

Intentions and decisions about early childhood education:

**Understanding the determinants and
dynamics of households' early intentions
and decisions about ECE and childcare
from birth to age two**

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Contents

Policy summary	6
Key findings	6
Policy recommendations.....	6
Executive summary	8
Parental preferences and decisions about ECE services	8
Mothers’ intended and actual use of parental leave.....	9
Factors predicting use of parental leave	9
Mothers’ use of ECE services up to 24 months of age.....	9
Implications.....	10
Introduction	12
Aims and objectives.....	12
General policy relevance	12
Background	12
Factors that influence preferences and decisions about ECE services.....	14
The contribution of this research	15
Method	17
Engagement with policy collaborators	17
Participants	17
Procedure.....	18
Measures and variable coding	18
Socio-demographic measures and ethnicity	18
Leave and work.....	18
ECE use and childcare variables	19
Data analysis.....	20
Results	22
Mothers’ intended and actual use of parental leave.....	22
Use of ECE services up to 24 months of age	29
Mothers’ antenatal intentions and actual use of ECE.....	29
Use of different types of ECE or childcare over time	33
Use and non-use of ECE services between 9 and 24 months	33
Factors influencing the use of different types of ECE	37
Socio-demographic factors influencing the types of ECE service chosen.....	37

Work factors related to different types of ECE	38
Discussion	42
Impact of subsidies and parental leave on decisions	42
Childcare intentions and engagement with ECE services	43
Engagement with different types of ECE services.....	44
Policy recommendations.....	45
Conclusion	47
Limitations and future directions	49
References	51
Appendix 1: Mothers’ antenatal intentions about ECE or childcare and actual arrangement used for most hours per week at 9 and 24 months	53

Table of figures

Figure 1: Factors influencing parental decision-making about ECE and childcare	15
Figure 2: Expected age of their child when mothers intended to return to work	23
Figure 3: Mothers’ antenatal intentions about ECE or childcare and actual arrangement used for most hours per week at 9 and 24 months	32

Table of tables

Table 1: Classification of provided ECE and childcare response options	20
Table 2: Summary statistics of child’s age and time on leave-related variables in the first 9 months	24
Table 3: Types of leave mothers took in the first 9 months: Multiple response .	25
Table 4: Reasons why mothers said they did not go on paid or unpaid leave: Multiple response	25
Table 5: Predictors of non-use of parental leave.....	27
Table 6: Mothers’ intended childcare before their child was born	30
Table 7: Type of ECE or childcare used by mothers for most hours per week when their child was 9 or 24 months old	30
Table 8: Predictors of use of informal care from 9 to 24 months old	34
Table 9: Predictors of use of different types of ECE or childcare from 9 to 24 months old.....	39

Policy summary

This study evaluates mothers' decisions about whether to engage with early childhood education (ECE) services before and during the first two years of their children's lives, using longitudinal data collected by the *Growing Up in New Zealand* (GUiNZ) study. For the purposes of this research, ECE refers to licensed services funded by the Ministry of Education. These services must meet standards relating to health and safety, environment, staff qualifications and ratios. In particular, the report examines the relationship between labour force participation and use of ECE during the early years to understand whether some groups disproportionately face barriers to using ECE.

Key findings

- Among mothers who took parental leave, the average period of leave was about 25 weeks of paid and unpaid leave, suggesting that women who returned to work extended their leave beyond the-then 14-week government-subsidised period of paid parental leave by almost three months.
- While half of mothers indicated the types of ECE and/or childcare they intended to use for their child when they returned to work, their actual choices about ECE or care frequently differed from their antenatal intentions when their child was 9 months or 2 years of age. Between 0 and 2 years of age, informal care by parents, relatives or other people was the main way mothers chose to look after their children.
- All maternal employment was related to an increased use of ECE services, and the more hours mothers worked each week the greater the likelihood of using ECE services over informal care.
- Mothers also became increasingly likely to use ECE services as their children grew older. In particular, mothers tended to make increased use of teacher-led, centre-based ECE.
- Mothers who reported they did not have a current partner were twice as likely to engage in ECE over informal care compared with partnered mothers, whereas mothers living in higher deprivation areas were almost twice as likely not to use an ECE service.

Policy recommendations

If government wishes to further support mothers of 0-2 year olds who want to return to the workforce, our results suggest the following:

- 1) Ensuring that pregnant women and their partners are **aware of their eligibility and rights for both paid and unpaid leave**. Perhaps engaging midwives to direct women to reliable information or advice about their

entitlements. Among working mothers who reported not taking leave, only 9% chose this as a parenting preference, and hence it is important to make sure that the other 91% who did not take leave were fully aware of their parental leave entitlements.

- 2) Mothers reporting not using parental leave were also more likely to be younger, working irregular hours, or not have a current partner, so information about parental leave entitlements should also target the needs of those groups.
- 3) **Investigating additional ways to incentivise flexible times and hours of operation of ECE services.** This would enable mothers who are living in more socio-economically deprived areas or working irregular hours, to have better access to ECE services.
- 4) **Considering measures to further reduce the cost of ECE for 0-2 year olds,** particularly for lower income families, who are currently accessing ECE services at lower rates.
- 5) **Consider improving access to Māori & Pasifika immersion and bilingual centre-based services.** Our findings suggest that the likelihood of people using these services is markedly higher in areas with the highest area-level deprivation, and this increased likelihood was not related to maternal ethnicity. The use of these services may therefore reflect their relatively higher availability in low socio-economic areas. Increased access to Māori & Pasifika immersion and bilingual centre-based services to all ethnic groups and across a range of socio-economic areas may be needed and welcomed by parents.

Executive summary

This study evaluates mothers' decisions about whether to engage with Early Childhood Education (ECE) services before, and during, the first two years of their children's lives using longitudinal data collected by the *Growing Up in New Zealand* (GUiNZ) study. For the purposes of this report, ECE refers to services that are licensed and funded by the Ministry of Education. These services must meet standards relating to health and safety, environment, staff qualifications and ratios, and deliver a curriculum consistent with the principles and strands of *Te Whāriki*. "Childcare" relates to informal, private arrangements that do not attract government funding and which do not need to meet any regulatory standards.

While it is well-known that funding for children aged between three and five years has contributed to almost universal uptake of ECE for that age group, uptake among parents of children aged two and under is more variable. This study investigates why uptake is more variable between these two ages, by examining how mothers' use of ECE changes as their needs – and the needs of their children – change. In particular, this report examines the relationship between labour force participation and use of ECE during the early years to understand whether some groups disproportionately face barriers to using ECE, and how this might affect participation in the work force.

This study is also important given the government's changes in July 2018 to both parental leave and financial support available in the early years. The new policies have extended paid parental leave, initially from 18 to 22 weeks, increasing to 26 weeks from April 2020. The 'Best Start' payment of \$60 per week, per child, is available to all families in the first year of a child's life, and continues for low and middle-income families until their child is three. These policies may affect parents' decisions about employment and childcare and/or ECE.

Parental preferences and decisions about ECE services

While parental decisions about whether to use ECE services or childcare can be seen as a single choice, it usually involves a complex balancing of a range of inter-related factors. The decision-making process may involve a balancing of decisions, including: balance between work and child-rearing, relative to the quality of care available; consideration of social, familial and cultural expectations and norms about care; family needs and resources; the affordability and accessibility of different types of care; as well as prior experiences. Attention should also be paid to how parents might prioritise different factors depending on their child's age, as they often prefer different arrangements for infants, toddlers and pre-schoolers. This has implications for how governments might choose to design and target parental leave and ECE subsidies.

Mothers' intended and actual use of parental leave

Among mothers who intended to return to the workforce, there were considerable differences between the intended length of parental leave, and how much leave they actually took.

- Before their child was born, three-quarters of mothers expected to return to work. While the average expected age of the child when the mothers returned to work was 10.5 months, there appeared to be two time peaks: first when their child was between four and six months of age (26%) and the second between 10 and 12 months of age (27%).
- Mothers who had returned to work by the time their child was 9 months old said, on average, that they took 25 weeks of total (paid and unpaid) leave (n = 2,461), and the actual average age of their child when they started or returned to work was just over five months (n = 2,161).
- Mothers tended to cover the difference between paid parental leave and the total time they spent on leave with a mix of annual leave, other types of pay or simply took it as unpaid leave.

Factors predicting use of parental leave

We also evaluated what factors predicted use of parental leave among mothers who had worked during pregnancy. Mothers were asked about their use of parental leave when their children were 9 months old. We found:

- Older mothers were statistically more likely to take leave, while mothers reporting no current partner were twice as likely not to take leave.
- Among mothers working when their child was 9 months old, those who had not taken parental leave were the least likely to be regular paid employees and the least likely to work regular daytime shifts.
- Mothers receiving childcare subsidies were more than twice as likely not to use parental leave.

Mothers' use of ECE services up to 24 months of age

As with mothers' intended and actual use of parental leave, we found differences between the kind of ECE service or care mothers intended to use and what they actually used. Mothers tended to use centre-based, teacher-led ECE more as their children grew older. Specifically, we found:

- The overall uptake of any type of ECE service at 9 months was about 17%, and 42% by 24 months. However, individual mothers' postnatal choices often differed substantially from their antenatal intentions.
- The majority of mothers (84%) who had indicated they wanted to use ECE services during the antenatal data collection wave chose to use informal care by a parent, a relative or other people at 9 months.

- Mothers were statistically much more likely to use an ECE service at 24 months compared to 9 months. Nonetheless, 58% of mothers who indicated an antenatal intention to use an ECE provider were still not using ECE at 24 months.

We found some differences in the use of different types of ECE over time, according to mothers' family situation, self-identified ethnicity, socio-economic position and employment, specifically:

- Mothers who reported they did not have a current partner were twice as likely to engage in ECE over informal care, compared with partnered mothers.
- Mothers using Māori & Pasifika immersion and bilingual centre-based services were much more likely than other mothers to report developmentally-based reasons (e.g. intellectual, social or language development) for their choice of provider.
- Mothers living in the most socio-economically deprived areas were more than twice as likely to use an informal care arrangement over an ECE service compared with those in the lowest deprivation quintile (OR = 2.15 – 2.3), and were more likely to use Māori & Pasifika immersion and bilingual centre-based services over other types of services (OR = 7.9-25.7), or teacher-led centre-based ECE over home-based ECE (OR = 2.0).
- Mothers who worked regular day hours were seven times more likely to use an ECE service, whereas those working irregular shifts were only about three times more likely to do so, compared to mothers who were not working. By contrast, compared with those not working, mothers who worked weekends were twice as likely not to use an ECE.

Implications

Our findings show that many mothers started making decisions about leave and childcare arrangements before their children were born, and that mothers in different positions made different decisions about whether, and what kind, of ECE service or care to use as their children aged.

The finding that 26% of mothers expected to return to work after about four to six months of leave corresponded reasonably closely to the duration of the government-funded 14-week period of paid parental leave at the time of the study. However, the average mother who had returned to work by the 9-month data collection wave took 25 weeks of total leave (both paid and unpaid), indicating that even mothers who had already returned to work had extended their leave beyond the government subsidy by approximately 10 weeks.

Mothers' antenatal intentions frequently differed from actual choices about ECE or care when their child was 9 months or 2 years of age. It was not until children turned 2 that mothers were more likely to engage with ECE services. Even so,

some groups of mothers were significantly less likely to engage with ECE services than others.

Policy should ensure all families can access high quality ECE services when they need them. Our results indicate that there is some inequity around access to ECE. It is likely that many mothers who were not using an ECE service would have done so with additional, targeted support. Therefore, the results suggest:

1. Ensuring that pregnant women and their partners are **aware of their eligibility and rights for both paid and unpaid leave**. Perhaps engaging midwives to help direct women to reliable information or advice as to their entitlements. Among working mothers who reported not taking leave, only 9% chose this as a parenting preference, and hence it is important to make sure that the other 91% are fully aware of their parental leave entitlements.
2. Mothers reporting not using parental leave were also more likely to be younger, working irregular hours, or not have a current partner, so information about parental leave entitlements should also target those groups.
3. **Investigating additional ways to incentivise flexible times and hours of operation of ECE services**. This would enable mothers who are living in more socio-economically deprived areas or working irregular hours, to have better access to ECE services.
4. **Considering measures to further reduce the cost of ECE for 0-2 year olds**, particularly for lower income families, who are currently accessing ECE services at lower rates.
5. **Consider improving access to Māori & Pasifika immersion and bilingual centre-based services**. Our findings suggest that the likelihood of people using these services is markedly higher in areas with the highest area-level deprivation, and this increased likelihood was not related to maternal ethnicity. The use of these services may therefore reflect their relatively higher availability in low socio-economic areas. Increased access to Māori & Pasifika immersion and bilingual centre-based services to all ethnic groups and across a range of socio-economic areas may be needed and welcomed by parents.

With these recommendations in mind, future studies should explore the impact of the government's new subsidies on parental choice and employment. More attention could be given to determining what constitutes high quality ECE within Aotearoa / NZ, as well as the impact of partners, social networks, and child characteristics on the decisions parents make about ECE and/or childcare and parental employment in the early years.

Introduction

Aims and objectives

This project investigated the following four core research questions using data from the demographically diverse *Growing Up in New Zealand* (GUiNZ) longitudinal study:

1. What are the factors that predict the use of parental leave?
2. What effect does parental leave and childcare subsidies have on decisions about early childhood education (ECE) or childcare?
3. To what extent do mothers' antenatal care intentions relate to actual use of ECE or childcare?
4. What are the factors that influence engagement with different types of ECE services in Aotearoa / NZ up to age two?

General policy relevance

Internationally, there is increasing interest in what affects the uptake of ECE services for pre-schoolers. This stems partly from wanting to increase parental – particularly maternal – employment, as well as growing evidence suggesting the importance of ECE in supporting children's social and educational development, especially among children from more socioeconomically deprived backgrounds (Melhuish 2016).

These economic, social and educational drivers have led to increased government involvement and interest in ECE services, in regulating service providers, and in policies to encourage families to take up ECE services. In particular, increasing participation in centre-based care is seen as a way to try to give children a more equal start in life.

Data from the GUiNZ cohort allows us to explore the factors associated with the use of ECE services using a large, demographically diverse sample of contemporary mothers of children in Aotearoa / NZ. We hope our findings help inform current policy initiatives intended to increase engagement with ECE services.

Background

Making decisions about whether and what kind of ECE service or childcare to choose is not simple for parents¹. The decision-making process may involve

¹ For the purposes of this report, ECE refers to services that are licensed and funded by the Ministry of Education. These services must meet regulated standards relating to health and safety, environment, staff qualifications and ratios, and deliver a curriculum consistent with the principles and strands of Te Whāriki. References to childcare relate to informal, private arrangements that do not attract government funding and which do not

balancing several decisions, including: balance between work and child-rearing, relative to the quality of care available; consideration of social, familial and cultural expectations and norms about care; family needs and resources; the affordability and accessibility of different types of care; as well as prior experiences. Determining whether and what kind of ECE or childcare to use often leads to trade-offs between multiple factors such as quality of education or care, convenience of location, and hours (Meyers & Jordan 2006, p. 65; Himmelweit & Sigala 2004). Understanding how this wide array of factors potentially influence or relate to parental decision-making about childcare or ECE services is important, because ultimately such decisions have the potential to influence children's development in important ways (Melhuish 2016), and can also influence when mothers return to employment and the hours and schedules they can work.

The current research-driven policy trend is to promote the uptake of quality centre-based ECE. This is because centre-based ECE is argued to be a better and/or more regulated way than home-based EC, to help three to five year olds develop a range of skills that are argued to be important for educational achievement at school, and in later life (e.g. early literacy, numeracy, language, and social skills) (Loeb et al. 2007; Magnuson et al. 2006; Gormley et al. 2005; Magnuson et al. 2004; Duncan 2003).

The evidence in support of ECE for 0-2 year-olds is sparser. In general, it is less clear whether early home-based ECE provides these benefits; arguably because quality is more variable, and there is less regulation.

Around the time the data for this study was collected, the New Zealand Children's Commissioner noted that the provision of ECE services in New Zealand was mixed, in terms of "availability, accessibility, adaptability, and acceptability" (Angus & Carroll-Lind 2011, p. xv), due in part to complicated licensing, regulation, monitoring and funding of ECE services, and agency involvement. This suggests a need to develop a better understanding of how contemporary Aotearoa / New Zealand parents navigate their way through the complex ECE space, especially in the early years, when the uptake is more variable.

This study seeks to address this gap and in doing so examines not only the pathways through different ECE providers in the early years, but also how individual factors (e.g., mothers' reported partnership status, mothers' attitudes and expectations towards childcare) and system-level factors (e.g., ECE subsidies, Paid Parental Leave (PPL)) relate to decisions about ECE and childcare over time.

need to meet any regulatory standards – in this report this is operationalised as "informal care".

Factors that influence preferences and decisions about ECE services

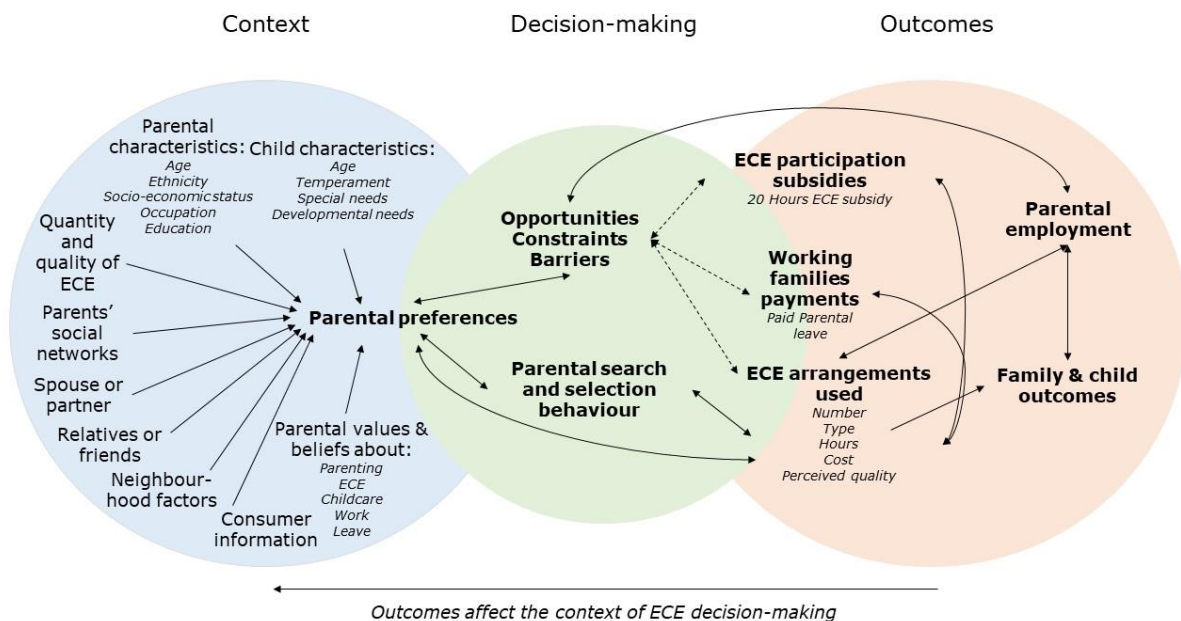
While a parent's decision about whether to engage with an ECE service can be observed as a single choice, it typically involves a wide range of complex and inter-related factors. Some of the key factors identified in the research literature are listed below.

Child factors	<ul style="list-style-type: none">• Number of children in the household• Age of the child (e.g., infant or toddler)• Development of the child
Working parents	<ul style="list-style-type: none">• Family employment situation, particularly for the mother (e.g., full-time or part-time, regularity of work schedules)• Eligibility for paid parental leave
Family resources and government support	<ul style="list-style-type: none">• Financial resources available• Eligibility for subsidies and income assistance• Availability of partner, extended family or a nanny
Social and cultural influences	<ul style="list-style-type: none">• Ethnic identification and the availability of culturally appropriate services• Parental preference about using ECE services• Social networks and societal expectations
ECE provider factors	<ul style="list-style-type: none">• Availability and accessibility• Fees charged by providers• Hours services are available• The availability of places and waiting lists• Structural features (e.g., size)• Process measures of quality (e.g. type of programme; degree of training of staff)• Urban or rural location.

Figure 1 is a hypothetical model representing some of this complexity in making decisions about ECE services. The model incorporates some of the components of earlier models, such as (Weber 2011) and (Pungello & Kurtz-Costes 1999), but has been adapted and modified for the Aotearoa / NZ context.

The model suggests that contextual factors, such as parent and child characteristics, parents' social networks, values and beliefs about ECE, influence parental preferences, which in turn influence the decision-making process and subsequent outcomes. Many of these influences on decisions about use of ECE services are reciprocal, with ECE use also supporting parental employment as well as other family and child outcomes.

Figure 1: Factors influencing parental decision-making about ECE and childcare



Adapted from Weber (2011, p. 4; 1999) and Pungello & Kurtz-Costes (1999, p. 38).

The contribution of this research

Relatively less research has examined the wide variety of issues and factors that parents might consider when making decisions about ECE use, and few have modelled the diverse range of individual, demographic, cultural and contextual influences on the decisions parents make about ECE services over time.

In particular, more attention needs to be paid to how parents might prioritise different aspects depending on their child's age; different arrangements might be preferred for infants, toddlers and pre-schoolers. Research suggests that parental preferences change over time and as more childcare options become available, accessible or affordable. In addition, as children grow, parents increasingly prioritise ECE services that focus more on children's social, cognitive and educational development. These changes have rarely been tracked longitudinally, especially using modelling methods that take multiple time points into account within a single model.

Our study builds upon existing research by using the GUINZ dataset to evaluate whether mothers' antenatal preferences about childcare or ECE use were met when their children were 9 and 24 months of age. We also extend the contribution of Bird et al. (2016), and Atatoa Carr et al. (2017), by considering whether a wider set of preferences was met. In addition, we explore the inter-relationship between employment status, paid parental leave and ECE use over time.

Differences between mothers' stated preferences for length of leave and ECE use, and actual uptake, as well as the reasons provided for this, can help to show whether families were able to realise their intentions for their children in their early years.

The implications of our findings have the potential to inform government policies around the engagement of different groups of people with different types of ECE services across the early years. In addition, it may provide insight into the relationship between the use of ECE subsidies and parental leave with earlier participation in ECE services. We expect our findings may also be of interest to parents (especially mothers) who are navigating the complex ECE provider landscape as well as to employers looking to support their employees returning to work after parental leave.

Method

Engagement with policy collaborators

This project has been a collaboration between researchers at the University of Auckland and the Ministry of Education. Early in the research, a working group was established with key partners at the Ministry of Education to help ensure we investigated questions of interest to the Ministry and that our outputs met the needs of policy makers.

The working group was led by our research partner within the Ministry of Education, Siobhan Murray (Senior Manager, ECE policy), and supported by Philip Stevens (Group Manager, Analysis and Research, Ministry of Education) as well as members of the Evidence, Data and Knowledge team, led by Simon Williamson (Manager, Research & Evaluation).

The working group met as needed over the course of the project. The draft report was also shared with our research partner, who provided important substantive feedback. This process helped to ensure we produced a high quality output that answered questions that were of interest to policy makers.

Participants

Participants in the current study were mothers who are part of the GUINZ study's longitudinal pre-birth cohort. Mothers were recruited during pregnancy from three District Health Boards: Auckland, Counties Manukau and Waikato. This region was chosen because of its ethnic and socio-economic diversity (Morton et al. 2013). All pregnant women who lived within this region who were due to give birth between 25 April 2009 and 25 March 2010 were eligible to participate. A multi-faceted strategy was used to recruit a sample broadly generalisable to the contemporary Aotearoa / NZ national birth cohort (Morton et al. 2014). The enrolled child cohort included 11% of the births in Aotearoa / NZ during the recruitment period and is broadly representative of all births between 2007 and 2010 with respect to ethnicity, maternal age, parity and socio-economic position (Morton et al. 2015).

Ethical approval for the *Growing Up in New Zealand* study was obtained from the New Zealand Health and Disability Northern Y Regional Ethics Committee. Written informed consent was obtained from all participating mothers. In total, 6,822 mothers were interviewed during pregnancy, who between them had 6,853 children (Morton et al. 2013).

In this study, observations were available for 6,822 mothers from the antenatal interview, 6,383 mothers from the 9 month interview, and 6,241 mothers from the 24 month interview. This represented a retention rate of 94% at 9 months and 92% at 24 months.

Procedure

Mothers were interviewed about topics across the multiple life-course domains considered by GUiNZ, including health, psychosocial and cognitive development, family and whānau, education, culture and identity, and neighbourhood and societal context (Morton et al. 2013). Trained interviewers conducted interviews in mothers' homes at the antenatal, 9 and 24 month time-points. Interviews were face-to-face and computer-assisted, and took about 90 minutes.. Interviewers read each survey question aloud. For most questions, mothers chose from a list of possible responses. A small number of questions allowed free response.

Measures and variable coding

Several measures were used to evaluate the factors that enabled or constrained mothers' use of ECE services and/or parental leave. These are outlined below.

Socio-demographic measures and ethnicity

Area-level socio-economic deprivation was measured using the decile scale of the NZ Index of Deprivation (NZDep) (Salmond et al. 2007). NZDep was then grouped in quintiles, where 1-2 was low deprivation and 9-10 was high, and was used to provide an estimate of the relative aggregate-level socioeconomic deprivation of the area in which each participant was living.

Mothers were asked a range of standard demographic questions at the antenatal interview that were included in the analyses as time invariant (fixed) variables. Maternal education was based on a mothers' highest qualification. Each mother's self-prioritised ethnicity was grouped into the following categories: European, Māori, Pacific, Asian and Other. Partnership status was asked broadly, ie: "Do you have a spouse or partner whom you consider to be a member of your family/whānau?", and therefore may include non-resident partners for many mothers. Finally, child parity was measured by whether the cohort child was the mother's first child.

A number of time-varying variables of mothers' background characteristics were included as well. The age of each mother at the time of the interview was included. Rurality was measured by whether mothers said they lived in a rural or urban area.

Leave and work

At antenatal data collection, mothers were asked about their intended use of parental leave, and where subsequently asked about their actual use at the antenatal 9 month interview. At the 9 month interview, mothers who had a paid job at any time while they were pregnant were also asked how old their child was when they returned to work, and how long their paid and unpaid leave was.

Variables regarding mothers' work situation and occupational status collected during the nine or 24 month interviews were also evaluated. These were categorical variables that indicated: what mothers' paid work situation was; what mothers' work schedules in their main job were; how many hours each week mothers worked in all their jobs, including overtime, coded into the categories of 19 or less hours, 20-29 hours, 30-34 hours, 35-39 hours, or 40 or more hours; and whether mothers worked weekends.

ECE use and childcare variables

Several variables related to ECE use or childcare arrangements were used or derived from mothers' responses at each time point. During the antenatal interview, mothers were asked whether they intended to work after their child was born and if so, the age they expected their child to be and whether they had decided the type of childcare or ECE service they would use. They were then asked to indicate all the types of childcare and/or ECE services they intended to use from a list of options.

At the 9 and 24 month interviews, questions about ECE and childcare use were based on those used in the *Longitudinal Study of Australian Children* (Harrison et al. 2005), including whether they had used a care or education arrangement, the main arrangement used, and the main reason for using that kind of service. Mothers who used an ECE service or childcare were asked: whether they paid for their child's ECE or care; whether they received a subsidy for their child's main care arrangement; and how many hours their child spent in their main education or care arrangement, coded into the categories of 0-19, 20-49 and 50 hours or more. Mothers who did not use any form of ECE or formal care arrangement were asked the main reason why not.

Table 1 indicates how mothers' responses about the main type of ECE or non-parental childcare used, were grouped into the following four categories for analytic purposes: teacher-led, centre-based ECE; Māori & Pasifika immersion and bilingual centre-based services; home-based ECE; and, informal childcare (see Table 1). The first three categories are subsidised by the Ministry of Education, while informal care usually is not (exceptions are described in the footnotes for Table 1).

The classification of teacher-led, centre-based ECE and home-based ECE was based on Ministry of Education classifications (Ministry of Education 2017). Based on advice from the Ministry of Education, nannies were included in the home-based ECE classification since most are affiliated with a home-based ECE provider. With respect to the classification of Māori & Pasifika immersion and bilingual centre-based services, it should be noted that the services included within this category are different from each other. For example, kōhanga reo are whānau-led services, while Pacific Island Early Childhood Centres are teacher-led centre-based services. Unfortunately however, the sample sizes were not large

enough to analyse these services separately. However, initial analysis indicated that the reasons provided by mothers using the different services included in this category were very similar – and aggregation also meant that the sample size (though still comparatively small) was large enough to be analysed meaningfully. Since this report focuses on the reasons mothers gave for using a particular service or care arrangement, this classification was considered justifiable.

Table 1: Classification of provided ECE and childcare response options

	Teacher-led, centre-based ECE, MoE subsidised	Māori & Pasifika immersion and bilingual centre-based services, MoE subsidised	Home-based ECE, MoE subsidised	Informal care, not MoE subsidised
Kindergarten	X			
Daycare centre*	X			
Organised home-based ECE programmes			X	
Kōhanga reo		X		
Pacific Islands early childhood centre*		X		
Nanny^			X	
Grandparent^				X
Parental care				X
Other relative^				X
Gym, leisure or community centre*	X			
Other person (includes friend or neighbour)				X

* These services are classified by the Ministry of Education as education and care services.

^ Nannies, grandparents and other relatives may be part of Ministry of Education-licensed home-based ECE services and therefore receive Ministry of Education subsidies. For the purposes of this analysis, we have assumed the majority of nannies are subsidised via their matching agency and therefore fall within home-based ECE, while the majority of grandparents and other relatives are not part of home-based ECE networks, and therefore not subsidised.

Data analysis

A strength of having a large and diverse cohort is the power to undertake complex analyses within ethnic and socio-economic subgroups, as well as for the whole cohort (Morton et al. 2013). We used descriptive statistics to report whether:

- mothers who said they intended to take parental leave actually took leave after their child was born
- there were differences in the length of mothers' intended and actual leave
- there were differences between the expected and actual age of children when mothers returned to paid work
- the intended type of ECE service or childcare reported by the mother before their child was born was the same as the one they used at 9 months and 24 months.

Since mothers were asked about whether they took leave in the 9 month interview, we developed binary logistic regression models to evaluate associations between socio-demographic, work and ECE use, with whether mothers did *not* take parental leave.

In addition, we developed longitudinal binary generalised linear mixed models to evaluate associations over time between socio-demographic variables, certain ECE and / or childcare, parental leave and work-related variables with:

1. How likely mothers were to use ECE services
2. How likely mothers were to use centre-based, teacher-led services, or home-based services, over informal childcare
3. How likely mothers who used ECE services were to use centre-based, teacher-led services over home-based services
4. How likely childcare subsidies and parental leave were to influence choice of ECE provider.

The longitudinal models considered the change in childcare use between 9 and 24 months. Data collected at each time point were treated as nested within mothers. The antenatal data collection wave was coded as zero, with time measured as a linear increase of one unit per data collection. Therefore the model intercepts represent mothers' responses at the antenatal data collection wave, and parameter estimates represent changes from the antenatal baseline (McCoach 2010, p. 125). To allow for variation across individual mothers' responses, intercepts were allowed to vary at the "mother" level.

For both sets of models, we report multivariate odds ratios (OR), providing an indication of the strength of association between each variable and the outcome measure. Analyses were conducted using Stata 15 (StataCorp LLC, College Station, Texas). A *p* value of < 0.05 was considered statistically significant.

Results

Mothers' intended and actual use of parental leave

Taking parental leave is an important way parents can help provide care for their infants and young children, and government subsidies such as paid parental leave can help support this. We evaluated the expected age of their child when mothers intended to return to work, whether mothers who were working during pregnancy actually took leave, and the intended length of leave (see Figure 2 and Tables 2 and 3) as well as reasons why mothers who were working while pregnant did not take leave (Table 4). In terms of descriptive statistics, we found that:

- Two-thirds of mothers in the antenatal cohort (n = 4,230) were working during their pregnancy.
- A total of 3,529 (84%) of those who were working during pregnancy took some form of parental leave, while 692 mothers did not take any leave.
- The two most common reasons why mothers who had been working did not take paid leave were because: they had resigned from their job or been made redundant, (n = 289, 42%); or due to government regulations about entitlement (n = 135, 19%). The remaining reasons are shown in Table 4.
- Of the three-quarters of mothers who expected to return to work, the most common age mothers expected their child to be when they did so had two main peaks. Twenty-six percent of mothers expected their child to be 4-6 months of age and 27% expected their child to be between 10-12 months of age. The average expected age was 10.5 months.
- Mothers who had returned to work by the 9 month interview reported, on average, that they took 25 weeks of paid and unpaid leave (n = 2,461), and the actual average age of their child when they started or returned to work was just over 5 months (n = 2,161).
- As mothers who took leave tended to use multiple types of paid and unpaid leave, they were likely to have covered the difference between paid parental leave and the total time they spent on leave with annual leave, other pay or no pay (Table 3).

Figure 2: Expected age of their child when mothers intended to return to work

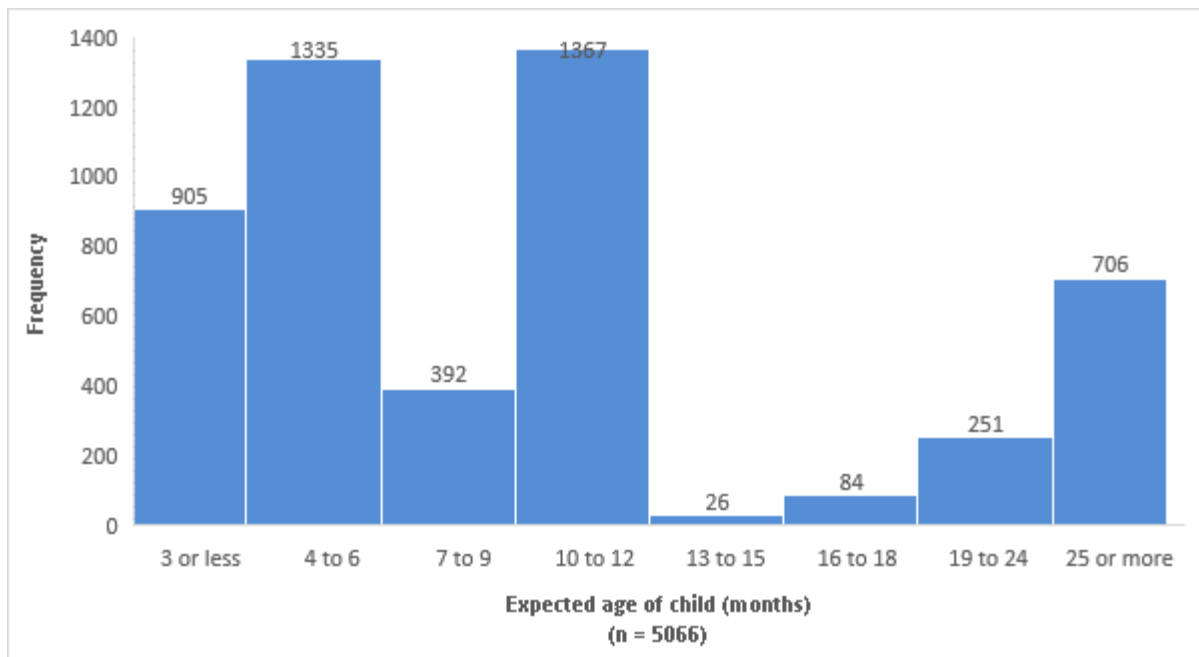


Table 2: Summary statistics of child's age and time on leave-related variables in the first 9 months

	Expected age of child when expected to return to work (months)	Actual age of child of mothers who returned to work by 9 months (months)	Anticipated length of leave (months)	Preferred length of leave (months)	Total paid and unpaid leave of those working at 9 months (months)
Count	4675	2134	3305	3140	2461
Mean	10.5	5.1	7.7	11.3	5.8
Median	7	5.1	6	12	5.6
Standard deviation	9.3	2.3	4.7	7.6	2.95
Min.	1	0	0.25	0.25	0
Max.	54	14.2	48	48	18.1
Non-response	2147	4688	3517	3682	4361
Total	6822	6822	6822	6822	6822
	Paid leave ^a (weeks)	Only paid parental leave (weeks)	Annual leave (weeks)	Other pay (weeks)	No pay (weeks)
Count	1117	2114	924	172	1506
Mean	15.2	13.9	4.6	10.8	17.1
Median	14	14	3	7	15
Standard deviation	5.9	4.1	5	10.5	11.1
Min.	1	1	0	0	0
Max.	70	61	52	61	78
Non-response	5705	4708	5898	6650	5316
Total	6822	6822	6822	6822	6822

^a Paid leave refers to the number of weeks mothers were on paid parental leave plus additional pay from their employer.

Table 3: Types of leave mothers took in the first 9 months: Multiple response

	Frequency	Percent of responses	Percent of cases
Paid parental leave	3084	49.7	87.4
Unpaid parental leave	1951	31.8	55.3
Annual leave	1182	19.7	33.5
Other leave	112	2.8	3.2
Sub-total	6329	100.0	179.3
No. of cases	3529	51.7	
Was not in paid work while pregnant	2151	31.5	
Did not go on parental leave	692	10.1	
Non-response	450	0.7	
Total	6822	100.0	

Table 4: Reasons why mothers said they did not go on paid or unpaid leave: Multiple response

	Frequency	Percent of responses	Percent of cases
Financial reasons	39	5.2	5.6
Government regulations about entitlement	135	18.1	19.5
Company or employer regulations about entitlement	31	4.2	4.5
Professional or work commitments	41	5.5	5.9
Parenting preferences	70	9.4	10.1
Resigned	242	32.4	34.9
Redundancy	47	6.3	6.8
Flexible work arranged	24	3.2	3.5
Self-employed/run family business	63	8.4	9.1
Other	55	7.4	7.9
Total	747	100.0	107.6
Valid cases	692		

Next we evaluated the predictors of use of parental leave among mothers who had been working during pregnancy. As questions about leave were asked during the antenatal and 9 months interviews, our analysis is restricted to these periods. Our analysis focused on the likelihood of mothers not going on leave, because we wanted to better understand the factors associated with non-use of parental leave.

Table 5 presents the multivariate odds of non-use of parental leave across four binary logistic regression models, for mothers who had been working during pregnancy. The results indicated that:

- Few socio-demographic variables predicted mothers' non-use of leave

- Area deprivation levels and rurality were not statistically significant predictors
- Mothers' age and whether they reported having a partner were statistically significant predictors: older mothers were more likely to go on leave, whereas mothers reporting they had no current partner were twice as likely not to take leave
- Mothers' self-prioritised ethnicity and highest education level, and whether their child was the first born, were not statistically significant.

The different models also considered the effect of various work and childcare-related variables. Along with the various socio-demographic variables, model 1 considered the effect of mothers' current work status and model 2 evaluated the influence of current work schedule on non-use of parental leave. Our findings indicate that compared to mothers who took parental leave:

- Mothers who had not taken parental leave were more likely to either look after their baby themselves, or for their partner to do so.
- Out of the possible different work statuses, mothers who had not taken leave were the least likely to be regular paid employees and the least likely to work regular daytime shifts when their child was 9 months old.

Models 3 and 4 included whether mothers paid for their childcare or ECE service in the first 9 months, or received a subsidy for their main service arrangement, controlling for mothers' work status (model 3) or schedules (model 4), and socio-demographic variables. We found that:

- The same variables which were statistically significant predictors in model 1 and 2 were significant in models 3 and 4.
- However, by adding the childcare subsidy into model 3, we see that those receiving childcare subsidies were more than twice as likely not to use parental leave.
- Mothers paying for their main ECE or care arrangement were significantly more likely to have taken parental leave.

Table 5: Predictors of non-use of parental leave

Did not go on parental leave: Multivariate Odds Ratios				
Predictor	(1) Work status and use of ECE or care	(2) Work schedule and use of ECE or care	(3) Work status and cost variables	(4) Work schedule and cost variables
Self-prioritised ethnicity				
Māori vs. New Zealand European	1.00	1.00	.958	.952
Pacific vs. New Zealand European	1.27	1.27	1.24	1.23
Asian vs. New Zealand European	1.32	1.33	1.32	1.33
Other vs. New Zealand European	1.20	1.14	1.18	1.09
Rurality group				
Rural area vs. urban area	1.23	1.12	1.17	1.08
NZDep quintiles				
2 vs. 1	.965	.951	.927	.919
3 vs. 1	.928	.889	.843	.805
4 vs. 1	1.13	1.12	1.07	1.05
5 vs. 1	1.13	1.10	.998	.997
Highest completed secondary school qualification				
Sec school/NCEA 1-4 vs. no secondary school qualification	1.03	1.06	.987	1.01
Diploma/Trade cert/NCEA 5-6 vs. no secondary school qualification	.971	1.00	.941	.957
Bachelor's degree vs. no secondary school qualification	.877	.907	.845	.861
Higher degree vs. no secondary school qualification	.684	.708	.647	.665
Mother's age (years)				
	.949***	.948***	.952***	.950***
Current partner status				
No current partner vs. current partner	2.02***	2.01***	1.71**	1.71**
Child parity				
Subsequent vs. first born	.862	.844	.866	.853
9 Month DCW paid work situation				
A paid employee (including those on leave) vs. not in workforce	.097***		.094**	
Self-employed and not	.273***		.234***	

Did not go on parental leave: Multivariate Odds Ratios				
Predictor	(1) Work status and use of ECE or care	(2) Work schedule and use of ECE or care	(3) Work status and cost variables	(4) Work schedule and cost variables
employing others vs. not in workforce				
An employer of other persons in my own business vs. not in workforce	.459**		.476**	
Working in a family business or family farm with or without pay vs. not in workforce	.282***		.241***	
Not currently in paid work and seeking work vs. not in workforce	.837		.770	
Not currently in paid work and have a new job to start in 4 weeks vs. not in workforce	.333***		.299***	
9 month work schedule description				
A regular daytime schedule vs. not working		.088***		.089***
A regular evening shift vs. not working		.125***		.133***
A rotating shift (changes from days to evenings to nights) vs. not working		.063***		.066***
Split shift (two distinct periods each day) vs. not working		.156**		.168**
On call vs. not working		.604		.565
Irregular schedule vs. not working		.42***		.366***
Baby looked after by someone other than self or partner				
Yes vs. informal care	.614***	.679***		
Paid for main care				
Yes vs. used informal care or did not pay for main care			.352***	.422***
Received a childcare subsidy for the main care arrangement				
Yes vs. used informal care or did not receive a subsidy			2.67**	2.50**
Constant	5.27***	4.83***	5.64***	5.23***
Model statistics				
Number of observations	3132	3103	2854	2827
Model degrees of freedom	23	23	24	24
-2 log likelihood	-1292.0	-1261.8	-1157.5	-1137.70
Model chi ²	706.4	734.5	682.7	691.2
Pseudo R-squared	.21	.23	.23	.23

Did not go on parental leave: Multivariate Odds Ratios				
Predictor	(1) Work status and use of ECE or care	(2) Work schedule and use of ECE or care	(3) Work status and cost variables	(4) Work schedule and cost variables
Akaike Information Criterion (AIC)	2631.9	2571.7	2365.0	2325.4
Bayes Information Criterion (BIC)	2777.1	2716.6	2513.9	2474.0

Legend: * p<0.05; ** p<0.01; ***<0.001

Use of ECE services up to 24 months of age

Mothers' antenatal intentions and actual use of ECE

Of the 6,822 mothers who participated at the antenatal wave, 5,352 responded to a multiple response question about the types of childcare they intended to use when they started or went back to paid work. Table 6 shows about a third of mothers had not yet decided what type of care or ECE they intended to use, while approximately half indicated an intention.

Of those who indicated an antenatal intention, a third of mothers planned to use some kind of care by a partner or relative, in their own home or a family member's home. Relatively few mothers planned to use child-minders. 29% of mothers wanted to use ECE or a similar kind of service. However, Table 7 shows that by the time their child was 9 months old, 11% of mothers who responded were using teacher-led centre-based ECE while only 5% were using home-based ECE. A further 1% had enrolled their child with a Māori & Pasifika immersion and bilingual centre-based service. By the time the child was 24 months old, we see a higher uptake of centre-based ECE (31%), while the home-based ECE increased to 8%, and 3.4% for Māori & Pasifika services.

Table 6: Mothers' intended childcare before their child was born

	Frequency	Percent of responses ¹	Percent of cases (mothers)
Child-minder in home (not family)	141	3.2	2.1
Child-minder in their home (not family)	164	3.7	2.4
Partner	728	16.4	10.7
Other family-own home	847	19.1	12.4
Other family-their home	579	13.1	8.5
ECE or similar	1280	28.9	18.8
Own care while working	500	11.3	7.3
Other childcare	40	0.9	5.9
Child at school	154	3.5	2.3
Subtotal of responses	4433	100.0	
No. of mothers indicating an intention	3351		49.1
Had not decided who would look after child	2001		29.3
Non-response	1470		21.5
Total	6822		100.0

¹ Mothers were able to give more than one response.

Table 7: Type of ECE or childcare used by mothers for most hours per week when their child was 9 or 24 months old

	9 months		24 months	
	Freq.	%	Freq.	%
Teacher-led, centre-based, MoE subsidised ECE	624	10.6	1752	30.7
Māori & Pasifika immersion and bilingual centre-based services, MoE subsidised	61	1.0	192	3.4
Home-based, MoE subsidised ECE	301	5.1	454	8.0
Total using ECE	986	16.8	2398	42.0
Informal care	4861	82.9	3265	57.2
Other	17	0.3	44	0.8
Sub-total of responses	5864	100.0	5707	100.0
Non-response	958	14.0	1115	16.3
Total	6822		6822	

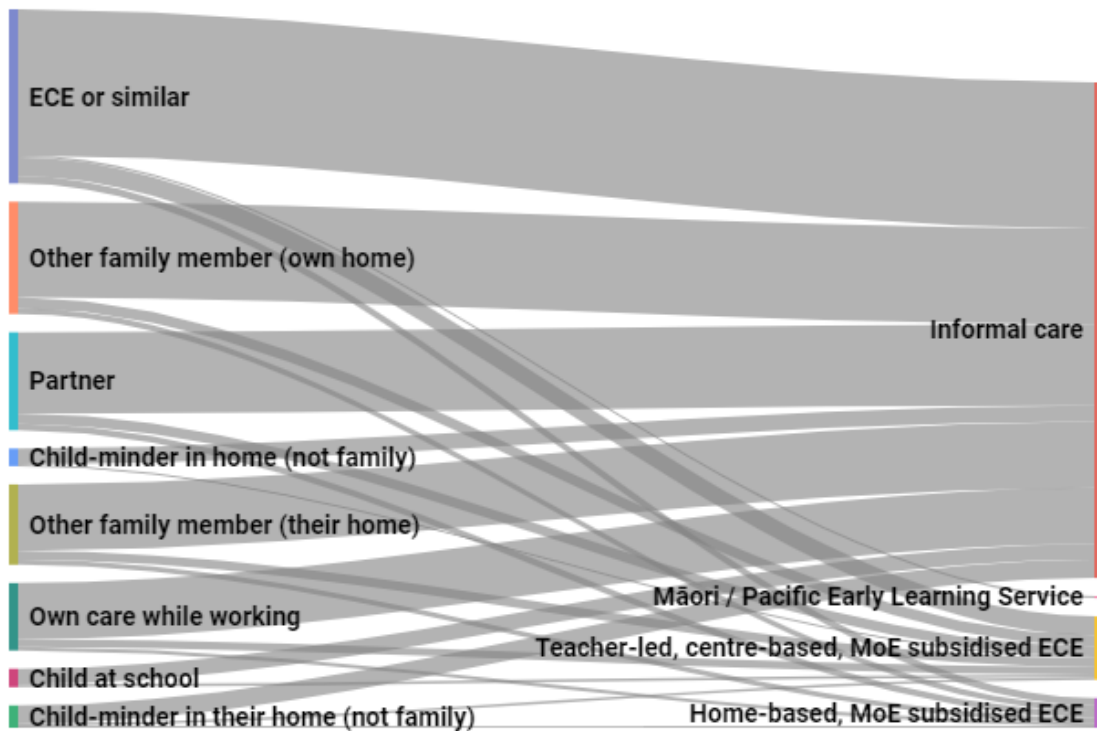
In terms of overall engagement with any type of ECE service, these figures suggest alignment between antenatal intentions and outcomes by 24 months, but also highlights how mothers' choices about ECE or childcare arrangements change from infancy to toddlerhood. These changes are explored in detail in the Sankey charts in Figure 3. These charts illustrate mothers' antenatal intentions about whether they planned to use ECE services or a different care arrangement, and what arrangement they subsequently used when their child was 9 and 24 months old. The underlying figures for these Sankey charts are presented in

Appendix 1: . While these results do not account for any multiple care arrangements mothers may have used, the charts make vividly clear that the main care used differed for many mothers compared with what they had intended before their child was born. In examining the Sankey charts and tables together we found that:

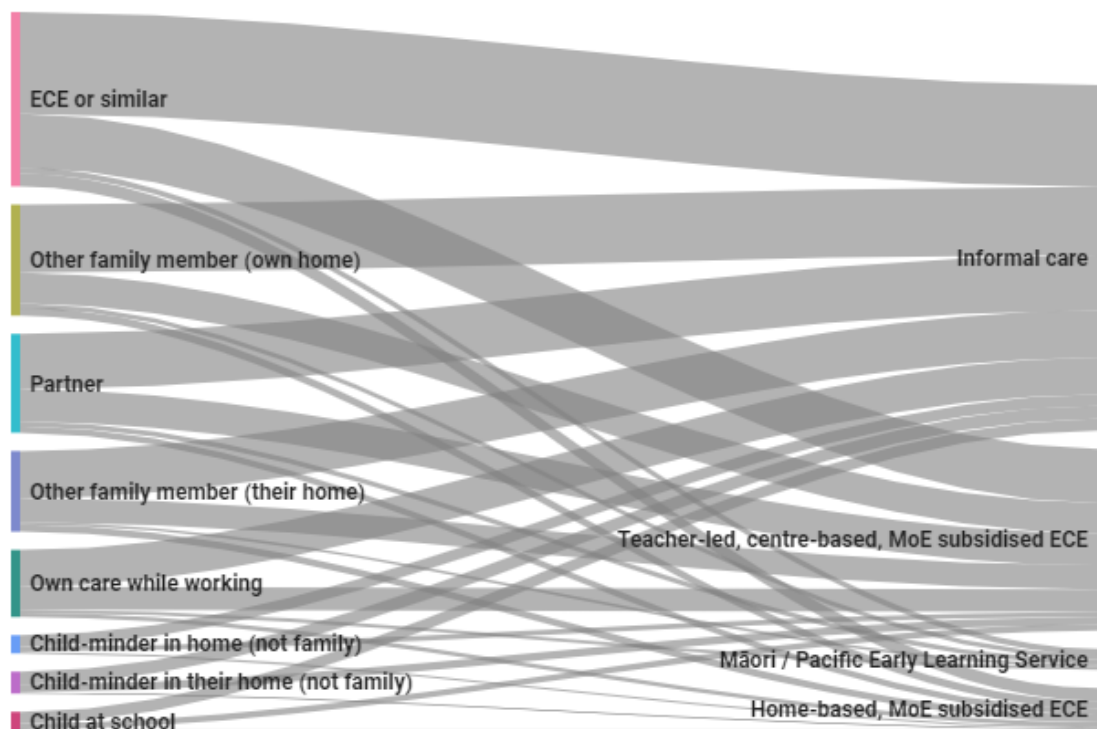
- The overall uptake of any type of ECE at 9 months was about 17%, and 42% by 24 months. However, individual mothers' choices often differed substantially from their antenatal intentions.
- 84% of mothers who antenatally had indicated they wanted to use ECE services, were still using parental care or other informal care arrangement at 9 months.
- 41.4% of mothers who used some type of ECE at 9 months used a different type at 24 months.
- By 24 months, there was a noticeable shift towards the uptake of centre-based, teacher-led ECE, yet 58% of mothers who indicated an antenatal intention to use an ECE provider were still not doing so.
- Interestingly, uptake of ECE services was similar irrespective of antenatal intention.

Figure 3: Mothers' antenatal intentions about ECE or childcare and actual arrangement used for most hours per week at 9 and 24 months

Antenatal to 9 months



Antenatal to 24 months



Use of different types of ECE or childcare over time

We found considerable change in the type of ECE services or childcare used over time. Consistent with overseas research, these changes represent an overall shift from informal care and home-based ECE into teacher-led centre-based ECE as children age. In addition, though the numbers were fairly small, there was a strong increase in the uptake of Māori & Pasifika services, with more than three times as many mothers opting for these services at 24 months.

Use and non-use of ECE services between 9 and 24 months

We evaluated the likelihood of using an informal childcare arrangement (ie parental care, care by relatives etc) between 9 months and 24 months to explore why some mothers chose not to engage in any type of ECE (see Table 1 for categories of ECE and / or care).

Table 8 presents odds ratios (OR) and summary statistics for three binary generalised linear mixed models. Separate models were run for three work-related variables because of overlap amongst the following variables: hours worked (ranging from less than 20 to 40 or more); work status (paid employee, self-employed, seeking work, etc); and work schedule (regular day schedule, evening shift, rotating shift, etc). The same demographic factors are controlled for in each model.

The results show that at 24 months:

- Mothers who lived in rural areas were about 20% more likely to use an informal care arrangement (OR = 1.19 – 1.26).
- Mothers in the highest deprivation quintile were more than twice as likely to use an informal care arrangement over an ECE service compared with those living in the lowest quintile (OR = 2.15 – 2.3).

In contrast:

- Mothers were much more likely to use an ECE service at 24 months compared to 9 months.
- Mothers who reported not having a partner were twice as likely to use an ECE arrangement over informal care.

Of note:

- There were no significant differences by mothers' self-prioritised ethnic identity.
- No significant differences were found by maternal education.
- There was no difference in uptake of ECE services based on birth order.

The impact of the different work-related variables was consistent with the findings of previous research. Compared to non-working mothers we found that:

- The greater the number of hours mothers said they worked on average each week, the less likely it was that they used an informal childcare arrangement (Model 1). Indeed, mothers working more than 40 hours per week were approximately 6 times more likely to use an ECE service than those not working.
- Similarly, mothers who said they were in any kind of regular paid or unpaid work were more likely to use an ECE service (Model 2).
- While all maternal employment was related to an increased use of ECE services, mothers who worked a regular day time schedule (model 3) were 7 times more likely to use an ECE service, whereas those working more irregular shifts were only about 3 times more likely to do so, compared to mothers who were not working.
- We also found that mothers who took parental leave were approximately 1.2 times more likely to use an ECE service.
- In contrast, mothers working weekends were twice as likely to *not* use an ECE service.

Table 8: Predictors of use of informal care from 9 to 24 months old

Predictor	Informal Childcare: Multivariate Odds Ratios		
	(1) Hours worked	(2) Work status	(3) Work schedule
Data Collection Wave (change over time)	.373***	.365***	.364***
Self-prioritised ethnicity			
Māori vs. New Zealand European	.985	.978	.977
Pacific vs. New Zealand European	.890	.890	.893
Asian vs. New Zealand European	1.06	1.05	1.05
Other vs. New Zealand European	.975	.956	.985
Rurality group			
Rural area vs. urban area	1.26**	1.19*	1.22*
NZDep quintiles			
2 vs. 1	1.28***	1.29***	1.28***
3 vs. 1	1.32***	1.30***	1.29***
4 vs. 1	2.01***	1.93***	1.88***
5 vs. 1	2.30***	2.24***	2.15***

Predictor	Informal Childcare: Multivariate Odds Ratios		
	(1) Hours worked	(2) Work status	(3) Work schedule
Highest completed secondary school qualification			
Sec school/NCEA 1-4 vs. no secondary school qualification	1.06	1.08	1.04
Diploma/Trade cert/NCEA 5-6 vs. no secondary school qualification	1.03	1.01	.998
Bachelor's degree vs. no secondary school qualification	1.11	1.12	1.09
Higher degree vs. no secondary school qualification	.952	.949	.923
Mother's age (years)			
	1.00	.999	1.00
Current partner status			
No current partner vs. current partner	.561***	.566***	.573***
Child parity			
Subsequent vs. first born	.953	.959	.954
Including overtime, hours worked per week			
19 or fewer hours vs. not working	.321***		
20 to 29 hours vs. not working	.164***		
30 to 34 hours vs. not working	.137***		
35 to 39 hours vs. not working	.121***		
40 or more hours vs. not working	.164***		
Took leave			
Yes vs. not in workforce while pregnant	.832***	.844***	.837***
No vs. not in workforce while pregnant	1.01	1.05	.999
Current paid work situation			
A paid employee (include those on leave) vs. not in workforce		.129***	
Self-employed and not employing others vs. not in workforce		.205***	
An employer of other persons in my own business vs. not in workforce		.134***	
Working in a family business or family farm with or without pay vs. not in workforce		.233***	

Predictor	Informal Childcare: Multivariate Odds Ratios		
	(1) Hours worked	(2) Work status	(3) Work schedule
Not currently in paid work and seeking work vs. not in workforce		.736**	
Not currently in paid work and have a new job to start in 4 weeks vs. not in workforce		.547***	
Usually works weekends			
Yes vs. no		2.07***	
Work schedule description			
A regular daytime schedule vs. not working			.139***
A regular evening shift vs. not working			.478***
A regular night shift vs. not working			.951
A rotating shift (changes from days to evenings and nights) vs. not working			.403***
Split shift (two distinct periods each day) vs. not working			.290***
On call vs. not working			.289***
Irregular schedule vs. not working			.342***
Constant	14.6***	16.6***	15.4***
Model statistics			
Number of observations	11129	11154	11107
Number of mothers	6276	6279	6270
-2 log likelihood	-6121.7	-6104.4	-6040.2
Model degrees of freedom	24	26	26
Model chi ²	1217.6	1230.2	1243.9
Chi bar 2 probability	.026	.025	.038
Akaike Information Criterion (AIC)	12295.4	12264.8	12136.3
Bayes Information Criterion (BIC)	12485.7	12469.7	12341.2
Intra-class correlation coefficient (ICC)	.047	.048	.043

Legend: * p<0.05; ** p<0.01; *** p<0.001

Factors influencing the use of different types of ECE

Having explored what factors might have influenced decisions to use an informal care arrangement over ECE services, we evaluated the factors associated with use of different *types* of ECE. Mothers using an ECE service also indicated why they were using that particular arrangement. In terms of descriptive statistics, work or study was the most common reason for mothers choosing to use an ECE service when their child was either 9 months old (88%, $n = 1,484$) or 24 months old (78%, $n = 2,257$). Of interest, although not the age range this study is focussing on, by the time children were aged 54 months old, work or study was markedly less important to mothers (12%, $n = 623$), than reasons such as the location (17%, $n = 860$) or the programmes or policies of the service (12%, $n = 617$) for choosing a particular type of ECE.

The models in Table 9 show the factors that predict whether mothers used one type of ECE versus the other (see Table 1 for the distinctions between the ECE categories). Overall we see a clear shift in service choice from when a child is 9 months to 24 months old, with mothers of 24 month olds being 1.9 times more likely to use teacher-led centre-based ECE over home-based compared with when their child was 9 months old (model 1), and 1.8 times more likely to use Māori & Pasifika immersion and bilingual centre-based services over home-based ECE (Model 3). Model 2 shows that usage increased at a similar rate for both Māori & Pasifika services, and for teacher-led services (OR = 0.97).

Socio-demographic factors influencing the types of ECE service chosen

In terms of the demographic predictors of type of ECE selected, our findings were broadly similar to the demographic predictors of mothers' overall use (or non-use) of informal care shown in Table 8 and described above. However, there were also some interesting differences.

While there were no significant differences by mothers' ethnicity, there were marked differences in terms of NZDep quintile. Those in the highest deprivation quintile were twice as likely to use teacher-led ECE over home-based, compared with those in the lowest deprivation quintile. There was also a marked trend toward much higher odds of using Māori & Pasifika immersion and bilingual centre-based services the higher the deprivation quintile, particularly when compared with home-based ECE. It should be noted, however, that since the number of children attending Māori & Pasifika services was relatively low, the confidence intervals are quite large. Nonetheless, this trend was strongly significant.

There were also some differences with respect to maternal education. More educated mothers tended to be more likely to use Māori & Pasifika immersion and bilingual centre-based services compared with both teacher-led and home-based ECE (models 2 and 3) – though this was only significant for mothers with

a bachelor's degree in comparison to those with no secondary school qualification.

Maternal age was also a significant factor in choice of ECE, with older mothers less likely to choose teacher-led centre-based ECE compared with home-based (OR = .95), and less likely to choose Māori & Pasifika services compared with either teacher-led (OR = .95) or home-based ECE (OR = .90).

Work factors related to different types of ECE

Mothers' work schedules were typically not associated with use of a particular type of ECE over another. The one exception was that mothers who were working a regular daytime schedule were less likely to use Māori & Pasifika immersion and bilingual centre-based services, and more likely to use either of the other classifications of ECE services.

With respect to the main reasons provided for mothers' choice of ECE type, we found that mothers who were using Māori & Pasifika immersion and bilingual centre-based services were markedly more likely to provide a reason that did not relate to their personal work or study requirements. It should be noted that due to the relatively small sample size for this group, the confidence intervals are quite large. Nonetheless there were several significant findings. These mothers were significantly more likely to:

- Indicate they felt the service was good for the child's intellectual development compared with either home-based (OR = 79.9) or teacher-led centre-based ECE (OR = 10.0).
- Report that they had chosen the service due to the opportunity for language learning (ORs = 12.7 compared with teacher-led; 28.9 compared with home-based).
- Provide reasons related to social development and the opportunity to mix with other children (ORs = 2.3 to 6.6).
- Enrol their child for more hours per week, compared with those using teacher-led centre-based ECE or home-based services (ORs = 7.8 to 11.7).

Comparing home-based ECE versus teacher-led centre-based ECE, mothers choosing teacher-led services were more likely to report reasons relating to their child's social development (OR = 2.3), intellectual development (OR = 6.8), or ability to mix with children the same age (OR = 3.0). These mothers were also more likely report that their child was enrolled with their main ECE service for 20-49 hours per week, compared with 0-19 hours (OR = 1.6).

Table 9: Predictors of use of different types of ECE or childcare from 9 to 24 months old

Predictor	Multivariate Odds Ratios		
	(1) Home-based ECE vs. teacher-led, centre-based ECE	(2) Teacher-led, centre-based ECE vs. Māori & Pasifika immersion and bilingual centre-based services	(3) Home-based ECE vs. Māori & Pasifika immersion and bilingual centre- based services
Data Collection Wave (change over time)			
	1.85***	.973	1.75*
Self-prioritised ethnicity			
Māori vs. New Zealand European	1.00	.913	.944
Pacific vs. New Zealand European	.792	1.31	1.24
Asian vs. New Zealand European	.834	1.12	.673
Other vs. New Zealand European	1.28	.914	1.41
Rurality group			
Rural area vs. urban area	1.02	.938	.826
NZDep quintiles			
2 vs. 1	1.13	2.14	3.79**
3 vs. 1	1.26	2.53*	3.87**
4 vs. 1	1.26	4.49***	6.76***
5 vs. 1	2.00***	7.89***	25.7***
Highest completed secondary school qualification			
Sec school/NCEA 1-4 vs. no secondary school qualification	1.21	1.83	2.53
Diploma/Trade cert/NCEA 5-6 vs. no secondary school qualification	1.11	1.68	2.28
Bachelor's degree vs. no secondary school qualification	1.02	2.27*	2.86*
Higher degree vs. no secondary school qualification	1.11	1.66	2.95
Mother's age (years)			
	.951***	.947***	.902***
Current partner status			
No current partner vs. current partner	1.23	1.01	1.02
Child parity			
Subsequent vs. first born	.993	1.06	.939

Multivariate Odds Ratios			
Predictor	(1) Home-based ECE vs. teacher-led, centre-based ECE	(2) Teacher-led, centre-based ECE vs. Māori & Pasifika immersion and bilingual centre-based services	(3) Home-based ECE vs. Māori & Pasifika immersion and bilingual centre- based services

Work schedule description

A regular daytime schedule vs. not working	1.10	.589*	.452**
A regular evening shift vs. not working	1.20	1.12	.653
A rotating shift (changes from days to evenings and nights) vs. not working	.760	.785	.745
Split shift (two distinct periods each day) vs. not working	1.01	1.04	.481
On call vs. not working	.667	.194	.521
Irregular schedule vs. not working	.674	1.20	.556

Main reason used arrangement

Because of your leisure or community activities vs. because of work or study	.721	7.22*	2.33
To give you a break or time alone vs. because of work or study	1.11	2.13	1.92
So you can attend to your own, partner's health needs vs. because of work or study	.804	2.34	.366
It is good for the child's social development vs. because of work or study	2.30***	2.31**	2.71*
It is good for the child's intellectual development vs. because of work or study	6.76**	10.0***	79.9***
To mix with other children of the same age vs. because of work or study	3.03*	3.84**	6.63*
Language learning vs. because of work or study	1.63	12.7***	28.9**

Hours each week in main care arrangement

20-49 hours vs. 0-19 hours	1.57***	8.50***	11.7***
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Multivariate Odds Ratios			
Predictor	(1) Home-based ECE vs. teacher-led, centre-based ECE	(2) Teacher-led, centre-based ECE vs. Māori & Pasifika immersion and bilingual centre-based services	(3) Home-based ECE vs. Māori & Pasifika immersion and bilingual centre- based services
50 hours or more vs. 0-19 hours	1.18	7.78***	9.63***
Constant	3.14**	.0134***	.0419**
Model statistics			
Number of observations	2879	2421	930
Number of mothers	2608	2243	897
-2 log likelihood	-1495.1	-585.7	-294.8
Model degrees of freedom	32	32	32
Model chi2	164.4	269.5	194.4
Akaike Information Criterion (AIC)	3056.2	1237.3	655.7
Bayes Information Criterion (BIC)	3253.1	1428.5	815.2

Legend: * p<0.05; ** p<0.01;
*** p<0.001

Discussion

To our knowledge this is the first Aotearoa / NZ study to examine antenatal ECE and childcare intentions against the decisions made when children are 9 months and 24 months of age, while also investigating the factors that influence changes in use of ECE services over time. In particular, we have explored the extent to which parental leave and employment status are key drivers of ECE use for infants up to the age of two.

This study is important because while there is funding for ECE use for 3-5 year olds in Aotearoa / NZ, and correspondingly almost universal uptake of ECE for this age group, the funding landscape and uptake of ECE in 0-2 years olds is markedly different. In this report we tried to develop a better understanding of the trajectories of decisions about whether to engage with ECE services across the first two years of life. In doing so we aimed to identify information that may be of use or interest to government and policy advisors as well as to parents/families/whānau – and to a lesser extent early childhood educators and employers seeking to support mothers, families and their young children in the early years.

Impact of subsidies and parental leave on decisions

Our findings that 26% of mothers expect to return to work when their child is around 4-6 months corresponds fairly closely to the end of paid parental leave (14 weeks or ~3.5 months at the time of the study). A further 27% expect to return at around 10-12 months, corresponding to the end of the one year parental leave entitlement. Of note however is that on average mothers indicated they would have preferred to take almost one year of leave. While this may be more realisable in the future as new legislation seeks to extend paid parental leave to 26 weeks from April 2020, it will still leave a gap of six months without pay if mothers take their preferred leave amount.

Of those who had worked before their child was born, about half had returned to work by the time their child was 9 months old, with the average mother taking 24.8 weeks of paid and unpaid leave. This suggests that even women who return to work typically extend their leave beyond the government subsidy by approximately 10 weeks. If this pattern continues when the paid parental leave entitlement is extended to six months, total leave will be somewhat closer to the average preferred duration of around a year.

With respect to mothers not taking paid or unpaid leave, the most common reasons were due to job resignation or not meeting the requirements. Few (only 5%) mentioned financial reasons, suggesting that typically it is not the case that mothers feel unable to take leave due to a lack of finances. We found very few demographic factors predicted non-use of parental leave; notably we found no effect for area-level deprivation, but we continued to find an effect for mothers

reporting no current partner and those working less regular shifts (with both factors associated with being less likely to take leave). This suggests that mothers without a current partner and those working more variable schedules, may need more support in order to take leave when their child is born. However, we also found that mothers who did not take leave remain more likely to look after the baby themselves (or their partner did). It is possible that those not taking leave chose to resign, or were working in less secure jobs, so it is important to note that this may not be an active choice for some mothers. We also found that among mothers who worked during pregnancy, those receiving subsidies, as well as those who were not paid employees when their child was 9 months old, were more likely not to have taken leave.

Childcare intentions and engagement with ECE services

Choosing whether to engage with an ECE provider, and which service to choose, is a complex decision for parents and families, with multiple individual and contextual factors contributing to the decision. Perhaps in reflection of this complexity, our findings show that mothers' decision-making often starts even before their child is born, with 50% of our cohort indicating antenatally the types of ECE and/or childcare they intended to use for their child when they went back to work.

This decision-making is often not a single decision, however. Instead we observe a large amount of individual change, with mothers' antenatal intentions and actual choices about ECE or care frequently differing from when their child is 9 months or 2 years of age. Indeed, antenatal intentions were not a significant predictor of post-natal engagement with ECE services. It is particularly notable that from birth to 2 years of age parental care is the primary mode of care, even among those whose antenatal intentions were to use an ECE service at the end of parental leave entitlements.

While this mismatch between antenatal intentions and actual choices about ECE may not be ideal from a policy planning perspective, these findings might give parents reassurance that changing ECE provider or childcare type is common in the first two years. Similarly, it is probably reassuring for parents to know that while they may have intended to use an ECE service before their child was born, once the child was born it is common to change their minds and prefer to be the primary carer.

One possible explanation for the uptake of ECE at 9 and 24 months being similar irrespective of mothers' antenatal intentions could relate to policy changes around the time their child was born. For example, the Future Focus Welfare Report Package was introduced in 2010 and created an obligation for domestic purposes beneficiaries to complete employment plans if they had children under the age of 6, with substantial benefit penalties if they did not comply. The income threshold for abatement of the childcare assistance subsidy was also reduced by approximately 6%, and indexation to inflation removed. The

introduction of these policies in 2010, which would fall between the antenatal and 9 month data collection phases for most mothers, may have meant that some mothers found that their antenatal intentions were no longer compatible with the new policy environment – for example, some mothers may have found they were no longer eligible for a subsidy for their intended arrangement.

As the third of our cohort who did not report an antenatal intention about whether to engage with an ECE provider were just as likely to be accessing ECE services at 9 and 24 months as those who did, there seems to be enough churn in the system to accommodate them in some capacity. This is of potential interest to policy makers and gives some reassurance to parents who wish to register later. However, it is possible that this degree of flux is insufficient to allow parents their first choice of ECE provider, which may mean, for example, settling for something less convenient (e.g., further away from home or work).

Engagement with different types of ECE services

While we do not know from this study whether mothers' final choice of ECE was their initial choice, our findings indicate that there is a substantial increase in uptake of ECE services between the ages of 9 and 24 months, and that this trend is much stronger for teacher-led, centre-based ECE. This trend was evident when mothers chose an ECE service in the first 9 months, with a greater uptake of teacher-led, centre-based ECE, but markedly higher uptake of this type of ECE when their children were two.

Knowing this shift towards centre-based ECE occurs around the age of 2 may be of interest to government and policy advisors looking to use ECE centres as a mechanism through which to introduce early intervention programmes.

We also found demographic factors associated with the use of ECE services, with mothers reporting no current partner being twice as likely to engage in ECE over informal care relative to partnered mothers, whereas mothers living in higher deprivation areas were almost twice as likely not to. Mothers living in areas with higher deprivation scores who did use an ECE service, were found to be more likely to use teacher-led centre-based ECE, or Māori & Pasifika immersion and bilingual centre-based service, compared with home-based ECE, irrespective of reported maternal ethnicity.

Importantly, we do not know if the decisions about whether to use ECE or not are 'freely' made choices for mothers without a current partner, as well as those living in areas with higher deprivation scores, or if they are a matter of necessity and due to cost or opportunity. The findings do however suggest that if there is a policy shift towards promoting the earlier uptake of ECE, targeted funding or support might be needed.

Our findings around the reasons mothers gave for using different types of ECE are also of interest to those looking to support the uptake of ECE in the early years. Perhaps most importantly, work and study were the most common

reasons for mothers choosing to use an ECE when their child was 9 and 24 months of age, whereas by 54 months of age mothers tended to focus on more child-centred developmental reasons for their choice of ECE. Work-related reasons were common across all ECE types, but interestingly, mothers using Māori & Pasifika immersion and bilingual centre-based services over either home-based or teacher-led, centre-based ECE were much more likely to report child-centred reasons, such as wanting to improve their child's intellectual or language development – suggesting an active decision by mothers when choosing these providers.

Policy recommendations

We do not know whether the current use of informal care and/or choice of ECE by mothers of 0-2 year olds by those living in more socioeconomically deprived areas, as well as those working more irregular schedules, is a choice, or because the preferred choice that meets their needs (financial, practical or other) is not available. More research, probably qualitative, is needed to better capture the voices of these groups and better understand the context in which their decisions about ECE or care are made.

However, if government wished to further support mothers of 0-2 year olds who wish to return to the work force, this research suggests the following:

1. Ensure that pregnant women and their partners are **aware of their eligibility and rights for both paid and unpaid leave**. Perhaps engage midwives to help direct women to reliable information or advice as to their entitlements. Among working mothers who reported not taking leave, only 9% chose this as a parenting preference, and hence it is important to make sure that the other 91% were fully aware of their parental leave entitlements. Mothers reporting not using parental leave were also more likely to be younger, working irregular schedules, or not have a current partner, so information about parental leave entitlements should also target the needs of those groups.
2. **Investigate additional ways to incentivise flexible times and hours of operation of ECE services**. This would enable mothers who are living in more socio-economically deprived areas or working irregular hours, to have better access to ECE services.
3. **Consider measures to further reduce the cost of ECE for 0-2 year olds**, particularly for lower income families, who are currently accessing ECE services at lower rates.
4. **Consider improving access to Māori & Pasifika immersion and bilingual centre-based services**. Our findings suggest that the likelihood of people using these services is markedly higher in areas with the highest area-level deprivation, and this increased likelihood was not related to maternal ethnicity. The use of these services may therefore reflect their relatively higher availability in low socio-economic areas. Increased access to

Māori & Pasifika immersion and bilingual centre-based services to all ethnic groups and across a range of socio-economic areas may be needed and welcomed by parents.

Conclusion

Policies which promote access to ECE have become vital to the education and wellbeing of Aotearoa / NZ children and their parents. As more women remain connected to the workforce, and more children attend ECE services from younger ages, policy needs to ensure families can access high quality services when they need them.

We expect that the Labour coalition government's changes in the early years subsidies (Paid Parental Leave [PPL] and the Best Start payment) may delay the uptake of ECE and or/childcare and the return to employment, but the factors associated with ECE or childcare uptake and use reported in this study are likely to remain the same.

The extension of PPL to 26 weeks by April 2020 may mean that in future mothers who are back at work by 9 months, who in our study probably had to cover the difference between paid parental leave and the total time they spent on leave with annual leave, other pay or no pay, may not need to do so. Or, these mothers may be able to extend the total duration of their leave. While such changes will undoubtedly be welcomed by these mothers, they still fall short of the 11 months on average the mothers said they would prefer to take.

Our findings that mothers from more socioeconomically deprived backgrounds and working more irregular shifts are more likely to use more parental care or draw on home-based ECE services, suggest that there may be some inequities in the accessibility of formal ECE during the early years. Findings such as these are unlikely to change with the introduction of additional early years subsidies.

The results of this study also shed further light on the decisions that mothers make about ECE for children who are two years old or younger. They show how antenatal intentions and realities often differ markedly at the individual level. Over time we see that mothers in Aotearoa / NZ were more likely to use informal care during the first 9 months with a shift towards ECE services as their children grew older.

While our research has evaluated what socio-demographic factors might predict mothers' decisions to use different types of ECE, our study has not examined how mothers formed their preferences, or how their choices impacted upon their subsequent decisions. We have not evaluated the effect of cost, quality or convenience, which can be important to the decisions made about which ECE service to choose. These remain important areas for future research.

In conclusion, we believe our results have several implications for policy and research concerning the accessibility of ECE services, and the provision of PPL to different families. In particular, we believe the government could prioritise resourcing and direct a portion of ECE funding towards improving access to more flexible ECE arrangements, especially for families with fewer resources and wider

family support, as well as those who work irregular hours or shifts. Such prioritisation would help to maximise the opportunities for all parents to access the support they need to provide the care or early education they wish for their children, while enabling them to work or study. Targeted and prioritised resourcing is arguably a more equitable use of public ECE expenditure than subsidising universal access to ECE services for pre-schoolers, given that participation rates are now close to universal.

Limitations and future directions

This study has focused on mother-reported data concerning their intentions about ECE and the realities and factors that predict decisions about ECE. We need to be aware that in predicting ECE type and uptake, we are only using available predictors in the GUiNZ dataset and there are other factors that have not been measured or included in the analysis that may also affect parental choices. While a key strength of longitudinal studies is the wide variety of information collected, there are still gaps, and it is likely that there are other important factors that have not been considered.

Decisions about childcare and whether and when to engage with ECE services are rarely made by one person. In this study, information about the use of ECE and the predictors thereof were collected only from the mothers or primary carer. This does not explore the role that partners, extended family and parental social networks can also have in these decisions. Further, as Figure 1 indicates, there is a diverse range of intersecting demographic, economic, cultural and contextual and political influences, and the interactions between them, that can affect families' decisions.

When exploring the impact of ethnicity on ECE decisions, we were only able to take the mother's self-identified main ethnic group into account. In reality, approximately 20% of the mothers identified with more than one ethnic group and approximately a third of the cohort children were identified as having two or more ethnic groups. In this study we could not take into account the full complexity and diversity of ethnic identification in the cohort and how the ethnic identification of the mother and father potentially impacts choices about childcare or ECE.

Apart from the child's age, this study has also not taken into account other individual child factors that may have influenced parents' choices, such as the child's temperament, developmental and/or any special needs. Similarly, while we have considered the impact of maternal age, education, socio-economic status and maternal work-related factors on ECE choices, we have not explored the impact of maternal or paternal mental or physical health, nor the impact that the partner's work situation may have had on a family's childcare and/or ECE choices.

Finally, the current government has recently brought in a number of changes to subsidies in the early years, which were not in effect when the data were collected. The new policies which extend PPL from 18 to 22 weeks, then up to 26 from April 2020, and the new universal Best Start payment of \$60 per week, per child, in the first year of a child's life (which continues for low and middle-income families until their child is three), may well affect parental childcare and/or ECE and employment decisions.

Future studies should explore the impact of these new subsidies on parental choice and employment. More attention could also usefully be given to the impact of partners, social networks, and child characteristics on choices about ECE and/or childcare and parental employment in the early years.

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Appendix 1: Mothers' antenatal intentions about ECE or childcare and actual arrangement used for most hours per week at 9 and 24 months

The data in the following table were used to create the Sankey charts presented in the Results section.

Intended care / ECE antenatally	ECE or care type used	9 months		24 months	
		Freq.	%	Freq.	%
Child-minder in home (not family)	Informal care	102	85.0	70	59.3
	Home-based, MoE subsidised ECE	-	-	12	10.2
	Teacher-led, centre-based, MoE subsidised ECE	10	8.3	30	25.4
	Māori & Pasifika immersion and bilingual centre-based services	-	-	-	-
Child-minder in their home (not family)	Informal care	116	80.0	80	58.0
	Home-based, MoE subsidised ECE	10	6.9	-	5.8
	Teacher-led, centre-based, MoE subsidised ECE	16	11.0	47	34.1
	Māori & Pasifika immersion and bilingual centre-based services	-	-	-	-
Partner	Informal care	517	81.6	342	55.4
	Home-based, MoE subsidised ECE	41	6.5	39	6.3
	Teacher-led, centre-based, MoE subsidised ECE	65	10.3	198	32.1
	Māori & Pasifika immersion and bilingual centre-based services	-	-	30	4.9
Other family member (own home)	Informal care	608	84.3	420	61.0
	Home-based, MoE subsidised ECE	37	5.1	48	7.0
	Teacher-led, centre-based, MoE subsidised ECE	69	9.6	188	27.3
	Māori & Pasifika immersion and bilingual centre-based services	-	-	28	4.1

Intended care / ECE antenatally	ECE or care type used	9 months		24 months	
		Freq.	%	Freq.	%
Other family member (their home)	Informal care	422	81.6	291	58.3
	Home-based, MoE subsidised ECE	32	6.2	43	8.6
	Teacher-led, centre-based, MoE subsidised ECE	57	11.0	147	29.5
	Māori & Pasifika immersion and bilingual centre-based services	-	-	16	3.21
ECE or similar	Informal care	929	83.5	627	58.0
	Home-based, MoE subsidised ECE	47	4.2	78	7.2
	Teacher-led, centre-based, MoE subsidised ECE	120	10.8	333	30.8
	Māori & Pasifika immersion and bilingual centre-based services	12	1.1	36	3.3
Own care while working	Informal care	358	82.5	227	54.8
	Home-based, MoE subsidised ECE	22	5.1	26	6.3
	Teacher-led, centre-based, MoE subsidised ECE	49	11.3	140	33.8
	Māori & Pasifika immersion and bilingual centre-based services	-	-	20	4.8
Child at school	Informal care	100	80.7	71	56.8
	Home-based, MoE subsidised ECE	-	-	12	9.6
	Teacher-led, centre-based, MoE subsidised ECE	17	13.7	38	30.4
	Māori & Pasifika immersion and bilingual centre-based services	-	-	-	-