigenous*	*Australia Non - Indigenous*
Not working	144000	5630922	186349	6143039	230618	6854434
(Expected)	(103003)	(5671919)	(128050)	(6201392)	(159577)	(32648)
Working	139918	10003236	164932	10869322	198159	11754066
(Expected)	(180915)	(9962239)	(223232)	(10811022)	(269200)	(11683025)
Test Statistics						
χ2	26073.32 *		42631.14 *		51534.80 *	
Odds Ratio (95% CI)	1.83 (1.81 – 1.84)		2.00 (1.99 – 2.01)		2.00 (1.87 – 2.13)	

*Note: * p* <.001.

The parameters used for the unemployed parameters was a combination of not in workforce, not looking for work and not looking for work in the next four weeks. A Chi-Square test of independence was calculated to examine the relationship between the Indigenous population of Australia and employment status compared to the Non-Indigenous population of Australia. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 26073.32, p <.001; X^2 (1) = 42631.14, p <.001; and X^2 (1) = 51534.80, p <.001. These results indicate that non-Indigenous people in Australia were 1.83 times, 2.00 times and 2.00 times more likely to be employed than the Indigenous population in Australia, in 2006, 2011 and 2016 respectively. Approximately half of the Indigenous population in Australia were not working over

the period of time analysed and this trend was relatively stable across all three selected census years. The literature clearly demonstrated that both Indigenous heritage and employment status were both food insecurity risk factors and these results indicate that more than one risk factor may have been occurring for the Indigenous population in Australia.

Table 5.22 Ipswich Indigenous employment status compared to Ipswich Non-Indigenous employment status

	2006		***2011***		***2016***	
	Ipswich Indigenous	*Ipswich Non -Indigenous*	*Ipswich Indigenous*	*Ipswich Non - Indigenous*	*Ipswich Indigenous*	*Ipswich Non - Indigenous*
Not working	1305	36138	1959	43759	2632	50985
(Expected)	(913)	(36530)	(1348)	(44370)	(1858)	(51759)
Working	1295	67816	1789	79564	2489	91708
(Expected)	(1686)	(67425)	(2400)	(78953)	(3263)	(90934)
Test Statistics						
χ^2	264.93 *		444.89 *		524.84 *	
Odds Ratio (95% CI)	1.89 (1.74 – 2.04)		2.00 (1.87– 2.13)		1.90 (1.80 – 2.01)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between the Indigenous population of Ipswich and employment status compared to the Non-Indigenous population of Ipswich. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 264.93, p <.001; X^2 (1) = 444.89, p <.001; and X^2 (1) = 524.84, p <.001. Indigenous people in Ipswich, were 1.89 times, 2.00 times and 1.90 times more likely to be unemployed than the remainder of the Ipswich population, in 2006, 2011 and 2016 respectively. This trend was relatively stable across all three selected census years. As explored in Chapter Two of this thesis, the literature identifies both Indigenous heritage

and employment status as a food insecurity risk factor and these findings indicate that more than one risk factor may have been occurring within the Indigenous population in Ipswich.

Table 5.23 Ipswich Indigenous employment status compared to Australian Indigenous employment status

	2006		***2011***		***2016***	
	Ipswich Indigenous	*Australian Indigenous*	*Ipswich Indigenous*	*Australian Indigenous*	*Ipswich Indigenous*	*Australian Indigenous*
Not working	1305	144000	1959	186349	2632	230618
(Expected)	(913)	(103003)	(1348)	(128050)	(1858)	(159577)
Working	1295	139918	1789	164932	2489	198159
(Expected)	(1686)	(180915)	(2400)	(223232)	(3263)	(269200)
Test Statistics						
χ^2	0.30		0.92		11.89 *	
Odds Ratio (95% CI)	0.98 (0.91 - 1.06)		0.97 (0.91 – 1.03)		0.91 (0.86 – 0.96)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between the Indigenous population of Ipswich and the Indigenous population of Australia in relation to employed or not working. The relationship between these variables was not significant in the 2006 and 2011 census years respectively, with X^2 (1) = 0.30, p =.58; X^2 (1) = 0.92, p =.33. However, in the 2016 census years, this relationship was significant with X^2 (1) = 11.89, p <.001; These results demonstrate that Indigenous people in Ipswich were 9% more likely to be employed than the Indigenous population of Australia in 2016. The trend suggests that this risk factor is increasing over time. As demonstrated in the literature, both Indigenous heritage and employment status is a food

insecurity risk factor and these results indicate that in the 2016 census, that more than one risk factor may have been occurring within the Indigenous population of Ipswich.

Table 5.24 Employment status for the Female and Male Indigenous population in Ipswich

Female employment status compared to Ipswich Male employment status.

	2006		***2011***		***2016***	
	Female	*Male*	*Female*	*Male*	*Female*	*Male*
Not working	756	549	1064	895	1454	1183
(Expected)	(629)	(676)	(955)	(1004)	(1275)	(1362)
Working	590	705	857	932	1186	1290
(Expected)	(625)	(670)	(872)	(917)	(1198)	(1278)
Test Statistics						
χ2	39.84*		15.38 *		26.79 *	
Odds Ratio (95% CI)	1.65 (1.41 - 1.92)		1.29 (1.14 – 1.47)		1.33 (1.20 – 1.49)	

*Note: * p* <.001.

A Chi-square test of independence was calculated to examine the relationship between employment status and male and females within the Ipswich population. The relationship between these variables was significant across all selected census years from 2006, 2011 and 2016, respectively, with *χ2* (1) = 39.84, *p* <.001; *χ2* (1) = 15.38, *p* <.001; and *χ2* (1) = 26.79, *p* <.001. This table demonstrates that females in Ipswich were 1.65 times, 1.29 times and 1.33 times more likely to be not working, compared to the male population in Ipswich, in 2006, 2011 and 2016 respectively. The trend was relatively stable across the three selected census years. This data demonstrates that this food insecurity risk factor is more prevalent for Indigenous females in the Ipswich region.

5.4.7.6 Indigenous young people

Table 5.25 Indigenous age group in Australia compared to Non-Indigenous age group in Australia

	2006		***2011***		***2016***	
	15-24 years old	*25 years & over*	*15-24 year old*	*25 years and over*	*15-24 year old*	*25 years and over*
Australia Indigenous	86004	197914	105653	245628	123719	305058
(Expected)	(48234)	(235684)	(57991)	(293291)	(67308)	(361470)
Australia Non-Indigenous	2618262	13015896	2760819	14251596	2864669	15743831
(Expected)	(2656032)	(12978126)	(2808481)	(14203933)	(2921080)	(15687419)
Test Statistics						
χ^2	36276.44*		47887.13*		57375.24*	
Odds Ratio	2.16 (2.14 – 2.18)		2.22 (2.20 – 2.24)		2.23 (2.21 – 2.24)	
(95% CI)						

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between people within the 15 to 25 year old age group throughout Australia as opposed to the over 25 year old age group within the Australian population. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 36276.44, p <.001; X^2 (1) = 47887.13, p <.001; and X^2 (1) = 57375.24, p <.001; The table demonstrates that Indigenous Australians are 2.16 times, 2.22 times and 2.23 times more likely to be in the 15-24 year age group than non-Indigenous Australians, in 2006, 2011 and 2016.

This trend was relatively stable across all three selected census years. Both ‘young people’ and Indigenous heritage were identified in the literature as two food insecurity risk factors and hence, these results indicate that more than one risk factor may have been occurring for the young Indigenous population of Australia.

Table 5.26 Indigenous age group in Ipswich compared to non-Indigenous age group in Ipswich

	2006		***2011***		***2016***	
	15-24 year old	*25 years and over*	*15-24 year old*	*25 years and over*	*15-24 year old*	*25 years and over*
Ipswich Indigenous	846	1754	1283	2465	1814	3307
(Expected)	(499)	(2101)	(729)	(3091)	(949)	(4172)
Ipswich non-Indigenous	19588	84366	23427	99896	25577	117116
(Expected)	(19935)	(84018)	(23981)	(99342)	(26442)	(116251)
Test Statistics						
χ^2	306.96*		538.98*		1002.64*	
Odds Ratio (95% CI)	2.08 (1.91– 2.26)		2.22 (2.07 – 2.38)		2.51 (2.37 – 2.66)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between people within the 15 to 24 year old age group, as opposed to the over 25 year old age group within the Ipswich Indigenous population. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X2 (1) = 306.96, *p* <.001; X2 (1) = 538.98, *p* <.001; and X2 (1) = 1002.64, *p* <.001; It can be concluded from these results that Indigenous people who live in Ipswich are 2.08 times, 2.22 times and 2.51 times more likely to be in the 15-24 year old age group, than non-Indigenous people in Ipswich, in 2006, 2011 and 2016 respectively. The trend increased across all three selected census years. As both Indigenous

heritage and ‘young people’ were identified in the literature as food insecurity risk factors, these results demonstrate that more than one risk factor for the Indigenous population in Ipswich, may have been present.

Table 5.27 Indigenous age group in Ipswich compared to Indigenous age group in Australia

	2006		***2011***		***2016***	
	15-24 year old	*25 years and over*	*15-24 year old*	*25 years and over*	*15-24 year old*	*25 years and over*
Ipswich Indigenous	846	1754	1283	2465	1814	3307
(Expected)	(499)	(2101)	(729)	(3091)	(949)	(4172)
Australia	86004	197914	105653	245628	123719	305058
Indigenous	(48234)	(235684)	(57991)	(293291)	(67308)	(361470)
(Expected)						
Test Statistics						
$\chi 2$	6.27		31.1*		108.94*	
Odds Ratio (95% CI)	1.11 (1.02– 1.21)		1.21 (1.13 – 1.29)		1.35 (1.28 – 1.44)	

*Note: *p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between people within the 15 to 24 year old age group in the Ipswich population compared to the over 25 year old age group within the Australian population. The relationship between these variables was significant in the 2011 and 2016 census years respectively with X2 (1) = 6.27, *p* =.01; X2 (1) = 31.1, *p* <.001; and X2 (1) = 108.94, *p* <.001; The Indigenous population in Ipswich were 1.21 times and 1.35 times more likely to be in the youth age group (15-25 years of age), compared to the Indigenous population in the remainder of Australia in 2011 and 2016 respectively. This trend increased across the three selected census years. As clearly demonstrated in the literature review

undertaken in Chapter Two of this thesis, both Indigenous heritage and ‘young people’ were food insecurity risk factors and hence, these results indicate that the Indigenous population in Ipswich may have more than one risk factor present.

Table 5.28 Age group for the female and male Indigenous population in Ipswich

	2006		***2011***		***2016***	
	Ipswich 15-24 year old	*Ipswich 25 years and over*	*Ipswich 15-24 year old*	*Ipswich 25 years and over*	*Ipswich 15-24 year old*	*Ipswich 25 years and over*
Male	452	802	660	1167	926	1547
(Expected)	(408)	(846)	(625)	(1202)	(876)	(1597)
Female	394	952	623	2465	886	1754
(Expected)	(438)	(908)	(658)	(1263)	(935)	(1704)
Test Statistics						
χ^2	13.56*		5.67***		8.42**	
Odds Ratio (95% CI)	1.36 (1.16-1.61)		1.18 (1.03-1.35)		1.18 (1.06-1.33)	

*Note: * p* <.001, **<.01 ***p<.05

A Chi-square test of independence was calculated to examine the relationship between age group and male and females within the Ipswich population. The relationship between these variables was significant all selected census years from 2006, 2011 and 2016 respectively, with χ^2 (1) = 13.56, p <.001; χ^2 (1) = 5.67, p =.01; and χ^2 (1) = 8.42, p =.05. This table demonstrates that males in Ipswich were .1.36 times and 1.18 times more likely to be within the 15-24 year old age group compared to females. This trend has been relatively stable over the three census years.

5.4.8 Young people

Table 5.28 Percentage of young people in Ipswich compared to percentage of young people in Australia

Young people 15-24 year old with food insecurity risk factors	***2006***		***2011***		***2016***	
	Ipswich	*Australia*	*Ipswich*	*Australia*	*Ipswich*	*Australia*
	N=20,434	*N= 2,469,966*	*N=24,710*	*N=2,633,902*	*N=27,391*	*N=2,725,979*
Single Parent Households	3.32%	1.52%	3.12%	1.40%	2.41%	1.10%
Not completed year 12	29.28%	24.36%	29.19%	24.96%	2.41%	18.92%
Male	16.36%	14.17%	16.13%	14.80%	12.59%	11.20%
Female	12.92%	10.19%	13.06%	10.17%	10.79%	7.73%
Unemployed	6.71%	6.38%	9.68%	7.46%	12.32%	9.00%
Male	3.30%	3.44%	5.23%	4.04%	6.72%	4.92%
Female	3.42%	2.94%	4.45%	3.42%	5.60%	4.08%
Not in workforce	27.28%	31.41%	29.98%	33.60%	29.85%	34.02%
Male	12.75	15.61%	14.19%	16.90%	14.63%	17.50%
Female	14.53%	15.79%	15.80%	16.70%	15.22%	16.52%
Total not working	34.00%	37.79%	39.66%	41.06%	42.17%	43.02%
Male	16.05%	19.05%	19.42%	20.94%	21.36%	22.42%
Female	17.95%	18.74%	20.24%	20.12%	20.82%	20.60%
Not working relative to total population	6.52%	6.42%	7.71%	6.78%	7.82%	6.75%
Male	3.08%	3.24%	3.78%	3.46%	3.96%	3.52%
Female	3.44%	3.18%	3.94%	3.32%	3.86%	3.23%

The definition of a young person was determined by using the 15 – 24 age group in the ABS census data.

5.4.8.1 Overall young people population

Table 5.29 Young people population in Ipswich and Australia compared to young people population

	2006		***2011***		***2016***	
	Ipswich	*Australia*	*Ipswich*	*Australia*	*Ipswich*	*Australia*
15-24 year old	20434	2683832	24710	2841762	27391	2960997
(Expected)	(18102)	(2686164)	(20977)	(2866472)	(23203)	(2965185)
Over 25 year old						
(Expected)	86120	13127690	102361	14394863	120423	15928466
	(88451)	(13125358)	(106094)	(14391130)	(124611)	(15924278)
Test Statistics						
χ^2	364.31*		801.33*		903.59*	
Odds Ratio	1.16 (1.14 – 1.18)		1.22 (1.21 – 1.24)		1.22 (1.21 – 1.24)	
(95% CI)						

Note: * p <.001.

A Chi-Square test of independence was calculated to examine the relationship between young people (15-24 years of age) population in Ipswich and the young people (15-24 years of age) population in Australia. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 364.31, p <.001; X^2 (1) = 801.33, p <.001; and X^2 (1) = 903.89, p <.001; Persons residing in Ipswich were 1.16 times, 1.22 times and 1.22 times more likely to be younger, than in the Australian population. This trend has remained relatively stable over the three selected census years. As

reflected in the literature review in Chapter Two, being a young person is a food insecurity risk factor and hence, the Ipswich community had a higher population that identified with this risk factor within all of the time periods analysed.

The following section analyses the young person (15-24 years of age) population in combination with education, single parent and employment food insecurity risk factors. This analysis has been undertaken to determine if two food insecurity risk factors were prevalent in the Ipswich young person population and comparisons made to the overall Australian young person population when analysing each risk factor.

5.4.8.2 Young people unemployed

Table 5.30 Australian young people employment status compared to Australian over 25 employment status.

	2006		***2011***		***2016***	
	Australian 15-24 year old	*Australia 25 years+*	*Australian 15-24 year old*	*Australia 25 years+*	*Australian 15-24 year old*	*Australia 25 years+*
Not Working	1021816	4753106	1176934	5152508	1285511	5799541
(Expected)	(981081)	(4793841)	(1044891)	(5284551)	(1112180)	(5972871)
Working	1682450	8460704	1689538	9344716	1702877	10249348
(Expected)	(1723185)	(8419969)	(1821582)	(9212673)	(1876208)	(10076017)
Test Statistics						
χ^2	3197.46*		31449.72*		51037.77*	
Odds Ratio	1.08 (1.08 – 1.08)		1.26 (1.26 – 1.27)		1.33 (1.33 -1.34)	
(95% CI)						

*Note: * p* <.001.

The 'not working' data was extracted for people who were unemployed and not in the workforce. These numbers do not include people who were in full-time study. 'Young people' was determined by including the age range 15 – 24. A Chi-Square test of independence was calculated to examine the relationship between young Australians who were not working as opposed to the general population throughout Australia that were not working. These numbers do not include people who were in full time study. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 3197.46, p <.001; X^2 (1) = 31449.72, p <.001; and X^2 (1) = 51037.77, p <.001. The results indicate that young people (in the 15-24 year old age group) throughout Australia, were 1.08 times, 1.26 times and 1.33 times more likely than the general

population to be unemployed and not working, in 2006, 2011 and 2016 respectively. This trend increased across all three selected census years. The literature as presented in Chapter Two of this thesis, clearly identifies both young people and employment status as a food insecurity risk factor, and these results demonstrate that in the young person age group throughout Australia, more than one food insecurity risk factor may have been occurring.

Table 5.31 Ipswich 15-24 year old age group compared to Ipswich over 25 years of age employment status

	2006		***2011***		***2016***	
	Ipswich 15-24 year old	*Ipswich 25 years+*	*Ipswich 15-24 year old*	*Ipswich 25 years+*	*Ipswich 15-24 year old*	*Ipswich 25 years+*
Not Working	6947	30496	9800	35918	11552	42065
(Expected)	(7180)	(30263)	(8890)	(36828)	(9936)	(43681)
Working	13487	55624	14910	66443	15839	78358
(Expected)	(13254)	(55857)	(15820)	(65533)	(17455)	(76742)
Test Statistics						
χ^2	14.48*		180.51*		506.49*	
Odds Ratio	0.94 (0.91– 0.97)		1.22 (1.18 – 1.25)		1.36 (1.32 – 1.40)	
(95% CI)						

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between the employment status of young people aged 15 – 25 years of age in Ipswich compared to people who were over 25 years of age in the Ipswich community. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X2 (1) = 14.48, *p* <.001; X2 (1) = 180.51, *p* <.001; and X2 (1) = 506.49, *p* <.001; This table demonstrated that in 2006 people in the 15 – 25 year old age group who live in Ipswich, were 6% more likely to be employed, than people over 25 years of age who live in Ipswich. However, in 2011 and 2016 the trend reversed and demonstrated that people in the 15 – 25 year old age group who live in Ipswich, were 1.22 times and 1.36 times less likely to be employed, than people over 25 years of age who live in Ipswich, in 2011 and 2016 respectively. This trend increased over the three census years. As both 'young people' and employment status was

identified in the literature as a food insecurity risk factor, this result indicates, that in the young person age group, unemployment was not an additional risk factor occurring in the Ipswich community, compared to people over the age of 25.

Table 5.32 Ipswich 15-24 year old employment status compared to Australian 15-24 year old employment status

	2006		***2011***		***2016***	
	Ipswich	*Australia*	*Ipswich*	*Australia*	*Ipswich*	*Australia*
	15-24 years	*15-24 years*	*15-24 years*	*15-24 years*	*15-24 years*	*15-24 years*
Not Working	6947	1021816	9800	1176934	11552	1285511
(Expected)	(7180)	(981081)	(8890)	(1044891)	(9936)	(112180)
Working	13487	1682450	14910	1689538	15839	1702877
(Expected)	(13254)	(1723185)	(15820)	(1723185)	(17455)	(1876208)
Test Statistics						
$\chi 2$	125.68*		20.15*		8.00*	
Odds Ratio (95% CI)	0.85 (0.82– 0.87)		0.94 (0.92 – 0.97)		0.97 (0.94 – 0.99)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between young people aged 15 – 25 years of age in Ipswich compared to young people aged 15 – 25 years of age throughout Australia and employment status. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X2 (1) = 125.68, *p* <.001; X2 (1) = 20.14, *p* <.001; and X2 (1) = 8.00, *p* <.001; It was concluded that young people in the 15 – 25 years old age group living in Ipswich, were 15%, 6% and 3% more likely to be employed, than a young person living throughout Australia, in 2006, 2011 and 2016 respectively. This trend decreased over all three selected census years. As both 'young people' and employment status was identified in the literature as a food insecurity risk factor, this result indicates that in the young person age group,

unemployment was not an additional risk factor occurring in the Ipswich community, compared to young people throughout Australia.

Table 5.33 Female 15-24 year old employment status compared to Male 15-24 year old employment status in Ipswich.

	2006		***2011***		***2016***	
	Female	*Male*	*Female*	*Male*	*Female*	*Male*
Not Working	3668	3279	5002	4798	5702	5850
(Expected)	(3399)	(3548)	(4852)	(4948)	(5715)	(5837)
Working	6331	7156	7231	7679	7849	7990
(Expected)	(6600)	(6887)	(7381)	(2529)	(7836)	(8003)
Test Statistics						
$\chi 2$	62.97*		15.30*		0.10*	
Odds Ratio (95% CI)	1.26 (1.19– 1.34)		1.11 (1.05 – 1.17)		1.00 (0.95 – 1.04)	

Note: * p <.001.

A Chi-square test of independence was calculated to examine the relationship between employment status, and male and females within the Ipswich young person (15-24 years old) population. The relationship between these variables was significant in in all selected census years, with $\chi 2$ (1) = 62.97, p <.001; $\chi 2$ (1) = 15.30, p =.01; and $\chi 2$ (1) = 0.10, p =.75 in the 2006, 2011 and 2016 census year, respectively. This table demonstrates that young females in Ipswich were 1.26 times more likely to not working, compared to the male population in Ipswich, in 2006. However, the trend has decreased over the three census years and demonstrates that there is no significant different between the employment status between young females compared to males by 2016.

5.4.8.3 Young people single parents

Table 5.34 Australian single parent households for 15 – 24 year old compared to Australian single parent households for over 25 age group

	2006		***2011***		***2016***	
	Australia 15-24 year old	*Australia 25 years+*	*Australia 15-24 year old*	*Australia 25 years+*	*Australia 15-24 year old*	*Australia 25 years+*
Single Parent Household (Expected)	40971 (111383)	782283 (711871)	40084 (119603)	861552 (782033)	33004 (122587)	926542 (836959)
Other (Expected)	2428995 (2358583)	15003735 (15074147)	2593818 (2514300)	16360535 (16440053)	2692975 (2603392)	17685018 (17774601)
Test Statistics						
χ^2	53907.40*		63853.18*		78586.96*	
Odds Ratio (95% CI)	0.32 (0.32– 0.33)		0.54 (0.50 – 0.59)		0.23 (0.23 – 0.24)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between young Australians who have were single parents compared to Australians over the age of 25 who were single parents. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 53907.40, p <.001; X^2 (1) = 63853.18, p <.001; and X^2 (1) = 78586.96, p <.001. These results indicate that young people in the over 25 years of age group in Australia, were 68%, 46% and 77% more likely than people in the 15-24 year old group throughout Australia, to be a single parent. This trend

was relatively stable over all three selected census years. As the literature identifies both young people and single parent status as food insecurity risk factors, this result indicates that in the young person age group, single parent status was not an additional risk factor occurring in the Australian population.

Table 5.35 Ipswich single parent households for 15 – 24 year old compared to Ipswich single parent households for over 25 age group

	2006		***2011***		***2016***	
	Ipswich 15-24 year old	*Ipswich 25 years+*	*Ipswich 15-24 year old*	*Ipswich 25 years+*	*Ipswich 15-24 year old*	*Ipswich 25 years+*
Single Parent Household (Expected)	679 (1049)	6541 (6171)	770 (1301)	8025 (7494)	661 (1479)	9812 (8994)
Other (Expected)	18319 (17949)	105168 (105538)	22318 (21787)	124987 (125518)	24533 (23715)	143413 (144231)
Test Statistics						
χ^2	161.92*		269.39*		559.52*	
Odds Ratio (95% CI)	0.60 (0.55– 0.65)		0.54 (0.50 – 0.58)		0.40 (0.36 – 0.43)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between young people from Ipswich who were single parents compared to the over the age of 25 population in Ipswich who were single parents. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 161.92, p <.001; X^2 (1) = 269.39, p <.001; and X^2 (1) = 559.52, p <.001. This result demonstrates that young people in the over 25 year old age group in Ipswich, were 40%, 46% and 60% more likely than people in the over 15-24 years of age group in Ipswich, to be a single parent. This trend increased over all three selected census years. The literature, as presented in Chapter Two of this thesis, identifies both

young people and single parent status as a food insecurity risk factor, this result indicates that in the young person age group, single parent status was not an additional risk factor occurring in the Ipswich population compared to the rest of Ipswich.

Table 5.36 Ipswich single parent households for 15-24 year old compared to Australian single parent households for 15-24 year age group.

	2006		***2011***		***2016***	
	Australia	Ipswich	*Australia*	Ipswich	*Australia*	Ipswich
	15-24 year old	*15-24 year old*	*15-24 year old*	*15-24 year old*	*15-24 year old*	*15-24 year old*
Single Parent	40971	679	40084	770	33004	661
Household	(111383)	(1049)	(119603)	(1301)	(122587)	(1479)
(Expected)						
Other	2428995	18319	2593818	22318	2692975	24533
(Expected)	(2358583)	(17949)	(2514300)	(21787)	(2603392)	(23715)
Test Statistics						
χ^2	430.53*		510.97*		424.43*	
Odds Ratio	2.21 (2.05– 2.40)		2.25 (2.10 – 2.43)		2.22 (2.06 – 2.40)	
(95% CI)						

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between young people from Ipswich who have were single parents compared to the over the age of 25 population in Ipswich who were single parents. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X^2 (1) = 430.53, p <.001; X^2 (1) = 510.97, p <.001; and X^2 (1) = 424.43, p <.001. In conclusion, this result demonstrates that young people in the 15 – 25 year old age group in Ipswich, were 2.21 times, 2.25 times and 2.22 times more likely to be a single parent than a young person throughout

Australia, in 2006, 2011 and 2016 respectively. This trend was relatively stable over all three selected census years. As reflected in the literature review, both young people and single parent status is identified as a food insecurity risk factor, this result does indicate that more than one food insecurity risk factor may have been occurring for young people in Ipswich.

Table 5.37 Ipswich single parent Female 15-24 year old compared to Ipswich single parent Male 15-24 year age group.

	2006		***2011***		***2016***	
	Ipswich Young Female	Ipswich Young Male	Ipswich Young Female	Ipswich Young Male	Ipswich Young Female	Ipswich Young Male
Single Parent	638	41	714	56	621	43
(Expected)	(332)	(347)	(1301)	(389)	(328)	(336)
Non – Single Parent	9361	10394	11519	12421	12930	13797
(Expected)	(9667)	(10088)	(11852)	(12088)	(13223)	(13505)
Test Statistics						
χ^2	569.88*		593.92*		528.27*	
Odds Ratio (95% CI)	17.28 (12.58– 23.72)		13.75 (10.46 - 18.07)		15.41 (11.30 – 21.01)	

*Note: * p* <.001.

A Chi-square test of independence was calculated to examine the relationship between single parent status and male and females within the Ipswich young person population (15-24 years of age). The relationship between these variables was significant across all selected census years from 2006, 2011 and 2016, respectively, with χ^2 (1) = 569.88, p <.001; χ^2 (1) = 593.92, p <.001; and χ^2 (1) = 528.27, p <.001. This table demonstrates that young females in Ipswich were 17.28 times, 13.75 times and 15.41 times more likely to be a single parent, compared to the young male population in Ipswich, in 2006, 2011 and 2016 respectively. This trend is

relatively stable of the selected census years. This demonstrates that this food insecurity risk factor for young females is more prevalent than for Indigenous males in the Ipswich region.

5.4.8.4 Young people education

Table 5.37 Year 12 completion for Australian 15-24 age group compared to year 12 completion for Australians aged 25+

	2006		***2011***		***2016***	
	Australia 15-24 years	*Australia 25 years+*	*Australia 15-24 years*	*Australia 25 years+*	*Australia 15-24 years*	*Australia 25 years+*
Grade 12 not completed	328206	7293346	363360	6664276	295512	6531564
(Expected)	(655786)	(6965765)	(637831)	(6389805)	(593692)	(6233384)
Grade 12 completed	906072	5817152	1017673	7170942	1151189	8657859
(Expected)	(578491)	(6144733)	(743202)	(7445413)	(853008)	(8956039)
Test Statistics						
χ^2	382001.33*		241382.78*		278184.23*	
Odds Ratio	0.29 (0.29– 0.29)		0.38 (0.38- 0.39)		0.34 (0.34– 0.34)	
(95% CI)						

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between young Australians who have completed year twelve educations compared to people over the age of 25 throughout Australia who have completed year twelve. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X2 (1) = 326308.19, *p* <.001; X2 (1) = 198028.20, *p* <.001; and X2 (1) = 251854.07, *p* <.001. Therefore, young people in the 15 – 25 year old age group in Australia, were 71%, 62%, and 66% more likely than the over 25 year old age group throughout Australia to have

completed year twelve education, in 2006, 2011 and 2016 respectively. This trend was relatively stable over all three selected census years. As both ‘young people’ and education level was identified as a food insecurity risk factor in the literature, as presented in Chapter Two, this result indicates that in the young person age group, completion of year twelve education, was not an additional risk factor or social determinant occurring in the Australian population.

Table 5.38 Year twelve completion for Ipswich 15-24 age group compared to year twelve completion of Ipswich over the age of 25.

	2006		***2011***		***2016***	
	Ipswich 15-24 years	*Ipswich* 25 years+	*Ipswich* 15-24 years	*Ipswich* 25 years+	*Ipswich* 15-24 years	*Ipswich* 25 years+
Grade 12 not completed	2924	55962	3551	55826	3225	57088
(Expected)	(5669)	(53217)	(6034)	(53343)	(5992)	(54351)
Grade 12 completed	6347	31076	7793	44464	9546	59021
(Expected)	(3602)	(33821)	(5310)	(46947)	(6809)	(61758)
Test Statistics						
χ^2	3784.04*		2429.25*		2609.83*	
Odds Ratio	0.26 (0.24– 0.27)		0.36 (0.35- 0.38)		0.35(0.34– 0.37)	
(95% CI)						

Note: * p <.001.

A Chi-Square test of independence was calculated to examine the relationship between young Australians who have completed year twelve educations compared to people over the age of 25 throughout Australia who have completed year twelve. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X2 (1) = 3007.88, p <.001; X2 (1) = 2114.29, p <.001; and X2 (1) = 2350.85, p <.001; These results indicate that young people in the 15 – 25 year old age group in Ipswich, were 74%, 64% and 65% more likely than the over 25 year old age group in Ipswich to have

completed year twelve education, in 2006, 2011 and 2016 respectively. This trend was relatively stable over all three selected census years. As ‘young people’ and education level were identified within the literature, this result indicates that in the young person age group, completion of year twelve education was not an additional risk factor occurring in the Ipswich population compared to young people throughout Australia.

Table 5.39 Year twelve completion for Ipswich 15-25 age group compared to year twelve completion for Australian 15-24 age group

	2006		***2011***		***2016***	
	Australia	*Ipswich*	*Australia*	*Ipswich*	*Australia*	*Ipswich*
	15-24 years	15-24 years	15-24 years	15-24 years	15-24 years	15-24 years
Grade 12 not completed	326526	2924	359809	3551	292257	3225
(Expected)	(326989)	(2461)	(360375)	(2985)	(292897)	(2615)
Grade 12 completed	905447	6347	1009880	7793	1141643	9546
(Expected)	(904984)	(6810)	(1009314)	(8559)	(1141003)	(10186)
Test Statistics						
χ^2	119.64*		147.02*		198.73*	
Odds Ratio (95% CI)	1.28 (1.22– 1.33)		1.28 (1.23- 1.33)		1.33(1.28– 1.39)	

*Note: * p* <.001.

A Chi-Square test of independence was calculated to examine the relationship between young people in Ipswich who have completed year twelve educations compared to young people throughout Australia who have completed year twelve. The relationship between these variables was significant in all selected census years from 2006, 2011 and 2016 respectively with X2 (1) = 132.41, *p* <.001; X2 (1) = 118.80, *p* <.001; and X2 (1) = 191.10, *p* <.001; These results demonstrated that young people in the 15 to 25 year old age group in Ipswich, were 1.28 times, 1.28 times and 1.33 times less likely than a young person throughout Australia to have completed year twelve education, in 2006, 2011 and 2016 respectively. This trend was relatively stable over all

three selected census years. As both ‘young people’ and education level were identified in the literature as food insecurity risk factors, this result indicates that more than one risk factor may have been occurring for young people in the Ipswich community compared to young people in the Australian community.

Table 5.40 Year twelve completion for Ipswich 15-25 age group Female compared to year twelve completion for Ipswich 15-25 age group Male

	2006		***2011***		***2016***	
	Female	*Male*	*Female*	*Male*	*Female*	*Male*
Grade 12 not completed	1290	3363	1589	1962	1499	1750
(Expected)	(1469)	(3189)	(1791)	(1760)	(1639)	(1609)
Grade 12 completed	1634	2979	4134	3659	4957	4590
(Expected)	(1455)	(3158)	(3932)	(3861)	(4816)	(4730)
Test Statistics						
χ2	64.10*		67.22*		32.45*	
Odds Ratio (95% CI)	0.70 (0.64– 0.76)		0.72 (0.66 - 0.78)		0.79 (0.73– 0.86)	

*Note: * p* <.001.

A Chi-square test of independence was calculated to examine the relationship between year twelve completion and non-completion and male and females within the young people (15-25 year old) Ipswich population. The relationship between these variables was significant across all selected census years from 2006, 2011 and 2016, respectively, with *χ2* (1) = 64.10, *p* <.001; *χ2* (1) = 67.22, *p* <.001; and *χ2* (1) = 32.45, *p* <.001. This table demonstrates that females in Ipswich were 30%, 28% and 21% more likely to have completed year twelve, compared to the male young person population in Ipswich, in 2006, 2011 and 2016 respectively. This trend has decreased over the three census years.

5.5 Summary of results

The analysis of this data has demonstrated that Ipswich experiences five out of six food insecurity risk factors at a higher rate than the rest of the Australian population. Additionally, many of these risk factors were significantly more likely for the female population in Ipswich. Further analysis also indicated that young people and the Indigenous population groups were likely to experience more than one food insecurity risk factor.

5.6 Conclusion

This chapter presented the purpose of this study, study design, data collection and analysis for this quantitative phase of this doctoral research. The results from this analysis have been presented in tables to represent each food insecurity risk factor. These results demonstrate the food insecurity risk factors occurring over the three census periods, in isolation and concurrently for young people and the Indigenous population in the Ipswich community and this was compared to the overall Australian population. Differences between gender within the Ipswich region were explored when the data was available from the ABS.

The implications of these results give a broad understanding of which food insecurity risk factors were present in the Ipswich region, which may have been influencing the nutritional intake of the community. It was demonstrated in the qualitative interviews that the Ipswich participants were not fully aware of the social inequities and food insecurity risk factors that may be shaping the nutritional intake of the community. However, the Toronto participants clearly identified these risk factors within their community and shaped their overall food strategy to address food system inequities driving food insecurity. Whilst this data does demonstrate which risk factors are more pronounced in the Ipswich community than the rest of Australia, this does not directly demonstrate the degree to which food insecurity is present or a direct causation between these risk factors and low fruit and vegetable consumption and high obesity rates. Analysis and discussion in relation to these findings is included in Chapter Six of this thesis. The insights from this phase and future implications of this research for the Ipswich community and other communities that may have similar risk factors shaping both their nutritional intake and overall health and wellbeing, will also be discussed in Chapter Six.

6. Chapter 6: Discussion and Future Implications

6.1. Introduction

This chapter provides an overall analysis and discussion of the research findings undertaken in this thesis. It discusses insights gained from each phase of the research and offers a discourse on how this research has added to the body of evidence about how communities can strategically respond to nutritional disparities. The sections in this chapter reflect the insights discovered during the two phases of this doctoral research, with a final section critiquing current nutritional policies that have real or potential influence within the Ipswich community. This critique is conducted through the lens of the findings of Phase 1 and 2 of this research. The research conducted resulted in a clear understanding that some members of the Ipswich community are experiencing social inequities leading to a high risk of food system inequity and consequently, food insecurity. The research indicated that a response must be customised and prioritised to these segments of the population, to ensure food system equity within a social model of health.

This chapter reflects how some communities around the world have transitioned over time towards adoption of a social model of health to address nutritional disparities. This was reflected both within the literature (Toronto Public Health, 2010b; Donovan, et al., 2011) and in the semi-structured interviews conducted with key stakeholders who have spent many years working to address these social inequities in the Toronto community. Interviews with key community stakeholders in Ipswich who discussed the barriers and enablers to a food strategy for the region, revealed that the Ipswich community is at the start of its journey in relation to determining what the problem was and forming a strategy to address this problem. It is evident that the individualised, biomedical health approach that has traditionally been used to address nutritional issues within the Ipswich community, and elsewhere, have not been effective at a community level, given the evidence of continually rising obesity rates (AIHW, 2018; DDWMPHN, 2017). Through this critical, exploratory research, some key stakeholders within the Ipswich community have started to evolve their approach to consider broader social model responses.

This PhD started by attempting to understand what key stakeholders within the Ipswich community believed were the barriers and enablers to increasing fruit and

vegetable consumption. This aim arose due to a desire to address the low levels of self-reported fruit and vegetable intake, high rates of obesity and associated high rates of non-communicable diseases within the Ipswich community (DDWMPHN, 2017; Department of Health, 2013). Through the process of this research, within a critical, exploratory qualitatively driven, sequential mixed-methods study, this project evolved into developing a solid understanding of the social inequities that are evident within the Ipswich community that may be influencing current food consumption patterns and finishes with consideration of how a strategic response may be tailored to the Ipswich community.

The strategic response occurring in Toronto was explored to give insight into the qualitative themes that were found in the Ipswich region. The findings from Toronto also indicated that significant social determinants (identified as food insecurity risk factors) were influencing food system inequities and nutritional disparities within the Toronto community. Conversely, the majority of key Ipswich community stakeholders identified the problem as one that was driven by individual consumption patterns, rather than identifying the issue as being linked to broader social inequities within the community. However, it was also clear that these participants were at the start of an exploration about appropriate community responses to the nutritional challenges of its population. The results from both the qualitative and quantitative research undertaken in this thesis have demonstrated that a social model of health is the most appropriate in explaining and responding to poor fruit and vegetable consumption and high obesity rates in 'at risk' communities. Whilst this is not a new approach in illness prevention, it is not occurring on a large scale within the Ipswich region, where health strategies are largely individualised.

6.2. Phase One Discussion

6.2.1. Part A - Ipswich

Part A of Phase One, the beginning of the data collection for this doctorate, was conducted to explore the understandings, perceptions and knowledge of key stakeholders in the Ipswich region of what may have been the barriers and enablers to the region's low fruit and vegetable consumption and their view of possible strategies that could be used to address this nutritional disparity. Semi-structured

interviews were undertaken with participants who were key stakeholders within the local government, healthcare or private organisations. They were selected because they worked within roles that were directly or indirectly able to influence the prioritisation, customisation or adoption of strategies that may address nutritional consumption in the local area. At interview, participants articulated their understanding of barriers and enablers to increasing fruit and vegetable consumption in Ipswich. During this process, the participants explored their understanding of what may be causing this issue and what potential strategies may be able to address this. The key themes that were identified in this phase reflected a solid foundation for any large-scale change within a region, notably that a strategic response should be based on community engagement and leadership. These findings were supported by the literature (Donovan et al, 2011; Hardman & Larkin, 2014; Mah & Thang, 2013).

A number of participants discussed that the low rates of fruit and vegetable consumption in Ipswich may be driven by lack of access, however, most of the participants saw individual drivers such as a lack of nutritional education and food literacy as the problem. Whilst most participants identified that supermarkets were the access point for fruit and vegetables, some participants discussed whether this was affordable for all members of the community. The key stakeholders did suggest that a potential increase in farmer's markets in the region may offer better access and more affordable fruit and vegetable options in the region, and some existing farmers markets were identified. Unfortunately, sustaining farmers markets has been challenging for the region; one recent local initiative in Ipswich did not survive past twelve months due to what the convener saw as poor community support, leading to commercial non-viability. A number of participants noted that any future initiatives had to be commercially viable. However, around Australia the number of farmer's markets is increasing, and they provide a valuable access point for many consumers to access their fruit and vegetables (Mok et al., 2013).

Further solutions considered by participants to improve access to fruit and vegetables for the Ipswich community included the creation of community gardens and creating food producing green areas within the central business district. The literature also identified these strategies to increase food access within a community, however it did reflect the importance of policy zoning and regulations to support

these initiatives (Donovan et al., 2015; Thompson & Maggin, 2012). Challenges regarding sustainability of such initiatives were identified within the literature, where community engagement, funding and leadership were discussed as significant influencers of long term, sustainable success (Hardman & Larkin., 2014; Huang & Drescher, 2015). Amongst the participant group, there was an awareness of the challenges in ensuring such initiatives were sustainable and the need for ongoing government or philanthropic funding to maintain them was identified. There was some discussion by one participant in the Ipswich region that perhaps the approach to create further access points to fruit and vegetables such as the community gardens, green walls and farmers markets identified, were targeted to middle class people who were time-poor rather than financially challenged. This group of people are less likely to be experiencing multiple food insecurity risk factors.

Within the context of community engagement, Ipswich participants identified a number of conduits to the community, such as schools and churches, to advocate for and support initiatives to increase consumption of and access to fruit and vegetables. This was also reflected within the literature where the Toronto Food Council, in their Urban Agriculture Action Plan (Toronto Public Health, 2010b) identified the importance of working with a number of different groups and organisations within the region to educate, support and build community capacity to create an equitable food system. Some Ipswich participants further identified the importance of harnessing community interest and support, as a key enabler to any food strategy that may address the nutritional consumption patterns of the Ipswich community. This was also reflected in the literature which identified that public advocacy and public interest significantly influenced the adoption, implementation and ongoing sustainability of food strategies, particularly within the Toronto region (Huang & Drescher, 2015; Muntaner et al, 2012; Toronto Public Health, 2010b).

The majority of the Ipswich participants identified that local government should offer a significant contribution in both leadership of a strategy and associated community engagement and this has been supported by the literature (Auckland et al., 2015; Donovan et al., 2011). This kind of activity has not been reflected in the Ipswich local government activity to date. Traditionally, the remit of local governments has not focused on health delivery, health outcomes or creating a healthy environment (Huang & Drescher, 2015; Mills, 2014). This may be due to the fact that health care

delivery comes from the state government in Australia (Mills, 2014), with any health-related strategy expected to be formed and implemented from within the state-run healthcare sector. The literature did demonstrate that local government policy is often formed in isolation to overall health and wellbeing goals of a community (Mills, 2014) however Huang and Dresher (2015) noted that local government is instrumental in the planning, implementation and evaluation of social health policies within a region. The key stakeholders interviewed in Phase One also believed the local government could potentially provide both in kind and fiscal support, as well as a social policy focus and leadership, which could drive a strategic response to increase fruit and vegetable consumption in the region.

A number of strategies were suggested by participants to enable an increase in fruit and vegetable consumption in the Ipswich region. Many participants in the Ipswich cohort believed educating individuals on food preparation and the benefits of fruit and vegetable consumption would directly influence the low rates of consumption. This was demonstrated in an initiative already underway in the Ipswich region, with the Jamie Oliver Ministry of Food providing food and cooking literacy skills to the community at low cost (The Good Foundation, n.d.). Many participants identified this initiative was already occurring within the region and was very supportive of the program. The literature has demonstrated that part of a broader social model response to nutritional disparities does include food education and this was supported by the Ottawa Charter in which one of the five action areas of health promotion include 'developing personal skills' (WHO, 2018b). The interviews undertaken in Ipswich in Phase 1 demonstrated that key stakeholders, in general, believe that the issue of low fruit and vegetable consumption was an individual nutritional consumption choice.

A focus on responding to individuals' food choices rather than social issues when addressing obesity, is the dominant model in many parts of the world. The lack of a social model response to address obesity in many regions across the world, including within Australia, continues despite the World Health Organisation recommending the use of a social model of health approach, since the conception of the Ottawa Charter in 1986 (WHO, 2018b). The individualised approach to nutritional disparities does not consider the social determinants that influence the environments in which people live and what shapes cultures, norms and attitudes

(WHO, 2003) and the rising obesity rates across the Western world clearly indicate this approach is not curbing this social health issue (WHO, 2018a). All five action areas for health promotion that the Ottawa Charter identified are examples of how a community can respond within a social model of health, to health inequities (WHO, 2018b). With a focus on social health policy to support and strengthen healthy environments within a health promotion framework, these action areas are focused on addressing social and cultural disparities to create equity in health and wellbeing for all members of a community (Talbot & Verrinder, 2010; WHO, 2018b). The literature does clearly demonstrate that if a community response is to be undertaken within a social model of health, a thorough understanding of the characteristics of a community must be undertaken, to tailor a successful and sustainable response (Rumbold & Dickson-Swift, 2012; Mosavel & Simon, 2010). Horner and colleagues (2014) stated the importance of ensuring that health policies were contextualised to the community in which they are implemented, particularly understanding the need of a particular target population when implementing policy, practice and research. At times these broader, social model considerations and strategies were starting to form for some of the Ipswich participants, as they began their journey to understand why there was a low consumption of fruit and vegetables in the region and how social policy may sit as a foundation to a strategic response to address the nutritional disparities occurring within the community.

6.2.2. Part B – Toronto

Part B of Phase One of this research was constructed to develop a firm understanding of how other communities around the world have responded to nutritional disparities. The literature identified that Toronto in Canada is a leader in community-based strategies aimed at addressing nutritional consumption patterns (Baker, 2013; Community Food Centres Canada, 2015; Mah & Thang, 2013; Toronto Food Council, 2010a, 2010b). Consequently, this part of the research involved semi-structured interviews with key stakeholders actively involved in the customisation, prioritisation, implementation or adoption of policies, programs or initiatives that attempt to influence nutritional consumption patterns in the Toronto region.

Each of the Toronto participants appeared highly educated and informed regarding the food insecurity evidence base including research findings and theory behind social mobility, social equity, the social model of health, community engagement and political prioritisation. Potentially, these key stakeholders were not just participants of an overall strategy, rather through their knowledge and understanding of the theoretical underpinnings of how social and cultural constructs shape individual behaviour, they in fact were part of a group which initiated and drove this strategic response to nutritional disparities within the Toronto region and how it has developed over the past thirty years. It was clear from the interviews undertaken that the participants understood how a professional, sustainable and strategic response could be formed, implemented and evaluated.

The interviews undertaken in Toronto found that key stakeholders involved in Toronto's food strategy viewed their practice as layered and multi-faceted, situated within a social model of health. The key themes from the Toronto region demonstrated an intimate understanding of the social and cultural characterisation of the population and a strategic focus on addressing these large social inequities. The Toronto participants were very clear that a healthy food system should be based on equity within a social justice framework. They had implemented a number of strategies, policies, programs and approaches that were all aligned with the aim of nutritional equity.

These were designed to shape the built and social environment to encourage healthier food choices and directly influenced food insecurity indicators through poverty reduction strategies, including minimum wages, anti-oppression policies and food access. Toronto key stakeholders expressed a strong view that focusing solely on individual food consumption behaviour patterns would not address food system inequities.

Consistent with the literature that states the importance of understanding the social characteristics of a community when addressing health disparities (Foley et al., 2010; Horner et al., 2014; Rumbold & Dickson-Swift, 2012), a number of Toronto key stakeholders identified that reliable data indicators were required to understand their community, health impacts and trends. They sought to understand the social, cultural and economic influences that were influencing the health and wellbeing of

their community. The Toronto participants all identified food insecurity risk factors and indicators, driven by social inequity that consequently led to food system inequity, which formed the foundation of a strategic response to address nutritional disparities within their community. Horner, Blitz and Scott (2014) identified the importance of contextualising a strategic response to specific community risk factors, demographics and indicators.

The literature also clearly demonstrated that addressing food insecurity risk factors has an overall positive influence on health and wellbeing including obesity levels as discussed within the literature review in Chapter 2 of this thesis (Bickel, et al., 2000; Charlton, 2016; Franklin et al., 2012; Martin & Ferris, 2007). The strategic approach undertaken in Toronto to influence nutritional consumption patterns, demonstrated broad-reaching strategies formed within a social model of health. These included food councils, overall food strategies and strong strategic partnerships to customise and prioritise local social health policy to those who were the most vulnerable and food insecure in the Toronto community (Baker 2013; Mah & Thang, 2013; Toronto Public Health, 2010).

The Toronto interviews had a clear theme of very strong engagement with local government representatives. Each participant identified local government as a leader, key stakeholder and conduit to the broader community within a social model of health. The participants strongly engaged with local government and they also provided the tools and resources for the wider community to engage with local government leaders. This finding reflects what was identified within the literature which demonstrated that political prioritisation and engaging with local government when attempting to influence health disparities within a community is essential to success (Gnomes et al., 2010; Krebs & Pelissero, 2010). Local government prioritisation was clearly identified by Auckland and colleagues (2015) as a key facilitator or broker of ensuring a strong, secure local food system. Muntaner and colleagues (2012) determined through their research, that local political influence is a barrier and enabler to the adoption of urban agriculture and a local, strategic food system that provides adequate access, use and affordability. This was certainly reflected in the Toronto interviews with all participants articulating the importance of political prioritising and social health policy delivery.

In addition to local government engagement, Toronto participants identified the importance of identifying, enabling and supporting what they referred to as 'Community Champions'. These were leaders within the local community that would advocate for and actively engage in forming strategies that support a food system based on equity. In a conceptual framework theorised by Donovan, and colleagues (2011) the authors stated that successful food systems encouraged community members to create partnerships and provide leadership within key community-based food strategies. As identified in the semi-structured interviews in Part B of Phase One, Toronto programs supported these 'Community Champions' by providing a platform (including tool kits) to engage with other members of the community and local government to advocate for an equitable food system. The interviews identified that community participation and leadership was encouraged regardless of the socio-economic situation community members were in, through the provision of nutritious meals, transportation assistance, anti-oppression policies and membership to advocacy groups that was based on social justice principles.

Further aligned with the key theme of community engagement and leadership, there is a strong synergy between the literature and the findings of the Toronto data collection phase in relation to the importance of community engagement and leadership to develop a sustainable strategy to build and maintain an equitable food system to support the health and wellbeing for all members of the community (Mah & Thang, 2013; Toronto Public Health, 2010a, 2010b). Donovan et al., (2011) suggest that to create a healthy and equitable food system, a broad, multi-faceted approach needs to be implemented including shaping the built, social and cultural environment in a way that provides opportunities that are easy and accessible to all members of the community.

This includes social and economic opportunities which require leadership from all levels of government, community members and organisations (Muntaner et al., 2012). The semi-structured interviews demonstrated that to address broad social inequities influencing the food system in Toronto, strategies included multi-faceted partnerships and collaboration with a number of stakeholders including schools, community hubs and hospitals. The Toronto participants articulated the importance of broad collaboration and partnerships to create sustainably funded and effective strategic responses. This approach is supported within the literature which also

reflected the importance of community engagement to ensure sustainable and strategic approaches when responding to a health disparity within a community (Gnomes et al., 2010; Hardman & Larkin, 2014).

Additionally, the need to understand the demographics of the community, to ascertain what social factors that were influencing health disparities including nutritional intake was also clear both within the literature (Horner et al., 2014; Rumbold & Dickson-Swift, 2012) and the research undertaken in this thesis. The findings of the semi-structured interviews conducted within Toronto in this phase were congruent with the literature findings and supported further investigation into the social inequities that may be influencing potential nutritional disparities in the Ipswich community. This clearly demonstrated the need for a detailed understanding of the social demographics of the Ipswich community to ensure an approach can be tailored, customised and prioritised to the community and its needs. An indication of the social inequities occurring within the Ipswich region would lead to an understanding of whether the broad social model approach that was undertaken in Toronto may be applicable to the Ipswich region.

6.2.3. Insights from Phase One

Toronto and Ipswich are very different communities in the size and demographics of the population and were in different stages in identifying and responding to nutritional inequities. In Toronto, participants were responding to these interview questions on the foundation of over twenty-five years of sustained food strategy initiatives occurring in a very large metropolitan region in Canada (Toronto Public Health, 2010a). Conversely, Ipswich participants were starting from a basis of not having a great deal of experience or dialogue in the community regarding nutritional consumption patterns and no strategic direction or coalition working to influence nutritional consumption patterns. The Ipswich key stakeholders were still formulating their assessment of the problem however some of them had started to think through the possible effects of social disparities on nutritional patterns in their community. This is a journey that was evident in the Toronto region in the past decades, where there is now a firm understanding of, and strategies founded on, a social model of health.

As previously discussed, the Toronto participants all understood a detailed characterisation of the demographics of their community and identified social inequities as the cause of a phenomena they termed ‘food insecurity’ leading to poor nutritional outcomes. This led to Toronto implementing a strategy that was customised to their region and focused their efforts on addressing the food insecurity drivers and large-scale social inequities such as poverty (Toronto Public Health, 2010a). Their programs and policy responses were based on a broad, social model of health.

In contrast, Ipswich participants were very focused on individual strategies such as health literacy and individual food consumption behaviours. This reflects the strategic approach of both the state government health policies and the West Moreton Hospital and Health Service Strategic plan on obesity reduction strategies which includes increased funding for bariatric surgery and dietician reviews (Queensland Health, 2018b). This is an approach which is not well supported by the literature which suggests limited success in reversing significant obesity rates by implementing an individual model of health (Talbot & Verrinder, 2010; WHO, 2018a) particularly within disadvantaged urban areas (Ramsay et al., 2012b).

McPherson and colleagues (2010) when ascertaining future trends in obesity levels and corresponding health impacts, report a sustained increased in both actual and projected obesity levels, despite significant resources applied to individual behaviour mitigation. Literature has suggested that health policies needed to be reformed to address social inequities, instead of being based solely on individual health behaviours (Toth, 2010). The social model approach however is not the foundation of the health care funding model or resource allocation that is employed within the Ipswich region (Queensland Government, 2016). The Toronto food strategy stands in contrast to this individualised approach.

The strategic approach undertaken in Toronto, was also aligned with the ‘Food Sensitive Planning and Urban Design’ (FSPUD) model (Donovan et al., 2010), as discussed in Chapter 2 of this thesis. A whole of system approach, was implemented in Toronto which included components as outlined in the FSPUD model (Donovan et al., 2010), such as changing the built environment, creating economic development and training, education and employment opportunities that supported a

healthy, secure and equitable food system. Examples of how Toronto embedded a wide food system approach included the creation of school food gardens, community kitchens, nutrition and education programs, food handler certificates, support of food processors and the purchasing of local food for government and city services (Mah & Thang, 2013; Toronto Public Health, 2010b). The approach in Toronto was not simply an approach targeting individuals' food consumption behaviours such as food literacy, but rather they created a food system approach that would also address long term social inequity such as income, education and training, which directly influences social determinants which are food insecurity risk factors.

A number of Ipswich participants identified the fact that sustainable solutions to increase fruit and vegetable consumption in the region needed to be commercially viable and driven by consumer demand. Contrary to this, the participants interviewed within the Toronto region were focused on strategies that reduced the inequities that they saw were driving food insecurity and poor nutrition in their community such as job creation, literacy, skills, community connection and a basic income guarantee (Toronto Public Health, 2010b).

These strategies that were implemented in the Toronto region were not commercially viable, however they were formed within a financially sustainable model such as social financing options or funded by partnerships with government and public health organisations (Community Food Centres Canada, 2015). The philosophy of social justice underpinned the initiatives driven by the Toronto Food Policy Council and the Toronto Youth Food Council and were not structured with commercial viability as a goal. The literature does suggest that whilst the commercial viability of strategies is not within a social model of health approach, many sustainable strategies do consider a broader approach around how the food system as a whole can contribute to the community including an interface between employment opportunities, social and economic development (Community Food Centres Canada, 2015; Donovan et al, 2011; Toronto Public Health, 2010b).

Of interest, only the Toronto participant group clearly identified the public health services as a key driver of a strategy to address nutritional disparities within a community. In fact, the Toronto participants all identified the Department of Public Health in Toronto as a key leader and enabler of a strategic response to establishing

a healthy, equitable, nutritious food system. The literature supported this view by suggesting that public health did have an important role to play in strategic health promotion policy formation and delivery (WHO, 2018a). This was not reflected by the Ipswich key stakeholders where the potential involvement of the Department of Health in Ipswich to address nutritional disparities was mentioned briefly once, by one participant. The other participants in Ipswich did not identify this as being within the remit of the public health sector. Potentially, the lack of identification of the role of public health within the Ipswich region may be a reflection of the significant cut to public health services that occurred in 2012, with the state government at the time cutting the entire public health department in each region in the state of Queensland due to funding concerns (Helbig & Miles, 2012). This may have led to a lack of strategic direction or provision of services at a regional level, focused on the prevention of non-communicable diseases, including those driven by obesity and low fruit and vegetable consumption (Queensland Health, 2016). Whilst there has been a lot of rhetoric around population health, including the re-orientation of the West Moreton Hospital and Health Service strategic plan to this focus, this is not equating to practice in regard to health service provision with no allocation of resources to public health or overall strategic social health policy focus within the region (Queensland Health, 2016).

When reflecting on the Ipswich participants' responses, there also appeared to be a differentiation between what participants saw as their own personal food consumption patterns, and what they saw may have been broader social issues influencing fruit and vegetable consumption in the region. Talbot and Verrinder (2010) notes the importance of health care professionals working within population health and public health to focus on social equity which is paramount to successful programs, initiative and care. The broader themes around potential social inequities occurring in Ipswich emerged only after prompting by the researcher and resulted in an articulation regarding what participants identified as other, more socio-economically disadvantaged people experienced, in the Ipswich community. By contrast, the Toronto participants saw themselves as an integral part of the community and included themselves within the social and cultural demographics within that community.

Whilst the Ipswich and Toronto communities are different in many ways, Ipswich may be able to learn from the strategic approach employed in Toronto. The strategic response that has occurred in Toronto over the last thirty years has firmly reflected strategies to directly address social inequities that have resulted in an inequitable food system. The results of this research demonstrate that a detailed understanding of these social determinants leading to food system inequities within the Ipswich region, is required to tailor a strategic nutritional response. Improving the nutritional intake of the community could increase the low fruit and vegetable consumption and corresponding high levels of obesity and non-communicable disease rates that are occurring within the community.

This finding supports the literature which indicates that tailoring a response to an individual community, requires a detailed understanding of the community needs and drivers to formulate a social health policy response (Foley et al., 2010). This strategy is different from the asocial, individual focus that is currently being delivered within the Ipswich community. Therefore, reflecting the exploratory, critical paradigm research design employed in this thesis, Phase Two was designed to ascertain if food insecurity risk factors, that were found within the literature review and addressed in the Toronto region, were of significance in the Ipswich region.

6.3. Phase Two Discussion

Due to the exploratory, sequential design employed within this thesis, Phase Two was designed to ascertain the food insecurity risk factors that may have been present within the Ipswich population over a number of years. The potential for food insecurity amongst selected social groups within the Ipswich region was a finding in Phase 1 of this research design. The thematic analysis undertaken within this phase indicated that the strategic response to influence the nutritional intake of the Toronto community was based on influencing food insecurity risk factors and building an equitable food system. Due to the exploratory, sequential nature of this research design, a detailed, longitudinal detailed characterisation of the Ipswich community was undertaken with publicly available data available on the ABS website from the 2006, 2011 and 2016 census (ABS, 2017a, 2017c, 2017d). This resulted in a comprehensive understanding the significance of food insecurity risk factors that were occurring within the Ipswich region and these were then juxtaposed to the

overall Australian population. This demonstrated that the Ipswich region was at risk of higher rates of multiple food insecurity risk factors, than the rest of the country.

Six food insecurity risk factors were explored using chi-square analysis, including education level, unemployment, single parent status, rental status, Indigenous heritage and young people. These food insecurity risk factors were identified within the Australian literature (AIHW, 2008; Cook et al., 2017; Friel et al., 2015), with international researchers identifying that mild to moderate food insecurity (food insecurity not driven by hunger) was linked to a higher incidence in being overweight or obese (Burns, 2004; Dinour, 2007; Franklin et al., 2012; Tanumihardjio et al., 2007). This concept was termed the 'food insecurity obesity paradox' in the literature. The literature further demonstrated that the risk of being overweight or obese due to mild to moderate food insecurity was amplified for the female population group (Martin & Ferris, 2007; Ramsey, et al, 2012b).

6.3.1. Overall food insecurity risk factors for the Ipswich community

The findings of Phase 2 of this research design indicated that Ipswich experiences five out of six of the food insecurity risk factors at a higher rate than the Australian population and additionally, many of these risk factors were more significant for women within the Ipswich region. Females within the Ipswich region experienced a higher likelihood of all but two food insecurity risk factors when compared to males in the Ipswich region. Further to this, analysis of the risk factors for both the Indigenous population and the young person population were also conducted when the data was available, demonstrating that the Indigenous population in Ipswich in particular experience a greater risk of multiple food insecurity risk factors compared to the rest of Australia.

Unemployment was the only risk factor identified to be not as prevalent in the Ipswich community compared to the rest of Australia. The results indicated that unemployment is not more of a risk factor in Ipswich compared to the rest of Australia, with persons living in the rest of Australia being slightly more likely to be unemployed than persons living in Ipswich. However, given the low odds ratio, it is likely that this does not represent a practically significant difference (Chen, Cohen & Chen, 2010). The finding that unemployment was not a higher risk in the Ipswich community may be a reflection of the significant federal and state government

resources utilised for the Ipswich region over the past decade, as it was identified as a priority for employment programs, policy and overall strategy (Ipswich City Council, 2008) and higher rates of single parents which are not included in unemployment figures.

However, underemployment may explain this finding, as low socio-economic areas do have high rates of underemployment (Department of Education, Employment and Workplace Relations, 2013), and these figures were not included in the unemployment figures. This unemployment risk factor however was of concern for females in the Ipswich region who were significantly more likely than the males to be unemployed. This trend is decreasing slightly over the census periods for females in the Ipswich region, however, it is still a significant risk factor for women in the Ipswich community with females at 1.5 times greater risk to be unemployed by the 2016 census. Additionally, females were significantly more likely to be single parents, with women up to five times more likely to be a single parent than males in the Ipswich community. This was a consistent trend across all census years. This may directly impact the risk of food system inequity for this population group.

Additionally, whilst this data was not publicly available through the ABS community profiles to evaluate, the literature does demonstrate that single parents are more likely to be within the rental market (McDonald, 2011), which would potentially put this group of people, at high risk of more than one risk factor. There is mounting evidence in the literature, that females are at a higher rate of both food insecurity and the 'food insecurity obesity paradox' (Franklin et al., 2012: Martin et al, 2011; WHO, 2003) and these results do indicate that people within the Ipswich area who are single parents, may also be underemployed, female and renters. All of these social determinants are implicated as food insecurity risk factors which can lead to nutritional disparities within a community (AIHW, 2016; Ramsey et al., 2012b). This is of particular concern in the Ipswich region and potentially may place this group of the population at very high risk of being food insecure.

The results presented in Chapter Five of this thesis demonstrated that Ipswich community members were less likely to have completed year twelve than the national population in Australia. This trend decreased slightly over the census periods and may be reflective of the significant state government resources put into

the Ipswich community to increase education rates of year 12 completion (Ipswich City Council, 2010). For the Ipswich population however, males were less likely than females to have completed year 12. Given that this trend is also consistent across Indigenous youth and the general populations, this may result in a significant risk to this population group and may reflect the high number of males entering trades in the region, and not finishing year 12 (Department of Education, Employment and Workplace Relations, 2013). Overall however, the lower rate of completion of secondary school puts the Ipswich community at higher risk of this food insecurity risk factor. Education is identified within the literature as both a food insecurity risk factor and broader social determinant of health, leading to poorer health outcomes including increased obesity driven non-communicable disease rates (Burns 2004; Ramsey et al 2012b; Rosier, 2012).

Rental status, as a food insecurity risk factor was very significant within the Ipswich community with Ipswich residents up to 2.51 times more likely to be renting that the rest of Australia. The increase in trend is also concerning as it demonstrated a significant increase from 2006 to 2016. The literature reflects that people living in lower socio-economic areas are more likely to be renters and additionally that rental households are more likely to be financially insecure (McDonald 2011). This may directly lead to more difficulty in accessing affordable food (Donovan et al., 2011). There were no statistics available through the ABS differentiating rates of renting between gender, however the literature demonstrates that single parents are more likely to be renters as opposed to the rest of the population (McDonald, 2011), and due to the significantly higher proportion of women who are single parents in the Ipswich region, it may be concluded that an increased rate of females renting may also be occurring. Renting status has been linked in the literature as a social determinant that is implicated in poor health outcomes (Talbot & Verrinder, 2010). This would again lead to potentially multiple food insecurity risk factors occurring for certain groups within the Ipswich community, leading to substantially higher risk of food insecurity as opposed to the Australian population.

6.3.2. Food insecurity risk factors for the Indigenous population

Overall, the results reflected that there is a higher percentage of people who are Indigenous in Ipswich as opposed to those in the rest of Australian across all census

collection data points apart from unemployment. Whilst Indigenous heritage is, of itself, a food insecurity risk factor identified within the literature (AIHW 2008; AIHW, 2012), data was available to also ascertain the rates of Indigenous people who rented, were single parents, unemployed, were a young person (15-24 years age group) or completed year 12. This gave a more complete analysis of the food insecurity risk factors that the Indigenous community in Ipswich may be facing. The results demonstrated that for the Indigenous population in Ipswich, there was a further likelihood of a compounding risk factor for rental status, single parent status, unemployment for females and being a young person. This is significant for the Indigenous population in Ipswich, as this leads to not only a high risk of food insecurity but additionally, these have all been identified as significant social determinants that lead to poorer overall health outcomes including increased rates of non-communicable diseases and higher mortality rates (Talbot & Verrinder, 2010).

The results presented in Chapter Five of this thesis demonstrated that the Indigenous population, both within Australia and within Ipswich, were less likely to have completed year twelve. This food insecurity risk factor however was less significant for the Ipswich population, with Indigenous people from Ipswich more likely to have completed year twelve than the Indigenous population in the rest of Australia. This may reflect the significant diverse policy initiatives and resources by the state government that has been implemented in the Ipswich region to increase year 12 completion rates for Indigenous people. This does demonstrate how social policy has been customised and prioritised for this group in a community that have been identified as at risk of social inequity. However, the Indigenous population in Ipswich were significantly less likely to have completed year 12 than the non-Indigenous population in Ipswich. Whilst the data is suggesting that this is improving, it is still a point of disadvantage and a food insecurity risk factor for the Indigenous population of Ipswich.

Both within Ipswich and Australia, Indigenous people were approximately three times more likely to be renting, as opposed to the non-Indigenous population. This therefore results in Indigenous people in Australia being ‘at risk’ of more than one food insecurity risk factor. For the Ipswich region however, Indigenous people were more likely to be renting than Indigenous people overall in Australia by 2016. This trend increased across the 2011 and 2016 census points which demonstrates that

this risk factor is becoming more significant in the Ipswich region. This does mean that the Indigenous population in Ipswich is at an increasing risk of a second food insecurity risk factor, living within a rental household. Additionally, the literature demonstrates that renting status may represent a cascade of disadvantage and social inequity which may be compounded by financial insecurity (McDonald, 2011).

When analysing the results for the Indigenous population who are also single parents, the very large odds ratios indicated that the Indigenous population in Australia were over 2.70 times more likely than the non-Indigenous population to be a single parent. The Ipswich region has a further risk for this food insecurity risk factor compared to Australia, with the Indigenous population in Ipswich more likely than the Indigenous population in Australia to be a single parent. Overall, the Indigenous population in Ipswich are over two times more likely to be a single parent that the non-Indigenous population in Ipswich. Whilst there was no data available for gender differentiation for this risk factor, the overall single parent statistics in the Ipswich region did demonstrate a significantly higher risk for females, hence, this may indicate that the Indigenous female population in Ipswich has multiple, potentially compounding, risk factors for food inequity and the corresponding, socially determined poorer health outcomes (Rumbold & Dickson-Swift, 2012).

When analysing the food insecurity risk factor of unemployment within the Indigenous population, it was evident that the unemployment rate for Indigenous people, both within Australia and in Ipswich, was higher than the rest of the population. Approximately half of the Indigenous Australian population are not employed. However, there was no significant difference between these rates within the Ipswich and Australia population. The data did reveal a significant difference in the unemployment levels between Indigenous males and Indigenous females in the Ipswich region. Indigenous females in the Ipswich region were significantly more likely to be unemployed. This is also reflected in overall employment data in the region, where females in the overall population were significantly more likely to be unemployed than males. Hence, unemployment is a food insecurity risk factor for both Indigenous and non-Indigenous females in the Ipswich region, which leads to food system and health inequities for this segment of the population.

Additionally, the data analysed in Chapter 5 of this thesis, also revealed that there were higher rates of young people (15-24 years of age) in the Ipswich Indigenous population, than the overall Australian Indigenous population. The results did demonstrate that there was a slightly higher rate of young Indigenous people in Ipswich compared to the rest of Australia. The literature demonstrates that young people are less likely to be financially secure and hence, more likely to be renters which is an additional risk factor (McDonald, 2011). The significance of potentially multiple social risk factors that may lead to food insecurity and poorer health outcomes is therefore evident within this population group in Ipswich.

As explored in Chapter 2 of this thesis, socio-economic disparities were linked in the literature to higher rates of obesity, lower life expectancy (Rumbold & Dickson-Swift, 2012) and food inequity as it directly impacts food access (Charlton, 2016). It is clear from the results of Phase 2 of this thesis study, that the Indigenous population of Ipswich is at risk of multiple, possibly concurrent risk factors leading to food system inequity. The Aboriginal and Torres Strait Islander Health Performance Framework, 2008 report (AIHW, 2008) demonstrates that social determinants, as well as the prevalence of obesity has a strong association to disease rates, particularly non-communicable diseases which are more prevalent in the Indigenous community in Australia than the rest of the population (AIHW, 2018).

The impact of these social determinants in the Aboriginal and Torres Strait Islander community has resulted in and been perpetuated by transgenerational trauma, social and health inequity and cultural degradation caused by gross class and racial divides and government policy aimed at segregation, over the history of white settlement in Australia (Walsh-Dilley, Woldford & McCarthy, 2016). The social, health and cultural systems that have been forced upon the Indigenous peoples of Australia has ostracised this group of people from their traditional food systems, food sources and cultural and social structures resulting in gross health and nutritional inequities (Rosier, 2012). This research has demonstrated that to address nutritional disparities within the food system in the Ipswich region, these embedded social inequities need to be addressed and social health policy must be customised and prioritised for the Indigenous people within the community.

6.3.3. Food insecurity risk factors for young people

The literature demonstrates that young people are at higher risk of food insecurity (AIHW, 2008; Martin & Ferris, 2007; Rosier, 2012). The Australian Institute of Family Studies (McDonald, 2011) demonstrates that young people are at risk of a cascade of disadvantage and social inequity driven by socio-economic factors perpetuated by financial insecurity. The Ipswich region has a higher rate of young people in the community, than the overall population in Australia. The Phase 2 analysis revealed the relationship between young people and employment, single parent status and education which demonstrated that young people may be at risk of more than one food insecurity risk factor, which may result in social, health and food inequity (Rumbold & Dickson-Swift, 2012; Talbot & Verrinder, 2010).

The analysis of employment data for young people revealed that young people in Australia are more likely than the general population to be unemployed. The parameters used for unemployed were a combination of 'not in workforce', 'not looking for work' and 'not looking for work in the next four weeks' within the ABS census data. Young people in Ipswich were more likely to be employed that people over the age of 25 within the Ipswich region in the 2006 census year, however this trend reversed over time and in the 2011 and 2016 census year, which resulted in young people being more likely to be unemployed. This is a concerning trend which is demonstrating greater social inequity for young people in the Ipswich region over time, resulting in exposure to multiple food insecurity risk factors, resulting in food system inequity.

One positive trend that is occurring in the Ipswich region for young people demonstrates that the gap has closed between males and females in relation to employment, with no difference in the employment levels for either male or female young people by 2016. A factor that may influence the rates of young people entering the workforce may be single parent status or if they are stay at home parents. These people, who the literature demonstrates are more likely to be women (Franklin et al., 2012), would not be reflected in unemployment data which may potentially influence this trend. Hence, these figures may not be totally reflective of what is occurring in the Ipswich region. Further cross-sectional analysis would be required to ascertain if this is a more significant problem then what is reflected in the data analysed in Chapter Five of this thesis.

The results presented in Chapter Five of this thesis also reflected that young people in Australia are much less likely to be a single parent than those in the over 25 years of age group. This may potentially reflect the high divorce rates Australia is experiencing, which occurs predominately outside of this age group (McDonald, 2011). However, in Ipswich, young people are over two times more likely to be a single parent relative to the rest of Australia. This is a significant risk factor for the young people in the Ipswich community as this social determinant is correlated with food insecurity risk and further health disparities (Charlton, 2016; Ramsey et al., 2012) and coupled with age, is a compounding risk. Additionally, young people who are females are significantly more likely to be a single parent than males in the Ipswich region. This demonstrates that young females in the Ipswich region are at higher risk of multiple and significant food insecurity risk factors that may lead to higher risk of food insecurity, obesity and associated non-communicable disease burden (Martin & Ferris, 2007).

When analysing the risk factor of education for young people, the data reflected that young people across Australia, including in Ipswich, are more likely to have completed year 12 as opposed to people over the age of 25. This is reflective of the general trend in society, of more people completing secondary education (McDonald, 2011). However, in Ipswich, young people are less likely to complete their secondary education compared to the rest of Australia. This is a significant additional risk factor for young people in the Ipswich region. This risk factor however was more significant for males in Ipswich than females, which may reflect the fact that more young males in lower SES areas leave school prior to year 12 to enter trades (McDonald, 2011).

The results from Phase 2 of this thesis, as demonstrated in Chapter 5, established that for young people in the Ipswich region, the unemployment trend is increasing and the single parent status is significantly higher than the rest of the Australian population in this age group, particularly for young women. The young people population group in Ipswich is also more likely to have not completed year 12 than compared to young people in Australia. This leads to young people in Ipswich at risk of multiple and at times significant social inequity which may be resulting in food system inequity. This has significant social health policy implications for strategies

that attempt to influence nutritional intake within the Ipswich region for this population.

6.3.4. Insights from Phase Two

Overall, many significant risk factors for food insecurity have been identified within the Ipswich community which may be causing food system inequity. As reflected in both the findings from Phase Two and the food insecurity risk factors identified within the literature, a large number of the Ipswich community are at high risk of at least one food insecurity risk factor. The social inequities driving food insecurity include education, single parent status, rental status in addition to the Indigenous and young people demographics within the Ipswich community are significant. Additionally, there are a number of significant food insecurity risk factors for women, Indigenous people and young people in the Ipswich region and the data does indicate that potentially concurrent risk factors may be occurring within these population groups. The literature indicates that these social inequities lead to higher risk of food insecurity, higher risk of being overweight or obese, higher mortality rates and higher non-communicable disease rates (AIHW, 2008; AIHW, 2018; Talbot & Verrinder, 2010; WHO, 2018a).

The results of the quantitative analysis undertaken in Phase 2 indicate that policy responses and initiatives aimed at addressing nutritional disparities within the Ipswich community, such as the low rates of fruit and vegetable consumption, may need broad social model responses to address specific 'at risk' demographics within communities with socio-economic inequalities such as the Ipswich community. This may include social health policy (at federal, state and local government levels), initiatives and community-based food strategies customised and prioritised to those who are the most vulnerable within the region. These findings are supported by the response that has occurred in the Toronto region in the past three decades that has been modelled to strategically address broad social inequities leading to food insecurity and nutritional disparities. As demonstrated by the significant and embedded social inequities identified within the Ipswich community, it is clear that the nutritional disparities occurring in the region require a long-term, sustained and strategic approach, which will need bi-partisan government support, multi-sectorial collaboration and strong leadership to slowly increase food system equity within the community.

6.4. Critique of current nutritional policy

Australia and many Western Countries around the world have implemented numerous nutritional based policies to attempt to stem the increase in obesity rates. How effective these nutritional policies have been can be difficult to ascertain, however it is evident that obesity levels are continuing to rise – in some communities more than others (AIHW, 2016; WHO, 2013). Whilst there are many examples around the world of social model health policy to attempt to influence obesity outcomes, obesity levels are still rising (Di Cesare et al, 2016; AIHW, 2018). Oliver (2013) believes that broad, social model public sector policy is what is required to effect change in citizen health behaviours. This is further supported by Toth, (2010) who suggests that public health policies and nutrition goals need strategic integration to ensure effectiveness. This supports the findings of the research undertaken in both Phase 1 and Phase 2 of this doctoral research that demonstrated that a broad, multi-sectorial, social model approach is required to form the foundation of a strategic response to nutritional disparities occurring within the Ipswich region.

WHO (2003) argues that healthy food systems are a political issue and integration of public health strategies and policies must be adopted at all levels of government to ensure affordable, nutritious fresh food for all members of society, particularly those who are vulnerable to food insecurity. This is further reflected in one of the key Ottawa Charter action areas (WHO, 2018b) which is 'building healthy public policy'. This may demonstrate that these initiatives need to be prioritised or customised to those demographics within a community that may be at risk of social and food system inequity. However, this will take long-term strategic leadership from federal, state and local governments and collaboration with the community, leaders and multi-sectorial organisations to address the embedded social and cultural systems that are shaping inequities within communities.

The implications of the findings of this thesis on policy prioritisation, customisation, design and evaluation are significant. The literature and the findings of this project indicate that there are certain population groups within each community that are more 'at risk' of food system inequity and the corresponding obesity paradox and associated

non-communicable disease burden (Cook et al., 2017; Egen et al., 2017; Rumbold & Dickson-Swift, 2012). Both the literature and findings of this thesis support the premise that communities with low levels of fruit and vegetable consumption and high levels of obesity must be analysed to ascertain the food insecurity risk factors occurring within the specific community (Rumbold & Dickson-Swift, 2012). This will determine which subsets of a population within a community may be experiencing social inequity, and hence, social model health policies must be prioritised and customised to ensure the food system is equitable to all, especially those who are most vulnerable within a community. Current policies in Australia, which are identified within the Food Policy Index scorecard and priority recommendations (2017) are not customised to high risk groups within a community and is not designed to accommodate specific community demographics, risk factors or socio-economic and cultural variables. Furthermore, health policy for obesity and nutritional consumption is implemented at a federal or state level in the majority of Australia (Mills, 2014).

To date, there is no national strategy around food policy or obesity prevention in Australia. The Obesity Policy Coalition in their scorecard and priority recommendations for the state and federal government in Australia, has recommended that a national strategy for improving population nutrition needs to be implemented as a matter of urgency (Food Policy Index, 2017). Whilst this report did identify that food labelling, no GST on basic foods and regular monitoring of population body weight is meeting best practice at the national level, other strategies were recommended such as taxing unhealthy foods such as a sugar tax and reducing exposure of children to the marketing of unhealthy food (Food Policy Index, 2017).

Whilst these recommendations are certainly broad social model policies, the findings of this thesis indicate that further policies tailored to ‘at risk’ communities are needed to address an unequitable food system, which lead to low rates of fruit and vegetable consumption, high rates of obesity and corresponding non-communicable diseases. The current social health policy initiatives within Australia are, in general, not prioritised or customised to address population groups of social inequity within ‘at risk’ communities. For example, nutritional panel labelling that has been implemented in

Australia to ensure consumers are given information regarding the nutritional content of the food they are purchasing (Food Policy Index, 2017), is not targeted or customised to those groups that have been identified as 'high risk' for food insecurity.

The Obesity Policy Coalition did identify that one state in Australia (South Australia) did incorporate population health considerations into their policy development, including the provision of support to local governments to create policies and strategies that support a healthy food environment (Food Policy Index, 2017). However, this is an anomaly in Australia, with no other states or territories adopting this approach. The findings of this thesis reflect the importance of policy initiatives such as those occurring within South Australia, and indeed within Toronto, where local government involvement is crucial to provide leadership, overall strategy and community engagement to support a healthier, fairer food system.

Victoria, New South Wales and Tasmania have small localised pockets of community-based food strategies. Four Councils on the outskirts of Sydney have initiated a comprehensive regional food strategy. The Illawarra regional food strategy focuses on "improving health and reducing inequalities of locally available food" through a diverse range of food security initiatives including the retention of key agricultural land and the encouragement of leadership within the local food economy (Shellharbour City Council, 2014. p. 4). This innovation, is changing community access to food, influencing diet and hence, the health and resilience of the communities in which it is embedded and is driven by local government policy initiatives (Shellharbour City Council, 2014).

In Devonport in the north of Tasmania, the local government instigated the Devonport Food Connections project in 2014 to encourage healthy food choices for their community members by attempting to build and maintain an equitable and secure food system (Devonport Regional Council, 2019). This program was modelled on the Toronto Food Connections model and does have a distinct focus on food insecurity within the region (Devonport Regional Council, 2019). It is of interest that the Devonport community has a high rate of socio-economic disparity and high levels of obesity, much like the Ipswich region (ABS, 2016).

The findings from Part A of this thesis reflect that there are policy vacuums in Ipswich where there is no integration of public health policy with local government activity. This is supported by the literature (Donovan et al., 2011; Mills, 2014) where it has been identified that in Australia, there is no overall food system strategy to address social inequity that may be a cause of significant nutritional challenges that are occurring in lower socio-economic regions around the country. The Victorian Heart Foundation in consultation with other key stakeholders, have suggested that opportunities do exist for the establishment of public health and wellbeing plans from a local and state government level, that would assist in supporting food strategies in communities in Australia (Donovan et al, 2011).

As demonstrated by the findings in the literature, nudging has been implemented by many governments across the world to successfully shape health behaviours. As described in Chapter 2, these 'nudges' shape the choice architecture in which people make decisions, for example, food choices (Quigley, 2013). The opportunity exists for Australia and communities such as Ipswich to implement 'soft' policy approaches to shape nutritional consumption behaviours. The state government has developed legislation and guidelines that are shaping access to unhealthy foods in the school environment, however on a community-based level, the built environment may be influencing nutritional consumption. In Ipswich, there are two large fast food restaurants within 500 metres of the largest state high school. Consequently, this shapes the choice architecture for school children and makes poor nutritional choices easy before and after school (Sunstein, 2014; Voyer, 2015). As demonstrated in the Literature review in Chapter 2 of this thesis, local government planning and prioritising does have the ability to shape policy that would prevent the further establishment of fast food chains near schools and shape the choice architecture for food choices for the Ipswich community (Donovan et al., 2015; Huang & Drescher, 2015; Muntanter et al., 2012).

Phase B of this thesis demonstrated that a number of significant food insecurity risk factors were occurring, at times concurrently, in the Ipswich region which subject the population within this community to a high risk of food system inequity and possibly,

obesity resulting from food insecurity, reflecting the 'food insecurity obesity paradox' (Martin & Ferris, 2007; Franklin, et al., 2012). This may explain the overall low rates of fruit and vegetable consumption in the region, and high rates of obesity and corresponding non-communicable disease burdens. The literature clearly demonstrates that mild to moderate food insecurity leads to higher rates of obesity (Bickel et al., 2000; Charlton, 2016) and further to this, research indicates that the social determinants that form the food insecurity risk, is directly linked to higher rates of non-communicable diseases and higher mortality rates (CDC, 2009; Australian Government, 2018). To mitigate the significant health impacts in communities with high level of obesity, the findings of this thesis support the premise that policy responses and strategies need to be formulated, implemented and evaluated at a community level within a social model of health, to directly influence social and food system inequity.

Communities with often lower socio-economic demographics need to be analysed to understand certain groups within the community that may be at significant risk of food system inequity. causing nutritional consumption disparities and corresponding policy interventions need to be customised to these specific 'high risk' groups. The detailed characterisation of the Ipswich community undertaken in Phase Two of this research, has demonstrated that the Ipswich community is one region that does have population groups at 'high risk' of social inequity leading to high rates of food insecurity risk factors.

It is therefore clear that policy vacuums, laws and legislation in Australia, have provided significant barriers to the evolution, adoption and sustainability of a secure food system in communities. The nutritional disparities experienced within communities, including low fruit and vegetable intake in the Ipswich community, may be a result of social inequity, which requires policy initiatives and approaches from all levels of government, particularly local government, to prioritise and customise broad social policy response for those who are most vulnerable within their community. This is reflected in the approach undertaken by Toronto, which integrated a strategic food system approach within their community over the last thirty years.

6.5. Conclusion

This chapter discussed the results and implications of the findings of the qualitative and quantitative components of this thesis. Linking the literature and the research findings, this chapter demonstrated how a detailed analysis of a population to identify groups experiencing social inequity was required, to be able to customise and prioritise policy responses to improve nutritional consumption within a community. The findings from this thesis confirmed the need to establish a strategic approach to food system inequity, engaging with the community and utilising local government involvement to lead and engage the community to address broader social inequities, such as those found in the Ipswich region. It was clear that Toronto has developed a sustainable, long term strategy and policies to shape the nutritional intake of their community around creating an equitable food system and tailoring the initiatives to address specific social inequities within the Toronto region. Ipswich is at the start of a journey in understanding that social inequities may be influencing nutritional intake. The impact of nutritional policy design at a federal and state level, as well as a policy vacuum at local government level has resulted in initiatives that have not been designed to prioritise policy responses for groups within the community that are at significant risk of social inequity.

Chapter 7 concludes this thesis by discussing the strengths and limitations of this research as well as overall implications of this inquiry. It will further discuss areas of opportunity for further research and provide specific recommendations in relation to addressing both the nutritional disparities occurring in the Ipswich community, but also in communities around the world with similar socio-economic inequities and food system inequities.

7. Chapter 7: Conclusions and recommendations

7.1. Introduction

The research undertaken in this doctoral study has offered some valuable insights into factors related to nutritional inequities occurring in the Ipswich region, and possible community responses. The two phases of this thesis explored, within a critical, exploratory lens, barriers and enablers to increasing fruit and vegetable consumption for the Ipswich community, that experiences high rates of obesity and corresponding non-communicable disease burden. The research undertaken resulted in a clear identification that some groups within the Ipswich population are experiencing social inequities, putting them at higher risk of food system inequity within the region. The research further demonstrated that to address these nutritional disparities, a response needs to be customised and prioritised to the most vulnerable within the community, within a social model of health.

Using an exploratory, qualitatively driven, sequential research design, the two phases of this research explored socio-economic structures that have influenced an unequitable food system in Ipswich, leading to low rates of fruit and vegetable consumption. Phase One of this doctoral research included interviews with key stakeholders in the Ipswich community to explore their understandings, perceptions and knowledge of the barriers and enablers to increase fruit and vegetable consumption and potential strategies that may be undertaken to improve this within the Ipswich region. This revealed that the Ipswich key stakeholders had a firm understanding that there were important components to implementing a strategic approach within a community, such as community engagement, leadership and the development of an overall strategy. Additionally, Ipswich participants identified a community-based approach should be facilitated by local government and other diverse key stakeholders to empower, enable and lead partnerships, with community engagement and include a strategic approach. However, Ipswich participants were at the start of their journey in understanding why these nutritional disparities may be occurring and therefore how to tailor a strategy to effectively address this.

The second part of Phase One was undertaken in Toronto, Canada, which was identified in the research literature as being one key community that has been working to influence the improved nutritional intake of their population for over thirty years. Semi-structured interviews with key stakeholders within that community were undertaken, to understand their experience in relation to barriers and enablers to implementing a successful food strategy to improve a community's nutritional status. This revealed that whilst community engagement and leadership was a key component of a community driven nutritional response, the strategic approach undertaken in Toronto was founded firmly on creating an equitable food system to address food insecurity. These understandings were not clearly articulated in the Ipswich interviews. In fact, it was not clear if the Ipswich community may have been experiencing food system inequity and further research was required to ascertain this. The interviews undertaken in the Ipswich region revealed that key stakeholders were at the start of their journey in understanding that social inequities may be influencing nutritional intake. Conversely, Toronto had a firm understanding of both the social inequities influencing nutritional intake and how to address these inequities through a broad range of social model initiatives and multi-sectorial, collaborative approaches.

The 'food insecurity obesity paradox' identified in the literature demonstrated that there was a clear link between mild to moderate food insecurity and obesity due to food system inequity (Franklin et al., 2012; Martin & Ferris, 2007; Ramsey, et al., 2011). Due to the findings in the literature, the findings from the Toronto interviews and the sequential exploratory design of the research, Phase Two involved a detailed longitudinal characterisation of the Ipswich community to identify and analyse food insecurity risk factors and identify those at high risk of food system inequity within the Ipswich region. A significant number of risk factors were identified as being more prevalent in the Ipswich region, compared to the rest of Australia. Key population groups within Ipswich were identified as having a number of potentially compounding risk factors including women, young people and the Indigenous population in the Ipswich region.

The findings from Phase Two of this research indicate that the population in Ipswich are vulnerable to food insecurity and the corresponding 'food insecurity obesity

paradox'. This 'high risk' community has a number of social inequities, aligned with food insecurity risk factors which may be leading to food system inequity.

The findings from the mixed-methods research undertaken for this thesis provides insights into how policies, strategies and initiatives must be prioritised and customised for each community, and in particular, the sub-groups within a population who are at higher risk of social inequity and corresponding food system inequity. These social inequities have been identified within the literature as determinants that perpetuate health disparities within low socio-economic regions and communities around the world (Rumbold & Dickson-Swift, 2012; Talbot & Verrinder, 2010).

7.2. Research outcomes: implications and recommendations

The literature has indicated a number of strategies have been used and researched around the world to shape policies, initiatives and programs to attempt to influence the social and environmental architecture within a community to influence positive nutritional change, as outlined in Chapter Two of this thesis. The findings of the research undertaken in this thesis supported the premise that a strategic response needs to be shaped around a detailed understanding of the social inequities occurring within a region. How a strategic response can be shaped to address social inequities is demonstrated in the 'Community-Based Health Equity Model' in Figure 5 of this chapter, that has been developed from the outcomes of this doctoral research.

As discussed in Chapter 6 of this thesis, it is clear that within Australia, policies implemented to address nutritional disparities have not been tailored to higher risk groups within communities (AIHW, 2011; Food Policy Index, 2017; Mills, 2014). The findings of this research reveal that the customisation, prioritisation and application of current and future policy and initiatives need to address obesity within a social health framework, (as opposed to an individualised approach) and tailored to the most vulnerable within the community. Effective policy development may likely need to go beyond what has traditionally utilised by federal and state governments and instead address the underlying socio-economic and cultural drivers within a community and decrease food insecurity risk factors. Additionally, the findings of this research support literature which demonstrates that local government has a unique ability to identify needs, engage with the community and provide leadership in the long-term implementation of a strategic approach to address significant health

disparities occurring within a region (Huang & Drescher, 2015; Muntaner et al., 2012; Mills, 2014). These findings are demonstrated in the 'Community-Based Health Equity Model' proposed in Figure 5 of this chapter.

As a result of the research undertaken for this thesis, recommendations for communities such as Ipswich that are facing nutritional inequities and attempting to formulate a sustainable, effective response; can be devised. This research demonstrates that an initial detailed analysis of food insecurity risk factors within the community at question, such as those outlined in Phase Two of this thesis, is required to meaningfully understand the social inequities that may be shaping the food system and health outcomes. Whilst food insecurity risk factors have been defined within the literature, these are broad social determinants which may impact on a variety of health and wellbeing outcomes (Rumbold & Dickson-Swift, 2012; Talbot & Verrinder, 2010). A detailed understanding of the social factors that are prevalent in a community gives a strong epidemiological foundation for many strategic health interventions and is illustrated in the "Community-Based Health Equity Model' in Figure 5 of this chapter. This forms a foundation for the development of broad social health policy initiatives to address social inequities, which can be customised and prioritised to those identified within the community, who are at high risk of one or multiple food insecurity risk factors.

Additionally, this research demonstrates the importance of forming relationships with, and developing an understanding of the perceptions of key stakeholders who may be able to directly or indirectly influence overall strategy, policy, initiatives or programs. This will ensure potential partnerships and collaboration can be identified and leadership garnered from within the local community. As demonstrated by the findings of this research and illustrated in Figure 5 of this chapter, involvement of key stakeholders including local government is crucial for the planning, implementation, ongoing success and evaluation of strategic initiatives aimed at improving social inequities occurring within a community.

Finally, this research demonstrates the need for longitudinal evaluation tools to track the progress of social inequities and health outcomes within a community. This may be able to be obtained through the analysis of government databases such as the ABS, where social indicators can be monitored over time to understand the trends of

social inequities and risk factors over time and the effectiveness of interventions including the tracking of health outcomes and disease burden within a community. This is reflected as a key component of the Community-Based Health Equity Model illustrated in Figure 5 of this chapter.

As evidenced by the literature presented in Chapter Two of this thesis, obesity levels directly influence the disease burden of heart disease, stroke, type 2 diabetes and some cancers (Aune et al., 2017; He et al., 2006; Hu, 2003). The WHO has identified obesity as a major health issue of the 21st century and has developed a 2025 global obesity target, to attempt to curb the rates of these disease burdens (WHO, 2018a). Therefore, if nutritional inequities can be addressed within a community, this would directly impact long term disease burden of these non-communicable diseases which is leading the way in morbidity and mortality rates across Australia and occurring within the Western world.

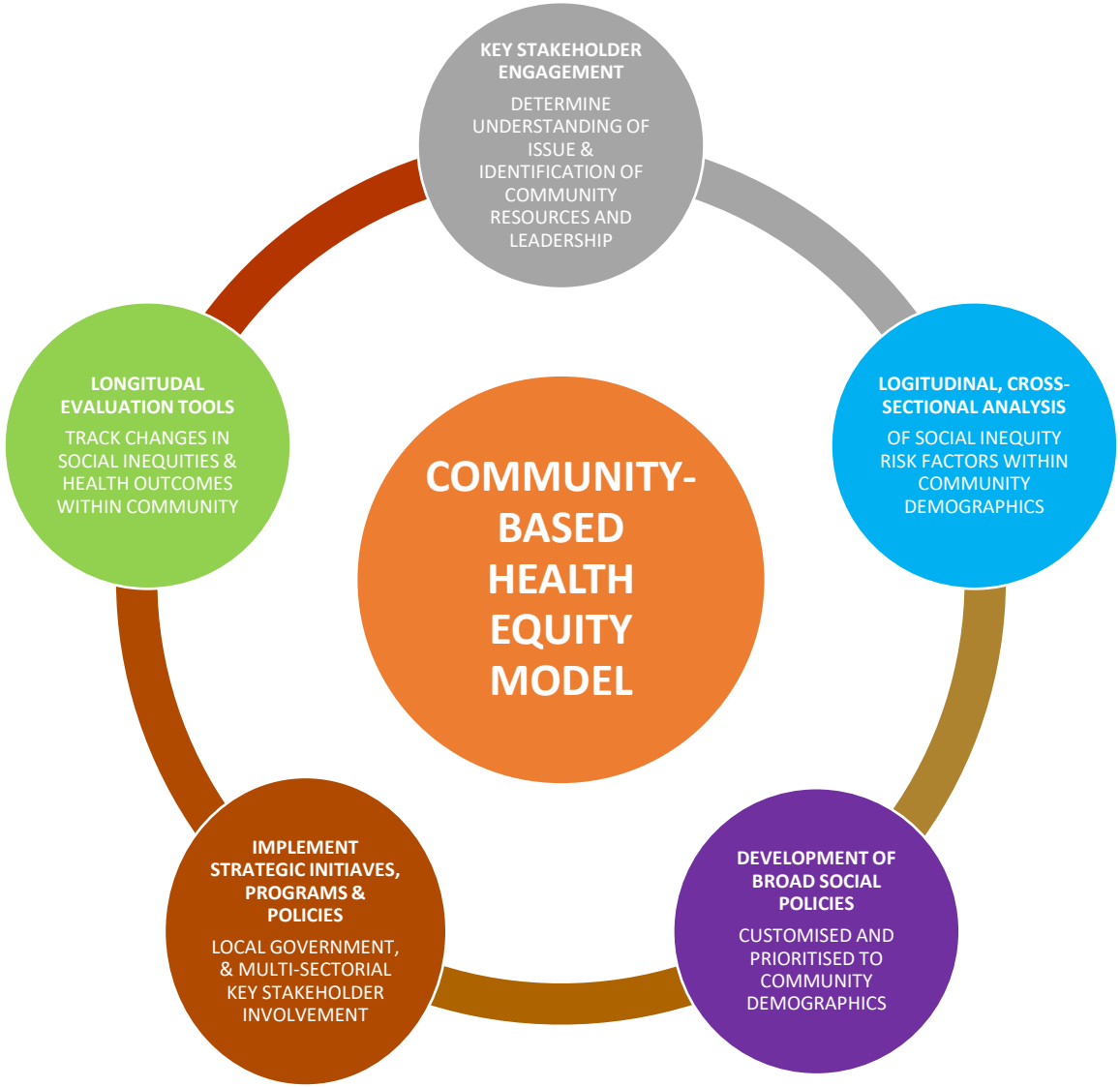
7.2.1. Key recommendations

- Obesity policy in Australia needs to be reviewed to take into account social factors influencing food system inequity and obesity. A social model of health approach must be adopted as the foundation to improving obesity rates in Australia.
- Ipswich needs a food strategy based on the social model of health, using a multi-sectorial, collaborative approach;
- Key stakeholder understanding of the disparities influencing the nutritional intake within a community is required, and barriers and enablers to a local strategic, collaborative approach needs to be identified, to inform a strategic response from key stakeholders;
- Leadership needs to be derived from local government, community leaders and residents. Local government policies (such as planning) must be designed with the public health goals of their community in mind;
- A cross-sectional, longitudinal analysis needs to be undertaken on ‘high risk’ communities to identify social determinants that may be leading to social and food system inequity;

- A social model strategic response to impact nutritional intake must be customised, tailored and prioritised for to those who are at high risk of food insecurity within a community;
- Longitudinal evaluation tools must be utilised to track changes in social inequities and health outcomes when determining effectiveness of the strategic approach over time; and

The framework outlined in Figure 5 has emanated from the findings and recommendations of this doctoral research and is applicable to many different communities around the world. Whilst this doctoral research specifically focused on nutritional disparities occurring within the Ipswich community over three points in time, the applicability of the 'Community-based Health Equity Model' outlined in Figure 5, to create a framework that can identify specific populations that may be experiencing social inequities, results in broad and diverse applicability to respond to health burdens within a community.

7.2.2. Community-Based Health Equity Model – Figure 5



7.3. Strengths and limitations

There are specific strengths and limitations of the enquiry undertaken in Phase One and Phase Two of this research. The use of an exploratory, mixed-methods approach for this research is a significant strength of this research as it enabled the ability to thoroughly explore and analyse key themes as they arose. Phase Two of this research evolved from the key themes that were found in the semi-structured interviews undertaken in Phase One of this research and enabled the researcher to let the research outcomes dictate the design of the doctoral research. Additionally, the mixed-methods approach ensured that the key themes discovered in Phase One could be explained and contextualised by integrating data analysis, confirming that the Ipswich region did have high rates of food insecurity risk factors.

Another major strength of this research is that it accessed a very large, robust data set from the ABS, which gave a clear understanding of the prevalence of risk factors within the Ipswich community. Further opportunities exist for researchers to undertake detailed, longitudinal characterisations of their community by utilising already existing population data sets, such as ABS data in Australia. This data set provided information on community demographics to understand which social determinants that may be prevalent, leading to significant social inequity and hence, it is not only applicable to food system inequity. WHO (2003) states that these same social determinants have overall impacts on social exclusion, unemployment, addiction, mental illness, heart disease, and domestic violence. Once a population analysis is undertaken to identify those most at risk within a community, social policy, initiatives and strategies can be implemented to specifically support those who are the most vulnerable within society and reduce impacts of social inequities leading to poor health and social outcomes. Unfortunately, there was certain data sets, particularly when examining two or more risk factors concurrently, that were not available in the ABS data, which would have further strengthened the analysis undertaken in the quantitative phase.

Another strength of this research was conducting the interviews with key stakeholders from Toronto to ascertain if their experiences were aligned with what the Ipswich key stakeholders had identified as the barriers and enabler in influencing nutritional intake

within their community. Within the exploratory lens of this research, findings from Toronto shaped the consequent phase of this doctoral research and led to the very important identification that food insecurity may have been the cause of nutritional inequities, low fruit and vegetable consumption and high rates of obesity in the Ipswich region. Whilst this was not evident from the interviews initially undertaken in Ipswich, further research, particularly considering the 'food insecurity obesity paradox' did indicate that this was a worthwhile consideration in the research design for this thesis. Whilst the exploratory method certainly enabled the research to naturally flow to subsequent phases, it did result in the fact, that potentially, the questions asked in the first phase of the interviews in Ipswich were not thorough enough to specifically cover food insecurity and identification of corresponding food insecurity risk factors. This concept was only discovered after visiting Toronto which exhibited high to severe food insecurity, generally driven by hunger, which did not in itself lead to higher obesity rates in Toronto.

The research undertaken in this doctoral study is the start of understanding and forming a suitable strategic response to address nutritional inequities within the Ipswich community. Whilst this inquiry analysed a detailed characterisation of the Ipswich population consistent with food insecurity risk factors, one limitation that exists is there has not been any data collected within the region utilising a food insecurity questionnaire tool which would be beneficial to have a fuller understanding of food insecurity within the region. Undertaking a food insecurity questionnaire, which asks participants if they and their household members were able to access food that is nutritious, within their budget, and if they had gone hungry if they had not been able to do so (Tarasuk et al., 2016) would complement the demographic analysis to provide a more detailed understanding of how the community perceives the influence of food insecurity on their household and may also give an understanding as to what degree of severity, the population may be experiencing food insecurity. The degree to which households experience food insecurity is important to understand as the literature presented in Chapter 2 of this thesis demonstrated that the 'food insecurity obesity paradox' is more likely to result in obesity among those people experiencing mild to moderate food insecurity (Bickel et al., 2000; Franklin et al, 2012). This survey was

outside of the scope of this doctorate due to the significant further time and funding required to undertake it.

Additionally, with further time and fiscal support, cross-sectional analysis between other communities, both within Queensland, Australia and across the world would provide more insights into patterns occurring in relation to social inequities and food system security and corresponding obesity driven non-communicable disease health outcomes. Further extensive research including pilot studies of interventions that are derived from this approach would also strengthen the evidence base for these research outcomes and provides future post-doctoral research opportunities. This was reflected within the Toronto region where there have been no formal evaluations undertaken of the impact of these strategies. Undertaking this analysis would create challenges as it would require large-scale, epidemiological studies, however it may be able to be ascertained from trends within the social inequity risk factors and non-communicable disease health outcomes and would give a valuable insight into the effectiveness of a community-based response to influence nutritional disparities.

7.4. Conclusion

This chapter outlined recommendations for future policy design and approaches to nutritional disparities within a community. The strengths and limitations of this research were discussed and future opportunities within this field, both within the Ipswich region and across the world were identified. This doctoral study has significantly contributed to the knowledge base to demonstrate an understanding of why some communities are at higher risk of nutritional disparities leading to obesity and what strategies may be able to be utilised to address this. The findings from this thesis demonstrated that to improve the nutritional status of the Ipswich community a detailed analysis of the population to identify groups experiencing social inequities needed to be conducted, so that social health policy and initiatives can be customised and prioritised within a multi-faceted, multi-sectorial response to ensure the most vulnerable people within the community can access an equitable food system.

The Health Equity Model for Community-Based Strategies was recommended and presented in this Chapter with the applicability to other communities experiencing health

burdens which are influenced by social inequity. These findings impact on knowledge and practice both within nursing and broader within health care and policy. It is clear that improving nutritional disparities within a community is complex and is based on sometimes concealed social inequities, resulting in significant non-communicable disease burdens. A broad, social health-based policy response and strategic initiatives are required and must be tailored to the most vulnerable within communities to ensure that food system equity and health equity is assured to everyone, regardless of their socio-economic status.

APPENDIX A

University of Southern Queensland

Consent Form for USQ Research Project - Questionnaire

Title of Project: "Key Stakeholder perspectives of the potential for integrated community action to improve access to fresh fruit and vegetables in a large regional city".

Human Research Ethics Approval Number: H15REA162

Research Team Contact Details

Principal Investigator Details	Supervisor Details
Mrs Aletha Ward	Professor Cath Rogers
Email: ward_aletha@hotmail.com	Email: cath.rogers@usq.edu.au
Telephone: (07) 3812 6084	Telephone: (07) 4631 2005
Mobile: 0403 312 854	Mobile: 0439 210 180

Statement of Consent

By signing below, you are indicating that you:

- Have read and understood the information document regarding this project.
- Have had any questions answered to your satisfaction.
- Understand that if you have any additional questions you can contact the research team.
- Understand that you are free to withdraw at any time, without comment or penalty.
- Understand that you can contact the University of Southern Queensland Ethics Coordinator on (07) 4631 2690 or email ethics@usq.edu.au if you do have any concern or complaint about the ethical conduct of this project.
- Are over 18 years of age.
- Agree to participate in the project.

Participant Name	
Participant Signature	
Date	

APPENDIX B

University of Southern Queensland

Participant Information for USQ Research Project

Please return this sheet to a Research Team member prior to undertaking the questionnaire.

Project Details

Title of Project: "Key Stakeholder perspectives of the potential for integrated community action to improve access to fresh fruit and vegetables in a large regional city".

Human Research Ethics Approval Number: H15REA162

Research Team Contact Details

Principal Investigator Details	Supervisor Details
Mrs Aletha Ward	Professor Cath Rogers
Email: ward_aletha@hotmail.com	Email: cath.rogers@usq.edu.au
Telephone: (07) 3812 6084	Telephone: (07) 4631 2005
Mobile: 0413 654 313	Mobile: 0439 210 180

Description

You are invited to participate in a research study, which aims to understand the preparedness of key stakeholders within Ipswich to undertake integrated community action to improve access to fresh fruit and vegetables. Your experience, knowledge and perceptions of what the key challenges and opportunities may be inform the key elements of this study. The research team requests your assistance because we are asking those with knowledge, experience and perceptions of what integrated community action could occur and to shape the findings of this project. The researcher is conducting this research as part of a Masters by research project, which may then lead to a fuller investigation in future PhD studies. Hence, the de-identified data gained from these interviews may be used in future for further studies by the researcher.

Participation

Your participation will involve participation in an interview that will take approximately 30 - 40 minutes of your time. The interview will take place at a time and venue that is convenient to you Monday to Friday within business hours.

Questions will include:

a) Do you think there is a role for a community to work towards improving access to fresh fruit and vegetables?
b) What if any, would you see as the benefits of such initiatives?
c) Do you have any knowledge of existing community initiatives in the Ipswich region, or anywhere else to increase the accessibility of fresh fruit and vegetables?
d) Do you have any ideas about what a community initiative in Ipswich could look like?
e) What do you think would be the barriers and enablers to these initiatives?

Information from the interviews will be audio recorded and will be analysed for key themes to give a better understanding of the preparedness of the region to undertake integrated community action to increase access to fruit and vegetables. The researcher will provide you, via email, with an electronic copy of the preliminary research results within 12 months of your participation.

Your participation in this project is entirely voluntary. If you do not wish to take part you are not obliged to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage. You may also request that any unprocessed data collected about you be destroyed. If you do wish to withdraw from this project or withdraw data collected about you, please contact the Research Team (contact details at the top of this form). Your decision whether you take part, do not take part, or to take part and then withdraw, will in no way impact your current or future relationship with the University of Southern Queensland.

Expected Benefits

It is expected that this project will not directly benefit you. Findings of this study could have important implications for the accessibility of fruit and vegetables for the community of Ipswich, Qld and could result in improved health outcomes for the community

Risks

There are no anticipated risks beyond normal day-to-day living associated with your participation in this project.

Privacy and Confidentiality

All comments and responses will be treated confidentially unless required by law.

Prior to the interview recording, the researcher will ask you to nominate a pseudonym name to be referred to during the interview. This is to maintain your confidentiality. Only the researcher will know, what pseudonym name refers to you.

You will be recorded during the interview by a USB digital recording device. This recording will then be transcribed so that general themes can be identified from the interview data. The person transcribing the interviews will only know you by your pseudonym and this will be used to identify the recording. This ensures confidentiality of what you say in the interview. The recording will be used for no other purpose than what is outlined in this information sheet. The researcher and a person who will transcribe the information at the University of Southern Queensland will have access to the recording. Due to the analyses required of the interviews, it is not possible to participate in the project without being recorded.

Post the interview the recording will be transcribed into a document. When this occurs, you will be sent a copy of the transcript so that you can check it for accuracy. You will also have an opportunity at this time to change what is included in the transcript.

Any data collected as a part of this project will be stored securely as per University of Southern Queensland's Research Data Management policy.

Consent to Participate

We would like to ask you to sign a written consent form (enclosed) to confirm your agreement to participate in this project. Please return your signed consent form to a member of the Research Team prior to participating in your interview.

Questions or Further Information about the Project

Please refer to the Research Team Contact Details at the top of the form to have any questions answered or to request further information about this project.

Concerns or Complaints Regarding the Conduct of the Project

If you have any concerns or complaints about the ethical conduct of the project you may contact the University of Southern Queensland Ethics Coordinator on (07) 4631 2690 or email ethics@usq.edu.au. The Ethics Coordinator is not connected with the research project and can facilitate a resolution to your concern in an unbiased manner.

Thank you for taking the time to help with this research project.
Please keep this sheet for your information.

APPENDIX C

University of Southern Queensland

Participant Information for USQ Research Project Interview

Project Details

Title of Project: "Key Stakeholder perspectives of the potential for integrated community action to improve access to fresh fruit and vegetables in a large regional city".

Human Research Ethics
Approval Number: H15REA162

Research Team Contact Details

Principal Investigator Details	Supervisor Details
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Telephone: (07) 3812 6084	Telephone: (07) 4631 2005
Mobile: 0413 654 313	Mobile: 0439 210 180

Description

You are invited to participate in a research study, which aims to understand the preparedness of key stakeholders within Ipswich to undertake integrated community action to improve access to fresh fruit and vegetables. Your experience, knowledge and perceptions of what the key challenges and opportunities in Toronto, Canada will inform the key elements of this study.

The research team requests your assistance because we are asking those with knowledge, experience and perceptions of what integrated community action could occur and to shape the findings of this project.

The researcher is conducting this research as part of PhD studies.

Participation

Your participation will involve participation in an interview that will take approximately – 15-20 Minutes, of your time.

The interview will take place at a time and venue that is convenient to you Monday to Friday within business hours.

Questions will include:

a) What do you see are the barriers or enablers of your project/program for implementation and long term success?
b) How did you engage the community into your program/project and was it critical for your success?
c) Do you believe that your project/program is useful in increasing public health outcomes in Toronto, specifically around nutrition related disease?

Information from the interviews will be audio recorded and will be analysed for key themes to give a better understanding of the preparedness of the region to undertake integrated community action to increase access to fruit and vegetables. The researcher will provide you, via email, with an electronic copy of the preliminary research results within 12 months of your participation.

Your participation in this project is entirely voluntary. If you do not wish to take part you are not obliged to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage. You may also request that any unprocessed data collected about you be destroyed. If you do wish to withdraw from this project or withdraw data collected about you, please contact the Research Team (contact details at the top of this form).

Your decision whether you take part, do not take part, or to take part and then withdraw, will in no way impact your current or future relationship with the University of Southern Queensland.

Expected Benefits

It is expected that this project will not directly benefit you. Findings of this study could have important implications for the accessibility of fruit and vegetables for the community of Ipswich, Qld and could result in improved health outcomes for the community

Risks

There are no anticipated risks beyond normal day-to-day living associated with your participation in this project.

Privacy and Confidentiality

All comments and responses will be treated confidentially unless required by law.Prior to the interview recording, the researcher will ask you to nominate a pseudonym name to be referred to during the interview. This is to maintain your confidentiality. Only the researcher will know what pseudonym name refers to you. You will be recorded during the interview by a USB digital recording device. This recording will then be transcribed so that general themes can be identified from the interview data. The person transcribing the interviews will only know you by your pseudonym and this will be used to identify the recording. This ensures confidentiality of what you say in the interview. The recording will be used for no other purpose than what is outlined in this information sheet. The researcher and a person who will transcribe the information at the University of Southern Queensland will have access to the recording. Due to the analyses required of the interviews, it is not possible to participate in the project without being recorded. Post the interview the recording will be transcribed into a document. When this occurs, you will be sent a copy of the transcript so that you can check it for accuracy. You will also have an opportunity at this time to change what is included in the transcript. Any data collected as a part of this project will be stored securely as per University of Southern Queensland's Research Data Management policy.

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Thank you for taking the time to help with this research project. Please keep this sheet for your information.

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