Effects of Systemic Characteristics on the Quality of Family Day Care Services in Australia

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Abstract

The National Quality Standard (NQS) in Australia has set a national benchmark for the quality of education and care services, including long day care (LDC) and family daycare (FDC). However, previous studies have examined the influential factors on the quality and quality improvement in LDCs, leaving FDCs understudied. This study aims to explore the effects of systemic characteristics on FDC's NQS ratings, with a focus on management type (MT), socio-economic status (SES), community accessibility and remoteness (CAR) and managing jurisdiction (MJ). Altogether 441 FDC schemes across all states and territories of Australia were derived from the Australian Children's Education and Care Quality Authority's (ACECQA) national dataset, including 4 FDCs with an overall rating of "Significant Improvement Required", 209 FDCs with a rating of "Working Towards NQS", 170 with a rating of "Meeting NQS" and 58 with a rating of "Exceeding NQS". Multinomial logistic regressions (MLR) were conducted to predict FDC's overall NQS rating for each systemic characteristic, controlling for the NQS version assessed against (2012 vs 2018). The results indicated that: (1) private for-profit FDC schemes were more likely to have lower NQS ratings than not for profit schemes; (2) FDC schemes located in low-SES communities were more likely to have lower NQS ratings than their counterparts in high-SES communities; and (3) schemes located in metropolitan areas were more likely to have lower ratings than the schemes in regional or remote areas. Results indicated that MT, SES, CAR and MJ could explain up to 19.3%, 9.2%, 6.9% and 7.8% of the variation in FDC's NQS ratings, respectively. These findings imply that policy attention should be paid to the variations and inequalities caused by the major systemic features. In addition, efforts should be made to further explore the urban-rural and poor-rich gaps to promote equality and equity in early childhood education and care.

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Signed and dated declaration

I, VINCENT CHAR, declare that:

This thesis presents work carried out by myself and does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; to the best of my knowledge, it does not contain any materials previously published or written by another person except where due reference is made in the text; and all substantive contributions by others to the work presented, including jointly authored publications, is clearly acknowledged.

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List of Abbreviations

Family Day Care (FDC)

Early Childhood Education and Care (ECEC)

Long Day Care (LDC)

Quality Improvement and Accreditation System (QIAS)

Family Day Care Quality Assurance (FDCQA)

National Childcare Accreditation Council (NCAC)

Child Care Benefit (CCB)

Quality Area (QA)

National Quality Framework (NQF)

Early Years Learning Framework (EYLF)

National Quality Standard (NQS)

Australian Children's Education and Care Quality Authority (ACECQA)

Outside School Hours Care (OSHC)

My Time, Our Place: Framework for School Age Care in Australia (MTOP)

Quality Improvement Plan (QIP)

Significant Improvement Required (SIR)

Working Towards NQS (WT)

Meeting NQS (MEET)

Exceeding NQS (EXCEED)

National Quality Standard Assessment and Ratings Process (NQSARP)

Family Day Care Ratings Scale (FDCRS)

Sustained Shared Thinking and Emotional Well-being (SSTEW)

Early Childhood Environment Rating Scale—Extension (ECERS-E)

Management Type (MT)

Socio-economic Status (SES)

Community Accessibility and Remoteness (CAR)

Managing Jurisdiction (MJ)

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Chapter 1: Introduction

This chapter provides a description of the Australian context behind FDC. It proceeds to define quality in ECEC services and provided a description of the FDCRS. The chapter describes the link between NQS ratings and other ECEC quality scales. Systemic influences of Family Day Care quality reveals a research gap in how MT, SES, CAR and MJ influence FDC scheme NQS ratings. Finally, a description of how classical bioecological systems theory serves as the theoretical framework was provided, along with the research questions.

1.1. Australian Context

1.1.1. The ECEC System

1.1.1.1. Family Day Care

Family Day Care (FDC), also known as Family Child Care, is a form of early childhood education and care (ECEC) where an educator looks after children in their own home (Williamson et al., 2011; Corr et al., 2014). In Australia, FDC educators are contracted to or, in a minority of cases, employed by co-ordinated FDC schemes to provide regulated and paid child care (Corr et al., 2014). FDC educators care for up to seven children, of which a maximum of four are of preschool age and under. The seven children include the educator's own children younger than 13 years of age if there is no other adult to care for them (Australian Children's Education & Care Quality Authority, n.d.). In addition, FDC schemes employ fieldworkers who provide operational support and monitor the uptake of regulations and quality assurance standards (Corr et al., 2014; Ishimine & Tayler, 2012). There are over 500 FDC schemes making up 4% of ECEC services in Australia (ACECQA, 2021f; FDCA, 2019), with the majority of the schemes located in New South Wales, Victoria and Queensland (ACECQA, 2021a). Over 13,000 FDC educators in Australia care for 125,000 children, representing 9.5% of the total number of children attending publicly funded ECEC services in Australia (FDCA, 2019).

Internationally, disparities exist in terms of the regulation and training of FDC educators. In Australia, FDC is regulated and FDC educators are required to have completed or be studying an approved Certificate III level ECEC qualification (Kagan, 2018; Davis et al., 2012). In Germany, FDC was incorporated into the formal regulatory ECEC system in 2005 and FDC educators must demonstrate knowledge as an educator gathered from deep and qualified training courses or in any other way (§§ 23 Para. 3 and 43 Para. 2 SGB VIII as cited in Schoyerer & Weimann-Sandig, 2015). FDC is regulated in

Finland and FDC educators are required to have postsecondary non-tertiary level education in health and welfare (Kagan, 2018). By contrast, Canadian FDC regulations vary across provinces and territories: four jurisdictions require no training on the part of educators, eight require a minimum course of up to sixty hours, and one requires completion of the Canadian Child Care Federation Family Home Day Care Training course (Eckhardt & Egert, 2018). In England, FDC is unregulated and FDC educators attend a basic course about the education curriculum, but no formal education is required (Owen, 2016, as cited in Eckhardt & Egert, 2018; Kagan, 2018). In the United States, some FDC educators are regulated while others function as unregulated home-based carers (Morrissey, 2007, as cited in Bohanna et al., 2010).

While FDC is a common choice of ECEC in Australia and internationally, there are other types of approved ECEC in Australia. The next section describes the different types of approved ECEC parents in Australia can choose from.

1.1.1.2. Other types of approved Early Childhood Education and Care

FDC is one of many types of government funded ECEC available to families in Australia. Other forms of ECEC include long day care (LDC), in-home care, occasional care and preschool. LDC is a centre based form of ECEC for children age from 0 to 6 years. In home care is another flexible form of ECEC provided to eligible children by an educator in the child's home. Occasional care is a flexible form of centre based ECEC that can be accessed regularly r as needed (Sheppard, 2015). Preschools are structured learning programs that are play based and are delivered by a qualified teacher. Preschools are aimed at children in the year or two years prior to beginning full time school (Steering Committee for the Review of Government Service Provision, 2019).

1.1.2. Historical quality improvement systems

1.1.2.1. Child Care Act 1972

The publicly funded ECEC system in Australia originated from the *Child Care Act 1972*, which marked the start of the Australian Government becoming involved in ECEC on a formal basis (Irvine & Farrell, 2013; Logan et al., 2013). The legislation's primary purpose was to fund the establishment and operating costs of childcare centres for working parents, particularly given the increasing participation of women in paid employment at the time (Irvine & Farrell, 2013; Logan & Press, 2012). *The Child Care Act 1972* was significant that it 1) established publicly funded child care; and 2) acknowledged the need for government intervention to secure high quality child care (Logan et al., 2012). During the 1990s, the provision of accessible, affordable and quality childcare emerged as a public priority (Brennan, 1998). A market model was utilised to drive service expansion as the *Child Care Act 1972* was amended to allow public funding to be accessed by private for-profit providers (Elliot, 2006). The expansion of the ECEC system into a market-based approach necessitated the introduction of quality accreditation systems to ensure regulatory compliance and ECEC quality.

1.1.2.2. Quality Improvement and Accreditation System (QIAS) and the Family Day Care Quality Assurance (FDCQA)

FDC schemes were monitored under the historical Quality Improvement and Accreditation System (QIAS) and the Family Day Care Quality Assurance (FDCQA). The QIAS was a child care quality assurance and accreditation system administered by the National Childcare Accreditation Council (NCAC) from 1994 to 2011 (NCAC, 2005; Council Of Australian Governments, 2008). Participation in the QIAS was mandatory for ECEC services to access funding from the Child Care Benefit (CCB), a governmental benefit that significantly subsidised the cost of ECEC for parents. Failure to participate in the QIAS program led to parents being unable to access the CCB for that service. The QIAS thus became important in the maintenance of national ECEC quality standards (Ishimine et al., 2010). The QIAS initially consisted of 52 principles of quality. A review of the QIAS from 1998 to 2000 led to the introduction of 10 quality areas encompassing 52 principles. Further changes in 2004 led to 1) a reduction in the number of quality areas (QAs) from 10 to 7; 2) a reduction in the number of principles from 52 to 33; and 3) standardisation of unsatisfactory and satisfactory indicators (NCAC, 2005). The introduction of the QIAS thus created threshold standards in ECEC (Ishimine et al., 2010). The QIAS was also credited for mediating market forces and placing ECEC quality as a political factor (Logan et al., 2016).

The QIAS did not come without criticisms. The QIAS was criticized for a vague definition of quality, vague terminology, the lack of quality areas focusing on the daily experiences of children, undervaluing the value of an educational curriculum and not assessing it (Ishimine et al., 2010) and a lack of evidence towards its validity and reliability (Elliott, 2004). A high score from QIAS may not mean high quality compared to other quality measures (Ishimine et al., 2010). Such criticisms may originate from the manner in which the QIAS relied on self-reporting by staff for five of the seven QAs. Staff self-reporting has been noted for potentially being unreliable and invalid (Ishimine et al., 2010).

Differences between FDC and centre based ECEC services led to the QIAS being supplemented by the FDCQA for FDCs in 2001 (Ishimine & Tayler, 2012). Like the QIAS, the FDCQA was also administered by the NCAC and participation in it was required for families to access the CCB. The FDCQA consisted of six QAs: (1) Interactions, (2) Physical environment, (3) Children's experiences, learning and development, (4) Health, hygiene, nutrition, safety and wellbeing, (5) Carers and coordination unit staff and (6) Management and administration (Ishimine & Tayler, 2012). The FDCQA was only in place for a decade before both it and the QIAS were supplanted by the introduction of the National Quality Framework (NQF) (COAG, 2008). The next section will discuss the NQF in greater detail.

1.1.3. National Partnership

In 2008, the Council of Australian Governments (COAG), composed of the Commonwealth government and the various state and territory governments, agreed to the National Partnership Agreement on Early Childhood Education (COAG, 2008). The National Partnership Agreement on Early Childhood Education, in turn, established a unified national system for education and care called the National Quality Framework (NQF) (Raban & Kilderry, 2017). A national Early Years Learning Framework (EYLF) was established, along with a National Quality Standard (NQS) assessment and rating system (Department of Education, Employment and Workplace Relations, 2009; COAG, 2009).

The key features of the NQF included:

- the Australian Children's Education and Care Quality Authority (ACECQA), a national body responsible for assessing and managing the national system
- the NQS, a national benchmark for education and care quality standards

- the Education and Care Services National Law (National Law) and the Education and Care Services National Regulations (Regulations), a national system for the regulation and enforcement of the NQS (Shepherd, 2015)

The following sections discuss the EYLF and the NQS in more detail.

1.1.3.1. Belonging, Being and Becoming: The Early Years Learning Framework for Australia (EYLF)

The NQS is part of the National Regulations that apply to most LDC, FDC, kindergarten/preschool and outside school hours care (OSHC) services in Australia (ACECQA, 2017b). The NQS is linked to two approved learning frameworks: 1) Belonging, Being and Becoming: The Early Years Learning Framework for Australia (EYLF); and 2) My Time, Our Place: Framework for School Age Care in Australia (MTOP). In addition, a jurisdiction-specific approved learning framework exists in Victoria (ACECQA, 2017b). As FDC caters to both prior to school and school children, both the EYLF and the MTOP apply to FDC. The focus in this study will be on the EYLF as FDC only caters to school aged children during the school holidays and before and after school (Attorney-General's Department, n.d.). The EYLF is guided by the United Nations Convention on the Rights of the Child, which 1) states that all children have the right to an education that lays a foundation for the rest of their lives, maximise their ability, and respects their family, cultural and other identities and languages; and 2) recognises the right of children to play and be active participants in all matters affecting their lives (United Nations General Assembly, 1989). The fundamental vision of EYLF is that the lives of children are characterised by three aspects of "belonging", "being", and "becoming" (DEEWR, 2009, pp. 7). "Belonging" refers to an understanding of where and with whom children belong; it recognises the interdependence of children with others and the basis of relationships in defining identities. "Being" refers to children learning about themselves, building and maintaining relationships with others, and meeting challenges in daily life. "Becoming" refers to the process of change experienced by children in the early years (DEEWR, 2009). Five learning outcomes

support the three aspects: 1) that children have a strong sense of identity; 2) that children are connected with and contribute to their world; 3) that children have a strong sense of wellbeing; 4) that children are confident and involved learners; and 5) that children are effective communicators (DEEWR, 2009). In addition, the EYLF follows five principles focused on assisting children to achieve the five learning outcomes. The five principles reflect contemporary theories and research in relation to early childhood education (DEEWR, 2009). The five principles are: 1) secure, respectful and reciprocal relationships; 2) partnerships; 3) high expectations and equity; 4) respect for diversity; and 5) ongoing learning and reflective practice.

1.1.3.2. National Quality Standard (NQS)

The NQS is a Quality Rating and Improvement System (QRIS). QRISs are common in the United States and are designed to rate individual ECEC programs and improve ECEC (Sabol *et al.,* 2013). QRISs in the United States utilise a market-based approach to improve quality (Sabol *et al.,* 2013). NQS, as an Australian QRIS, differs in that it seeks to drive improvement through the use of Quality Improvement Plans (QIPs) as part of its rating and assessment process (ACECQA, 2017b). The NQS measures quality on four different levels. From smallest to largest the levels are: 1) the level of the element; 2) the level of the standard; 3) the level of the quality area (QA); and 4) the overall quality level (ACECQA, 2017b). The rating for each level is determined by the rating for the level preceding it, except for quality at the level of the element, which is determined on a "met/not met" system (ACECQA, 2017b). The name and description of each QA is provided in Table 1 (ACECQA, 2021c). The overall NQS rating is determined by a series of rules on how to combine the individual QAs into a single composite rating (ACECQA, 2017b). The rules determining the overall NQS quality rating are detailed further in section 1.1.3.3.

Table 1

Descriptions of the seven NQS quality areas

Quality area	Name	Description
Quality area 1	Educational program and practice	Educational program and practice of educators are child-centred, stimulating and maximise opportunities for enhancing and extending each child's learning and development
Quality area 2	Children's health and safety	Children have the right to experience quality education and care in an environment that safeguards and promotes their health, safety and wellbeing
Quality area 3	Physical environment of the approved provider	Physical environment is safe, suitable and provides a rich and diverse range of experiences that promote children's learning and development
Quality area 4	Staffing arrangements	Qualified and experienced educators, who develop warm, respectful relationships with children, create predictable environments and encourage children's active engagement in the learning program
Quality area 5	Relationships with children	Relationships with children are responsive, respectful and promote children's sense of security and belonging
Quality area 6	Collaborative partnerships with families and communities	Collaborative relationships with families are fundamental to achieving quality outcomes for children, and community partnerships based on active communication, consultation and collaboration are essential
Quality area 7	Governance and leadership	Effective leadership and governance of the service contributes to quality environments for children's learning and development

1.1.3.3. Overall National Quality Standard rating

The overall NQS rating is determined by the ratings assigned to the seven QAs. The NQS categorises each QA into one of four ratings through an assessment and rating process. Ranked in order from lowest to highest, the ratings are: 1) Significant Improvement Required (SIR); 2) Working Towards NQS (WT); 3) Meeting NQS (MEET); and 4) Exceeding NQS (EXCEED). ECEC services that attain a rating of EXCEED in all seven QAs are eligible to apply to ACECQA for the highest rating of "Excellent" (ACECQA, 2017b). However, less than 1% of all services are rated Excellent (ACECQA 2021a; 2021f). The specific rules to determine the NQS overall rating are as follows.

- Services assessed as SIR in any one QA will receive an overall NQS rating of SIR
- In the absence of any SIR QA ratings, services assessed as WT in any single QA will be assessed as WT overall.
- In the absence of any SIR/WT QA ratings, services that obtain a rating of EXCEED in up to four QAs will be rated MEET overall; if a rating of EXCEED is attained in four QAs, two of the four QAs must not be QAs 1, 5, 6 or 7.
- In the absence of any SIR/WT QA ratings, ECEC services that obtain a rating of EXCEED in at least four QAs, two of which must be QAs 1, 5, 6, or 7 will be rated EXCEED overall (ACECQA, 2017b).

The ratings assigned to each QA are themselves based on ratings assigned to standards within each QA. The rating assigned to each standard is based on ratings assigned to elements within each standard. Having described the rules governing the assignment of the overall NQS rating, section 1.1.3.4 will describe the NQS assessment and rating process.

1.1.3.4. National Quality Standard Assessment and Ratings Process (NQSARP)

The NQS assessment and ratings process (NQSARP) sets out the steps by which education and care services receive a quality rating. The NQSARP is undertaken by the relevant State/Territory government education and care authority (ACECQA, 2017b). The steps to the NQSARP are as follows: 1) self-assessment and quality improvement; 2) notice of visit; 3) assessment and ratings visit from assessors takes place at the service; 4) draft report; 5) feedback on the draft report; 6) final report and notice of final ratings are issued to the provider; 7) ratings published on national registers (ACECQA, 2017b). This section will describe the process.

In the self-assessment and quality improvement step, the service conducts a self-assessment of how and where its practices align with the NQS. The service identifies strengths and areas for improvement in a QIP (ACECQA, 2017b). In the notice of visit stage, the state or territory regulatory authority provides written notice to the service of the commencement of the NQSARP. The QIP is submitted to the regulatory authority (ACECQA, 2017b). There are some differences in how the NQSARP is applied to centre based services and FDC schemes. For example, while centre based services receive a 4-week notice period prior to the assessment, there is no requirement for FDC schemes to receive a standardised length of notice period (FDCA, 2019). In the third stage, assessors visit the service at the beginning and end of the assessment and rating visit (ACECQA, 2017b), which takes between one to two days (Phillips, 2020). When assessing FDC schemes, assessors will also visit a sample of one or more FDC educators at the FDC venue or residence. The sample is determined by the regulatory authority, not the FDC scheme (ACECQA, 2017b). The assessment visit involves the use of “observe”, “discuss” and “sight” techniques to gather evidence of how the service meets or fails to meet the 40 elements of the NQS. A draft report is then written and the ECEC service has the opportunity to provide feedback to the

regulatory authority. A final report is then written, although the service has the option to apply for a review (ACECQA, 2017b).

Services with lower quality ratings are re-rated more frequently than services with higher quality ratings (ACECQA, 2017b). However, it has been noted that regulatory authorities may not employ enough assessors to assess services (Phillips, 2020). The NQS was revised in 2018. Section 1.1.3.5 describes the differences between the 2018 version of the NQS and the 2012 version.

1.1.3.5. 2012 and 2018 versions of the NQS

In 2018, a revised version of the NQS was implemented. While no changes were made on the QA level, the revised 2018 version of the NQS had fewer standards and elements than the 2012 version. There are 15 standards and 40 elements in the 2018 version compared with 18 standards and 58 elements in the 2012 version (table 2) (ACECQA, 2017d). The 2018 version also introduced three thematic concepts that need to be demonstrated for services to attain an EXCEED rating: 1) practice is embedded in service operations; 2) practice is informed by critical reflection; and 3) practice is shaped by meaningful engagement with families and/or the community (ACECQA, 2017c). In addition, in order to be rated EXCEED in a QA, a service must attain an EXCEED rating in all standards within that QA (ACECQA, 2017c).

Table 2

Number of standards and elements within each quality area for the 2012 and 2018 versions of the NQS

	2018		2012	
	Number of standards	Number of elements	Number of standards	Number of elements
Quality Area 1	3	9	2	9
Quality Area 2	2	6	3	10
Quality Area 3	2	5	3	7
Quality Area 4	2	4	2	4
Quality Area 5	2	4	2	6
Quality Area 6	2	6	3	9
Quality Area 7	2	6	3	13

(ACECQA, 2021d; 2021e).

1.1.3.6. Criticisms of the NQS

The NQS, as a QRIS, has been criticized on a number of levels. First, the NQS has been criticized for adopting measures that do not measure child outcomes to assess quality as a QRIS (Siraj et al., 2019). Indicators such as the quality of the physical environment (comparable to NQS QA 3) are only modestly related to the skill of children (Sabol et al., 2013). And family partnerships, comparable to NQS QA 6, have even less evidence of a link to child outcomes (Sabol et al., 2013). Second, the NQS has been criticized for failing to consistently yield links to learning after their multiple indicators are aggregated and converted to ratings (Siraj et al., 2019). Finally, the NQS has been critiqued for obscuring the meaning of individual elements linked to child outcomes by highlighting an overall measure of quality based on a combined instructional, process and compliance element score (Siraj et al., 2019).

1.2. Defining quality in Early Childhood Education and Care

Research into ECEC quality has been generally classified into one of three categories: 1) quality at the level of the system; 2) process quality; and 3) structural quality. Quality at the level of the system refers to ECEC as an overarching system composed of a number of sub-systems (Employment and Social Development Canada [ESDC], 2019). The manner in which the sub-systems operate and interconnect determines the quality of ECEC services. Process quality refers to the experiences of children in childcare, including their relationships, materials and activities (Phillipsen et al., 1997). Structural quality refers to aspects that are covered by regulations (e.g., educator qualifications, group size and educator to child ratios) (Harrison, 2008). Structural child-care quality has been linked directly to process child-care quality, which, in turn, is linked to child outcomes (National Institute of Child Health and Human Development, 2002).

1.2.1. Quality at the level of the system

Quality at the level of the system is determined through the strength of linkages between components of the overall ECEC system (ESDC, 2019). ECEC experts unanimously believe that high quality would be best established at the systems level (ESDC, 2019). Studies into Sure Start Local Programmes (SSLP) in the UK have suggested that greater integration of services tends towards some benefits for targeted children (Belsky et al., 2006; Melhuish et al., 2007). Greater integration is thought to lend itself to improve service quality, promote stability in the learning environment of children, and encourage smoother transitions from child care to school (Corter et al., 2009). In Hong Kong, implementation of policies and incentives to improve the quality of ECEC on a systems level was essential to ensure access to all children (Rao & Li, 2009). Prior to reforms, kindergartens in Hong Kong had been noted to be of poor quality (Li et al., 2010; Li & Rao, 2005; Li et al., 2008). Improving quality at the level of the system improves overall ECEC quality.

General systems theory (von Bertalanffy, 1968) underpins the concept of quality at the level of the system. General systems theory is a science that investigates general laws for complex arrangements called systems (Sieniutycz, 2019). It views phenomena as a web of relationships between elements which cumulatively make up a system (Kagan et al., 2016). Within systems theory, complex patterns can only be understood when the relationships between the elements that compose them are considered (Laszlo, 1996). General systems theory constituted a paradigm shift from considering the whole as unchangeable closed system to a series of sub-systems that interact with each other and the environment (Luhmann, 1995). Whilst general systems theory has been applicable to many fields, it has been linked to child development through bioecological systems theory (Kagan et al., 2016).

Bioecological systems theory (Bronfenbrenner, 1979) is a theory of child development whereby the child is influenced by four environmental systems: the microsystem, the mesosystem, the exosystem and the macrosystem. The microsystem refers to the objects a child responds to and the people a child interacts with directly, and the complex interactions between them (Bronfenbrenner, 1979). Settings in the microsystem are the child's family, school and neighbourhood (Moser et al., 2014). The exosystem refers to settings that do not directly involve the child as an active participant, but which nevertheless affect the child's immediate environment (Bronfenbrenner, 1979). The mesosystem is defined as a set of interrelations between two or more settings. In these settings, the developing person becomes an active participant – for example, a child's involvement in school (Moser et al., 2014). The fourth level in this theory is the macrosystem, which contains the values and beliefs of the culture in which the child is growing up (Bronfenbrenner, 1979).

1.2.2. Process quality

In terms of bioecological systems theory, process quality is about the direct experiences of the child (Moser et al., 2014). Process quality includes staff to child interactions and development focused curricula. A number of studies suggested that educator to child interactions contribute to improved academic and social outcomes (Downer et al., 2010; O'Connor & McCartney, 2007; Ponitz et al., 2009; von Suchodoletz et al., 2017). Some studies suggest that educators who were trained in educator to child interactions contributed to improvement in child self-regulation (Raver et al., 2011) and pre-academic skills (Mashburn et al., 2010)

Curriculum plays a role in supporting children to develop school readiness skills in ECEC (Yoshikawa et al., 2013). In a meta-analysis of the effects of early childhood curricula on social-emotional competence in children from low income families, it was found that curricula can produce social-emotional benefits for children (Yang et al., 2019). Furthermore, curricula focused on development, together with concurrent professional development and progress monitoring, are thought to improve preschool child outcomes (Dickinson, 2011; Yoshikawa et al., 2013). .

1.2.3. Structural quality

In terms of bioecological systems theory, structural quality is about 1) the mesosystems that connect the series of proximal processes the child engages in while attending FDC; and 2) the exosystems that connect the micro-systems to societal institutions such as statutory quality regulation and monitoring systems, funding policies, and macro-economic factors (Moser et al., 2014). Structural quality encompasses educator to child ratios, group size, space and physical environment of the

provider, and educator qualifications. The following sections will describe educator to child ratios, group size, space and physical environment, and educator qualifications in greater detail.

1.2.3.1. Educator to child ratios

There is mixed evidence regarding the influence of the ratio of educators to children on global quality. Higher educator to child ratios has been related to higher quality teaching and interactions, better provisions for learning and health (Stein, 2010) and benefits for child development (Dalli et al., 2011; Huntsman, 2008; Phillips & Lowenstein, 2011). In classrooms with a low educator to child ratio, more hours per week spent in care predicted lower adjustment on hyperactivity and conduct problems, and more conduct problems for children who entered ECEC at a young age (Kohl et al., 2020). In another study, the quality of the relationships between 414 children aged 14 months and 54 months and educators in child care classrooms organised by ratio and group size according to Federal Interagency Day Care Requirements (FIDCR) and by the Early Childhood Environmental Ratings Scale (ECERS) and the Infant and Toddler Environmental Rating Scales (ITERS) was studied. Higher educator to child ratios were associated with higher levels of appropriate caregiving (Howes et al., 1992).

However, a systemic review of 29 studies evaluating the link between educator to child ratios in preschool ECEC programs and children's outcomes reported that a majority of studies reported non-significance associations between ratios and children's approach to learning, cognitive outcomes, physical outcomes, math outcomes and language outcomes (Perlman et al., 2017). Higher levels of cortisol change in children, a measure of stress, was reported in centres where the educating team was made up of more than four adults (Legendre, 2003). Educator to child ratios have been found to be not significantly related to a measure of overall quality or educator sensitivity when other caregiver characteristics were also considered (Burchinal et al., 2002).

1.2.3.2. Group size

Group size was generally found to negatively correlated with child outcomes. A study of 113 children in France found group size to be positively correlated with levels of cortisol change in children, where levels of cortisol is a measure of stress (Legendre, 2003). Group size was negatively associated with caregiver sensitivity in a study of 202 FDC educators from five of the United States (Forry et al., 2013). However, a study of 414 children in the United States found no association between group size and appropriate caregiving (Howes et al., 1992).

1.2.3.3. Space and physical environment

The physical environment has been linked to child development (Evans, 2006). The physical environment has been found to support creativity in children (Hong et al., 2009; Warner & Myers, 2009; Richardson & Mishra, 2018). Classroom density level (square foot per child) also been suggested to influences preschooler behaviour and attention deficits (Maxwell, 1996). One study investigated the morning cortisol changes of 113 children (18 to 40 months) in eight publicly funded day care centres in Paris and Budapest. It was found that morning cortisol increases were related to less available space per child (Legendre, 2003).

1.2.3.4. Educator qualifications

There is mixed evidence that educator qualifications specific to ECEC are influential to quality ECEC. High levels of educator qualifications were found to be necessary for high quality ECEC with infants and toddlers (Dalli et al., 2011; Munton et al., 2002). Formal education within ECEC for educators

was found to predict appropriate caregiving for infants (Whitebook & Phillips, 1992, cited in Tout, et al., 2005). By contrast, in a study of 130 family day care providers in California, Texas and North Carolina, training was found to not affect process quality (Kontos et al., 1996). In an analysis of seven studies of ECEC to predict classroom quality and four year old academic outcomes from educator qualifications, a lack of evidence in support of an association between educator qualifications and classroom quality or child academic gains was found (Early et al., 2007). In another study, higher levels of educator background in relation to early childhood did not predict quality (Stein, 2010).

Quality in ECEC can be classified into three categories: 1) quality at the level of the system; 2) process quality; and 3) structural quality. Having defined quality in ECEC, the next section will describe how quality in FDC is measured.

1.3. Measurement of quality in FDC

The quality of FDC can be measured through the FDC Ratings Scale (FDCRS; Harms & Clifford, 1989). The FDCRS was developed in the United States as a standardised tool to assess FDCs, FDC educators, and the interactions between children, the environment and the educator (Harms & Clifford, 1989). The scale thus attempts to define quality in FDC in a standardised manner (Rowland et al., 1996). The FDCRS was adapted from the Early Childhood Environment Scale, which was developed for children aged 2 ½ to 5 years in a preschool or centre based child care (ECERS; Harms & Clifford, 1980).

The FDCRS is composed of six subscales (32 items). The subscales relate to space and furnishings for care and learning (six items), basic care (seven items), language and reasoning (four items), learning activities (nine items), social development (three items) and adult needs (three items). A criterion based scale is used to score each item, where a score of one represents inadequate quality

and a score of seven represents excellent quality (Harms & Clifford, 1989). A specific set of criteria is required to be met before the next score on the scale can be met (Harms & Clifford, 1989). The reliability and validity of the FDCRS has been reported from a number of researchers from the United States and Canada (Rowland et al., 1996). The FDCRS was found to be reliable in the United Kingdom, provided some modifications were made to the scale (Rowland et al., 1996). A second version of the FDCRS, called the Family Child Care Environmental Rating Scale Revised (FCCERS-R) (Harms et al., 2007), and a third version (FCCERS-3) (Harms et al., 2019) have been released. The FDCRS (e.g. Burchinal et al., 2002; Doherty et al., 2006; Forry et al., 2013; Kontos et al. 1996) and FCCERS-R (e.g. Kelton et al., 2013; Porter & Reiman, 2015) have been widely used in literature to measure quality in FDCs.

1.4. Link between NQS ratings and other ECEC quality scales

Research into NQS ratings, while limited, can be categorised into 1) research into characteristics of services that are rated at different levels of quality; and 2) research into the link between NQS quality and other ECEC research scale. This section will describe both categories in greater detail.

Services that attain varying levels on the NQS overall rating can be differentiated on the basis of constructs that define quality. In one study, detailed content analysis was used to examine differences in quality levels for the NQS. Intentionality, frequency, extent and inclusivity were found to be four constructs found to most commonly differentiate between NQS quality levels (Jackson, 2015). A subsequent study sought to understand the context and characteristics of services that were rated as MEET or EXCEED. Three constructs were found to define quality as 1) goal orientation to children's learning; 2) the reach of educator practice in seeking to attain these goals; and 3) the process by which leadership in a service supports educator's practice (Thorpe et al., 2021).

NQS overall quality ratings have been compared to ECEC research scales. While a lack of research linking NQS with ECEC research scales exists, NQS ratings are often interpreted as interchangeable with research measurements of quality in ECEC (Siraj et al., 2019). The NQS was thus compared with the Sustained Shared Thinking and Emotional Well-being (SSTEW) and Early Childhood Environment Rating Scale—Extension (ECERS-E). NQS and quality scale data were analysed from 257 ECEC services across three Australian states. Centres were selected for representation and not representativeness across a range of characteristics. The SSTEW and ECERS-E were selected because they focus on curricular quality and interactional quality (Siraj et al., 2019). Modest positive associations between the NQS and the two scale scores were found. However, there were high levels of variability on scale measures within NQS rating designations. Several centres achieving high-quality scores on ECERS-E and SSTEW were rated as not yet meeting the NQS, and the reciprocal pattern was also common (Siraj et al., 2019)

1.5. Systemic influences of Family Day Care quality

The importance of ECEC quality has led to a plethora of research into factors that predict quality in ECEC (e.g., Votruba-Drzal et al., 2004; Sims et al., 2006; Sylva et al,. 2012). Characteristics of ECEC services that have been identified to predict quality include 1) management type (MT); 2) socio-economic status (SES); 3) community accessibility and remoteness (CAR); 4) managing jurisdiction (MJ). This section will describe in further detail how the literature identifies how each factor may predict FDC quality.

1.5.1. Management type (MT)

MT was found to affect ECEC quality internationally. An analysis of data from four U.S. states in the Cost, Quality, and Child Outcomes study found for profit ECEC services to be of lower quality than not for profit ECEC services (Blau, 2000). Subsidised not for profit ECEC services were found to be of higher levels of quality than unsubsidised for profit ECEC services in a study of 57 ECEC services in Connecticut (Kagan & Newton, 1989). In a study examining the 1976-77 National Day Care Centre Supply Study, federally regulated not for profit ECEC services were found to offer higher levels of quality than federally regulated for profit ECEC services (Preston, 1993). A study of 227 ECEC services in five metropolitan areas in the United States found not for profit ECEC services rated higher than for profit ECEC services on two measures of process quality (Whitebook et al., 1990). Not for profit child care services have been noted to be of higher quality than care provided by for-profit services. The higher quality of care was thought to be due to choices relating to the lower child–staff ratios, better-educated staff and directors, and higher rates of professional development for staff in Canada (Cleveland & Krashinsky, 2009).

MT has been found to influence ECEC quality in Australia. National data has shown that a higher proportion of for profit ECEC services in Australia, along with outside school hours care (OSHC) services, were rated WT than not for profit services or services managed by schools (ACECQA, 2021a). The Quality Improvement Research Project (QIRP) commissioned by ACECQA analysed systemic characteristics that were associated with long day care services that previously attained an overall NQS rating of WT and improved that rating to MEET or EXCEED in their most recent NQS assessment. Not for profit services were found to be more likely to improve to a MEET rating from a WT rating than for profit services (Harrison et al., 2019). While 1) the proportion of ECEC and OSHC services attaining each overall NQS rating category by MT is reported regularly by ACECQA (2021a); and 2) the influence of MT on services that underwent a NQS assessment after being assessed as WT has been studied, there is a lack of data on A) whether MT can predict FDC scheme overall NQS quality ratings; and, if so, B) how much of the variance in FDC scheme overall NQS quality ratings can be explained by MT. An investigation examining the influence of MT on FDC scheme NQS quality outcomes may thus be worthwhile.

1.5.2. Socio-economic status (SES)

The international literature is conflicted as to whether SES is a key influence on ECEC quality. In a study of child care arrangements for approximately 3,000 toddlers and 6,000 4 year olds in the United States, the magnitude of quality difference between formal and informal early childhood education was examined. SES was found to indirectly influence ECEC quality. It was noted that the formal ECEC sector offered higher quality care across a variety of measures and that informal programs were more common in lower-income communities. However, there was no direct evidence of a socio-economic effect on FDC quality (Bassok & Galdo, 2016). Another study examined ECEC quality in centres and home-based

settings in five cities in California, Connecticut, and Florida. Mothers who worked longer hours during the week, an indicator of socio-economic disadvantage, tended to select lower quality ECEC providers (Fuller et al., 2004). While it was noted that Asian Americans (mainly Vietnamese) selected home-based providers that scored lower levels of quality on the Arnett scale than providers selected by families of other ethnicities, there is a lack of clarity as to whether Asian Americans were of lower socio-economic status (Fuller et al., 2004). A Vancouver study found no statistical significance on basic socio-economic status variables between higher-quality FDC providers and lower quality groups. However, there were statistical differences in training background, licensing, employment motivation, caregiving practices and perceptions of caregiving (Pence & Goelman, 1991).

SES was found to influence ECEC quality in Australia. Higher proportions of ECEC and OSHC services located in the bottom 20% of SES communities were rated WT as compared to ECEC and OSHC services located in the top 20% of SES communities (ACECQA, 2020). A study of 421 classrooms found there was significantly less availability of ECEC in low SES areas and that programs provided a lower average quality of care than in more advantaged neighbourhoods (Cloney et al., 2016). The QIRP found ECEC services located in the top 20% of SES communities were more likely to improve to a rating of EXCEED from a rating of WT compared to ECEC services located in SEIFA the bottom 20% of SES communities (Harrison et al., 2019). By contrast, a study examining the extent to which the NQS predicted scores in the ECERS-E and the SSTEW, no statistical difference was found between ECEC services located in communities of differing levels of socio-economic status (Siraj et al., 2019). While 1) the proportions of ECEC and OSCH services attaining each overall NQS rating category has been compared between ECEC and OSCH services located in low SES communities and ECEC services located in high SES communities (ACECQA, 2020); 2) the influence of SES on ECEC services that underwent a NQS assessment after being assessed as WT has been studied; and 3) the extent to which NQS ratings predictions of ECERS-E and SSTEW ratings are influenced by SES has been examined, there is a lack of

data on A) whether the influence of SES on FDC scheme overall NQS quality ratings is statistically significant; and B) how much of the variance in FDC scheme overall NQS quality ratings can be explained by SES. An investigation examining the influence of SES on FDC scheme NQS quality outcomes may thus be worthwhile.

1.5.3. Community accessibility and remoteness (CAR)

Accessibility to quality and affordable ECEC services in rural areas is identified as a problem in China (Hong & Chen, 2017; Hu et al., 2014), Nepal (Khanal et al., 2017), Taiwan (Leung & Chen, 2017), Vietnam (Boyd & Phuong, 2017) and the United States (Maher et al., 2008; Anderson & Mikesell, 2019). In Vietnam, quality of ECEC services in rural areas is affected by a shortage of qualified teachers (Boyd & Phuong, 2017). A study of the quality of 91 kindergartens in rural Zhejiang province found that private kindergartens had problems recruiting high quality teachers and problems funding the purchase of furnishings, equipment and educational materials (Hu et al., 2014). In another study, differences in structural and process quality measurements were investigated in 172 classrooms in rural West Virginia. The majority of classrooms were found to be of "fair" or "poor" quality, suggesting a lack of high quality ECEC options in rural West Virginia (Hartman et al., 2016).

CAR was linked to ECEC quality in Australia. A higher proportion of ECEC and OSHC services located in metropolitan regions of Australia were rated as EXCEED than ECEC and OSHC services located in regional Australia or remote areas of Australia (ACECQA, 2020). Similarly, higher proportions of ECEC services located in remote areas of Australia were rated as WT than ECEC services located in regional Australia or metropolitan Australia (ACECQA, 2000). The QIRP examined the influence of CAR on whether ECEC services in Australia were likely to improve from a WT rating. CAR was not found to have

a statistically significant effect on the likelihood of a long day care service improving from WT (Harrison et al., 2019). In a study testing the extent to which the NQS predicted scores in the ECERS-E and the SSTEW, CAR was found to make a statistically significant difference in the SSTEW model, but not the ECERS-E. However, the sample was not geographically representative, and the researchers did not make further examinations (Siraj et al., 2019). Yet it remains unclear A) whether the influence of CAR on FDC scheme overall NQS quality ratings is statistically significant; and B) how much of the variance in FDC scheme overall NQS quality ratings can be explained by CAR. An investigation examining the influence of CAR on FDC scheme NQS quality outcomes should thus be encouraged.

1.5.4. Managing jurisdiction (MJ)

The MJ of FDC schemes was found to be a predictor of quality in international ECEC. In one study from the United States, the state the ECEC service was located in was a significant predictor of observed quality as measured by the FDCRS total score and the subscales of Tone and Discipline and Provisions for Learning and Health (Stein, 2010). It was suggested that regulatory differences between States potentially impact the quality of care offered in FDC. However, the state the ECEC service was located in did not predict the quality of educator-child interactions as measured by CIS subscales or the Teaching and Interactions subscale of the FDCRS (Stein, 2010). It was proposed that MJs are more likely to impact standards of health and safety and less likely to impact the types of behaviour that would be assessed by the FDCRS Teaching and Interactions subscale or by the CIS (Stein, 2010). A study of 120 FDCs in Kansas, Nebraska, Missouri and Iowa found that regulation and lower proportions of children receiving public child care subsidies, two MJ based variables, were associated with higher global quality in FDCs (Raikes et al., 2005).

Within Australia, there has been a trend towards ensuring more consistent regulatory requirements of different MJs, as described in section 1.1.3. Despite the introduction of the NQF, MJ was found to influence ECEC service quality in Australia. The ACT and South Australia were the only MJs where over 40% of ECEC and OSHC services were rated EXCEED (ACECQA, 2020). The QIRP found the MJ of the ECEC to have a statistically significant effect on whether services that were rated as WT improved. Compared to services in New South Wales, 1) services in Queensland and Victoria were more likely to improve to MEET than to have no change from a previous WT rating; and 2) services in Queensland, South Australia and Victoria were less likely to improve to EXCEED from a previous WT rating as compared to an improvement to MEET from a previous WT rating (Harrison et al., 2019). However, in another study, regression analysis showed adding MJ to a model of socio-economic status, geographic region, service type and maximum number of places did not improve the fit of a model predicting the association between the NQS and the ECERS-E and SSTEW ratings scales. MJ was not found to influence the two ratings scales. However, only 3 states were included in the analysis (Siraj *et al.* 2019). On the whole, there is a lack of clarity as to whether the influence of MJ on FDC scheme overall NQS quality ratings is statistically significant, and how much of the variance in FDC scheme overall NQS quality ratings can be explained by MJ. An investigation examining the influence of MJ on FDC scheme NQS quality outcomes would provide such clarity.

1.6. Conceptual framework and conclusion

Most research about FDC comes from the United States (Bohanna et al., 2010). While FDC in Australia is regulated (FDCA, 2019) and has been regulated since the 1970s (Bohanna et al., 2010), FDC in the United States includes a large proportion of unregulated FDC educators. Many findings about FDC in the United States thus may not be applicable to FDC in Australia. Within Australia, there was a gap in the literature as to whether 1) MT; 2) SES; 3) CAR; and/or 4) MJ influences FDC scheme overall NQS ratings. An examination of quality at the level of the system as to how FDC systemic characteristics influence overall NQS quality ratings would serve to fill that literature gap.

An examination of quality at the level of the system can be undertaken using Bronfenbrenner's original version of bioecological systems theory (Bronfenbrenner, 1979), henceforth referred to as classical bioecological systems theory, as a theoretical framework. Classical bioecological systems theory is based on general systems theory (Kagan et al., 2016), which posits that complex patterns can only be understood when the relationships between the elements that compose them are considered (Laszlo, 1996). Unlike the contemporary version of bioecological systems theory, which is based on a Process-Person-Context-Time model (PPCT) (Bronfenbrenner, 2005; Bronfenbrenner & Evans, 2000; Bronfenbrenner & Morris, 2006), classical bioecological systems theory is based on a theory of four interacting environmental subsystems. The four interacting environmental subsystems, which make up the "context" aspect of PPCT, influence child development as part of a larger system (Tudge et al., 2009). The four environmental sub-systems of classical bioecological systems theory are: 1) the microsystem; 2) the mesosystem; 3) the exosystem; and 4) the macrosystem. The microsystems consists of any environment in which the child spends time engaging in activities and interactions (Bronfenbrenner, 1979; Tudge et al., 2009). Within the context of this study, the microsystem consists of the child's home and the FDC the child attends. The mesosystem includes the interrelations between

microsystems (Bronfenbrenner, 1979), including curriculum characteristics and pedagogical approaches (Bronfenbrenner, 1996). The exosystem refers to contexts in which the child is not directly situated within, but which nonetheless influence the child indirectly (Bronfenbrenner, 1979). The macrosystem are contexts that encompass groups, cultures or other social structures, whose members hold common values or beliefs systems (Bronfenbrenner, 1993; Tudge et al., 2009). The systemic characteristics: MT, SES, CAR and MJ thus fit within the macrosystem.

A distinction is made between classical bioecological systems theory and contemporary bioecological systems theory to avoid conceptual incoherence and inadequate testing of the theory (Tudge et al., 2009). In a study of 25 papers that were 1) published between the years 2001 and 2009; and 2) explicitly described as being based on Bronfenbrenner's theory, 21 were not based on the contemporary version of the theory. Explicitly stating that the conceptual foundation for the study is based on the classical theory and not contemporary theory avoids conceptual incoherence and inadequate testing of the theory.

Having described 1) the gap in the literature; and 2) the conceptual framework of the study, the following are presented as the research questions for the study:

Research question 1: How do MT, SES, CAR and MJ influence the likelihood of a FDC scheme attaining a rating of WT/SIR as opposed to MEET?

Research question 2: How do MT, SES, CAR and MJ influence the likelihood of a FDC scheme attaining a rating of WT/SIR as opposed to EXCEED?

Research question 3: How do MT, SES, CAR and MJ influence the likelihood of a FDC scheme attaining a rating of MEET as opposed to EXCEED?

Chapter 2: Methods

This chapter provides a description of the dataset analysed during the study. It proceeds to describe the systemic characteristics: management type (MT), socio-economic status (SES), community accessibility and remoteness (CAR) and managing jurisdiction (MJ). It also describes the covariate: version of the National Quality Standard (NQS). The chapter describes the type of analysis considered for the study and the manner in which Multinomial Logistic Regression was used to answer the research questions.

2.1. Dataset

The initial dataset consisted of 507 FDC schemes included in the NQS q4 2020 data set of which 441 had completed an NQS assessment. The remaining 66 FDC schemes were excluded from the dataset due to not having completed an NQS assessment. The final dataset thus consisted of a population of 441 FDC schemes of which 4 (0.9%) received an overall NQS rating of SIR, 209 (47.4%) received a rating of WT, 170 (38.5%) received a rating of MEET, and 58 (13.1%) received a rating of EXCEED. No FDC schemes attained an overall NQS rating of EXCEL, although 14 were eligible to apply for the designation having been rated EXCEED in all seven QAs (ACECQA, 2017b; 2021f). Thus, as a population, the data is representative of FDC in Australia. The following section describes the dependent variables (i.e., measures of overall quality), independent variables (i.e., systemic characteristics of the FDC schemes) and the covariate (i.e., the version of the NQS tested against) extracted from the dataset.

2.1.1. NQS overall rating

The nominal dependent variable in this study is the overall NQS rating of the FDC scheme. At the overall level of NQS quality, rules are created on how to combine individual indicators into a composite quality rating (Sabol et al., 2013; ACECQA, 2017b). The overall NQS quality scale which is based on the ratings given to the seven QAs and governed by rules set by the NQS. NQS was coded in SPSS 27.0 as follows: SIR = 0, WT = 1, MEET = 2, EXCEED = 3.

2.1.2. Systemic characteristics

This section describes the systemic characteristics (i.e., independent variables) analysed in the study. The systemic characteristics analysed in the study are MT, SES, CAR and MJ. This section describes each systemic characteristic in greater detail.

2.1.2.1. Management type (MT)

There are four FDC schemes MTs in Australia: 1) private for profit (n = 248; 56.2%); 2) private not for profit – community managed (n = 72; 16.3%); 3) private not for profit – other organisations (n = 42; 9.5%); and 4) State/Territory and local government managed (n = 79; 17.9%) (ACECQA, 2021f). The MT was coded in SPSS 27.0 software as follows: 1 = private for profit; 2 = private not for profit – community managed; 3 = private not for profit – other organisations; and 4 = State/Territory and local government managed

2.1.2.2. Socio-economic status (SES)

SES was measured using the Socio-Economic Indexes for Areas (SEIFA). SEIFA was developed by the Australian Bureau of Statistics (ABS). The ABS uses information from Australia's Census, conducted every five years, to develop SEIFA (ABS, 2021a). SEIFA uses four indexes: 1) the Index of Relative Socio-Economic Disadvantage (IRSD); 2) the Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD); 3) the Index of Education and Occupation (IEO); and 4) the Index of Economic Resources (IER).

The SEIFA classification for each FDC scheme was included as part of the NQS q4 2020 dataset as SEIFA deciles. A SEIFA decile of 10 represented the highest level of socio-economic advantage (and the lowest level of socio-economic disadvantage) and a SEIFA decile of 1 represented the lowest level of

socio-economic advantage (and highest level of socio-economic disadvantage) (ABS, 2021a). The SEIFA deciles was converted into SEIFA quintiles. SEIFA deciles 1 and 2; 3 and 4; 5 and 6; 7 and 8; 9 and 10 were converted into SEIFA quintiles 1 (n = 181; 41.0%), 2 (n = 88; 19.9%), 3 (n = 58; 13.2%), 4 (n = 58; 13.2%) and 5 (n = 31; 7.0%), respectively. 25 FDC schemes (5.7%) had no SEIFA deciles linked to them from the dataset. The FDC schemes with no reported SEIFA deciles were treated as missing data by SPSS 27.0 software and not included in the analysis for SES. A SEIFA quintile of 5 represented the highest level of socio-economic advantage (and lowest level of socio-economic disadvantage) and a SEIFA quintile of 1 represented the lowest level of socio-economic advantage (and highest level of socio-economic disadvantage) (ABS, 2021a).

2.1.2.3. Community Accessibility and Remoteness (CAR)

CAR was measured by the Accessibility and Remoteness Index of Australia (ARIA+), a measure of accessibility and remoteness in Australia. ARIA+ is a general access model covering education, health, shopping, public transport, and financial/postal services produced by the Hugo Centre for Population and Migration Studies (HCPMS). It is the basis for the Australian Bureau of Statistics (ABS) classification of remoteness (ABS, 2021b). ARIA+ measures remoteness based on road distance from over twelve thousand population localities across Australia to the nearest town or locality (Service Centre) based on population size. Population size is used as a proxy measure representative of service availability at a given location (Versace et al., 2019) through five service centre categories: 1) category A (urban centre populations of 250,000 persons or more); 2) category B (urban centre populations of 48,000 to 249,999 persons); 3) category C (urban centre populations of 18,000 to 47,999 persons); 4) category D (urban centre populations of 5,000 to 17,999 persons); 5) category E (urban centre populations of 1,000 to 4,999 persons). The distance from a community to the nearest Service Centre in each category is

determined and then divided by the national average for each category. The quotient is capped at 3 to standardise the results. The standardised value of each of the five Service Centre categorised are added to produce an overall value between 0 (high accessibility) and 15 (highly remote) for each population locality (HCPMS, 2021).

The result of the ARIA+ process are five classifications of CAR: 1) major cities of Australia (n = 300; 68.0%); 2) inner regional Australia (n = 88; 20.0%); 3) outer regional Australia (n = 47; 10.7%), (4) remote Australia (n = 4; .9%); and (5) very remote Australia (n = 2; .5%). CAR was coded in SPSS 27.0 software as follows: major Cities of Australia = 1; inner regional Australia = 2; outer regional Australia = 3; remote Australia = 4; and Very Remote Australia = 5.

2.1.2.4. Managing jurisdiction

MJ refers to the state or territory that are responsible for managing education and care services (ACECQA, 2021f). There are eight MJs in Australia that manage FDCs composed of six states (New South Wales (n = 147; 33.2%), Victoria (n = 133; 30.2%), Queensland (n = 100; 22.9%), Western Australia (n = 30; 6.9%), South Australia (n = 12; 2.7%), Tasmania (n = 10; 2.1%)) and two territories (Australia Capital Territory (ACT) (n = 6; 1.4%); Northern Territory (NT) (n = 3; 0.7%)). MJ was coded in SPSS 27.0 software as follows: New South Wales = 1; Victoria = 2; Queensland = 3; Western Australia = 4; South Australia = 5; Tasmania = 6; ACT = 7; Northern Territory = 8.

2.1.3. Covariate

The NQS version refers to the version of the NQS that the FDC scheme was assessed and rated against. The NQS version is a feature of the dataset. There were two versions of the National Quality Standard: the 2012 version and the 2018 version (ACECQA, 2021f). MLR was thus performed to ascertain the overall NQS rating of FDC schemes, given the version of the NQS the FDC scheme had been assessed against. The logistic regression model was statistically significant, $\chi^2(8) = 29.968$, $p < .001$; Pearson's $\chi^2(6) = 8.731$, $p = .189$. The version of the NQS was subsequently added to the multinomial logistic regression for each systemic characteristic as a covariate. NQS version was coded as follows: 1 = 2012 version of the NQS (n = 205; 46.9%); 2 = 2018 version of the NQS (n = 232; 53.1%).

2.2. Analysis

All analysis was conducted using SPSS 27.0 software. Descriptive statistics in the forms of frequencies were undertaken for each FDC Scheme characteristic. This section will describe 1) the types of analysis considered for the research questions; 2) the manner in which MLR was selected as the type of analysis for the study; and 3) how MLR were conducted to answer the research questions.

2.2.1. Types of analysis considered

A number of types of analysis were considered as the method of analysis in order to answer the research questions. This section will describe 1) simple linear regression; 2) one way analysis of variance (ANOVA); 3) ordinal logistic regression; and 4) binomial logistic regression and why they were considered unsuitable.

In a simple linear regression, the linear relationship between two continuous variables is assessed to predict the dependent variable's value based on the independent variable's value (LS, n.d.a). However, linear regression was unsuitable because NQS overall rating was not a continuous variable (LS, n.d.a).

The one-way analysis of variance (ANOVA) is used to ascertain whether there are any statistically significant differences between the means of two or more independent groups (LS, n.d.b). A key assumption of ANOVA is that the dependent variable should be continuous (LS, n.d.b). As NQS overall rating was not a continuous variable, ANOVA was not suitable for the study.

Ordinal logistic regression is used to predict an ordinal dependent variable given one or more independent variables (LS, n.d.c). The NQS overall rating outcomes were converted into ordinal variables (i.e., SIR = 0; WT = 1; MEET = 2; EXCEED = 3) and an ordinal logistic regression was run with the overall NQS rating as the dependent variable, MT as the independent variable and the version of the NQS as a covariate. The Pearson's goodness of fit test analyses how poor the model is at predicting the outcome. A statistically significant result of a Pearson's goodness of fit test indicates the model is not a good fit. The output of the ordinal logistic regression test suggested that the model was invalid (Pearson's χ^2= 25.339, $p < .001$). To confirm the result, another ordinal logistic regression was run with overall NQS rating as the dependent variable, MJ as the independent variable and the version of the NQS as a covariate. 18.9% of the covariate patterns had expected frequencies of zero in the output of the ordinal regression, suggesting the model was invalid. As a solution, FDC schemes in Western Australia, South Australia, Tasmania, ACT and NT were combined into a single category (n = 60; 13.7%). The regression was repeated with four categories (New South Wales, Victoria, Queensland and other). The output of the ordinal logistic regression test suggested that the model was invalid (Pearson's $\chi^2(10) = 26.768$, $p = .003$). The failure of the ordinal logistic regression test to produce a valid model

suggested that, perhaps counterintuitively, caution should be applied to the idea of any inherent order between SIR, WT, MEET and EXCEED.

A binomial logistic regression is used to predict the odds of an event occurring where the dependent variable is dichotomous (i.e., has two outcomes) and there is one or more independent variables that can be categorical or continuous (LS, n.d.d). It was not suitable because the dependent variable (NQS overall rating) had three major categories and not two. However, MLR is similar to binomial logistic regression except it allows for dependent variables having three or more categories.

2.2.2. Multinomial logistic regression (MLR)

A MLR attempts to predict the probability that an observation falls into one of three or more categories of a dependent variable based on one or more independent variables that can be either continuous or categorical (LS, n.d.e). In this study, MLR was used to answer research questions 1, 2 and 3.

The suitability of MLR for the study rested on four assumptions being met:

1. The dependent variable should be measured at the nominal level.
2. The independent variables are continuous, ordinal or nominal
3. There should be independence of observations and the dependent variable should have mutually exclusive and exhaustive categories.
4. There should be no outliers, high leverage values or highly influential points (LS, n.d.e).

The data met the assumptions for MLR:

1) A nominal variable is a variable that has one or more categories, but there is no inherent ordering to the categories. The dependent variable, overall NQS rating, had four categories (SIR, WT, MEET and EXCEED). The failure of the ordinal regression to produce a valid model suggested a lack of inherent ordering to the categories
2) MT, CAR, and MJ were nominal variables; SES was an ordinal variable.
3) Each FDC scheme had a single overall NQS rating. Therefor the dependent variable had mutually exclusive and exhaustive categories.
4) A casewise analysis was performed using SPSS 27.0 software to identify potential outliers. Casewise analysis produced standardised residuals for each FDC scheme. Standardised residuals are a measure of the strength of the difference between observed values and expected values in chi-square testing. Standardised residuals over a value of 3 were considered as potential outliers. However, there were no datapoints with standardised residuals equal to or over 3. Therefore, no datapoints were taken to be outliers.

Having found no violations of assumptions, MLR was selected as the method of analysis.

The FDC scheme overall NQS quality rating was the nominal dependent variable. SIR, WT, MEET and EXCEED were the sub-categories of the nominal dependent variable. The four FDC characteristics were the independent variables.

Having described how MLR was selected as the method of analysis, the next section will describe the preliminary analysis of covariate patterns.

2.2.3. Preliminary Analysis: Covariate Patterns

Preliminary analysis of the dataset revealed multiple covariate patterns with expected frequencies of zero. The result suggested a need to modify the dataset categories prior to further analysis. An understanding of covariate patterns is necessary to conceptual the need to alter dataset categories. A covariate pattern is a unique combination of independent variables. For example, private for profit FDC schemes located within a SEIFA quintile 1 community that was assessed under the 2012 version of the NQS is one covariate pattern. A regression with MT as the independent variable and version of the NQS as a covariate will result in 32 covariate patterns (i.e., 4 MTs x 2 versions of the NQS x 4 NQS rating outcomes = 32 covariate patterns); a regression with MT and SES as two independent variables in a regression with version of the NQS as a covariate will result in 160 covariate patterns (i.e., 4 MTs x 5 quintiles of SES x 2 versions of the NQS x 4 NQS rating outcomes = 160 covariate patterns). In order for a MLR model to be valid: 1) there should be few covariate patterns with expected cell frequencies of zero (ideally none at all); and 2) the proportion of expected cell frequencies greater than 5 should be 80% or more (LS, n.d.e). The inclusion of SIR as a separate NQS ratings outcome in regressions leads to covariate patterns with expected cell frequencies of zero. As a result, FDC schemes with a SIR rating were combined with the group of FDC schemes with a WT rating. The coding was as follows: SIR = 1; WT = 1; MEET = 2; EXCEED = 2. The combination of both groups is sensible conceptually. NQS assessors rate services on whether each element is met or unmet. If the assessor decides the element was not met, the next step is to decide if the element was not met on a WT level or if it was not met on a SIR level (ACECQA, 2017b). A category of WT/SIR thus consists of all FDC schemes that failed to feet at least one NQS element. The removal of FDC schemes with a SIR rating from the dataset was considered and rejected. While the removal of outliers from a sample should be considered

with caution, this study analysed a population of FDC schemes. Removing outliers from a population would make the resultant model inherently less reliable.

A preliminary MLR was conducted with the 2012 vs 2018 version of the NQS as the independent variable and the overall NQS rating as the dependent variable. The model was statistically significant, χ^2 (2) = 15.416, $p < .001$. The version of the NQS was subsequently entered as a covariate for the regressions with each of the four systemic characteristics.

Each of the four systemic characteristics was entered individually into separate regressions. Entering more than one systemic characteristic in the regression model along with version of the NQS as a covariate resulted in 1) numerous covariate patterns with expected cell frequencies of zero; 2) the proportion of expected cell frequencies greater than 5 exceeding 80%, which suggested that the regression model was of dubious validity. Thus, a maximum of one systemic characteristic was entered into the regression equation at a time along with version of the NQS as a covariate.

However, entering the systemic characteristics, CAR and MJ, respectively, with version as an NQS as a covariate in a regression resulted in numerous covariate patterns with expected cell frequencies of zero. The models were thus of dubious validity. In order to create a model of more trustworthy validity, 1) the CAR categories with the lowest accessibility (and highest remoteness) levels: outer regional Australia (n = 47), remote Australia (n = 4) and very remote Australia (n = 2) were combined into a single category; and 2) the MJs with populations of under three million: Western Australia (n = 30), South Australia (n = 12), Tasmania (n = 10), ACT (n = 6) and NT (n = 3) were combined into a single sub-category. The regression was repeated with the new sub-categories. There were 1) no covariate patterns with expected cell frequencies of zero; and 2) the proportion of expected cell frequencies greater than 5 was over 80%, which suggested that there were no problems with the model relating to covariate patterns. Having solved covariate problems with frequencies of zero, regressions

were performed to answer research questions 1, 2 and 3. Details of the plan behind the regressions are provided in section 2.2.4.

2.2.4. Analysis Plan

To answer research question 1 and research question 2 a set of MLRs were conducted. WT/SIR was set as the reference category for the dependent variable.

The validity of the model was tested with a chi-square test and confirmed with a Pearson's goodness of fit test. The Pearson's goodness of fit test analysis how poor the model is at predicting the outcome. A statistically insignificant result of a Pearson's goodness of fit test indicates the model is a good fit. The nagelkerke R^2 was used to determine how much of the variation in overall NQS rating scores the model explained. To account for potential increases in Type I error (i.e., false positives) due to a large number of statistical tests being run from the regression, statistical significance was taken at a critical value of .05 divided by the total number of predictor variables (i.e., $p < .025$) (Tabatchnick & Fidell, 2007).

For the first set of regressions, the different sub-groups within each systemic characteristic were compared to each other by setting different sub-groups as the reference category. For example, for SES, SEIFA quintile 3 was selected as the reference category. The chances of FDC schemes in SEIFA quintiles 1, 2, 4 and 5 communities to attain a rating of WT/SIR rather than MEET as compared to FDC schemes in SEIFA quintile 3 communities were calculated through the regression. The regression could then be repeated with FDC schemes in SEIFA quintile 2 communities as the reference category. The chances of FDC schemes in SEIFA quintile 2 communities to attain a rating of WT/SIR rather than MEET could then be compared with those of the other four SEIFA quintiles. The process was repeated with FDC schemes in SEIFA quintile 1 and quintile 4 communities, respectively set as the reference category. In this

manner, the regression was repeated with different reference categories 1) three times for MT; 2) four times for SES; 3) two times for CAR; 4) and three times for MJ. The output model does not change when a different reference category is set (LS, n.d.e).

The odds ratio computes the chances of a particular event happening in comparison to the event not happening (Petrucci, 2009). The odds ratio for research question 1 computed the chances of a FDC scheme attaining a rating of WT /SIR as opposed to a rating of MEET. The odds ratio for research question 2 computed the chances of a FDC scheme attaining a rating of WT /SIR as opposed to a rating of EXCEED.

To answer research question 3, the second set of multinomial logistic regressions were conducted. MEET was set as the reference category for the dependent variable.

As with research questions 1 and 2, model validity was tested with a chi-square test and confirmed with a Pearson's goodness of fit test. Nagelkerke R^2 was used to determine the level of variation in overall NQS rating scores explained by the model. Statistical significance was taken at $p <$ .025 to account for the increased Type I error due to a large number of statistical tests being run from the regression (Tabatchnick & Fidell, 2007).

For this set of regressions, the different sub-groups within each systemic characteristic were compared to each other by setting one sub-group as the reference category. Then, in order to compare every sub-category within each systemic characteristic with every other sub-category, the regression was repeated with different reference categories: 1) three times for MT; 2) four times for SES; 3) two times for community CAR; 4) and three times for MJ.

The odds ratio computes the chances of a particular event happening in comparison to the event not happening (Petrucci, 2009). The odds ratio for research question 3 computed the chances of a FDC scheme attaining a rating of MEET as opposed to a rating of EXCEED.

This chapter described the types of analysis considered for the study. It described how MLR was selected as the method of analysis. Next, a description of the preliminary analysis involving covariate patterns was provided. Finally, the analysis plan behind the regressions detailed how the data to answer the research questions would be obtained was provided. Chapter 3 will provide the results of the study.

Chapter 3: Results

This chapter provides a description of the results of the study. It provides the overall NQS ratings across FDC scheme management type (MT), socio-economic status (SES) community accessibility and remoteness (CAR) and managing jurisdiction (MJ). The chapter proceeds to describe how each systemic characteristic influenced FDC scheme NQS ratings.

3.1. Overall NQS ratings across systemic characteristics

Table 3 shows the number of FDC schemes attaining overall NQS ratings of SIR, WT, MEET and EXCEED for each of systemic characteristics. Amongst the four MTs, FDC schemes in the private for profit category had higher proportions of WT ratings (61.7%) and lower proportions of MEET ratings (32.3%) and EXCEED ratings (5.2%) than the private not for profit – community managed (30.6%; 50.0%; 18.1%, respectively), private not for profit – other organisations (26.2%; 50.0%; 21.4%, respectively) or state/territory and local government managed (29.1%; 41.8%; 29.1%, respectively) categories. Amongst SES quintiles, FDC schemes in quintile 3 had lower proportions of WT ratings (36.2%) compared to FDC schemes in quintile 1 (50.3%), quintile 2 (50.0%) or quintile 4 (41.4%). FDC schemes in quintile 3 also had higher proportions of MEET ratings (58.6%) and lower proportions of EXCEED ratings (5.2%) than FDC schemes in quintile 1 (37.0%; 12.2%, respectively), quintile 2 (37.5%; 11.4%, respectively), quintile 4 (36.2%; 22.4%, respectively) and quintile 5 (35.5%; 25.8%, respectively). Regarding CAR, FDC schemes in major cities of Australia had higher proportions of WT ratings (53.0%) and lower proportions of MEET ratings (34.3%) than FDC schemes in inner regional Australia (35.2%; 45.5%, respectively) or outer regional Australia (34.0%; 51.1%, respectively). Amongst MJs, Queensland FDC schemes had lower proportions of WT ratings (46.9%), a higher proportion of MEET ratings (46.0%) and a higher proportion of EXCEED ratings than New South Wales FDC schemes (46.9%; 41.5%; 10.2%, respectively), Victorian FDC schemes (52.6%; 36.1%; 10.5%, respectively) and Western Australia (73.3%; 10.0%; 16.7%).

Table 3

Overall NQS quality ratings by systemic characteristic

		Significant Improvement Required		Working Towards NQS		Meeting NQS		Exceeding NQS	
	n	f	%	f	%	f	%	f	%
Management type									
Private for profit	248	2	.8	153	61.7	80	32.3	13	5.2
Private not for profit - community managed	72	1	1.4	22	30.6	36	50.0	13	18.1
Private not for profit - other organisations	42	1	2.4	11	26.2	21	50.0	9	21.4
State/territory and local government managed	79	0	0	23	29.1	33	41.8	23	29.1
Socio-economic status									
Quintile 1	181	1	.6	91	50.3	67	37.0	22	12.2
Quintile 2	88	1	1.1	44	50.0	33	37.5	10	11.4
Quintile 3	58	0	0	21	36.2	34	58.6	3	5.2
Quintile 4	58	0	0	24	41.4	21	36.2	13	22.4
Quintile 5	31	1	3.2	11	35.5	11	35.5	8	25.8
Community accessibility/remoteness									
Major cities of Australia	300	2	.7	159	53.0	103	34.3	36	12.0
Inner regional Australia	88	1	1.1	31	35.2	40	45.5	16	18.2
Outer regional Australia	47	1	2.1	16	34.0	24	51.1	6	12.8
Remote Australia	4	0	0	3	75.0	1	25.0	0	0
very remote Australia	2	0	0	0	0	2	100.0	0	0
Managing Jurisdiction									
New South Wales	147	2	1.4	69	46.9	61	41.5	15	10.2
Victoria	133	1	.8	70	52.6	48	36.1	14	10.5
Queensland	100	0	0	35	35.0	46	46.0	19	19.0
Western Australia	30	0	0	22	73.3	3	10.0	5	16.7
South Australia	12	0	0	8	66.7	3	25.0	1	8.3
Tasmania	10	1	10.0	4	40.0	3	30.0	2	20.0
ACT	6	0	0	1	16.7	4	66.7	1	16.7
NT	3	0	0	0	0	2	66.7	1	33.3

The following sections will describe the models generated from the multinomial logistic regression in relation to each systemic characteristic. Each section will also describe how each systemic characteristic relates to the three research questions.

3.2. Management type

MLRs were performed with private for profit as the reference category and repeated with private not for profit – community managed, and private not for profit – other organisations as the reference categories, respectively, to ascertain the overall NQS rating of FDC schemes. MT as the independent variable and the version of the NQS was a covariate. As 1) the MT categories lacked both intrinsic ordering and a well defined numerical distance between them (Zhang et al., 2015); and 2) differences in frequency values, across MTs may influence statistical significance calculations, repeating the regression with different reference categories was necessary to compare every combination of MTs. The logistic regression models were statistically significant, $\chi^2(8) = 80.307$, $p < .001$; Pearson's $\chi^2(6) = 8.894$, $p = .180$, respectively. The model respectively explained 19.3% (Nagelkerke R^2) of the variance in the overall NQS rating.

3.2.1. Likelihood of attaining WT/SIR as opposed to MEET for Management Type

Private for profit FDC schemes were more likely to be rated WT/SIR than MEET as compared to 1) community managed private not for profit FDC sch*emes (odds ratio* = 2.96; $p < .001$); 2) private not for profit FDC schemes managed by other organisations (odds ratio = 3.35; $p = .002$); and 3) state/territory and local government managed FDC schemes (odds ratio = 2.741=; $p = .001$) (Table 4).

Table 4

Logistic regression comparing the likelihood of a WT/SIR rating compared with a MEET rating for management type

	B	SE	Wald	*df*	*P*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Private not for profit – community managed	1.09	.30	12.77	1	.000***	2.96	1.63	5.37
Private not for profit – other organisation	1.21	.39	9.73	1	.002**	3.35	1.57	7.17
State/territory and local government managed	1.01	.31	10.88	1	.001**	2.74	1.51	4.99
Private for profit	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Other than as compared to private for profit FDC schemes, 1) community managed private not for profit FDC schemes; 2) private not for profit FDC schemes managed by other organisations; and 3) state/territory and local government managed FDC schemes were not more or less likely to be rated WT/SIR than MEET as compared to any other MT (The results of these analyses are presented in Appendix A).

3.2.2. Likelihood of attaining WT/SIR as opposed to EXCEED for Management Type

Private for profit FDC schemes were more likely to be rated WT/SIR than EXCEED as compared to 1) community managed private not for profit FDC schemes (odds ratio = 8.86; $p < .001$); 2) private not for profit FDC schemes managed by other organisations (odds ratio = 10.01; $p < .001$); and 3) state/territory and local government managed FDC schemes (odds ratio = 13.88; $p < .001$) (table 5).

Other than as compared to private for profit FDC schemes, 1) community managed private not for profit FDC schemes; 2) private not for profit FDC schemes managed by other organisations; and 3) state/territory and local government managed FDC schemes were not more or less likely to be rated WT/SIR than EXCEED as compared to any other management type (Appendix A).

Table 5

Logistic regression comparing the likelihood of a WT/SIR rating compared with an EXCEED rating for management type

	B	SE	Wald	*df*	*P*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Private not for profit – community managed	2.18	.47	21.73	1	.000***	8.86	3.54	22.17
Private not for profit – other organisation	2.31	.54	18.37	1	.000***	10.10	3.51	29.09
State/territory and local government managed	2.63	.43	38.26	1	.000***	13.88	6.03	31.95
Private for profit	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

3.2.3. Likelihood of attaining MEET as opposed to EXCEED for Management Type

Private for profit LDC schemes were more likely to be rated MEET than EXCEED as compared to 1) community managed private not for profit FDC schemes (odds ratio = 2.99; $p = .017$); and 2) state/territory and local government managed FDC schemes (odds ratio = 5.06; $p < .001$), but not as compared to private not for profit FDC schemes managed by other organisations (odds ratio = 3.01; $p = .031$). The odds ratio for the latter is provided as the *p* value approaches significance and is thus noteworthy (Table 6).

Other than as compared to private for profit FDC schemes, 1) community managed private not for profit FDC schemes; 2) private not for profit FDC schemes managed by other organisations; and 3) state/territory and local government managed FDC schemes were not more or less likely to be rated MEET than EXCEED as compared to any other management type (Appendix A).

Table 6

Logistic regression comparing the likelihood of a MEET rating compared with an EXCEED rating for management type

	B	SE	Wald	*df*	*P*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Private not for profit – community managed	1.10	.46	5.74	1	.017*	2.99	1.22	7.33
Private not for profit – other organisation	1.10	.51	4.63	1	.031	3.01	1.10	8.23
State/territory and local government managed	1.62	.42	15.09	1	.000***	5.06	2.23	11.48
Private for profit	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

3.3. Socio-economic Status

A MLR was performed with SEIFA quintile 3 as the reference category and repeated with SEIFA quintiles 1, 2, and 4 as the reference categories to ascertain the overall NQS rating of FDC schemes given community socio-economic advantage as an independent variable and the version of the NQS as a covariate. As differences in frequency values across SEIFA quintiles may influence statistical significance calculations, repeating the regression with different reference categories was necessary to compare every combination of SEIFA quintiles. The logistic regression model was statistically significant, $\chi^2(10) =$

34.286, $p < .001$; Pearson's $\chi^2(8) = 6.738$, $p = .565$. The model explained 9.2% of the variance in the overall NQS rating.

3.4.1. Likelihood of attaining WT/SIR as opposed to a MEET rating for socio-economic status

FDC schemes in SEIFA quintile 3 were less likely to be classified as WT/SIR than MEET as compared to FDC schemes in SEIFA quintile 1 (odds ratio = 0.44; $p = .011$), but not as compared to FDC schemes in 1) SEIFA quintile 2 (odds ratio = .45; $p = .026$); 2) SEIFA quintile 4 ($p = .120$); or 3) SEIFA quintile 5 ($p = .264$). The comparison between FDC schemes in SEIFA quintile 3 and FDC schemes in SEIFA quintile 2 approaches significance and is thus noteworthy (Table 7).

Other than as compared to FDC schemes in SEIFA quintile 3, FDC schemes in 1) SEIFA quintile 1; 2) SEIFA quintile 2; 3) SEIFA quintile 4; and 4) SEIFA quintile 5 were not more or less likely to be classified as WT/SIR than MEET as compared to FDC schemes in other SES categories (Appendix A).

Table 7

Logistic regression comparing the likelihood of a WT/SIR rating compared with a MEET rating for socio-economic status

	B	SE	Wald	*Df*	*P*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Quintile 1	-.81	.32	6.45	1	.011*	.44	.23	.83
Quintile 2	-.80	.36	4.94	1	.026	.45	.22	.91
Quintile 4	-.64	.41	2.41	1	.120	.53	.24	1.18
Quintile 5	-.56	.50	1.25	1	.264	.57	.21	1.53
Quintile 3	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

3.4.2. Likelihood of attaining WT/SIR as opposed to EXCEED for socio-economic status

FDC schemes in SEIFA quintile 3 were not more likely to be classified as WT/SIR than EXCEED as compared to 1) SEIFA quintile 1 ($p = .369$); 2) SEIFA quintile 2 ($p = .496$); 3) FDC schemes in SEIFA quintile 4 ($p = .046$); or 4) FDC schemes in SEIFA quintile 5 ($p = .052$) (table 8).

Other than as compared to FDC schemes in SEIFA quintile 3, FDC schemes in 1) SEIFA quintile 1; 2) SEIFA quintile 2; 3) SEIFA quintile 4; and 4) SEIFA quintile 5 were not more or less likely to be classified as WT/SIR than EXCEED as compared to FDC schemes in other SES categories (Appendix A).

Table 8

Logistic regression the comparing the likelihood of a WT/SIR rating compared with an EXCEED rating for socio-economic status

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Quintile 1	.60	.67	.81	1	.369	1.82	.49	6.72
Quintile 2	.49	.72	.46	1	.496	1.63	.40	6.60
Quintile 4	1.43	.71	3.99	1	.046	4.17	1.03	16.89
Quintile 5	1.50	.78	3.77	1	.052	4.50	.98	20.57
Quintile 3	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

3.4.3. Likelihood of attaining MEET as opposed to EXCEED for socio-economic status

FDC schemes in SEIFA quintile 3 were more likely to be classified as MEET than EXCEED as compared to FDC schemes in 1) SEIFA quintile 4 (odds ratio = 7.86; $p = .004$); or 2) SEIFA quintile 5 (odds ratio = 7.88; $p = .007$), but not as compared to FDC schemes in 1) SEIFA quintile 1 (odds ratio = 4.12; $p = .031$); or 2) SEIFA quintile 2 ($p = .070$) (table 9). The comparison between FDC schemes in SEIFA quintile 3 and FDC schemes in SEIFA quintile 1 approaches significance and is noteworthy.

Other than as compared to FDC schemes in SEIFA quintile 3, FDC schemes in 1) SEIFA quintile 1; 2) SEIFA quintile 2; 3) SEIFA quintile 4; and 4) SEIFA quintile 5 were not more or less likely to be classified as MEET than EXCEED as compared to FDC schemes in other SES categories (Appendix A).

Table 9

Logistic regression comparing the likelihood of a MEET rating compared with an EXCEED rating for socio-economic status

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Quintile 1	1.42	.66	4.63	1	.031	4.12	1.12	14.96
Quintile 2	1.29	.71	3.29	1	.070	3.62	.90	14.58
Quintile 4	2.06	.71	8.46	1	.004**	7.86	1.96	31.55
Quintile 5	2.06	.77	7.15	1	.007**	7.88	1.74	35.82
Quintile 3	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

3.4. Community accessibility and remoteness

A MLR was performed with "major cities of Australia" as the reference category and repeated with "inner regional Australia" as the reference category in order to ascertain the overall NQS rating of FDC schemes given CAR as an independent variable and the version of the NQS as a covariate. As differences in frequency values across CAR categories may influence statistical significance calculations, repeating the regression with different reference categories was necessary to compare every combination of CAR. The logistic regression models were statistically significant, $\chi^2(6) = 27.193$, $p < .001$; Pearson's $\chi^2(4) = 7.696$, $p = .103$. The model respectively explained 6.9% in overall NQS rating.

3.5.1 Likelihood of attaining WT/SIR as opposed to MEET for community accessibility and remoteness

FDC schemes in major cities of Australia were more likely to be rated WT/SIR than MEET as compared to FDC schemes in inner regional Australia (odds ratio = 1.94; $p = .014$), but not as compared to FDC schemes in outer regional Australia, remote Australia and very remote Australia (odds ratio =

2.05; p = .026). However, the p value of .026 for the latter comparison approaches significance and is noteworthy (Table 10).

FDC schemes in inner regional Australia were not more or less likely to be rated WT or SIR than MEET as compared to FDC schemes in outer regional Australia, remote Australia, and very remote Australia (p = .889) (Appendix A).

Table 10

Logistic regression comparing the likelihood of a WT/SIR rating compared with a MEET rating for community accessibility and remoteness

	B	SE	Wald	*df*	*P*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Inner regional Australia	.66	.270	6.07	1	.014*	1.94	1.14	3.29
Outer regional Australia + remote Australia + very remote Australia	.72	.32	4.93	1	.026	2.05	1.09	3.85
Major cities of Australia	0			0				

Note: *p < .025; ** p < .01; *** p < .001

3.5.2. Likelihood of attaining WT/SIR as opposed to EXCEED for community accessibility and remoteness

FDC schemes in major cities of Australia were more likely to be rated WT/SIR than EXCEED as compared to FDC schemes in inner regional Australia (odds ratio = 2.30; p = .022) but not as compared to the combined FDC schemes in outer regional Australia, remote Australia or very remote Australia (p = .393) (Table 11).

FDC schemes in inner regional Australia were not more likely to be rated WT/SIR than EXCEED as compared to FDC schemes in outer regional Australia, remote Australia and very remote Australia (p = .480) (Appendix A).

Table 11

Logistic regression the comparing the likelihood of a WT/SIR rating compared with an EXCEED rating for community accessibility and remoteness

	B	SE	Wald	*df*	*P*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Inner regional Australia	.83	.36	5.28	1	.022*	2.30	1.13	4.68
Outer regional Australia + remote Australia + very remote Australia	.44	.51	.73	1	.393	1.54	.57	4.18
Major cities of Australia	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

3.5.2. Likelihood of attaining MEET as opposed to EXCEED for community accessibility and remoteness

FDC schemes in major cities of Australia were not more likely to be rated MEET than EXCEED as compared to FDC schemes in inner regional Australia ($p = .637$) but also not as compared to FDC schemes in outer regional Australia, remote Australia or very remote Australia ($p = .575$) (table 12).

FDC schemes in inner regional Australia were not more likely to be rated MEET than EXCEED as compared to FDC schemes in outer regional Australia, remote Australia, and very remote Australia ($p = .413$) (Appendix A).

Table 12

Logistic regression comparing the likelihood of a MEET rating compared with an EXCEED rating community accessibility and remoteness

	B	SE	Wald	*df*	*P*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Inner regional Australia	.17	.36	.22	1	.64	1.19	.58	2.41
Outer regional Australia + remote Australia + very remote Australia	-.28	.50	.31	1	.58	.76	.28	2.02
Major cities of Australia	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

3.5. Managing jurisdiction

A MLR was performed with FDC schemes managed by Queensland as the reference category and repeated with FDC schemes managed by New South Wales and Victoria, respectively, as the reference categories in order to in order to ascertain the overall NQS rating of FDC schemes given MJ as an independent variable and the version of the NQS as a covariate. As 1) MJ categories lacked both intrinsic ordering and a well defined numerical distance between them (Zhang et al., 2015); and 2) differences in frequency values across MJs may influence statistical significance calculations, repeating the regression with different reference categories was necessary to compare every combination of MJs. The logistic regression models were statistically significant, $\chi^2(8) = 30.664$, $p < .001$; Pearson's $\chi^2(6) = 8.662$, $p = .193$. The model explained 7.8% (Nagelkerke R^2) of the variance in the overall NQS rating.

3.6.1. Likelihood of attaining WT/SIR as opposed to MEET for managing jurisdiction

FDC schemes managed by Queensland were less likely to be rated WT or SIR than MEET as compared to FDC schemes managed by 1) Western Australia, South Australia, Tasmania, ACT, and NT (odds ratio = .32; p = .003), but not as compared to FDC schemes managed by NSW (p = .107) or Victoria (odds ratio = .528; p = .030). However, the p value in the case of the latter approaches significance and is noteworthy (Table 13).

FDC schemes managed by Victoria were more likely to be rated WT/SIR than MEET as compared to the combined FDC schemes managed by Western Australia, South Australia, Tasmania (odds ratio = 3.13; p = .003) (Table 14). The FDC schemes managed by New South Wales were not statistically significantly more or less likely to be rated WT/SIR than MEET as compared to FDC schemes managed by 1) Victoria (p = .502); or 2) Western Australia, South Australia, Tasmania (p = .056) (Appendix A).

Table 13

Logistic regression comparing the likelihood of a WT/SIR rating with a MEET rating for Managing Jurisdiction (Queensland reference category)

	B	SE	Wald	*df*	*P*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
New South Wales	-.46	.29	2.59	1	.107	.63	.36	1.10
Victoria	-.64	.29	4.74	1	.030	.53	.30	.94
Western Australia + South Australia + Tasmania + ACT + NT	-1.14	.38	8.99	1	.003*	.32	.15	.67
-Queensland	0			0				

Note: *p < .025; ** p < .01; *** p < .001

Table 14

Logistic regression comparing the likelihood of a WT/SIR rating compared with a MEET rating for Managing Jurisdiction (Victoria reference category)

	B	SE	Wald	*df*	*P*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Western Australia + South Australia + Tasmania + ACT + NT	1.14	.38	8.98	1	.003**	3.13	1.485	6.61
Victoria	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

3.6.2. Likelihood of attaining WT/SIR as opposed to EXCEED for managing jurisdiction

FDC schemes managed by Queensland were less likely to be rated WT/SIR than EXCEED as compared to FDC schemes managed by Victoria (odds ratio = .33; $p = .007$), but not as compared to FDC schemes managed by 1) Western Australia, South Australia, Tasmania, ACT and NT ($p = .133$) or 2) New South Wales ($p = .058$) (table 15).

FDC schemes managed by New South Wales were not more or less likely to be rated WT or SIR than EXCEED as compared to FDC schemes managed by 1) Western Australia, South Australia, Tasmania ($p = .866$); or 2) Victoria ($p = .421$) (Appendix A).

FDC schemes managed by Victoria were not more or less likely to be rated WT or SIR than MEET as compared to FDC schemes managed by Western Australia, South Australia, Tasmania ($p = .163$) (Appendix A).

Table 15

Logistic regression the comparing the likelihood of a WT/SIR rating compared with an EXCEED rating for Managing Jurisdiction

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
New South Wales	-.78	.41	3.58	1	.058	.46	.21	1.03
Victoria	-1.11	.41	7.23	1	.007**	.33	.15	.740
Western Australia + South Australia + Tasmania + ACT + NT	-.70	.46	2.26	1	.133	.50	.20	1.24
Queensland	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

3.6.3. Likelihood of attaining MEET as opposed to EXCEED for managing jurisdiction

FDC schemes managed by Queensland were not less likely to be rated MEET than EXCEED as compared to FDC schemes managed by 1) New South Wales ($p = .433$); 2) Victoria ($p = .250$); or 3) Western Australia, South Australia, Tasmania, ACT and NT ($p = .383$) (table 16).

FDC schemes managed by New South Wales were not less likely to be rated MEET than EXCEED as compared to FDC schemes managed by 1) Western Australia, South Australia, Tasmania, ACT and NT ($p = .138$); or 2) Victoria ($p = .709$) (Appendix A).

FDC schemes managed by Victoria were not statistically significantly less likely to be rated MEET than EXCEED as compared to FDC schemes managed by Western Australia, South Australia, Tasmania, ACT and NT ($p = .075$) (Appendix A).

Table 16

Logistic regression comparing the likelihood of a MEET rating compared with an EXCEED rating for Managing Jurisdiction

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
New South Wales	-.320	.41	.60	1	.441	.73	.33	1.62
Victoria	-.48	.42	1.31	1	.253	.62	.27	1.41
Western Australia + South Australia + Tasmania + ACT + NT	.444	.50	.790	1	.374	1.56	.58	4.16
Queensland	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

3.6. Concluding comments

Results indicated that private for profit FDC schemes were found to have lower NQS ratings than not for profit FDC schemes. Private for profit FDC schemes were more likely to 1) be rated WT/SIR than MEET; and 2) be rated WT/SIR than EXCEED as compared to A) community managed private not for profit FDC schemes; B) private not for profit FDC schemes managed by other organisations; and C) state/territory and local government managed FDC schemes. They were more likely to be rated MEET than EXCEED as compared to 1) community managed private not for profit FDC schemes; and 2) state/territory and local government managed FDC schemes.

FDC schemes located in low SES communities were more likely to have lower NQS ratings than their counterparts in high-SES communities. FDC schemes in SEIFA quintile 3 were lesslikely to be classified as WT/SIR than MEET as compared to FDC schemes in SEIFA quintile 1. They were also more likely to be classified as MEET than EXCEED as compared to FDC schemes in SEIFA quintile 4 or SEIFA quintile 5.

FDC schemes located in metropolitan areas were more likely to have lower ratings than FDC schemes in regional Australia. FDC schemes in major cities of Australia were statistically significantly

more likely to 1) be rated WT/SIR than MEET; and 2) be rated WT/SIR than EXCEED as compared to FDC schemes in inner regional Australia.

There were statistically significant differences in NQS ratings amongst MJs. FDC schemes managed by Queensland were less likely to be rated WT or SIR than MEET as compared to FDC schemes managed by 1) Western Australia, South Australia, Tasmania, ACT, and NT collectively, while FDC schemes managed by Victoria were more likely to be rated WT/SIR than MEET as compared to FDC schemes managed by Western Australia, South Australia, Tasmania, ACT and NT collectively. FDC schemes managed by Queensland were also less likely to be rated WT/SIR than EXCEED as compared to FDC schemes managed by Victoria. Having identified the findings of the study, the next section will relate the findings to existing literature.

Chapter 4: Discussion

This study investigated the effects of four systemic characteristics (MT, SES, CAR, and MJ) on FDC scheme overall NQS ratings. In particular, the study compared how each of the four characteristics influence the likelihood of a FDC scheme 1) attaining a rating of WT/SIR as opposed to MEET; 2) attaining a rating of WT/SIR as opposed to EXCEED; and 3) attaining a rating of MEET as opposed to EXCEED.

Utilising bioecological systems theory as a general framework, the study examined the influence of four systemic characteristics located within the macrosphere. MLR models for MT, SES, CAR and MJ were found to be valid. The model for MT was found to explain the largest variation on overall NQS ratings, 19.3%. SES was found to explain 10.6% of the variation of FDC scheme's overall NQS ratings. MJ was found to explain 7.7%, while CAR was found to explain 7.1%. The following section describes how MT, SES, CAR, and MJ relate to the likelihood of a FDC scheme attaining a rating of 1) WT/SIR as opposed to MEET; 2) WT/SIR as opposed to EXCEED; and 3) MEET as opposed to EXCEED.

4.1. Management Type (MT)

FDC schemes run on a for profit basis were found to attain lower NQS ratings than FDC schemes run on a not for profit basis. Private for profit FDC schemes were 1) nearly three times more likely to be rated WT/SIR than MEET; and 2) over eight times as likely to be rated WT/SIR than EXCEED than community managed private not for profit FDC schemes, private not for profit FDC schemes managed by other organisations and state/territory and local government managed FDC schemes. Private for profit FDC schemes were three and five times more likely to be rated MEET than EXCEED as compared to 1) community managed private not for profit FDC schemes; and 2) state/territory and local government managed FDC schemes, respectively. The MT model explained 19.3% of the variation in FDC scheme overall NQS quality was explained by MT, the highest of four systemic characteristics tested.

The reason for the disparity between private for profit FDC schemes and not for profit FDC schemes may be due to "thick" and "thin" markets (Cleveland & Krashinsky 2009, pp. 458). Thick ECEC markets are characterised by high levels of demand for ECEC care, whereas thin markets are characterised by low levels of demand. Distinguishing between "thick" and "thin" markets may be the key to analyzing the differences between child care quality from not for profit organisations and for profit organisations (Cleveland & Krashinsky, 2009). Due to the competitive force of families selectint geographically convenient child care and quality child care, competition fails to equalise quality across providers. Not for profits are the beneficiaries of a virtuous circle in the production of quality child care when markets are thick enough to support the differentiation of quality across services (Cleveland & Krashinsky, 2009). Staff and directors with higher levels of early childhood education are hired. Training and additional professional development are encouraged. However, demand for high quality child care is not enough to encourage providers to differentiate on the basis of quality when markets are thin

(Cleveland & Krashinsky, 2009). There is a lack of not for profit advantage in thin markets, with the possible exception of additional resources through government grants and private donations (Cleveland & Krashinsky, 2009).

4.2. Socio-economic status (SES)

FDC schemes located within communities of lower SES were found to attain lower NQS ratings in comparison to those of higher SES. FDC schemes in SEIFA quintile 1 are twice as likely to be classified as WT/SIR than MEET as compared to FDC schemes in SEIFA quintile 3 communities. FDC schemes in SEIFA quintile 3 were nearly eight times more likely to be classified as MEET than EXCEED compared to FDC schemes in SEIFA quintile 4 or in SEIFA quintile 5. No significant differences in SES were found between the FDC schemes classified as WT/SIR as compared to EXCEED. The SES model explained 9.2% of the variance in the overall NQS rating.

The general pattern of FDC schemes of lower SES tending to rate more poorly on overall NQS ratings could be explained by the theory of how "concentrated affluence" (Hatfield et al., 2015, pp. 323) affects child care quality. FDC homes in communities with higher concentrated affluence were likely to be of higher quality, and FDC homes in communities with lower concentrated affluence to be of lower quality (Hatfield et al., 2015). Examples of concentrated affluence included families with incomes of $75,000 or higher, adults with tertiary education, and employment in professional or managerial occupations. It has been theorised that 1) families with tertiary qualifications and with higher incomes may purposely seek higher-quality FDC homes and thus create demand for them; 2) FDC educations in communities with higher concentrated affluence were more likely to have tertiary qualifications and contribute to higher quality programs (Hatfield et al., 2015).

However, only 10.6% of the variation in FDC scheme's overall NQS rating was found to be explained by SES. The low level of variation explained by the model could be explained by the geographic distribution of FDC educations relative to the FDC scheme they engage with or are employed by. FDC schemes engage with or employ educators over wide geographical areas. FDC educators may be located in communities of differing level of socio-economic advantage than the community the FDC scheme is based in (Bonnin & Ridgway, 1988). SES assigned to FDC schemes may not necessarily match the SES of FDC educators. The mismatch may explain the low level of variation in FDC overall NQS rating explained by SEIFA quintiles as a measure of SES.

4.3. Community accessibility and remoteness (CAR)

FDC schemes in metropolitan Australia were found to attain lower levels of overall NQS ratings than FDC schemes in regional or remote Australia . FDC schemes in major cities of Australia were nearly twice as likely to be rated WT/SIR than MEET compared to FDC schemes in inner regional Australia. The CAR model explained 6.9% of the variance in the overall NQS rating.

That FDC schemes in metropolitan Australia were found to attain lower levels of overall NQS ratings may be explained by the level of accessibility to FDC in regional and remote Australia. While 28% of the Australian population live in regional and remote areas of Australia (ABS, 2019), 24.3% of FDC educators operate in the same regions (FDCA, 2019). FDC is the often the only option available for child care in some regional and remote areas of Australia (FDCA, 2019). By contrast, there are fewer child care placements in rural and remote Australian locations proportionally than in metropolitan Australia (Raban & Kilderry, 2017). Households in metropolitan Australia were also more likely to experience multiple problems with child care (e.g., lack of quality, centre location, centre choice) than households in regional Australia or remote Australia (Cassels et al., 2007). Problems included the location of the

ECEC service, choice of ECEC service, and inflexible hours offered by the service, suggesting that ECEC services, and FDC by extension, may be less accessible in metropolitan Australia than in regional Australia. ARIA+ may not accurately measure accessibility to FDC as it is a theoretical composite measure of accessibility to non-ECEC areas such as transportation, health, and finance (HCPMS, 2021). A study examination measuring accessibility to FDC in different Australian regions may shed light on the situation.

However, CAR explained only 7.1% of the variation in FDC scheme overall NQS ratings. Similarly, CAR was not found to have any statistically significant effect on the likelihood of ECEC services improving from a WT rating (Harrison et al., 2019). While long day care services in inner regional Australia were found to have higher SSTEW ratings than long day care services in metropolitan Australia in one study, the sample was not representative (Siraj et al., 2019).

4.4. Managing jurisdiction (MJ)

Understanding the effect of the MJ on the aggregate quality scale of FDC schemes requires an understanding of Australian Commonwealth and State/Territory powers. Australia's system of governance contributed to a fragmented ECEC system, which has only recently undergone an attempt at streamlining. Under the Constitution of Australia, the Australian Government has 1) limited exclusive powers mostly relating to custom and excise duties, holding referendums to change the constitution, and coining money; and 2) a large number of powers to be exercised concurrently with the States (Productivity Commission, 2017). State Governments have official responsibility over everything else, including ECEC. However, the Australian Government is involved in many state responsibilities, such as ECEC, through funding (Parliament of NSW, n.d.). The historical result of multiple MJs over ECEC was varied licensing and regulations for FDC across Australia. Multiple MJs led to problems such as

"inconsistent terminology", a mixture of funding sources and regulations, and "overlapping commonwealth and state jurisdictions" (Ishimine & Tayler, 2012, pp. 49). It was not until the introduction of the NQF in 2008, and the passing of state applied law schemes that a consistent national standard was applied across Australia. The state of Victoria passed the *Education and Care Services National Law*. The remaining states and territories, except Western Australia, passed application Acts. Western Australia passed corresponding legislation to the National Law. Each state and territory thus passed legislation agreeing to a consistent application of ECEC rules and regulations. The standardisation of assessment and rating systems allows a comparison across states and territories, which was performed in this study.

FDC schemes located within different jurisdictions were found to attain some levels of diverging overall NQS ratings. FDC schemes managed by 1) Queensland; and 2) Victoria were over three times less likely to be rated WT than MEET as compared to FDC schemes managed by Western Australia, South Australia, Tasmania, ACT and NT. FDC schemes managed by Queensland were three times less likely to be rated WT than EXCEED as compared to FDC schemes managed by Victoria. FDC schemes from New South Wales did not show levels of diverging NQS ratings as compared to FDC schemes in any other MJ category. The grouping of FDC schemes managed by Western Australia, South Australia, Tasmania, ACT, and the Northern Territory into a single sub-category based on population is a study limitation. The limitation stems from a lack of clear association between MJ population and ECEC quality outcomes.

The MJ regression model only explained 7.8% of the variation in FDC scheme's overall NQS ratings. The low level of variation explained may be due to standardisation across MJs. The introduction of the NQF and the passing of the *National Law* and relevant applicable acts provided consistent regulations across all Australian jurisdictions. In theory, consistent regulations should remove variations in quality ratings. However, some jurisdictional differences continue to exist for FDC schemes.

For example, the notification periods granted to FDC educators selected for visits as part of the NQS assessment process vary across Australian states and territories (FDCA, 2019).

4.5. Level of variation in quality explained by systemic characteristics

The four systemic characteristics: MT, SES, CAR, and MJ, respectively, explain 19.3%, 10.6%, 7.1%, and 7.7% of the variation in FDC scheme overall NQS ratings. Between 19.3% and 45.0% of the total variation is explained by the four systemic characteristics, where 45.0% is a theoretical maximum unlikely to exist in reality due to the potential for overlapping effects among systemic characteristics.

The level of variance in NQS ratings explained by each systemic characteristic that overlaps the level of variance in NQS ratings explained by the other systemic characteristics is unclear. To provide clarity, chi-square tests for association were conducted between 1) SES and MT; 2) SES and MJ; 3) SES and CAR; 4) MT and CAR; 5) MT and MJ; 6) MJ and CAR. MT was strongly associated with MJ ($p < .001$) and CAR ($p < .001$) and MJ was strongly associated with CAR ($p < .001$), suggesting a degree of overlap between the level of variation explained by MT and that of MJ and CAR. MT, MJ and CAR likely explain little more than the 19.3% of the variation in NQS ratings explained by MT. The association is weaker between SES and MT ($p = .022$), suggesting that at least some of the variation in NQS ratings explained by SES can be added to the 19.3% explained by MT. A strong association between SES and CAR ($p = .001$) further suggests that CAR fails to independently explain any of the variation in NQS ratings. The full results of the chi-square tests along with cross tab analysis for each pair is provided in Appendix B.

The conceptual framework for the study was based on classical bioecological systems theory, which holds that four interacting environmental subsystems influence child development

(Bronfenbrenner, 1979). As the four systemic characteristics were located in the macrosphere, logic dictates that variation within FDC scheme NQS ratings unexplained by the four system characteristics may be explained by elements within the microsphere, mesosphere or exosphere. While this study examined how FDC scheme characteristics at the level of the macrosphere influenced overall NQS ratings, a study examining how FDC educator characteristics at the level of the microsphere influence overall NQS ratings may explain more of the variance in overall NQS quality.

An alternate explanation conceptually may arise from contemporary bioecological systems theory, PPCT. The four environmental subsystems of classical bioecological systems theory collectively make up the "context" aspect of PPCT (Bronfenbrenner & Morris, 1998). An alternate explanation may be that the variation within NQS ratings may be explained by the remaining aspects of PPCT, namely proximal processes, person, or time. Proximal processes refer to enduring interactions that occur regularly over extended periods of time (Bronfenbrenner & Morris, 1998). Person refers to the personal characteristics of an individual. Time can refer to experiences occurring at different points of a child's life or change and impermanence of individuals and cultures and how it influences child development (Tudge et al., 2009). Thus, a study examining whether FDC schemes experiencing the same NQS assessment process at different points of the FDC scheme's "lifetime" (e.g., first NQS assessment versus second NQS assessment) may explain more of the variance in the overall NQS quality.

Overall NQS quality ratings for FDC schemes may have some measure of inherent unreliability. The QIAS, the predecessor to the NQS, was criticized for lacking evidence toward its validity and reliability (Elliot, 2004). High scores from the QIAS may not mean high quality compared to other quality measures (Ishimine et al., 2010). The NQS, in a similar manner, was found to have 1) services that attained ratings of EXCEED rate poorly on the ECERS-E and SSTEW scales; and 2) services that attained ratings of WT and MEET rate highly on the ECERS-E and SSTEW research scales (Siraj et al., 2019). The NQS assessment and rating process is believed to be generally a poor reflection of service quality and, at

best, only an accurate reflection of service quality in limited ways (Fenech et al., 2006; Phillips, 2020). The NQS assessment and rating process was suggested to 1) devote inadequate amounts of time to the assessment and observation process (Phillips, 2020); 2) involve the subjective judgment of assessors (Phillips, 2020); and 3) be focused on vague wording of elements within the quality areas (Phillips, 2020; Siraj et al., 2019).

Aspects of the NQS assessment and rating process, such as the length of notice ECEC services are given prior to an assessment, may influence the consistency of NQS ratings. While educators in centre-based services are notified at least four weeks ahead of assessment visits, there is no standard length of notice period for FDC educators (FDCA, 2019). The variability of notice may influence NQS quality ratings. The length of service time experienced by FDC educators who are observed as part of the assessment process may similarly influence NQS ratings consistency. The selection of educators visited by assessors also lacks standardisation. FDC schemes have no control over which educators participate in assessments. However, centre-based services has some degree of control as to which educators participate in assessments due to 1) the four-week notice period for the assessment; and 2) the ability to roster staff on the day of assessment (FDCA, 2019; ACECQA, 2017b).

The nature of quality has been criticized for 1) being too strongly associated with western ideals and being too focused on neo-liberalism (Simpson et al., 2017); and 2) use of the word “quality” when “evaluation” would be more appropriate terminology (Dahlberg et al., 1999). The NQS, as a QRIS, has been criticized for failing to measure child outcomes to assess quality (Sabol et al., 2013; Siraj et al., 2019). The way the overall NQS rating is aggregated and converted into a rating has been criticized for failing to consistently yield relations to learning (Sabol et al., 2013; Siraj et al., 2019). The NQS combines instructional, process and compliance elements without highlighting specific elements linked to child outcomes (Sabol et al., 2013; Siraj et al., 2019; Mathers et al., 2012). The result is that the meanings of the ratings generated can be obscured (Sabol et al., 2013; Siraj et al., 2019). The implication is that the

systemic characteristics examined in the study may not predict much variation in overall NQS ratings, partly because the NQS measures non-ECEC elements of quality.

Chapter 5: Conclusion, Limitations and Implications

The aim of this Master of Research Study was to examine the effects of four systemic characteristics on FDC scheme overall NQS ratings. The study utilised multinomial logistic analysis to create a prediction model separately testing the individual effects of 1) MT; 2) SES; 3) CAR; and 4) MJ on FDC scheme on the likelihood of a FDC scheme A) attaining a rating of WT/SIR as opposed to a rating of MEET; B) attaining a rating of WT/SIR as opposed to a rating of EXCEED; and C) attaining a rating of MEET as opposed to a rating of EXCEED. In terms of MT, private for profit FDC schemes were nearly three times more likely to be rated WT/SIR than MEET as compared to 1) community managed private not for profit FDC schemes; 2) private not for profit FDC schemes managed by other organisations; and 3) state/territory and local government managed FDC schemes. They were at least eight times more likely to be rated WT/SIR than EXCEED" as compared to 1) community managed private not for profit FDC schemes; 2) private not for profit FDC schemes managed by other organisations; or 3) state/territory and local government managed FDC schemes. And they were three and five times more likely to be rated MEET than EXCEED as compared to 1) community managed private not for profit FDC schemes; and 2) state/territory and local government managed FDC schemes, respectively. Regarding SES, FDC schemes in SEIFA quintile 3 were half as likely to be classified as WT/SIR than MEET as compared to FDC schemes in SEIFA quintile 1 communities, but over seven times more likely to be classified as MEET" than EXCEED as compared to FDC schemes in SEIFA quintile 4 communities or SEIFA quintile 5 communities. In terms of CAR, FDC schemes in major cities of Australia were nearly twice as likely to be rated WT/SIR than MEET as compared to FDC schemes in inner regional Australia and over twice as likely to be rated WT/SIR than EXCEED as compared to FDC schemes in inner regional Australia. Finally, regarding MJ, FDC schemes managed by Queensland were more than three times less likely to

be rated WT/SIR than MEET as compared to FDC schemes managed by Western Australia, South Australia, Tasmania, ACT, and NT; and three times less likely to be rated WT/SIR than EXCEED as compared to FDC schemes managed by Victoria. FDC schemes managed by Victoria were over three times more likely to be rated WT/SIR than MEET as compared to FDC schemes managed by Western Australia, South Australia, Tasmania.

While the study found each of the systemic characteristics to significantly affect FDC scheme NQS overall ratings, the level of variance explained by each systemic characteristic was relatively low. For example, MT, SES, CAR, and MJ explained 19.3%, 9.2%, 6.9% and 7.8% of the variance in NQS overall ratings, respectively. The study's strengths might be its use of the entire population of FDC schemes in Australia as its dataset, thus guaranteeing the results to be representative. Another strength of the study was its exclusive focus on FDC. Other studies that include FDC in datasets predominantly featuring centre based services risk the influence of the majority centre-based services drowning out any conclusions to have about FDC services. Finally, a significant strength of the study was the manner in which regressions were repeated with different reference categories. The use of different categories allowed for full comparisons to be made within each service category.

5.1. Limitations

Limitations of the study included 1) the use of SEIFA as a measure of SES; 2) the use of ARIA+ as a measure of CAR; 3) collapsing Western Australia, South Australia, Tasmania, ACT and Northern Territory into a single MJ category; and 4) MLRs of single systemic characteristics.

The use of SEIFA as a measure of SES is a limitation of the study. FDC schemes engage with or employ educators over wide geographical areas. Thus, FDC educators may be located in communities of differing level of SES than the community the FDC scheme is based in. SES assigned to FDC schemes may not necessarily match the SES of FDC educators.

Similarly, the use of ARIA+ as a measure of CAR for FDCs is another study limitation. ARIA+ theoretically measures accessibility to areas outside of education such as transportation, health, and finance (HCPMS, 2021). ARIA+ also theoretically measures accessibility to aspects of education outside of ECEC such as universities. ARIA+ may overestimate accessibility to ECEC in metropolitan Australia and underestimate accessibility to ECEC in regional Australia and remote Australia.

Combination the MJs Western Australia, South Australia, Tasmania, ACT and Northern Territory into a single category is a study limitation. Collapsing the MJs into a single category was necessary to avoid expected cell frequencies of zero during MLRs. The MJs were combined based on having populations of under three million each, but MJ may not be correlated with ECEC quality.

Finally, inputting single systemic characteristics into MLRs was a study limitation. Examining two systemic characteristics with version of the NQS assessed against as a covariate led to expected cell frequencies of zero in the MLR. The level of variance in NQS ratings explained by each systemic characteristic that overlaps the level of variance in NQS ratings explained by the other systemic characteristics is unclear. To overcome this limitation, chi-square tests for association were conducted between 1) SES and MT; 2) SES and MJ; 3) SES and CAR; 4) MT and CAR; 5) MT and MJ; 6) MJ and CAR.

There were statistically significant results between SES and MT (p = .022), SES and CAR (p = .001), MT and CAR (p < .001), MJ and CAR (p < .001), MT and MJ (p < .001).

5.2. Future research directions.

The limitations of the study were in some part due to the limited scope of the Master of Research program. The positive aspect to the limitations is that the same limitations provide opportunities for future research.

Within the context of classical bioecological systems theory, a study examining how FDC educator characteristics at the microsphere, mesosphere, or exosphere may explain more of the variance in FDC scheme overall NQS quality. Within the context of modern bioecological systems theory, a study of the "Process", "Person," or "Time" aspects of the PPCT model may explain a greater proportion of variance in FDC scheme overall NQS quality. One such study may examine whether FDC schemes experiencing the same NQS assessment process at different points of the FDC scheme's "lifetime" (e.g., first NQS assessment versus second NQS assessment).

The manner in which the level of variance in NQS ratings explained by each systemic characteristic, controlling for the other systemic characteristics and the version of the NQS assessed against could be analysed using linear regression. A study that transforms nominal NQS ratings into numerical ratings is required for linear regression to be valid. Possible vectors for transformation include advanced statistical techniques such as learning a pairwise dissimilarity amongst NQS ratings (e.g., Zhang et al., 2015) or clustering algorithms (e.g., Qian et al., 2015; Xu et al., 2019).

5.3 Concluding comments

FDC, particularly FDC in Australia, is a widely utilised, yet seldomly researched form of ECEC. In addition, the NQS in Australia is a relatively novel measure of quality about which relatively little is known from a research perspective. This study contributes to ongoing research about systemic characteristics that influence FDC quality and research about influences on NQS quality indicators. Findings confirmed that MT, SES, CAR, and MJ influenced FDC scheme's overall NQS quality ratings. However, the level of variability in NQS overall rating each systemic characteristic, outside of MT, explained was low. Findings imply that policy attention should be paid to the variations and inequalities caused by the major systemic features. More efforts should be made to narrow the urban-rural and poor-rich gaps to promote equality and equity in early childhood education and care.

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Appendix A

Table 1

Logistic regression comparing the likelihood of a WT/SIR rating compared with a MEET rating for Management Type

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Private not for profit – other organisation	.124	.450	.075	1	.783	1.132	.468	2.736
State/territory and local government managed	-.077	.381	.041	1	.839	.926	.438	1.954
Private not for profit – community managed	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 2

Logistic regression comparing the likelihood of a WT/SIR rating compared with a MEET rating for Management Type

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
State/territory and local government managed	-.201	.453	.198	1	.657	.818	.337	1.986
Private not for profit – other organisations	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 3

Logistic regression comparing the likelihood of a WT or SIR rating compared with an EXCEED rating for Management Type

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Private not for profit – other organisation	.131	.576	.052	1	.820	1.140	.368	3.529
State/territory and local government managed	.449	.468	.919	1	.338	1.567	.626	3.925
Private not for profit – community managed	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 4

Logistic regression comparing the likelihood of a WT or SIR rating compared with an EXCEED rating for Management Type

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
State/territory and local government managed	.318	.545	.340	1	.560	1.374	.473	3.995
Private not for profit – other organisation	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 5

Logistic regression comparing the likelihood of a MEET rating compared with an EXCEED rating for Management Type

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Private not for profit – other organisation	.008	.532	.000	1	.989	1.008	.355	2.861
State/territory and local government managed	.527	.439	1.441	1	.230	1.693	.717	3.999
Private not for profit – community managed	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 6

Logistic the regression comparing the likelihood of a MEET rating compared with an EXCEED rating for Management Type

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
State/territory and local government managed	.519	.500	1.076	1	.300	1.680	.630	4.480
Private not for profit – other organisation	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 7

Logistic regression comparing the likelihood of a WT/SIR rating compared with a MEET rating for Socio-economic Status

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Quintile 2	.015	.280	.003	1	.957	1.015	.586	1.759
Quintile 4	.181	.340	.286	1	.593	1.199	.616	2.333
Quintile 5	.256	.449	.327	1	.568	1.292	.536	3.113
Quintile 1	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 8

Logistic regression comparing the likelihood of a WT/SIR rating compared with a MEET rating for Socio-economic Status

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Quintile 4	.166	.377	.194	1	.659	1.181	.564	2.473
Quintile 5	.241	.477	.255	1	.613	1.273	.500	3.242
Quintile 2	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 9

Logistic regression comparing the likelihood of a WT or SIR rating compared with a MEET rating for Socio-economic Status

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Quintile 5	.075	.515	.021	1	.884	1.078	.393	2.956
Quintile 4	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 10

Logistic regression comparing the likelihood of a MEET rating compared with an EXCEED rating for Socio-economic Status

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Quintile 2	-.128	.444	.083	1	.773	.880	.368	2.102
Quintile 4	.646	.441	2.150	1	.143	1.909	.804	4.529
Quintile 5	.649	.539	1.449	1	.229	1.914	.665	5.508
Quintile 1	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 11

Logistic the regression comparing the likelihood of a MEET rating compared with an EXCEED rating for Socio-economic Status

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Quintile 4	.774	.517	2.247	1	.134	2.169	.788	5.971
Quintile 5	.777	.602	1.667	1	.197	2.175	.669	7.078
Quintile 2	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 12

Logistic regression comparing the likelihood of a MEET rating compared with an EXCEED rating for Socio-economic Status

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Quintile 5	.078	.584	.018	1	.894	1.081	.344	3.393
Quintile 4	0	.	.	0	.	.	.	.

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 13

Logistic regression comparing the likelihood of a WT/SIR rating compared with a MEET rating for Community Accessibility and Remoteness

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
Outer regional Australia + remote Australia + very remote Australia	.053	.380	.019	1	.889	1.054	.501	2.219
Inner regional Australia	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 14

Logistic the regression comparing the likelihood of a MEET rating compared with an EXCEED rating for Community Accessibility and Remoteness

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Outer regional Australia + remote Australia + very remote Australia	-.451	.551	.671	1	.413	.637	.216	1.875
Inner regional Australia	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 16

Logistic regression comparing the likelihood of a WT/SIR rating compared with a MEET rating for Managing Jurisdiction

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
Victoria	-.176	.263	.451	1	.502	.838	.501	1.403
Queensland	.462	.287	2.594	1	.107	1.587	.905	2.784
Western Australia + South Australia + Tasmania + ACT + NT	-.680	.356	3.649	1	.056	.507	.252	1.018
New South Wales	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 17

Logistic regression comparing the likelihood of a WT/SIR rating compared with an EXCEED rating for Managing Jurisdiction

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Victoria	-.338	.420	.646	1	.421	.713	.313	1.626
Western Australia + South Australia + Tasmania + ACT + NT	.079	.467	.029	1	.866	1.082	.434	2.701
New South Wales	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 18

Logistic regression comparing the likelihood of a WT/SIR rating compared with an EXCEED rating for Managing Jurisdiction

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Western Australia + South Australia + Tasmania + ACT + NT	-.504	.361	1.950	1	.163	.604	.298	1.225
Victoria	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 19

Logistic regression comparing the likelihood of a MEET rating compared with an EXCEED rating for Managing Jurisdiction

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Victoria	-.162	.433	.139	1	.709	.851	.364	1.989
Western Australia + South Australia + Tasmania + ACT + NT	.759	.511	2.205	1	.138	2.136	.784	5.818
New South Wales	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Table 20

Logistic the regression comparing the likelihood of a MEET rating compared with an EXCEED rating for Managing Jurisdiction

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Western Australia + South Australia + Tasmania + ACT + NT	.921	.517	3.166	1	.075	2.511	.911	6.921
Victoria	0			0				

Note: *$p < .025$; ** $p < .01$; *** $p < .001$

Appendix B

A chi-square test for association was conducted between SES and MT. One expected cell frequency was less than five. There was a statistically significant association between SES and MT, $\chi 2(12) = 23.80$, $p = .022$. The standardised residuals between socio-economic status and management type are provided in Table 1.

Table 1

Standardised residuals between socio-economic status and management type

	Management Type													
			Private for profit			Private not for profit – community managed			Private not for profit – other organisation			State/territory and local government managed		
	N	%	N	%	SR	N	%	SR	N	%	SR	N	%	SR
Socio-economic Status														
Quintile 1	181	43.5	96	41.4%	-0.5	36	51.4%	1.0	16	40.0%	-0.3	33	44.6%	0.1
Quintile 2	88	21.2	41	17.7%	-1.2	18	25.7%	0.8	11	27.5%	0.9	18	24.3%	0.6
Quintile 3	58	13.9	33	14.2%	0.1	8	11.4%	-0.6	10	25.0%	1.9	7	9.5%	-1.0
Quintile 4	58	13.9	43	18.5%	1.9	5	7.1%	-1.5	3	7.5%	-1.1	7	9.5%	-1.0
Quintile 5	31	7.5%	19	8.2%	0.4	3	4.3%	-1.0	0	0.0%	-1.7	9	12.2%	1.5

A chi-square test for association was conducted between SES and MJ. One expected cell frequency was less than five. There was not a statistically significant association between SES and MJ (p = .111). The standardised residuals between socio-economic status and managing jurisdiction are provided in Table 2.

Table 2

Standardised residuals between socio-economic status and managing jurisdiction

	Managing Jurisdiction												
			New South Wales			Victoria			Queensland			Western Australia + South Australia + Tasmania + ACT + NT		
	N	%	N	%	SR	N	%	SR	N	%	SR	N	%	SR
Socio-economic Status														
Quintile 1	181	43.5	69	47.6	0.7	49	39.8	-0.6	43	43.9	0.1	20	40.0	-0.4
Quintile 2	88	21.2	34	23.4	0.6	24	19.5	-0.4	23	23.5	0.5	7	14.0	-1.1
Quintile 3	58	13.9	13	9.0	-1.6	21	17.1	0.9	13	13.3	-0.2	11	22.0	1.5
Quintile 4	58	13.9	20	13.8	0.0	15	12.2	-0.5	17	17.3	0.9	6	12.0	-0.4
Quintile 5	31	7.5%	9	6.2	-0.5	14	11.4	1.6	2	2.0	-2.0	6	12.0	1.2

Note: SR = Standardised Residual

A chi-square test for association was conducted between SES and CAR. One expected cell frequency was less than five. There was a statistically significant association between SES and CAR, $\chi 2(8) = 25.20$, $p = .001$. The standardised residuals between socio-economic status and community accessibility and remoteness are provided in Table 3.

Table 3

Standardised residuals between socio-economic status and community accessibility and remoteness

			Community Accessibility and Remoteness								
			Major Cities of Australia			Inner Regional Australia			Outer Regional Australia + Remote Australia + Very Remote Australia		
	N	%	N	%	SR	N	%	SR	N	%	SR
Socio-economic Status											
Quintile 1	181	113	40.9	-0.6	42	47.7	0.6	26	50.0	0.7	113
Quintile 2	88	46	16.7	-1.6	27	30.7	1.9	15	28.8	1.2	46
Quintile 3	58	44	15.9	0.9	6	6.8	-1.8	8	15.4	0.3	44
Quintile 4	58	48	17.4	1.5	7	8.0	-1.5	3	5.8	-1.6	48
Quintile 5	31	7.5	25	9.1	1.0	6	6.8	-0.2	0	0.0	-2.0

A chi-square test for association was conducted between MT and CAR. All expected cell frequency were over five. There was a statistically significant association between MT and CAR, $\chi 2(6) = 167.07$, $p < .001$. The standardised residuals between management type and community accessibility and remoteness are provided in Table 4.

Table 4

Standardised residuals between management type and community accessibility and remoteness

	Community Accessibility and Remoteness										
			Major Cities of Australia			Inner Regional Australia			Outer Regional Australia + Remote Australia + Very Remote Australia		
	N	%	N	%	SR	N	%	SR	N	%	SR
Management Type											
Private for profit	248	56.2	225	75.0	4.3	19	21.6	-4.3	4	7.5	-4.7
Private not for profit – community managed	72	16.3	21	7.0	-4.0	21	23.9	1.7	30	56.6	7.3
Private not for profit – other organisation	42	9.5	17	5.7	-2.2	17	19.3	3.0	8	15.1	1.3
State/territory and local government managed	79	17.9	37	12.3	-2.3	31	35.2	3.8	11	20.8	0.5

Note: SR = Standardised Residual

A chi-square test for association was conducted between MT and MJ. All expected cell frequency were over five. There was a statistically significant association between MT and MJ, $\chi2(9) = 77.03$, $p < .001$. The standardised residuals between managing jurisdiction and community accessibility and remoteness are provided in Table 5.

Table 5

Standardised residuals between managing jurisdiction and community accessibility and remoteness

			Community Accessibility and Remoteness								
			Major Cities of Australia			Major Cities of Australia			Major Cities of Australia		
	N	%	N	%	SR	N	%	SR	N	%	SR
Managing Jurisdiction											
New South Wales	147	33.3	105	35.0	0.5	29	33.0	-0.1	13	24.5	-1.1
Victoria	133	30.2	104	34.7	1.4	24	27.3	-0.5	5	9.4	-2.7
Queensland	100	22.7	56	18.7	-1.5	22	25.0	0.5	22	41.5	2.9
Western Australia + South A + Tasmania + ACT + NT	61	13.8	35	11.7	-1.0	13	14.8	0.2	13	24.5	2.1

Note: SR = Standardised Residual

A chi-square test for association was conducted between MJ and CAR. All expected cell frequency were over five. There was a statistically significant association between MJ and CAR, $\chi 2(6) = 27.38$ $p < .001$. The standardised residuals between management type and managing jurisdiction are provided in Table 6.

Table 6

Standardised residuals between management type and managing jurisdiction

	Managing Jurisdiction													
			New South Wales			Victoria			Queensland			Western Australia + South Australia + Tasmania + ACT + NT		
	N	%	N	%	SR	N	%	SR	N	%	SR	N	%	SR
Management Type														
Private for profit	248	56.2	80	54.4	-0.3	92	69.2	2.0	51	51.0	-0.7	25	41.0	-1.6
Private not for profit – community managed	72	16.3	24	16.3	0.0	11	8.3	-2.3	22	22.0	1.4	15	24.6	1.6
Private not for profit – other organisation	42	9.5	8	5.4	-1.6	3	2.3	-2.7	26	26.0	5.3	5	8.2	-0.3
State/territory and local government managed	79	17.9	35	23.8	1.7	27	20.3	0.7	1	1.0	-4.0	16	26.2	1.5

Note: SR = Standardised Residual