ORANGA TAMARIKI
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Raising the age of care

A technical analysis

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These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI) which is carefully managed by Stats NZ. For more information about the IDI, please visit: https://www.stats.govt.nz/integrated-data/

The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994 for statistical purposes. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

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The transition from adolescence to adulthood is a significant phase in the development of rangatahi. While challenging for most, this phase can be especially difficult for rangatahi who spent time living in the Care and Protection (C&P) system, as they are more likely to carry childhood traumas, leave placement with little financial or social support, and move into inadequate housing (Ministry of Social Development, 2016).

Compared with the overall population, care leavers tend to record less-preferable socioeconomic-related outcomes as adults. This has been well documented both in New Zealand (Atwool, 2010; Crichton & Templeton, 2015; McLeod et al., 2015; Ball et al., 2016; Tumen et al., 2016), and internationally (Courtney et al., 2007; Leslie et al., 2005; Bruskas, 2008; Tonmyr et al., 2011; Gypen et al., 2017; Dunnigan, et al., 2017; Doyle et al., 2018). Furthermore, the tamariki of care leavers are far more likely to come to the attention of Oranga Tamariki (Tumen et al., 2016).

From April 2017, changes in the New Zealand Care and Protection system included the increase of the eligibility age at which rangatahi can remain (or return to) placement for an additional year, to 18 years of age. Reasons for Raising the Age of Care (or RAC) included the aligning the age in which rangatahi exit care with other laws and norms in New Zealand that required individuals to be at least aged 18 (voting, signing tendency agreement, etc.), with New Zealand's obligations to the United Nation Convention on the Rights of the Child (which sets the age of adulthood at 18), and with cognitive findings suggesting that that the process of brain maturation took longer than previously thought (Gluckman & Hayne, 2011).

This analysis examines the effects RAC had on the outcomes of rangatahi, both during that additional year (i.e., from ages 17-18), as well as between the ages of 18 and 20. The analysis focuses on a cohort of rangatahi who turned 17 between April 2017 and March 2018 (i.e., in the first year of RAC), and recorded C&P placements at the ages of 15 and 16. This cohort was selected for this analysis due to the fact that since the introduction of RAC, (effectively) all rangatahi who remained in placement after the age of 17 were also recorded placement at some point between the ages of 15 and 16. In addition, large shares (nearly 60%) of this cohort recorded placements during their 17th year.

Using a Difference-in-Difference (DiD) approach, the outcomes for this cohort were compared with those from older cohorts (i.e., who were 17 years or above when RAC came into effect) with comparable characteristics, as well as with the outcomes experienced by a control group which included rangatahi of the same age, but who were not expected to be affected by RAC.

The analysis found that RAC led to strong reduction in benefit use between the ages of 17 and 20. In addition, the analysis also suggests that RAC led to improvements

in gaining *level 2 or above* educational qualifications by the age of 19. However, the results of the analysis cannot conclusively determine whether the reduction in benefit use resulted from greater participation in education or employment.

Focusing on rangatahi from specific ethnic groups, while strong reductions in benefit use was detected across all ethnic groups between the ages of 17 and 18, this was only sustained between ages 18-20 for Non-Māori or Pacific Peoples (NMP) rangatahi (i.e., not identified as Māori or Pacific Peoples, largely European ethnic group). In terms of education, the analysis found improvements in the likelihood of gaining *any* educational qualifications at ages 18 and 19 among Pacific Peoples or NMP rangatahi, with no such improvements detected for rangatahi Māori. Furthermore, the analysis found reductions in the total income earned from Wages and Salary (W&S) by rangatahi Māori between the ages of 17 and 18. Overall, the findings suggest that the ability to remain in care for an additional year did not deliver benefits to rangatahi Māori to the same extent as for other groups.

To test the robustness of these findings, DiD estimations were conducted for comparable cohorts from previous years with rangatahi who were too old to be affected by RAC. Overall, the effects attributed to RAC in the analysis were not replicated when examining the outcomes of these earlier cohorts, which in turn supports the robustness of the analysis. However, using a different specification for the DiD models reduced the accuracy of estimated improvements in educational qualifications for the overall sample (i.e., all ethnic groups) and for NMP rangatahi. On the other hand, the results for Pacific People rangatahi remained large and (statistically) significant, providing further confidence to their robustness.

Overall, while the benefit and education related findings were in line with the anticipated effects of introducing RAC, no improvements in health, employment, teenage pregnancy, or justice related outcomes were detected. On one hand, lack of findings may reflect limitations in the design of this study (e.g., the DiD estimates are expected to understate the effects of RAC), data limitations in the Integrated Data Infrastructure (data source for this analysis), the relatively short time-horizon examined (until the age of 20), and/or sample size related issues. On the other hand, it may also be possible that as a stand-alone change, RAC was not sufficient to achieve all these improvements.

As discussed in the review of the Care and Protection system (Ministry of Social Development, 2016), RAC was the first component of a package of changes aimed at improving these outcomes. Later changes included increasing the upper age for appearing in Youth Court from 17 to 18 years, and a Transition Support Service that assists with the transition of care leavers into adulthood (both came into effect in July 2019).

The methodology used in this analysis could potentially be used to examine these more recent changes in the future. Exploring the effects of these will provide a more in-depth understanding regarding the effectiveness of such initiatives at improving the future outcomes of rangatahi leaving care.

Introduction

The transition from adolescence to adulthood is a significant phase in the development of rangatahi. While challenging for most, this phase can be especially difficult for rangatahi who spent time living in the Care and Protection (C&P) system as they are more likely to carry childhood traumas, leave placement with little financial or social support, and move into inadequate housing (Ministry of Social Development, 2016).

Compared with the overall population, care leavers tend to record less-preferable socioeconomic-related outcomes as adults. This has been well documented both in New Zealand (Atwool, 2010; Crichton & Templeton, 2015; McLeod et al., 2015; Ball et al., 2016; Tumen et al., 2016),[1] and internationally (Courtney et al., 2007; Leslie et al., 2005; Bruskas, 2008; Tonmyr et al., 2011; Gypen et al., 2017; Dunnigan, et al., 2017; Doyle et al., 2018). Furthermore, the tamariki of care leavers are far more likely to come to the attention of Oranga Tamariki (Tumen et al., 2016).

In New Zealand, rangatahi in care placements are under the protection of the Chief Executive of Oranga Tamariki, operating under the Children, Young Persons, and Their Families (CYPF) Act. The broad objective of this Act is to promote the well-being of children, young persons, and their families. For this, Oranga Tamariki, the government agency assigned with the legal responsibility to intervene in accordance with this Act, assists caregivers and families to prevent and protect tamariki and rangatahi from suffering harm, ill-treatment, abuse, neglect, or deprivation.[2]

Historically, the protection of the CYPF Act ended once a rangatahi turned 17, as they were considered to be adults under the New Zealand law.[3] For rangatahi in care, this meant losing access to some types of placements (e.g., Bed-nights, Group Homes, Independent Living), and in other types of placements (e.g., foster care), having their caregivers lose access to professional and financial support.

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[1] For example, Crichton et al. (2015) found that by age 21, tamariki that were placed in care during childhood (about 2.4% of the entire cohort examined) were seven time as likely to be referred to a CYF Youth Justice services, twice as likely *not* to gain an NCEA level 2 qualification, six times as likely to receive benefit payments for more than two years, and 10 times as likely to have been in prison.

[2] In situations where the whānau of a tamariki or rangatahi cannot provide them with safe, stable, loving care (typically determined in a Family Court), the tamariki or rangatahi can be placed into state care. Placements can be for a short period of time (e.g., days, weeks), or on a permanent basis, and placement types include remaining with the immediate whānau (under the supervision of Oranga Tamariki), in kin and non-kin foster care arrangements, or in government-run homes.

[3] At that time, some forms of legal protection were still available after the age of 17. This included a transition into adulthood service (introduced in July 2016 for rangatahi that meet certain criteria) which enabled care leavers (with certain placement experiences) to contact Oranga Tamariki for assistance (e.g., financial support). In addition, guardianship status could be provided until the rangatahi turned 20 (note that this refers to the duties, rights, and responsibilities in relation to the upbringing of a child, rather than to the day-to-day care as in a custody order). Finally, a rangatahi could be placed in the guardianship of the court until the age of 18, or be appointed to a welfare guardian.

Compared with other OECD jurisdictions, 'aging out of care' in New Zealand occurred at a relatively young age, and the support offered to a care leaver was relatively limited (Table 1). Perhaps not surprisingly, expecting care leavers to take full adult responsibilities at the age of 17 has been the subject of much criticism.[4] Common criticisms raised include inconsistencies with other laws and norms in New Zealand that require individuals to be at least aged 18 (voting, signing tendency agreement, etc.), with New Zealand's obligations to the United Nation Convention on the Rights of the Child (which sets the age of adulthood at 18), and with cognitive findings suggesting that that the process of brain maturation took longer than previously thought (Gluckman & Hayne, 2011).

Table 1 – Age of leaving care and support for care leavers in New Zealand and in a selection of countries (as in 2015)

Country	Age leaving care	Age for extended support	Support for care leaves
N.Z.	**17**	**20**	**After care advice/support may be requested until the age of 20 (from June 2016)**
U.S.A.	18-21	21	Care may be extended until age 21 in certain states and subject to certain conditions
Scotland	21	26	After care support until age 26 (since April 2015)
Ireland	18	21	After care support until age 21
England/ Wales	18-21	24	Foster care can be extended until age 21. After-care support until age 24 provided the youth is in education, training, or employment
Australia	17-18	21-25	After care support in all states, and varies by state (e.g., New South Wales – 21; Victoria - 25)
Canada	18-19	21-24	After care support until the age of 21 (Ontario, Manitoba). Youth may make an agreement/s to receive support for up to 24 months, subject to meeting certain conditions until the age of 24 in British Columbia.
Norway	18	23	Youth may consent to extend care until 23
Sweden	18-21	18-21	Care can extend to 21 in mandatory care cases, otherwise rangatahi often stay in care until completion of their upper secondary school education at the age of 19.

Source: New Zealand Government (2015).

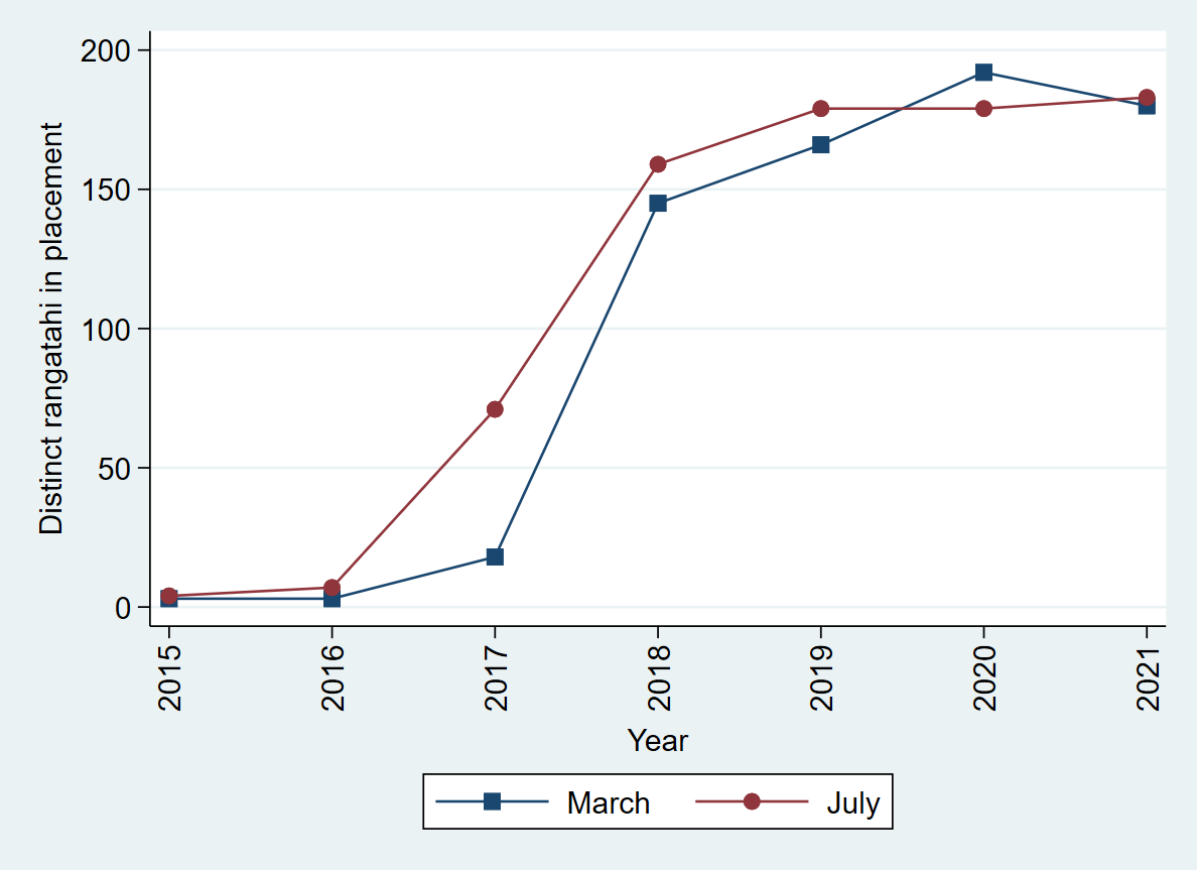
In 2016, as part of an overall review of New Zealand's Care and Protection system (Ministry of Social Development, 2016), the review's Expert Panel recommended that the upper age for Care and Protection services eligibility should increase by one year to 18. Quoting international evidence, the panel anticipated that 'Raising the Age of Care' (RAC) to 18 would improve the health (physical and mental), education (e.g., secondary achievements, truancy, tertiary education), labour market (employment, benefit dependency), offending, and teenage pregnancy outcomes of care leavers (New Zealand Government, 2015). In the first year, it was predicted that RAC would directly affect over 300 rangatahi aged 17 and 160 15-16-year-olds indirectly (by incentivising them to remain in placements for longer).

[4] For example, see 'Who kicks their child out at 17?' - Govt raises age of care amid radical overhaul of CYF | Stuff.co.nz

Following this review, a Bill enacting this change was passed in December 2016 [SOC-16-Min-0024 refers], coming into effect in April 2017 [LEG-16-MIN-0064 refers]. From April 2017, rangatahi were entitled the full protection of the CYPF Act, including remaining or returning to care placement,[5] until to the age of 18.[6]

Figure 1 presents the number of (distinct) rangatahi who recorded one or more days in placement between the age of 17 and 18 in the March and July of each year between 2015 and 2021. For both months, the figure suggests a drastic increase in the number of rangatahi in placement since RAC came into effect, increasing from less than 10 in 2015 and 2016, to about 70 in (July) 2017, to 150 and more from 2018.[7]

Figure 1 – Distinct rangatahi in C&P placement at ages 17-18 by year (March, July), 2015-2021



Source: Oranga Tamariki (2022)**. Notes**: Number of distinct rangatahi, aged 17-18 in Care and Protection (C&P) placements in each March and July between 2015 and 2021. Placement types include Child and Family Support Services, Family Home, Family/ Whānau, Other, and Residential Placements.

[5] For example, a young adult who turned 17 in February 2017 (i.e., two months before RAC came into effect), had the right to return to placement between the age of 17 and 2 months and 18. Note that this decision is determined via a care agreement, or through a court order.

[6] This change was reported to be the first component of a package aimed at improving outcomes for young people transitioning from care to young adulthood, including the introduction of a new Transition Support Service, and increasing the age young adults that appear in youth courts to 18 (both coming into effect in July 2019).

[7] Note that in 2017, the counts for July are much larger than for March, as July captures the months following the implementation of RAC. In addition, the counts in Figure 1 are lower than the numbers outlined by the Expert Panel (e.g., 300 rangatahi in the first year), since the figure captures the number of rangatahi in placement in a given month, rather than over an entire year.

In terms of related (empirical) evidence, the Midwest Study refers to a series of evaluations examining the outcomes of care leavers from the states of Iowa, Wisconsin, and Illinois (within the United States).[8] Findings from the Midwest Study were often used in the support of introducing RAC (Ministry of Social Development, 2016), as some of its evaluations compared the outcomes of care leavers from different states with different upper ages of leaving care. More specifically, outcomes were compared between the states of Iowa and Wisconsin, where 'aging out' of care (largely) occurred at the age of 18 (and less commonly, 19), and with Illinois, where rangatahi typically remained in placement until the age of 21.[9]

Courtney et al. (2007) reported that at the age of 21, rangatahi from Illinois (where the age of leaving care was 21) were almost twice as likely to attend and complete their first year of college (equivalent to a 2–4-years of undergraduate study). However, no such differences were detected at later ages (Courtney et al., 2009; 2011, Dworky and Courtney, 2010), nor were there differences in terms of gaining associate's or bachelor's degrees (at any age).

In addition, Dworky and Courtney (2010a) found that compared with Illinois, care leavers from Iowa and Wisconsin (with lower age of leaving care) were 2.7 time more likely to have been homeless by the age of 18 (but not at older ages), as well as a greater likelihood of pregnancy by the age of 21 (Dworky and Courtney, 2010b). Furthermore, while Cusick et al. (2011) did not report any differences across states in terms of justice-related outcomes (e.g., arrests, violent criminal behaviour), one specification in their report suggested that rangatahi from Wisconsin were *less* likely than their peers from Illinois to record violent criminal behaviour.[10]

Overall, the evaluations suggested that rangatahi from Illinois (i.e., where rangatahi tend to remain in care until 21) fared better in some outcomes compared with their peers from Iowa and Wisconsin. However, as the authors of these studies stated, their findings were descriptive, and were not designed to measure the causal effects of different age for leaving care and outcomes. For example, it was not clear whether any of the estimated differences observed between the states were to do with the differences in the 'upper age' of placement, or other inter-state differences.

In New Zealand, the only relevant analysis identified examined outcomes at age 18 for rangatahi who recorded placement during their 17th year in the period following the introduction of RAC (Oranga Tamariki, 2018). Since the analysis was conducted not long following the introduction of RAC, available data only allowed the examination of outcomes for 170 rangatahi. The analysis compared the outcomes of

[8] These reports were designed to evaluate outcomes of care leavers following the introduction of the John Chafee Foster Care Independence Programme (as part of the 1999 Foster Care Independence Act). This programme funds services for care leavers to support their transition into adulthood. This include fundings for room and board, Medicaid coverage (until the age of 21), and vouchers for tertiary education and training.

[9] The data for these studies were based on interviews with care leavers from the three states at a different age (732 interviews at the ages of 17 and 18, 603 at the age of 19, 602 at the ages of 23 or 24and 596 at the age of 26). In addition, in some studies the survey was linked with sources of data.

[10] Table 10 of the report. This table includes estimates from Poisson regression, and included a set of demographics, risk-factors, "out-of-home experiences", and "Social Bonds" controls.

those who remained in placement until the age of 18 with the outcomes of those who remained for only part of that year, and found that on average, those who remained in placement until the age of 18 recorded longer educational enrolment spells, and a greater likelihood of attaining an educational qualification. However, (as noted in the analysis) these differences were descriptive, and therefore could not be solely attributed to the introduction of RAC.[11]

The goal of this analysis is to isolate the effects of RAC on the outcomes of care leavers at different ages (17-18; 18-20). For this, a Difference-in-Differences (DiD) approach is applied, comparing outcomes between cohorts of rangatahi who were young enough to be affected by RAC with those who were too old, as well as with those who recorded placement during adolescence, but were not expected to be affected by RAC (i.e., control group).

[11] That is, the analysis did not attempt to test whether the observed differences are due to RAC, or a reflection of differences between the two groups.

Study population and identification strategy

The study population for this analysis includes 3,039 rangatahi who turned 17 between April 2015 and March 2018,[12] and recorded one or more days in Care and Protection (C&P) placement between the ages of 10 and 16 (inclusive).[13] This population captures 97% of all rangatahi who recorded placements between the ages of 17 and 18 during the study's period, with all data used for creating the study population sourced from Statistics New Zealand's Integrated Data Infrastructure (IDI).[14]

The decision to only include rangatahi with placement history in adolescence (10-16) follows the rationale that since the vast majority of rangatahi in New Zealand never enter (or require) placement, they should not be examined as they are not expected to be affected by RAC (i.e., those in-care are a very selective group). Also, note while the terms 'care' and 'placement' differ conceptually and in what they measure in practice,[15] they are used interchangeably in this analysis, and follow the definition of placement since RAC is expected to affect the outcomes of rangatahi by enabling them to remain in placement for longer durations (rather than focusing on changes in legal status as measured by care).

To measure the impacts of RAC, the study population was grouped in two ways. First, rangatahi were grouped into three cohorts based on the period in they turned 17, reflecting their eligibility to remain in (or return to) placement following the introduction of RAC. The *Pre* cohort includes 1,035 rangatahi who turned 17 between April 2015 and March 2016. Rangatahi from this cohort were not expected to be affected by RAC since all were aged 18 or older when RAC came into effect

[12] Note that the decision to restrict the sample to March 2018 was due to data coverage limitations, and since the adulthood outcomes of rangatahi who turned 17 at later dates were more likely to be affected by more recent changes to the C&P, such as the introduction of a Transition Support Service until the age of 25, and raising the upper age of Youth Justice to 18 (both came into effect in July 2019).

[13] Other sample restrictions included having a gender, birth year and month, personal identifier, and spine identifier in the IDI's personal details table. Spells starting with the year 1900 and/or ending in 9999 were not included (these typically mark unknown start/end dates in the placement data). Note that spells did not include Youth Justice placements.

[14] The IDI is a data warehouse that includes linked individual level data from a range of government agencies and sources (e.g., IRD, Ministry of Education, Ministry of Health). For more information on the IDI, see: https://www.stats.govt.nz/integrated-data/integrated-data-infrastructure

[15] In the Care and Protection system, Care refers to a legal order in which tamariki or rangatahi are under the custody of the Chief Executive of Oranga Tamariki. Placements on the other hand, refer to the subsequent placing of a rangatahi and tamariki. As a result, counts of the populations under the two terms may differ. For example, Craig (2021) identified 5,945 distinct tamariki and rangatahi in care and 5,678 in placement as at 30 June 2020. Sun et al. (2020) identified 6,409 distinct tamariki and rangatahi in care (under the custody of the Chief Executive) on 30 June 2018 (under various Care and Protection orders), and 6,010 tamariki and rangatahi (under C&P placements). While 99% of those in placement were also in care, only 92% of those in care also recorded a placement.

(April 2017). Next, the *Semi* cohort includes 1,038 rangatahi who turned 17 between April 2016 and March 2017 and could have been (partially) affected by RAC, since they could have potentially returned to placement *at some point after* the age of 17 (and before turning 18). Finally, the *Full* cohort includes 966 rangatahi who turned 17 between April 2017 and March 2018, and therefore could have been affected by RAC *from* the age of 17.

The study population was also allocated to treatment and control groups. The treatment group included rangatahi who recorded one or more days in C&P placement between the ages of 15 and 16, while the control group included all those who recorded one or more days in C&P placement between the ages of 10 and 14 (but not at ages 15-16). The treatment group includes 1,683 rangatahi, while the control group 1,356 (i.e., across all cohorts). Allocating rangatahi into treatment and control group (within each cohort) followed the logic that some rangatahi were more (or less) likely to be targeted by RAC, and therefore remain/return to placement at ages 17-18. For example, as will be discussed in the Descriptive Analysis section, while many of the rangatahi from the treatment group recorded placements after the age of 17, (effectively) none of the rangatahi from the control group had.

Table 2 presents the distribution of the study population by cohort and treatment status. Overall, the treatment group is relatively larger (24%), with the largest difference recorded between the treatment and control groups from the *Semi* cohort (36% larger). In terms of overall cohort size (i.e., regardless of treatment status), the *Full* cohort is about 7% smaller.

Table 2 – Rangatahi by cohort and treatment status

Status / cohort	Pre	Semi	Full	Total
Control	480	438	438	1,356
Treatment	555	600	528	1,683
Total	1,035	1,038	966	**3,039**

Notes: Counts are randomly rounded according with Statistics New Zealand's confidentiality requirements.

Using this approach, the impact of RAC is measured by comparing the outcomes of rangatahi from different cohorts who were either not exposed to RAC (i.e., *Pre*), partially exposed (*Semi*), or fully (*Full*) exposed, as well as between rangatahi (within each cohort) with different likelihood to record placements after the age of 17 (defined by their treatment status). This estimation approach is known as Difference-in-Differences (DiD).[16] In terms of magnitude, the DiD estimates are expected to yield greater effects for the outcomes of rangatahi from the *Full* compared with those from *Semi*, since the first was exposed to RAC for a longer duration (i.e., for the entire year between ages 17 and 18, rather than some of it). However in practice,

[16] For a non-technical introduction for Difference-in-Difference, see: Difference-in-Difference Estimation | Columbia Public Health. Examples of applying this approach in the social sector include Dalgety et al. (2010) and Preval et al. (2021).

differences in outcomes will depend on the proportions from each group remaining in (or returning to) placement after the age of 17, and the effects this will have on their outcomes.

To illustrate how DiD estimates the impact of RAC on outcomes, assume a simple example with a treatment and a control group, and only *two* cohorts (Table 3). The treatment group includes all rangatahi that are likely to remain in placement after the age of 17 (e.g., in care towards the age of 17), while the control includes rangatahi are not (e.g., were never in care, left care at an earlier age). Next, each of these groups (control, treatment) can be further divided into two cohorts, *Pre* and *Full*. As in the analysis, the *Pre* cohort includes rangatahi who turned 18 (or older) when RAC came into effect (so would not remain/return to placement at ages 17-18) while the *Full* cohort includes rangatahi who were 17 or younger (could potentially remain/return).

In this example, assume that at the age of 18, 60% of rangatahi from the *treated Full* cohort were employed, compared to 50% from the *treated Pre* cohort (Table 3, first row). At the same time, 80% of rangatahi from the control group's *Full* cohort were employed, and 75% from control group's *Pre* cohort were (Table 3, second row).

Taking the difference between each pair of cohorts suggests that the employment rate for the *treated* rangatahi from the *Full* cohort was (60% - 50% =) 10 percentage points (pp) greater, while the rate for the control group's *Full* cohort was (80% - 75% =) 5pp greater (Table 3, rightmost column). To estimate the impact of RAC, the DiD calculates the difference between these two differences (10pp and 5pp), concluding that RAC led to a (10pp – 5pp=) 5pp increase in the employment rate.

Table 3 – Difference in Difference (DiD). Employment rate at the age of 18 (example)

Group	Pre	Full	Difference (pp)
Treatment	50%	60%	10
Control	75%	80%	5

Estimation

The Difference-in-Differences (DiD) model used to estimate the impacts of RAC can be written as:

$$Y_{itj} = \alpha + Semi_t\delta_1 + Full_t\delta_2 + Treat_j\delta_3 + (Semi_t * Treat_j)\delta_4 + (Full_t * Treat_j)\delta_5 + X_i\beta + \varepsilon_{itj} \quad (1)$$

Where Y represents the outcome of interest for rangatahi *i* from cohort *t* and treatment group *j*. α is the intercept, and in the context of this equation, captures the mean outcome Y of rangatahi from the control group, and the *Pre* cohort. $Semi$ and $Full$ are dummy variables equal to one when rangatahi are from these cohorts. Their respective coefficients - δ_1 and δ_2 - estimate the (mean) difference in outcome Y for the control group's *Full* and *Semi* cohorts, relatively to those of *Pre* (α).[17] $Treat$ is a dummy variable that equals one if a rangatahi was from the treatment group, with δ_3 estimating the difference in mean outcome Y between the *Pre* cohort's treatment and control groups.

The variables of interest for this analysis are the interaction terms between *Semi* and *Full* cohort dummies with *Treated*. For these interaction terms, δ_4 is the DiD estimate for the *Semi* cohort, and δ_5 is the DiD estimate for the *Full* cohort from the treatment group. That is, these estimate the difference in outcomes between rangatahi who were in placement at ages 15-16 and were partially (or fully) affected by the introduction of RAC with those who were too old to be affected (treatment group; cohort *Pre*) as well as those who were not targeted by RAC (i.e., all cohorts from the control group).[18] X is a matrix of individual-specific controls,[19] and ε is an error term. Note that in all specifications, the standard error is clustered by Regional Council of Residence at age 17.

The DiD estimation will be applied for the entire sample, as well as separately by main ethnic group (Māori, Pacific Peoples, and Non-Māori/Pacific Peoples) in order to explore whether RAC affected different groups differently.[20]

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[17] For example, assume a mean outcome of 4% for the control group, cohort *Pre*. Then, if the mean outcome for the *Semi* and *Full* cohorts (from the control group) are 5% and 6% (respectively), then α, δ_1, and δ_2 will equal to 0.04, 0.01, and 0.02, respectively.

[18] The rationale for including a control group is to control for other changes that occurred more broadly over time. For example, over the study period, overall reductions in youth offending and improvements in educational achievements have been recorded in New Zealand (Ministry of Justice, 2020; Ministry of Education, 2021).

[19] Note that in the DiD regressions, all count variables are estimated in natural logs. Counts of zero were set to -999 and were estimated alongside with the dummy variable that is equal to one if rangatahi recorded at least one interaction.

[20] Ethnicity is sourced from the *personal details* table in the IDI. This table captures ethnic information from various sources (e.g., Education, Health, Census). To identify ethnicity, a Total Response approach is used, with

Difference in Difference (DiD) assumptions

To interpret the estimated effects of RAC on rangatahi outcomes as causal (δ_4 and δ_5 in the model above), two main assumptions are required to hold. These are exogeneity of treatment and parallel trends. In addition, the stable composition assumption is also commonly tested to provide confidence that the control group is a reasonable comparison to the treatment.

First, the exogeneity of treatment assumption requires rangatahi not be able to determine whether they are affected by RAC or not. This assumption cannot be formally tested but seems plausible in the context of this analysis as the decision of whether to remain in (or return to) placement after the age of 17 depends on rangatahi date of birth (which they cannot affect), with the final decision (typically) determined in a Family Court by a judge (that is, the decision is not determined by the rangatahi).

However, it is possible that rangatahi with records of placement since April 2017 from the age of 17 in the Oranga Tamariki systems were not in placement in practice (e.g., absconded, data measurement errors). In addition, it is also likely that rangatahi from older cohorts (*Semi*, *Pre*) remained in placement after the age of 17 (e.g., foster care), but were not recorded as such since Oranga Tamariki did not have the legal right to monitor their situation (since they were legally defined as adults at the time). The effect of any such measurement inconsistencies will be to downward bias the estimated effects (i.e., understate) of RAC on outcomes.

Next, the stable composition assumption requires that the characteristics of rangatahi from the treatment and control groups remain relatively stable across cohorts. That is, while the characteristics of rangatahi are allowed to vary by cohort, any differences in characteristics between treatment group's cohorts should also be observed between the control group's cohorts.[21] This assumption can be tested using the following model:

$$X_{itj} = \alpha + Semi_t\delta_1 + Full_t\delta_2 + Treat_j\delta_3 + (Semi_t * Treat_j)\delta_4 + (Full_t * Treat_j)\delta_5 + \varepsilon_{itj} \quad (2)$$

Where X represents an observed characteristic of rangatahi *i* from cohort *t* and treatment group *j*. As in the main analysis, a DiD approach is used to test this assumption. The stable composition assumption holds if the coefficients of the interaction terms (δ_4 and δ_5) are not statistically significant. This is tested in the Descriptive Statistics section.[22]

7.7% of rangatahi identified as both Māori and Pacific Peoples. As a results, such rangatahi will be included in the samples when estimating outcomes for the Māori and Pacific Peoples sub-groups.

[21] For example, if the share of rangatahi Māori in the treated *Full* cohort is 5pp greater than in the (treated) *Semi* cohort, the same 5pp difference should be observed between the *Full* and *Semi* cohorts from the control group.

[22] Note that this test is limited as it only tests this assumption for observed characteristics.

Finally, the parallel trends assumption requires that any differences in outcomes between the treatment and control groups in the period *preceding* the introduction of RAC follow a parallel trend. This assumption is tested to eliminate possibilities such as where observed changes in outcome following the introduction of RAC are in fact continuations of pre-existing trends. As in the stable composition assumption, differences in outcomes can exist between the treatment and control groups, but must remain constant over time (i.e., not decrease or increase). The model used for testing this assumption can be written as:

$$Y_{itj} = \alpha + Treat_j\lambda + \left(Treat_j * \sum_{t=2015q2}^{2016q1} \gamma_t\right)\delta_t + X_i\beta + \gamma_t + \varepsilon_{itj} \quad (3)$$

The model only examines the period covered by the *Pre* cohort (i.e., prior to the introduction of RAC), testing variation in outcomes between rangatahi who turned 17 in different year/quarters (the *Pre* cohort captures 4 of these year/quarters). Y represents outcomes for rangatahi *i* from treatment group *j* and year/quarter *t*. *Treat* captures rangatahi treatment status, and X represent a matrix of rangatahi specific controls. γ_t captures the average outcome for each year-quarter (period fixed effects). The coefficients of interest in this model are δ_t, and capture the (average) difference in outcomes between this cohort's treatment and control groups in each quarter. For the parallel trends assumption to hold, these estimated differences (δ_t) should not be statistically different from one another. This will be determined by a joint significance (F-test) test.

Relating to this, the parallel trends assumption also requires that in the absence of RAC, differences in outcomes between the groups would have continued to remain parallel. This means that the only factor changing the outcomes of rangatahi from the treatment group (i.e., but not control) was the introduction of RAC. This assumption may be violated due to the introduction of the support service (July 2016) and a Transition Support Service for care leavers (July 2019). If these services were more likely to improve the outcomes of rangatahi that were also more likely to benefit from RAC, then the estimated effects of RAC may be overstated. This (as well as other limitation of the study's design) will be discussed in more details next.

Limitations of the study's approach for estimating the effects of RAC

The DiD approach used in this study estimates the impacts of RAC by comparing the differences in outcomes between cohorts/treatment status with different levels of *eligibility* to remain/return to placement after the age of 17. That is, differences in outcomes are measured between rangatahi with different levels of eligibility to RAC, regardless of whether rangatahi remained/returned to placement in *practice*. In addition, outcomes are estimated for both rangatahi who remained in placement for

highly different durations (e.g., years, one day).[23,24] These are expected to reduce the strength of the DiD estimates, hence potentially understating the effects of RAC on outcomes.

An alternative approach to the one used in this analysis could have been to focus on rangatahi who *recorded* placements during the age of 17 (i.e., rather than focusing on *eligibility*). For example, the study population in Oranga Tamariki (2018) examined the outcomes of rangatahi who recorded placements during the age of 17 (since April 2017). In that analysis, the treatment group included rangatahi who remained in placement for the entire additional year (i.e., until the age of 18), and the control group included rangatahi who recorded placements for some of that year (i.e., left placement before turning 18). For the purposes of this analysis, the key limitation of this approach when estimating outcomes is that it is not clear whether any differences between the two groups only reflect differences in the duration of remaining in placement, or also reflect other differences between these two groups. For example, if rangatahi with more complex needs (which may be or may be not observed in the data) were more likely to record less preferable outcomes in adulthood were also more likely to remain in placement until the age of 18, then the estimates of the analysis may understate the benefits resulting from RAC. Conversely, if rangatahi that would record better outcomes in adulthood (regardless of RAC) were also more likely to remain in placement until the age of 18, then the estimated benefits of RAC will be overstated. While this potential bias can be mitigated by including control variables, it will not be known if all such differences were fully controlled for.

A second potential approach could have been to focus on eligibility (as done in this analysis) but restrict the sample to more closely reflect the profile of rangatahi who remained in placement after the age of 17. For example, preliminary analysis found that nearly all rangatahi that recorded placements during their 17th year (since April 2017) also recorded a placement *towards* their 17th birthday (e.g., 16 and 9 months, 16 and 11 months). Using this finding, it could have been possible to create a treatment group that only included rangatahi who recorded a placement towards the age of 17.[25] However, the preliminary testing also found that found that many of the characteristics of rangatahi for this treatment group were significantly different between the *Semi* and *Full* cohort. A potential explanation for these differences may be that the announcement of RAC prior to its introduction incentivised rangatahi with different (observed and potentially unobserved) characteristics to remain in placement for longer at earlier ages (e.g., remain in placement until the age of 17 rather than leaving at age 16 and 6 months). Therefore, if this approach was used, then again it would have been far more challenging to assess whether any estimated differences in outcomes solely reflected the introduction or RAC, or also captured

[23] The 25th percentile for days in (C&P) placement by age 17 in the treatment group was 318 days, with a median of 1,117 days. On the other hand, the 25th percentile for the control group in terms of placement duration was 16 days, with a median of 338 days.

[24] Note that the duration of placement by age 17, as well as other placement histories-related characteristics are captured by a number of control variables in the DiD analysis.

[25] With the control group including rangatahi who recorded placements only at earlier ages.

outcomes of rangatahi with different underlying characteristics (i.e., who would have experienced different outcomes in adulthood even if RAC was not introduced).

That is, even though this study's approach may lead to the understatement of the impacts of RAC, it is preferable to the other two approaches discussed since it is less sensitive to selection bias. Under this approach, the effects estimated should not be interpreted as the 'pure' effects of RAC on outcomes, but rather as the effects of RAC on the outcomes of rangatahi that were eligible for an additional year in placement.

In contrast, the estimates of RAC in this study may also be positively biased (i.e., overstated) since they may also capture the effects of the Support service (introduced in July 2016) and Transitions Support Service for care leavers (introduced in July 2019), since the impact of these services may have been stronger for *treated* rangatahi from the *Semi* and *Full* cohorts.[26] First, both services allowed rangatahi to contact Oranga Tamariki for support provided they remained in placement for at least 3 consecutive months from age 14 and 9 months. This means that rangatahi from the control group (i.e., from either cohort) were not likely to be eligible for this service since none were not in placement at ages 15 or above (by definition). Second, while contacting Oranga Tamariki for support was available for *treated* rangatahi (who met all other criteria) from all cohorts, rangatahi from the *Semi* and *Full* more could have used this service from a younger age, and for a longer period (since these services are capped at ages 20 and 25).[27]

[26] The earlier service required rangatahi to be between ages 15-20, with the more recent one extended to the age of 25. To be eligible to advice and support (in both services), rangatahi must have recorded a continuous period of 3 months after the age of 14 years and 9 months in a C&P placement, with an iwi social service, a cultural social service, a child and family support service, Court wardship, on remand and/or under a Youth Justice supervision with residence order, under a Youth Justice supervision with activity (in custody) order, in Police custody, or in remand or serving a prison sentence. In addition, the Transitions Support Service also included a Maintain Contact service in which rangatahi under the age of 21 were referred to a transition provider who will maintain contact if you are subject to a process/proceeding under the Act. For more information, see: Oranga Tamariki Act 1989 No 24 (as at 31 January 2018), Public Act Transition from care to independence – New Zealand Legislation.

[27] The Transitions Support Service also included a Maintain Contact component (until age 21). This means that when introduced, 25% of rangatahi from the Pre cohort were not eligible (as they were too old), while all rangatahi from the *Semi* and *Full* cohort could participate. However, the uptake of this component (and Transition Service more generally) was reported to be slow, with only 7% of eligible rangatahi being contacted by a transition worker in July 2019, one third in July 2020, and about half in July 2021 (Malatest International, 2021). Furthermore, internal discussions with Oranga Tamariki staff suggested that since all rangatahi from the study population (i.e., from all cohorts) were over the age of 18 when the service came into effect, it is likely that this component was scarcely used by these cohorts since there was not enough time to find them a transition worker prior to this service coming into effect. Overall, assessing the magnitude of this bias is challenging, but theoretically will depend (among other things) on the proportion of rangatahi from each cohort/treatment status that accessed it, and the extent to which these services affected each outcome.

Outcome and control variables

The selection of outcome variables (broadly) follows the outcomes expected to be improved in the review of the Care and Protection system (Ministry of Social Development, 2016). As discussed in the introduction section, the review expected improvements in health, education, labour market, teenage pregnancy, and justice related outcomes. Using this list as a starting point, the final set of outcome variables to explore was selected based on suitability, availability, quality, and coverage of available data in the IDI. These are presented in Table 4.

The effects of RAC on rangatahi outcomes are examined at two age-periods: at ages 17 up to 18 (i.e., effects during additional year of placement), and between the age of 18 and 20 (longer-term effects). For outcomes between ages 18 to 20, data coverage issues in health-related outcomes means that these could only be examined between ages 18 and 19, and educational qualifications gained outcomes by the age of 19 (rather than by the age of 20). Furthermore, since all indicators are derived from administrative records of interactions between rangatahi and government agencies, they should be considered as imperfect proxies for the outcomes stated in the Care and Protection review.

The control variables used for this analysis include demographic characteristics (e.g., gender, ethnicity, parenting) location-based information (regional council of residents, local area deprivation level), educational experience and achievement (e.g., educational qualification, school interventions, age/reason leaving school), health-related events (Potentially Avoidable/Ambulatory Sensitive Hospitalisations [PAH/ASH], Mental Health/Substance Abuse service use [MSHU], diagnosis of chronic condition), Care and Protection-related events (e.g., any/number of C&P Family Group Conference [FGC] referrals, any/number of C&P Reports of Concerns [ROC] relating to the rangatahi, first age in C&P placement, total days C&P in placement until age 17, placement records at different age milestones [year and month]), and justice-related events (police victimisation/offending events). Note the geographic-related variables that are measured at the age of 17, while all other controls variables are measured by the age of 17. The complete list of control variables included in the DiD estimations is presented in Table A1.

Table 4 – Outcome variables

Subject	Source	Indicator
Health	MOH+	Recorded any Mental Health and/or Substance Abuse (MHSU) service use
		Recorded any Potentially Avoidable or Ambulatory Sensitive Hospitalisations (PAH/ASH)
Education	MOE*	Gained any educational qualification
		Gained any level 2 or above NZQF educational qualification
		Gained any level 4 or above NZQF educational qualification
		Enrolled (one day or longer) to any tertiary educational institution (18-20 only)
Labour market	IR/MSD	Earned any income from Wage and Salaries (W&S)
		Total months recording W&S income
		Total W&S income
		Earned any income from Main Benefit income
		Total months receiving Main Benefit income
		Total main benefit income
		Subject in any Unsupported Child/Orphan Benefit spell (17-18 only) &
Justice[28]	POL	Recorded any victimisation events
		Recorded any records of offending events
	COR	Recorded any community service or remand/custody sentence (18-20 only)
Parenting	Data	Recorded any births (17-18 only)[29]

Notes: + Health outcomes for ages 18-19 rather than 19-20 as in other indicators. * When calculating educational achievements at the later age (18 and above), the indicator measures these by the age of 19 (rather than 20). In addition, qualification gained data (by age 19) is sourced from year of completion records. Therefore, gaining qualification was calculated based on whether the 19th birthday occurred in the same year as the qualification gained, rather than using a specific date as in all other indicators. & Unsupported Child/Orphan Benefit spells are accessed by the caregivers of the rangatahi (hence the rangatahi is the subject of such benefit, rather than its recipient).

[28] These include both Police offending and victimisation events, and correction sentences. For correction sentences, outcomes group community work (e.g., home detention, community detention, community programme, supervision) and custody (e.g., prison, remand) sentences.

[29] Parenting indicators are derived by linking the study population to the parent1 and parent2 identifiers in the personal details table.

Results

Descriptive statistics

Figure 2 presents the share of rangatahi from the treatment group of each cohort who recorded placement at different age milestones between the ages of 15 and 18, with each milestone capturing an incident in which a placement spell overlapped with a certain age (e.g., 16 years and 3 months). While aged 15, shares for the *Pre* and *Semi* cohort seem to remain relatively stable across the milestones. On the other hand, while the greatest share of rangatahi was recorded in *Full* cohort (nearly two-thirds of all rangatahi from that cohort), shares were trending downwards.

While aged 16, all cohorts record a downwards trend in terms of shares, but the *Pre* cohort records a steeper decline in shares than the other two cohorts. Additional analysis examining the decline in this cohort suggests that this decline was driven by a (relatively) stronger *exit* rate, rather than a (relatively) weaker *entry* (or *re-entry*) rate. Furthermore, the gradient of this decline is in-line with the declines recorded for the two cohorts preceding *Pre* (i.e., one and two years older).[30]

From age of 17, the shares of rangatahi in placement in the *Pre* and *Semi* cohorts first record a strong 'level drop', before continuing the downward trends in shares. For the *Full* cohort, while the downward trend continued during this age, a 'level drop' in shares was not observed. By the age of 17 years and 11 months (17.11 in the figure), 37% of rangatahi from the *Full* cohort recorded placement, compared with 8% from the *Semi* cohort, and (effectively) none from the *Pre*.[31]

Examining placement patterns for these treated cohorts, 58% of the rangatahi from the *Full* cohort recorded placements at one or more of Figure 2's milestones during the age of 17. Of those, just over half recorded placement in every milestone between the ages of 17 and 18, with an additional 4% recording all milestones until the age of 17 and 10 months. In contrast, 9% recorded placement only at the age of 17 (i.e., spell overlapped with 17th birthday but not at any other milestone),[32] and additional 5% until the age of 17 and 1 month (i.e., but not after).

In contrast, the placement patterns observed for the *Pre* and *Semi* cohort were very different than those of *Full*. For the *Semi* cohort, while 47% recorded placement in at least one milestone during the age of 17, of those, only 11% recorded placement in every milestone, compared with 60% who recorded placement only when turning 17, and 6% only until the age of 17 and 2 months. A case note analysis found that in

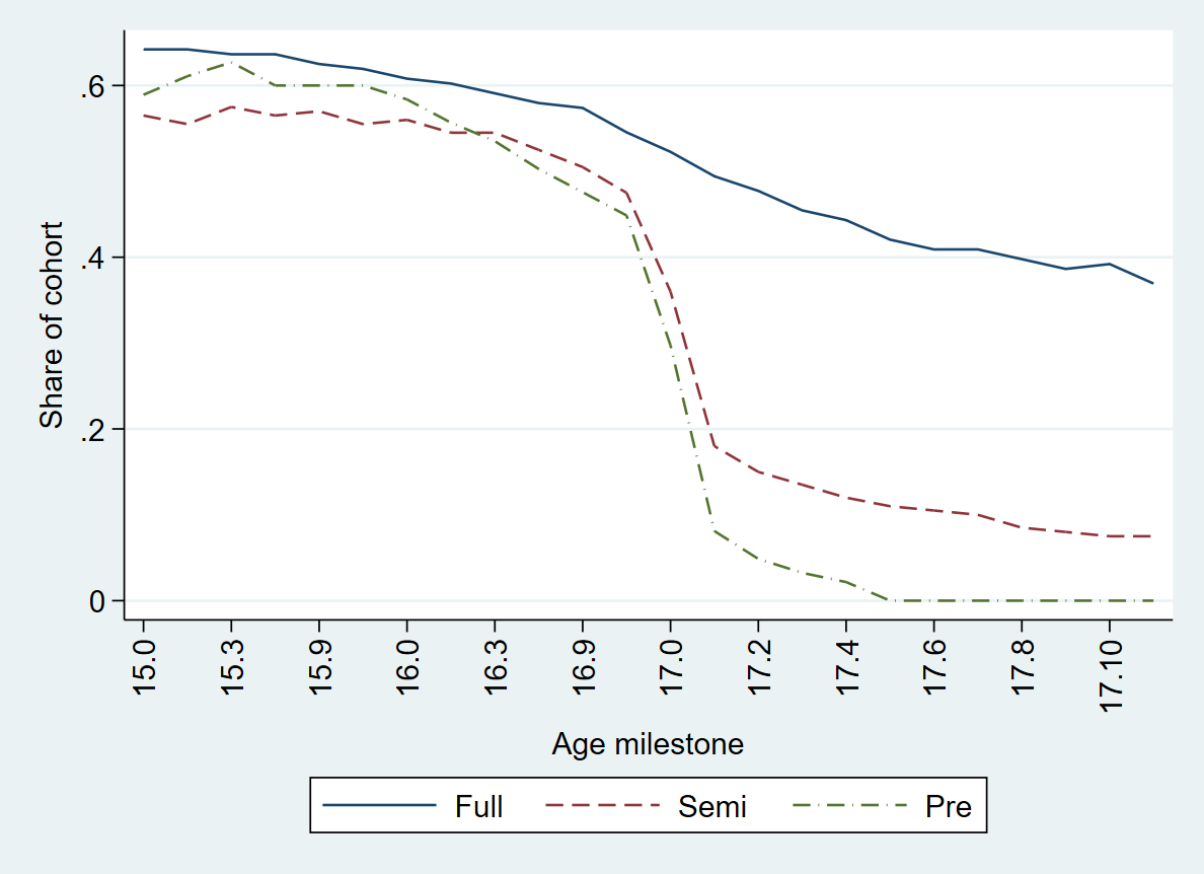
[30] The trend in placement for the *Pre* cohort was compared to those one and two years older. All cohorts showed the same strong reduction during the age of 16, with nearly no placements recorded from age 17. For more information about placement trends for the different cohorts, see Appendix C.

[31] Shares have been suppressed due to low counts.

[32] Note that the data is based on placement spells overlapping with age milestones. The record of placement at age 17 may be a result of measurement errors in birth dates and spell end dates and may not capture an actual placement.

almost all cases, rangatahi from this cohort who recorded placement in every milestone were under a guardianship order (e.g., S110(2a), S110(2b), 113A). In other instances, rangatahi were recorded in placement, but in practice contacted Oranga Tamariki for support (through the care leavers support service). Similarly, while 43% of the rangatahi from the *Pre* cohort recorded placement in one or more milestones during the age of 17. Of those, 81% recorded a placement only when turning 17, 5% recorded placements until the age of 17 and 1 month, with only 3% recording placements in all milestones. However, a case note analysis found that the rangatahi from this cohort who recorded placement in all milestones were under guardianship orders.

Figure 2 – Rangatahi in placement at different ages, share of entire cohort (treatment group only)



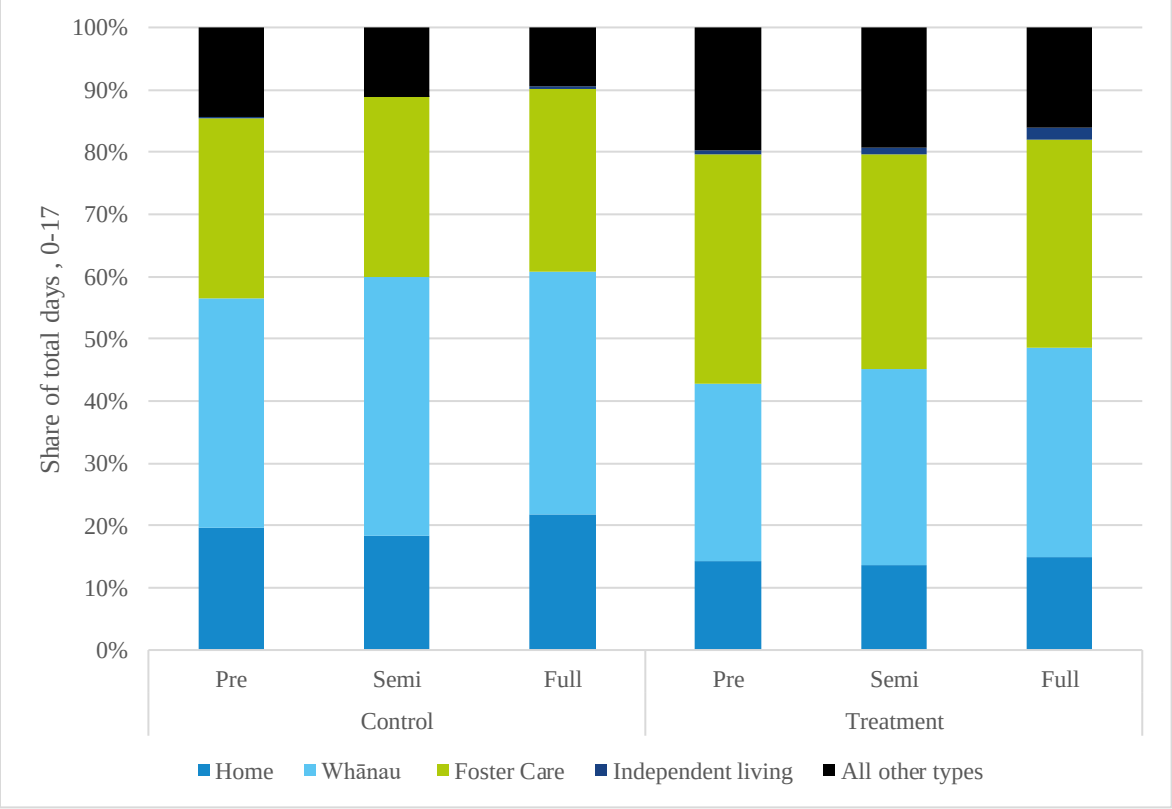
Notes: Counts were randomly rounded in accordance with Statistics New Zealand's requirements. All cohorts include rangatahi from the treatment group. *Full* cohort includes rangatahi who turned 17 between April 2017 and March 2018. *Semi* cohort includes rangatahi who turned 17 between April 2016 and March 2017. *Pre* cohort includes rangatahi who turned 17 between April 2015 and March 2016.

Overall, the data suggests that the *Full* cohort was more likely to record placements after turning 17, as well as to remain in placement for longer periods. In addition, the analysis did not find any strong evidence that *re-entry* to placement was common (in any of the cohorts). That is, the data suggests that after the age of 17, young adults who left placement were not likely to return. Furthermore, while the patterns of the *Semi* cohort lie somewhere in between those of the *Pre*- and *Full* cohorts, they are more similar to those from of *Pre* (possibly due to administrative adjustments/lags in RAC implementation). This may have a bearing on the effects RAC had on the

outcomes from the treated *Semi* cohort, since their improvements were dependent on them returning to placement after the age of 17 (and before age 18).

Figure 3 presents the distribution of C&P placement days from birth to age 17 by (grouped) placement type. The figure shows that overall, differences in the share of total days spent in placement by type varied by rangatahi from the control and treatment groups, rather than by cohort. Compared to the control group, rangatahi from the treatment group were less likely to record placements at home (i.e., with biological parent/s) or with whānau (kin foster-care arrangement) and were more likely to record placements with non-kin foster carer, in Independent Living,[33] and in *all other types* of placements (e.g., Bednights, other short-term arrangements). Amongst the treatment group's cohorts, rangatahi from the *Full* cohort recorded a 2-4pp greater share of days with whānau placements (34%), a 2-4pp lower share of days with non-kin foster carers, and a 3-4pp lower share in *all other types* of placements. Note that these differences resemble those recorded between the control group's cohorts, hence are likely to suggest (broader) changes in the C&P system that affected placement practices more generally.

Figure 3 – Share of total days in C&P placement by grouped type from the age of 0-14 (0-17)

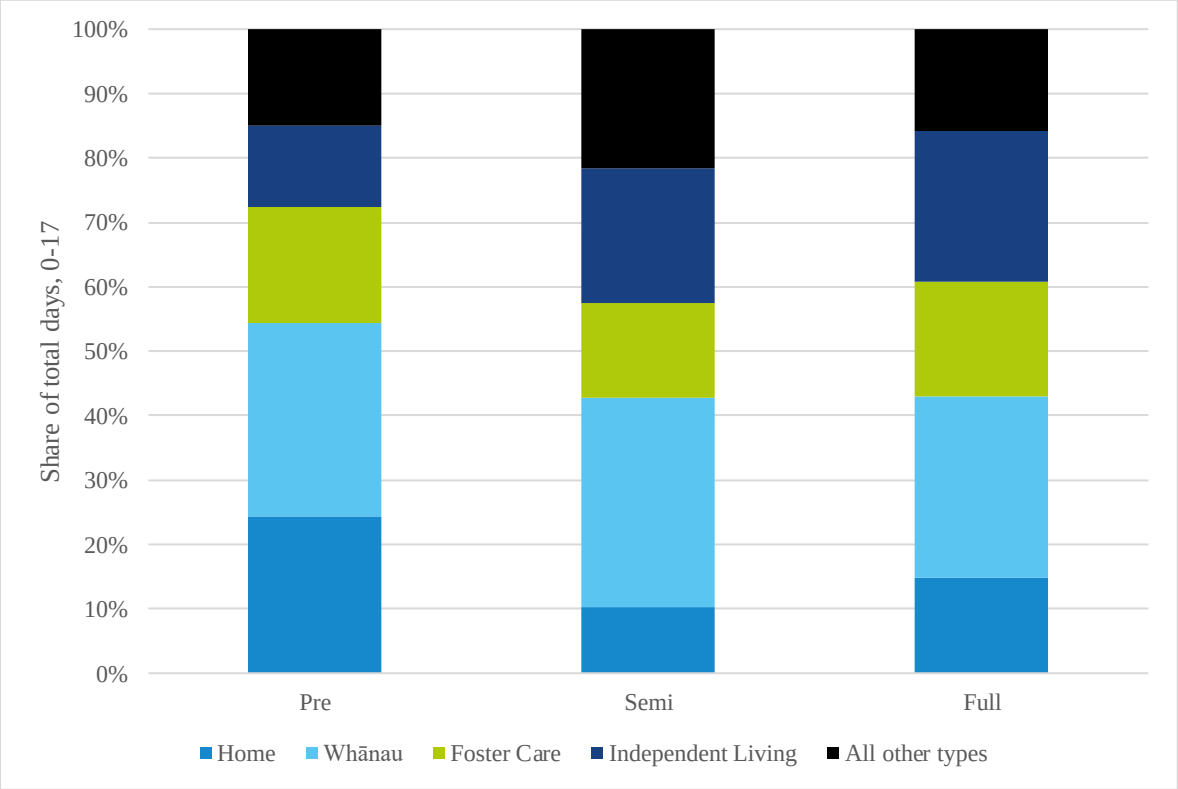


Source: Oranga Tamariki (2021). **Notes**: *Home* includes being placed, returning, and remaining at home. *All other types* include boarding school/hostel placement, Bednights, detention in Police custody, residential placement (C&P and YJ orders, and non-Oranga Tamariki residence), supervised group homes, and YSS (one-to-one care placement, conduct disorder and sexual abuse).

[33] This type of placement is approved when suitable transitional care arrangement cannot be found, and supports rangatahi to live independently if they are over 16, are working or studying, and have adequate life skills and an identified network of support around them.

Between the ages of 17 and 18 (Figure 4), the largest grouped category in terms of day for the treatment group's cohorts[34] was whānau placements, accounting for between 28-33% of all days amongst cohorts. Compared to the *Pre* cohort, the share of days at home placements was lower for the *Semi* and *Full* cohorts (10-15% compared to 24%), while the share of Independent Living arrangements was much greater (21-23% compared to 13%). In fact, Independent Living showed the largest change in terms of shares when compared to the earlier age (1-2% of total days). In contrast, all cohorts recorded large reductions in shares under Foster Care placements, falling from about one third of total days until the age of 17, to 15-18% from age 17 (this was the largest category for the earlier age). Since the *Pre* cohort recorded far fewer days in placements after the age of 17, the figure suggests a movement of rangatahi that were affected by RAC from Home and (non-kin) Foster Care placements and into Independent Living. Finally, *all other types* of placements were more common among rangatahi from the *Semi* cohort (22% of days compared to 15-16% for *Pre* and *Full*). This category largely captured Bednight Support placements, which captured about 10% of all days for the *Pre* and *Full* cohorts, and 15% for *Semi*.

Figure 4 – Share of total days in C&P placement by grouped type, ages 17-18 (treatment group)

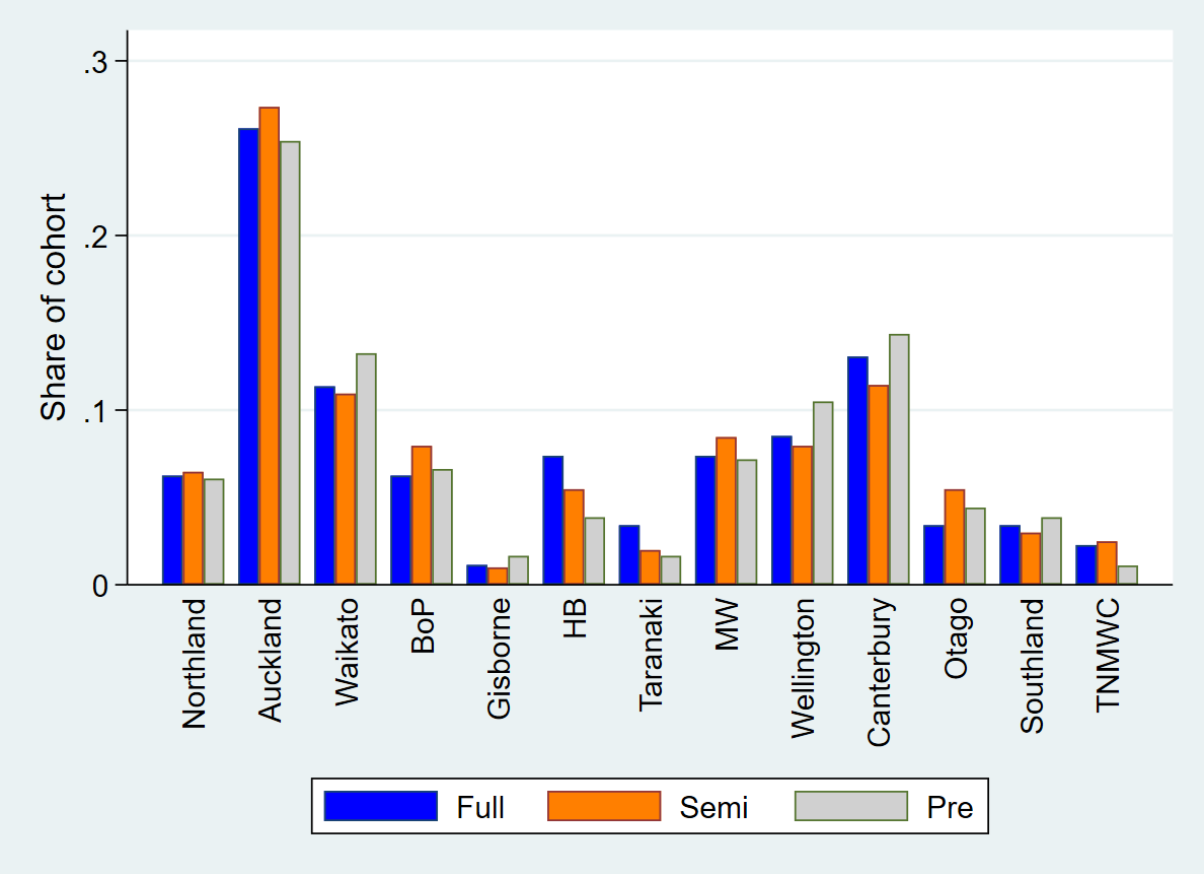


Source: Oranga Tamariki (2021). **Notes**: Home includes returning and remaining at home. All other types include boarding school/hostel placement, Bednights, detention in Police custody, residential placement (C&P and YJ orders, and non-Oranga Tamariki residence), supervised group homes, YSS (one-to-one care placement, conduct disorder and sexual abuse).

[34] The distribution of days for the control group is not presented due to no/small counts of days.

Geographically, about half of each treatment group's rangatahi resided in the upper North Island Regional Councils at the age of 17 (Figure 5). This included 25-27% who lived within Auckland, 11-13% in Waikato, and 7-8% in the Bay of Plenty Regional Councils. Other regions with relatively large shares include Manawatu-Wanganui (7-9%), Wellington (6-7%) and the Canterbury Regional Council (8-9%). Overall, these distributions were similar to those of the control group's cohorts, as well as the overall distribution of rangatahi in New Zealand.[35]

Figure 5 – Cohort distribution by Regional Council, treatment group



Notes: All shares are based on counts that were randomly rounded in accordance with Statistics New Zealand's confidentiality requirements. **Labels**: Bay of Plenty (BoP), Hawkes Bay (HB), Manawatu-Wanganui (MW), Tasman, Nelson, Marlborough, and the West Coast (TNMWC).

Table 5 presents the mean values for a selection of characteristics for rangatahi by (or at) the age of 17. These characteristics shown in this table are a sub-set of the control variables that were used in the DiD analysis. The first three columns of the table show the mean value only for rangatahi from the treatment group's cohorts separately. Most characteristics are shown in terms of share (i.e., proportion of rangatahi with a specific attribute), while some measure the average magnitude (e.g., number of Reports of Concern relating to the rangatahi, number of days in

[35] Compared to all those under the custody of Oranga Tamariki Chief Executive (year to July 2017) the shares were somewhat different. While shares in Auckland were similar (25%), greater shares were recorded in Wellington (21%) and lower shares in Canterbury (8%) and Waikato (8%). All other areas recorded similar shares to those in the study's sample.

C&P placement until the age of 17). The two rightmost columns show the DiD estimates that were used to test for the stable composition assumption (*Equation 2*).

In terms of demographic characteristics, most shares are similar across cohorts. For example, about half (47-50%) of the rangatahi in each cohort were identified as females, approximately 4% had one or more children, and on average, resided in a meshblock with a deprivation score equal to the 9th most deprived percentile (with 10 being most deprived).[36] On the other hand, a greater share of rangatahi were identified as Māori in the *Full* cohort (65% compared with 57-59% in the other cohorts), and a relatively lower share of rangatahi identified as Pacific Peoples (about 2.5-3.2 percentage points (pp) lower). The DiD estimates confirms that the larger share of Māori rangatahi in the *Full* cohort is greater than in the *Pre* (and relatively to the differences recorded in the control group's cohorts). On the other hand, no statistically significant differences were recorded for the *Semi* cohort, or between any cohorts in terms of Pacific Peoples representation.[37]

Table 5 suggests improvements in educational qualification gains for the *Full* and *Semi* cohorts by age 17. In addition, rangatahi from the *Full* cohort were less likely to record one or more educational interventions (due to suspension, stand-downs, or truancy), or leave school before the age of 17 (due to suspensions, expulsions, or truancy) than those from the other two cohorts. In fact, the shares for the *Semi* cohort were the largest. However, the DiD estimates suggests that these differences in shares were not statistically significant, suggesting that similar differences were also recorded amongst the control group's cohorts.

In terms of health, rangatahi from the *Semi* and *Full* were more likely to record Potentially Avoidable or Ambulatory Sensitive Hospitalisations (PAH/ASH) (6-8pp), or to be diagnosed with a chronic condition (1-2pp), while the shares using Mental Health/Substance Abuse (MHSU) services were similar. Note that none of the health-related variables violated the stable composition assumption.

In terms of Care and Protection (C&P) characteristics, rangatahi from the *Full* cohort entered placement for the first time four months earlier, recorded 2-3 months longer in C&P placement, recorded one additional Reports of Concern (ROCs), and were referred about one time more to a Family Group Conference (FGC). Of those, only the number of ROCs and FGCs violated the stable composition assumption.

In terms of justice-related variables, the share of rangatahi who recorded any police offence events by the age of 17 was similar, while the share recording police victimisation events was far larger in the *Full* and *Semi* cohort (and statistically significant in the DiD estimates). These differences may reflect the coverage of this variable in the IDI since the victimisation data has only started to be systematically

[36] Deprivation information is based on the 2018 New Zealand Index of Deprivation (NZDEP). The NZDEP uses information from the Census of Population and Dwellings (e.g., employment, incomes, access to telecommunications) to allocate areas (e.g., meshblock, Regional Council) scores based on their local characteristics. Scores are also converted into percentiles, with 10th being the most deprived (Atkinson et al., 2021).

[37] This suggests that similar differences were recorded between the control group's cohorts.

collected since 2014. Therefore, the increase over time may (at least partially) reflect improvements in data coverage, rather than differences in characteristics.[38] Finally, the share of rangatahi who the subject of an Unsupported Child Benefit or Orphan Benefit (UCB/OB) was similar across cohorts (38-40%). Overall, despite some differences across cohorts (especially *Full*), most shares were similar, and if statistically, the different and relatively small.

Table 5 – Mean value for a selection of control variables, all treatment group's cohorts

	Cohort			DiD	
Characteristic (share of cohort unless stated otherwise)	**Pre**	**Semi**	**Full**	**Semi**	**Full**
Female	0.47	0.5	0.506	0.081*	0.008
Māori	0.573	0.59	0.653	0.021	0.085**
Pacific Peoples	0.157	0.15	0.125	-0.033	-0.054
Any children	0.038	0.04	0.040	-0.007	0.008
NZDEP18 score	1089	1089	1087	-0.96	-7.828
Educational qualifications: any	0.303	0.365	0.375	-0.03	0.043
Educational qualifications: L.2 or above	0.130	0.175	0.199	-0.003	0.052
Any school interventions	0.746	0.795	0.739	0.067*	-0.009
Left school before age 17	0.07	0.1	0.051	0.004	-0.041*
Any PAH/ASH events	0.416	0.5	0.483	0.057	0.073
Diagnosed with Chronic Condition/s	0.054	0.06	0.068	-0.004	0.013
Any Mental Health and/or Substance Abuse service use	0.784	0.785	0.778	-0.041	-0.029
Age at first placement (months)	123	123	119	1.96	-1.37
Total days in placements, 0-17	1,592	1,547	1,720	-43.999	84.983
Total number of ROCs concerning the rangatahi	10.1	10.9	12.1	.524	1.226***
Total number of FGCs referrals	2.4	2.7	3.5	.319**	0.91***
Any Police Victimisation events	0.211	0.39	0.506	.062**	0.083***
Any Police Offence events	0.638	0.64	0.614	0.038	0.046
Subject of Unsupported Child and/or Orphan's benefit	0.384	0.38	0.398	-0.04	-0.057

Notes: Shares/counts by (or at) age 17. For DiD columns: * - significant at the 10% level, ** - significant at the 5% level, *** - significant at the 1% level. Educational qualification includes qualification gained in secondary school (including tertiary qualifications). Shares/counts were randomly rounded in accordance with Statistics New Zealand's confidentiality requirements. The full list of control variables is presented in Table A1. Shares/counts for the control group's cohort are presented in Table C1.

Table 6 presents the share of rangatahi recording various outcomes between the ages of 17 and 18. As in Table 5, shares are only shown for the treatment group's cohorts (separately). In addition, the rightmost column shows the F-Statistic of a joint significance test for the parallel trends test discussed in the previous section (*Equation 3*). As discussed, this test determines whether estimated differences in outcomes in the DiD analysis can be attributed to RAC.[39]

For the *Full* cohort, the table suggests greater interactions (shares, months, and income) with the labour market in terms of receiving Wages and Salary (W&S)

[38] In the control group, this share increased from 12% of the *Pre* cohort, to 24% for the *Semi* cohort, and to 33% for the *Full* cohort.

[39] * - significant at the 10% level, ** - significant at the 5% level, *** - significant at the 1% level. Note that only tests that rejected the null hypothesis of parallel trends at the 5% or lower will be considered.

income, and less interaction with main benefits (e.g., receiving on average 2.8 months of main benefit income compared with 5.7-6 months in the other cohorts).[40] Related to this, the *Full* cohort also recorded a (1-2pp) lower share of rangatahi being the subject of (any) UCB/OB spells. Therefore, the table suggests *raw* increases in labour market participation, and *raw* reductions in the use of main benefits.

Rangatahi from the *Full* cohort were less likely to parent (new) children between the ages of 17 and 18, while rangatahi from the *Full* and *Semi* cohorts were more likely to have any (and level 2 or above) educational qualifications. In terms of health, rangatahi from the *Semi* cohort were more likely to record PAH/ASH and MHSU service use events.

For justice-related outcomes, the *Semi* and *Full* cohorts recorded 2.5-3pp greater in terms of records of victimisation events, and lower shares with police offending events (2.2-4.2pp lower). The *Semi* cohort had a greater share of rangatahi with any correction sentences. Overall, the parallel trend tests for all outcomes at this age suggest that the parallel trends assumption was not rejected, hence all the outcomes between the ages and all outcomes will be examined in the main analysis.

Table 6 – Mean value for the outcome variables between the ages of 17 and 18, treatment group

	Cohort			Parallel trends
Outcome (share of cohort unless stated otherwise)	**Pre**	**Semi**	**Full**	**F-Statistic**
W&S: any income	0.346	0.420	0.460	.48
W&S: months receiving income	3.730	4.460	4.830	.25
W&S: total income	2,523	2,903	3,269	1.56
Main benefit: any income	0.535	0.505	0.256	.12
Main benefit: months receiving income	5.989	5.670	2.830	.07
Main benefit: total income	4,179	3,674	1,833	.32
Subject of any Unsupported Child and/or Orphan benefit	0.103	0.095	0.080	.3
Any children	0.054	0.040	0.034	.85
Educational qualifications: any	0.541	0.595	0.585	.39
Educational qualifications: L.2 or above	0.405	0.455	0.472	1.57
Any PAH/ASH events	0.011	0.035	0.023	.13
Any MHSU service use	0.405	0.435	0.438	.6
Any Police Victimisation events	0.130	0.170	0.165	.25
Any Police Offending events	0.378	0.400	0.358	1.46
Any Correction Sentences	0.146	0.165	0.142	1.85

Notes: Shares/counts are randomly rounded in accordance with Statistics New Zealand's requirements. For parallel trends test column: * - significant at the 10% level, ** - significant at the 5% level, *** - significant at the 1% level Shares/counts for rangatahi from the control group are in Table C2.

Table 7 follows the same structure as Table 6, but focuses on outcomes between the ages of 18 and 20. Compared to the ages of 17-18, the shares receiving any W&S income, the average number of months of receiving W&S income, and total income

[40] W&S and benefit incomes are not adjusted for inflation. Therefore, differences in total W&S income across cohorts are likely to be overstated, and differences in benefit income across cohorts understated.

were far lower. For example, shares with any W&S fell from 35-46% to 5-6%, and average months fell from 3-4 to one half. In contrast, receiving main benefit income drastically increased and included over 80% of rangatahi (compared with 26-53% at ages 17-18). Note that the number of months of receiving benefit income and total benefit income received could not be attributed to RAC since the test results (F-Statistic) suggest that the parallel trends assumption was rejected.

In terms of education, the table suggests lower enrolment in tertiary education for the *Semi* and *Full* cohorts, as well as a lower share of rangatahi with level 4 or above educational qualification by age 19. On the other hand, the share of rangatahi from these cohorts with any educational qualification was greater (63-66% compared with 58%), as well as with level 2 or above (51-52% compared with 44%). Of those, only the gaining of any educational qualifications by age 19 outcome violated the parallel trends assumption.

With respect to health outcomes, the *Full* cohort records a greater share of rangatahi with any PAH/ASH events, while its share of those using any MHSU services is somewhat lower. Finally, victimisation events were more common in the *Semi* and *Full* cohorts (possibility due to data coverage issues), while the share with police offending events was lower for the *Full* cohort, while differences in terms of correction sentencing were relatively small.

Table 7 – Mean value for the outcome variables between the ages of 18 and 20, treatment group

	Cohort			Parallel trends
Outcome (share of cohort unless stated otherwise)	**Pre**	**Semi**	**Full**	**F-Statistic**
W&S: any income	0.054	0.055	0.057	1.47
W&S: months receiving income	0.341	0.265	0.278	1.28
W&S: total income	11,016	11,895	13,130	1.36
Main benefit: any income	0.822	0.820	0.807	1.06
Main benefit: months receiving income	16.930	16.935	16.534	4.14**
Main benefit: total income	11,300	11,742	11,863	5.12**
Any days enrolled in public Tertiary Educational institutions	0.514	0.465	0.415	0.88
Educational qualifications: any	0.584	0.655	0.625	3.82**
Educational qualifications: L.2 or above	0.443	0.515	0.511	1.79
Educational qualifications: L.4 or above	0.070	0.050	0.045	0.51
Any ASH/PAH events	0.011	0.015	0.028	0.44
Any MHSU service use	0.416	0.395	0.409	0.53
Any Police Victimisation events	0.232	0.255	0.284	0.6
Any Police Offence events	0.427	0.430	0.386	0.44
Any correction sentences	0.276	0.265	0.267	0.27

Notes: Shares/counts are randomly rounded with accordance to Statistics New Zealand's requirements. Shares/counts for rangatahi from the control group are in Table C3. For parallel trends test column: * - significant at the 10% level, ** - significant at the 5% level, *** - significant at the 1% level.

Difference in Difference (DiD) estimates

Table 8 summarises the estimated effects of RAC using the DiD approach, including the full set of controls (*Equation 1*). The table shows the results for rangatahi from the *Semi* and *Full* cohorts (separately) between the ages 17-18 and 18-20. Most estimates present the effect of RAC in terms of percentage point (pp) change; with few presenting in terms of frequency (e.g., number of months receiving W&S income) and quantity (e.g., total main benefit income).

To provide more context regarding the magnitude of changes, statistically significant estimates are discussed in terms of percentage change relative to the share recorded for the overall sample.[41] For example, a sample mean of 0.2 for an outcome and an estimate (e.g., for the *Full* cohort) of 0.05 will indicate an increase of (0.05/0.2=) 25%.[42]

Results for all rangatahi

At ages 17-18, rangatahi from the *Semi* cohort were 20% (9pp) more likely to receive (any) W&S incomes, as well as record one additional month receiving such income. In contrast, differences at ages 18-20 were smaller, and not statistically significant. That is, any improvements in W&S outcomes for this cohort were only during their 17th year. For the *Full* cohort, these effects were smaller, and not statistically significant. It is not clear why the W&S related estimates are significant for the *Semi* cohort but not for the *Full,* and may reflect an imperfect identification strategy.

For main benefit-related outcomes, the table suggests a strong reduction in all benefit-related variables for the *Full* cohort. The share recording (any) benefit income was 27.3pp lower between the ages of 17 and 18, receiving this income (on average) over a 3-month shorter period, and earning $2,179 less. From the overall mean, these suggest reductions of 75-78% between the ages of 17 and 18. For ages 18-20, the estimates suggest a decrease of 12% in the likelihood of receiving any main benefit income.[43]

The strong reductions in benefit-related earnings between the age of 17 and 18 may not be surprising. First, rangatahi remaining in placement for one year longer may not need such benefits. While it can be argued that while in placement, these rangatahi would be more likely to be the subject of Unsupported Child or Orphan benefits (UBC/OB), the DiD estimates did not detect any statistically significant difference. Second, during the same period, the eligibility age for most of the main benefits available (e.g., Jobseeker Support) have also increased (to 18). This may explain the drastic decline between the ages of 17 and 18, but not that between the ages of 18 and 20.

[41] Shares and counts for the full sample, and by main ethnic group are presented in Table C4.

[42] Only estimates that were statistically significant at the 5% or lower are discussed. Statistically significant estimates that were previously found to reject the parallel trends assumption are shown in *italics*.

[43] The estimates of the two remaining benefit related outcomes were also negative and significant, though these could not be attributed to RAC as the parallel trends assumption for these did not hold.

To test whether the decline in main benefit use at ages 17-18 reflects an overall decline, or a shift towards other types of benefits that were still available at this age, further DiD estimates examined the effect of RAC on recording one or more spells for the Youth Payment and Young Parent benefits.[44] The estimates suggest statistically significant *reductions* in the share of rangatahi from the *Full* cohort recording any such spells. Therefore, the analysis finds no evidence of 'switching' behaviours and suggests that the introduction of RAC led to reductions in benefit use between ages 17-20.[45]

With respect to educational outcomes, no significant differences were estimated between the ages of 17 and 18, nor there were differences in terms of enrolment to tertiary educational institutions between the ages of 18 and 19. However, rangatahi from the *Full* cohort were 4.6pp (an increase of 9%) more likely to gain a level 2 or above educational qualification by age 19.[46] These findings contradict those found in the MidWest study (e.g., Courtney et al., 2007) where rangatahi leaving placements at later ages were more likely to enrol (and complete) their first year of college (tertiary education), but not to gain educational qualifications.

No other outcomes were statistically significant. Therefore, the DiD results suggest that RAC improved some educational achievements, and reduced benefit use, while the anticipated improvements in health and justice outcomes were not detected.

[44] Both benefit types were available during the study period for rangatahi aged 18 or younger. Young Parent benefits required rangatahi to have children (Youth benefits | New Zealand Government (www.govt.nz)).
[45] The analysis also examined changes in use of any type of benefits (i.e., one or more days under any type of benefit), finding statistically significant reductions for the Full at ages 17-18, and ages 18-20.
[46] The estimates for gaining any qualification also suggest an increase. However, this outcome cannot be attributed to RAC since it was found to violate the parallel trends assumption.

Table 8 – Difference-in-Difference (DiD) full sample, outcomes at ages 17-18 and 18-20

	17-18		18-20	
Outcome	**Semi**	**Full**	**Semi**	**Full**
W&S: any income	**0.088*** **	0.053	0.004	0.017
W&S: months receiving income	**0.956*** **	0.449	-0.068	-0.027
W&S: total income	430	-100	-1869	-732
Main benefit: any income	0.005	**-0.273*** **	-0.005	**-0.092*** **
Main benefit: months receiving income	-0.037	**-3.053*** **	0.457	*-1.538*** **
Main benefit: total income	-209	**-2179*** **	*1410***	-1090
Subject of any UCB/OB spells	-0.045*	-0.04	-	-
Any children	-0.012	-0.012	-	-
Any days enrolled in public Tertiary Educational institutions	-	-	0.022	-0.01
Educational qualifications: any	0.016	0.041	*0.032*	*0.06***
Educational qualifications: L.2 or above	-0.025	0.034	-0.004	**0.046** **
Educational qualifications: L.4 or above	-	-	-0.014	-0.019
Any PAH/ASH events	0.025*	0.016*	0.002	0.001
Any MHSU service use	0.04	0.017	-0.022	-0.005
Any Police Offence events	0.033	0.007	0.024	0.008
Any Police Victimisation events	0.004	0.001	-0.009	0.044
Any correction sentences	0.026	0.029	0.008	0.054

Note: Parameter estimates statistically different from zero at 99% (***), 95% (**), 90% (*) confidence. Statistically significant estimates are in bold. Statistically significant estimates that violated the parallel trends assumption are in *italics*. Qualification at 18-20 panel by the age of 19, and health outcomes are for the 18-19 age period. Standard errors are clustered by regional council.

Results by main ethnic group

Table 9 presents the results of the DiD estimates for Māori, Pacific Peoples, and Non-Māori or Pacific People (NMP) rangatahi between the ages of 17 and 18. For brevity, the table includes only the estimated effects for the *Full* cohort (since this cohort is of most interest for this analysis).

As found for the entire sample, the table shows strong reductions in benefit use for all ethnic groups between ages 17-18. For Māori, declines in benefit use and months receiving benefits fell by 53-56%, with total income falling by 66%. For Pacific Peoples, shares and number of months also fell by about one half, and incomes by 90%. For NMP, the three variables fell by about 90%. None of these variables violated the parallel trends assumption (in any ethnic group).

In terms of education, Pacific Peoples recorded an increase of 31% in the share gaining *any* educational qualification by age 18, while NMP recorded an increase of 18%. On the other hand, no statistically significant differences were recorded for rangatahi Māori. All other estimates were either not statistically significant, and/or violated the parallel trends assumption.

Table 9 – Difference-in-Difference (DiD) by main ethnic group, outcomes at ages 17-18

Outcome	Māori	Pacific Peoples	Non-Māori or Pacific Peoples
W&S: any income	0.043	0.013	0.06
W&S: months receiving income	0.263	-0.021	0.601
W&S: total income	-815	-1373	1342*
Main benefit: any income	**-.199****	**-.447*****	**-.366*****
Main benefit: months receiving income	**-2.366****	**-5.092*****	**-3.991*****
Main benefit: total income	**-1840****	**-3828*****	**-2686*****
Subject of any UCB/OB spells	-0.032	-0.013	-0.031
Any children	0.001	0.026	-0.02
Educational qualifications: any	-0.007	**0.182*****	**0.111****
Educational qualifications: L.2 or above	0.026	0.108	0.003
Any PAH/ASH events	0.019*	*0.071***	0.007
Any MHSU service use	-0.036	0.07	0.077
Any Police Offence events	0.026	-0.071	-0.082
Any Police Victimisation events	-0.031	-0.02	0.06
Any correction sentences	0.057	0.02	-0.008

Note: Parameter estimates statistically different from zero at 99% (***), 95% (**), 90% (*) confidence. Statistically significant estimates are in bold. Statistically significant estimates that violated the parallel trends assumption are in *italics*. Standard errors are clustered by regional council.

Table 10 presents the results of the DiD specifications for the three ethnic groups between the ages of 18 and 20. In terms of labour market outcomes, the table suggests that the only significant change was a $3,787 decline in W&S incomes for rangatahi Māori from the *Full* cohort.

For benefit-related outcomes, the only statistically significant outcome identified was a 25% reduction in the number of months NMP rangatahi received such income (about 3 months). For education, statistically significant increases were recorded for the share of Pacific Peoples and NMP rangatahi who recorded *any* educational qualification by age 19. For Pacific Peoples rangatahi, this indicates an increase of 33%, and for NMP a 17% increase. Finally, all other outcomes were either not statistically significant, or violated the parallel trends assumption (e.g., ASH/PAH for Pacific Peoples rangatahi).

Table 10 – Difference-in-Difference (DiD) by main ethnic group, outcomes at ages 18-20

Outcome	Māori	Pacific Peoples	Non-Māori-Pacific Peoples
W&S: any income	0.007	0.048	0.027
W&S: months receiving income	-0.129	0.349	0.009
W&S: total income	**-3787****	-3836	4692*
Main benefit: any income	-0.065*	-0.102	-0.123*
Main benefit: months receiving income	-0.583	-1.734	**-2.936****
Main benefit: total income	-95	-2798	-2358
Any days enrolled in public Tertiary Educational institutions	0.002	0.057	-0.129*
Educational qualifications: any	0.019	**0.206****	**0.113****
Educational qualifications: L.2 or above	0.003	0.164	0.07
Educational qualifications: L.4 or above	-0.018	0.023	-0.055
Any PAH/ASH events	0.008	*-0.072***	0.016
Any MHSU service use	-0.021	0.091	-0.013
Any Police Offence events	0.001	0.008	0.016
Any Police Victimisation events	0.033	-0.045	0.094
Any correction sentences	0.07	0.032	0.034

Note: Parameter estimates statistically different from zero at 99% (***), 95% (**), 90% (*) confidence. Statistically significant estimates are in bold. Statistically significant estimates that violated the parallel trends assumption are in *italics*. Qualification at 18-20 panel by the age of 19, and health outcomes are for the 18-19 age period. Standard errors are clustered by regional council.

Robustness checks

To test the robustness of the findings, two main checks were conducted. First, all models were re-estimated using both unadjusted and heteroskedasticity robust, standard errors. For the entire sample (i.e., all ethnic groups) and for NMP rangatahi, while benefit-related outcomes did not change, the highest qualification estimates were less precise (significant only at the 10% level). For rangatahi Māori, the reductions in benefits were still (statistically) significant, but the reduction in W&S income was only significant at the 10% level. Finally, the findings for Pacific Peoples rangatahi held across all specifications (reduction in benefit use, qualifications).

Second, as a placebo test, the DiD models were re-estimated, examining the outcomes of older cohorts that were not affected by RAC (i.e., all rangatahi from these cohorts who turned 18 before the announcement and introduction of RAC). For this, a sample that includes rangatahi that turned 17 between April 2013 and March 2015 was constructed. As in the main analysis, the sample only includes rangatahi who recorded one or more days in C&P placements between the ages of 10 and 16.

As in the main analysis, treatment status was determined by whether rangatahi recorded placements between the ages of 15 and 16 (or only 10 to 14). In this *placebo* sample, the *Pre_placebo* cohort includes all rangatahi who turned 17 between April 2012 and March 2013, *Semi_placebo* includes all rangatahi who turned 17 between April 2013 and March 2014, and the *Full_placebo* includes all rangatahi who turned 17 between April 2014 and March 2015. That is, every cohort is 3 years older than its respective cohort from the analysis. If differences between

these cohorts are estimated, then this may suggest that the findings from the main analysis could (at least partially) reflect other differences between cohorts, rather than the impacts of RAC.

Table 11 presents the distribution of this sample across cohorts and treatment status. Compared with the study population, this sample is (23%) larger, with the treatment group being 20% larger, and the control group being 27% larger. On the other hand, the distribution of rangatahi (i.e., regardless of treatment status) is very similar to the distribution in the study population (31-35% in each cohort from the *placebo* sample; 32-34% in cohort from the study population). In terms of compositional change, the only statistically significant difference between the *placebo* sample's cohorts was a 4pp greater share of Pacific Peoples rangatahi from the *Semi_placebo* cohort (i.e., compared to the *Pre_placebo* cohort). Furthermore, only the *receiving any benefit income* (at ages 17-18) and *gaining any educational qualification* (by age 19) outcomes violated the parallel trends assumption.

Table 11 – Rangatahi by cohort and treatment status, placebo sample (turned 17 between April 2012 to March 2015)

Status / cohort	Pre	Semi	Full	Total
Control	558	558	573	1,719
Treatment	753	696	582	2,031
Total	1,311	1,284	1,155	**3,750**

Notes: Counts are randomly rounded in accordance with Statistics New Zealand's confidentiality requirements

Table 12 presents the DiD results for the *placebo* sample (all ethnicities). The analysis suggests some differences in terms of health (decreases in PAH/ASH events at ages 18-20), and justice-related outcomes (police victimisations, correction sentences) that were not detected in the study's main analysis. On the other hand, the strong reduction in benefit-related outcomes, or increases in educational qualification gains were not detected for the *placebo* sample. Overall, that the effects of RAC on education and benefit outcomes were not duplicated for the placebo sample is welcomed as this increases the confidence of the possibility that the effects detected in the main analysis are a result of introducing RAC.[47]

[47] The table shows increases in the share of rangatahi from the *Semi* and *Full* cohorts recording correction sentences and Police victimisation events between ages 17 and 18. The positive estimate is likely to (at least partially) reflect limitations in data coverage (e.g., victimisation data has only been systematically available since 2014).

Table 12 – Difference-in-Difference (DiD) placebo sample, outcomes at ages 17-18 and 18-20

	17-18		18-20	
Outcome	**Semi**	**Full**	**Semi**	**Full**
W&S: any income	-0.043	-0.002	-0.008	0
W&S: months receiving income	-0.285	0.001	-0.053	-0.076
W&S: total income	40	269	549	1074
Main benefit: any income	-0.009	0.036	0.025	0.034
Main benefit: months receiving income	-0.225	0.379	0.144	0.805
Main benefit: total income	-71	290	-83	90
Subject of any UCB/OB spells	0.011	-0.002	-	-
Any children	-0.023	-0.01	-	-
Any days enrolled in public Tertiary Educational institutions	-	-	-0.043	-0.042
Educational qualifications: any	-0.005	0.001	-0.003	0.016
Educational qualifications: L.2 or above	-0.008	0.007	0.022	0.029
Educational qualifications: L.4 or above			0.019	-0.009
Any PAH/ASH events	0.008	-0.01	**-0.019****	-0.016
Any MHSU service use	-0.019	0.019	-0.007	0.025
Any Police Offence events	-0.046	-0.015	-0.035	-0.078
Any Police Victimisation events	0.012	**0.052*****	0.02	0.027
Any correction sentences	**0.011****	**0.103*****	0.025	0.041

Note: Parameter estimates statistically different from zero at 99% (***), 95% (**), 90% (*) confidence. Statistically significant estimates are in bold. Statistically significant estimates that violated the parallel trends assumption are in *italics*. Qualification at 18-20 panel by the age of 19, and health outcomes are for the 18-19 age period. Standard errors are clustered by regional council.

Discussion

The analysis finds that following the introduction of Raising the Age of Care (RAC), rangatahi who were eligible to remain in placement for an additional year (i.e., until the age of 18) recorded strong reductions in main benefit-related outcomes between the ages of 17 and 20, as well as an increased likelihood to gain a level 2 or above educational qualifications by the age of 19. However, the results of the analysis cannot confirm that the reduction in benefit use was driven by greater participation in tertiary education or in employment.

Reductions in benefit-related earnings were detected for the three ethnic groupings tested between the ages of 17 and 18, but only for rangatahi that were not identified as Māori or Pacific Peoples (NMP) between the ages of 18 and 20. In addition, while the analysis found improvements in the likelihood of Pacific Peoples and NMP rangatahi to gain (any) educational qualifications (at both ages 18 and 19), no improvements in this likelihood were detected for rangatahi Māori.

Overall, while these impacts were in line with the anticipated effects of RAC (Ministry of Social Development, 2016), the analysis did not detect other outcomes that were predicted to improve following the introduction of RAC (employment, health, teenage pregnancy, justice). Furthermore, the findings suggest that the ability to remain in care an extra year did not deliver benefits to rangatahi Māori to the same extent as for other groups.

While it is possible that the design of the analysis, data limitations in the IDI, the relatively short period of time observed (until the age of 20), and/or sample size related issues were (at least partially) the reason for not detecting other anticipated improvements, it may also be possible that RAC was not sufficient to achieve these as a stand-alone change.

As discussed in the review of the Care and Protection system (Ministry of Social Development, 2016), RAC was only the first component of a broader package targeting the improvement of outcomes for rangatahi leaving care. Later changes which came into effect in July 2019 included increasing the upper age for appearing in Youth Court (from 17 to 18 years) and a Transitions Support Service for care leavers (until the age of 25).

The methodology used in this analysis can be applied to examining the effects of these later initiatives in future work. Exploring these will provide a more in-depth understanding of the effectiveness of initiatives at improving the future outcomes of rangatahi.

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Appendix A – Control variables

Table A1 – Control variables

Area	Description	Source	Table	Notes
Demographics	Female identity	data	personal_details	snz_gender_code=2
	Year/quarter turned 17			Used as a set of year/quarter fixed effects
	Ethnicity			Based on snz_ethnicity_grp indicators (=1). Ethnicities are mutually inclusive
	Any/total number of children linked to by age 17			Link snz_uid to child via parent 1 parent 2 identifiers
	Regional Council of residence in at age 17		address_notification	Used as a set of regional council fixed effects
	NZDEP (2018) score/percentile of residential	metadata	DepIndex2018_MB2018	Scores and quintiles
Education	Any/number of suspensions, stand-down, or truancy related interventions recorded by age 17	moe_clean	student_intervention	
	Record/s of leaving school before the age of 17 due to continues absence, exclusion, or expulsion		student_leaver	Based on values from the variable *reason_leaving*
	Had any/L.2 or above secondary school qualification by age 17		student_qualification	moe_sql_nqf_level_code, linked to the MOE metadata qualification table, including only 1-3 NZQF qualification (including international qualification with equivalent levels).
Health	Recorded any Potentially Avoidable or Ambulatory Sensitive (PAH/ASH) events by age 17	moh_clean	pub_fund_hosp_discharges_event; pub_fund_hosp_diag	Final indicator is cleaned using the restrictions from the Oranga Tamariki Child Wellbeing model
	Recorded any chronic condition events by age 17		chronic_condition	moh_chr_first_incidnt_date is used to capture dates
	Recorded any/total Mental Health and/or Substance Abuse (MHSU) events by age 17		pub_fund_hosp_discharges_event; pub_fund_hosp_diagpharmaceutical; PRIMHD	Final indicator is cleaned following the business rules set by the Oranga Tamariki Child Wellbeing model

Care and Protection	Recorded any/total C&P Family Group Conferences references by age 17 Any/total Reports of Concern events by age 17 C&P Placement at different age milestones First age in C&P placement Total days in C&P placements by the age of 17	cyf_clean	cyf_ev_cli_fgc_cys_f, cyf_ev_cli_fgc_cys_f cyf_intakes_events, cfi_intakes_detailes cyf_placements_events, cyf_placement_detailes	Dummy variables equal to one if placement overlapped with birthday in each year between 10 and 15. Dummy variables also created to capture spells that overlapped with first, third, sixth, ninth, and eleventh month at ages 15 and 16. Only including placements business area code equal to CNP in in table cyf_placements_details) Age in months
Justice	Any/total police victimisation events by age 17 Any/total police offending events by age 17	pol_clean	pre_count_victimisations pre_count_offenders	Based on the date from pol_prv_earliest_occ_start_date Based on the date from pol_pro_earliest_occ_start_date

Note: for the Difference-in-Difference (DiD) estimation, all count variables are logged (natural log). Counts of zero are set to -999, and when estimated, the (logged) count variables included alongside the 'any incident' (dummy variable) flags.

Appendix B – Placement trends

This appendix provides more information about the (C&P) placement histories of the sample population. Table B1 present the average age rangatahi recorded in their first C&P placement. This is shown for the entire sample, and by cohort/treatment status. Overall, the average age first entering placement was 9 years and 10 months. Across cohorts, first age at placement varied by as much as 3 months (from 9 years and 8 months for the *Full* cohort to 9 years and 11 months for the *Pre*), while first placement for rangatahi from the treatment group was on average 6 month older (10 years compared with 9 years and 6 months). Rangatahi from the *Full* cohort (regardless of treatment status) tend to be (2-4 month) younger when recording first placement.

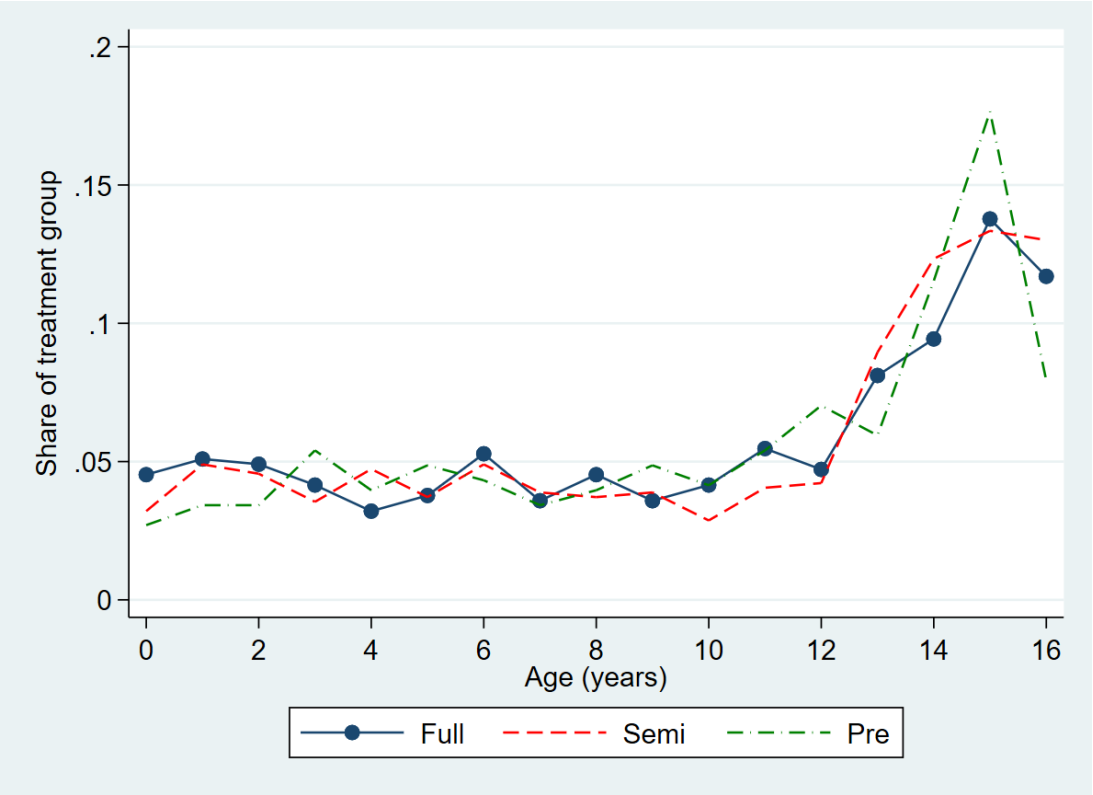
Table B1 – Average age first recording C&P placement (Year.Month)

Group / Cohort	Pre	Semi	Full	**Total**
Control	9.8	9.6	9.5	9.6
Treatment	10.2	10.1	9.10	10
Total	9.11	9.10	9.8	9.10

Figure B1 presents the share of treated rangatahi (by cohort) who recorded first entry by age (in years). All cohorts show similar shares until about the age of 11, with increased shares at older ages, especially between the ages of 14 and 16. The Pre cohort records a spike in shares at age 15 (about 4 percentage points (pp) greater than other cohorts), and a lower share at age 16 (4-6pp less).

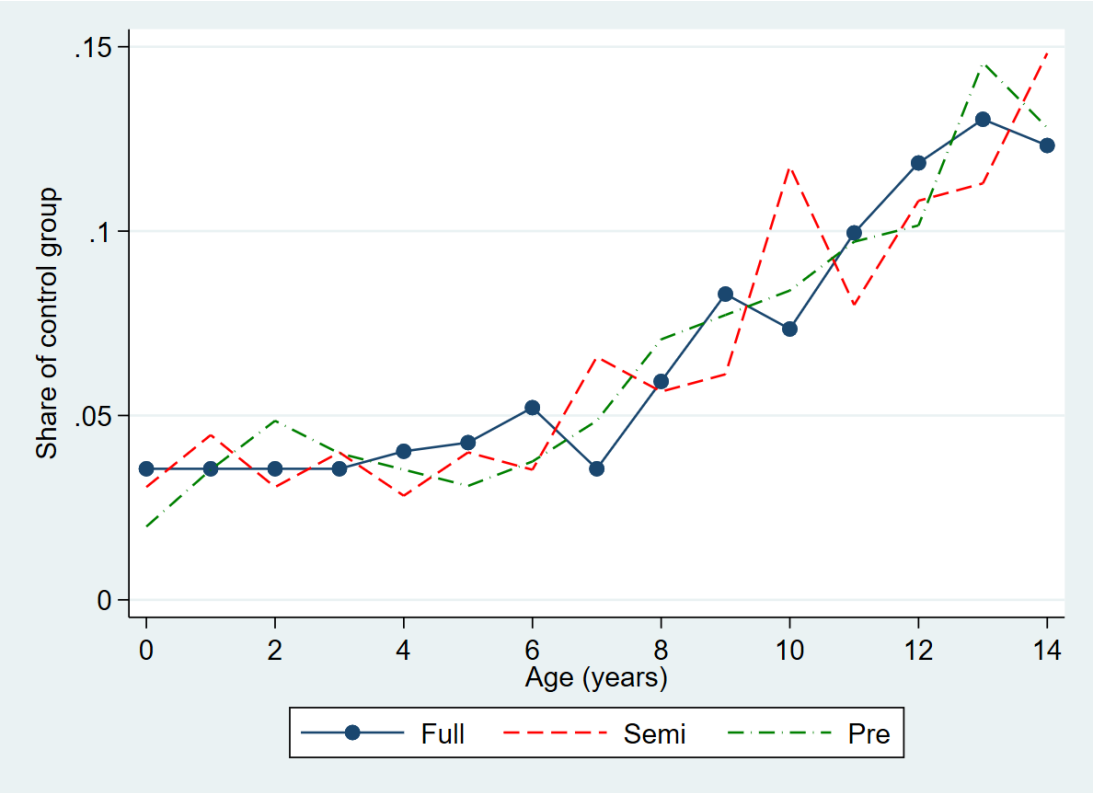
Figure B2 presents the same distribution but for rangatahi from the control group. For this group, the differences are not as large at the higher ages (14-16), with all cohorts recording relatively large entry to placement at age 14 (around 13-15% of the sample).

Figure B1 – Age (years) at first C&P placement, % of treatment group



Notes: Shares are based on randomly rounded counts in accordance with Statistics New Zealand's confidentiality requirements.

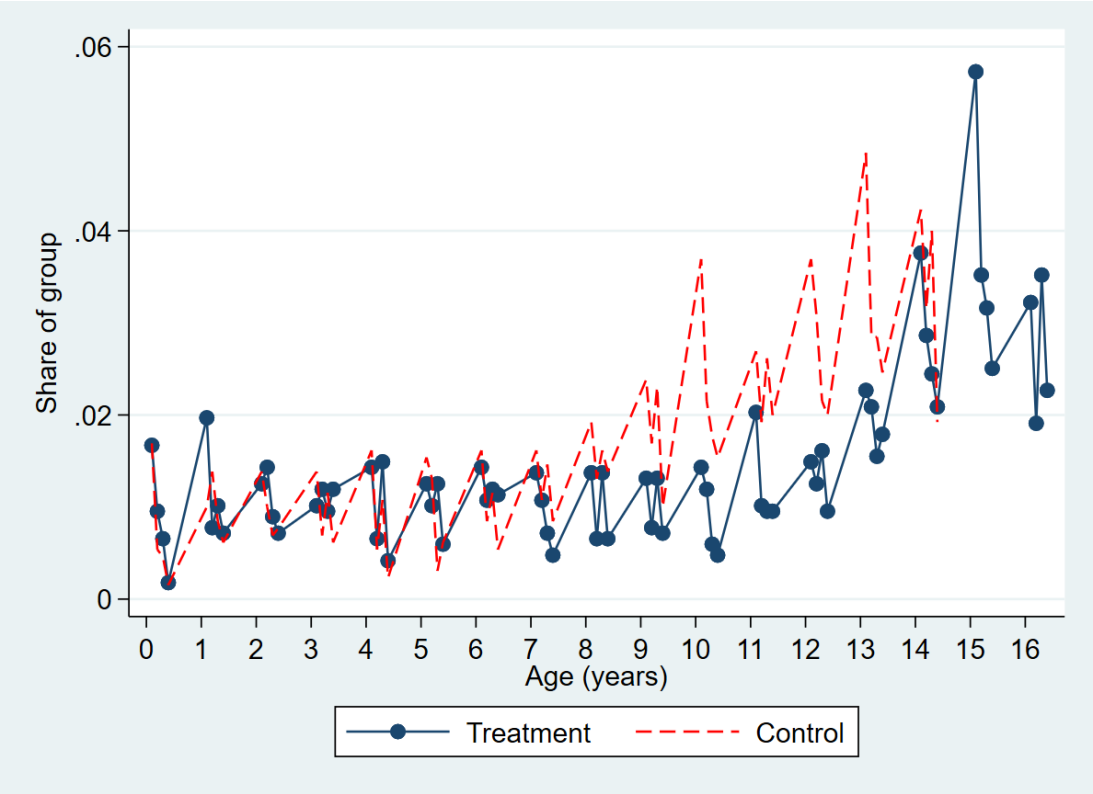
Figure B2 – Age (years) at first C&P placement, % of control group



Notes: Shares are based on randomly rounded counts in accordance with Statistics New Zealand's confidentiality requirements.

Examining this more closely, Figure B3 presents the share of the control and treatment group (all cohorts combined) by the year and quarter rangatahi recorded their first C&P placement. Both groups show similar distribution until the age of 15. While the shares from the control group that recorded placement at ages 9-10 is somewhat larger, both groups maintain the pattern of increasing shares with age. Over 25% of rangatahi from the treatment group entered placement for the first time between the ages of 15-16, mainly in the first four months of age 15. On the other hand, the control group does not include any entries at the ages of 15-16 (by definition).

Figure B3 – Year/Quarter recording first placement



Notes: Shares are based on randomly rounded counts in accordance with Statistics New Zealand's confidentiality requirements.

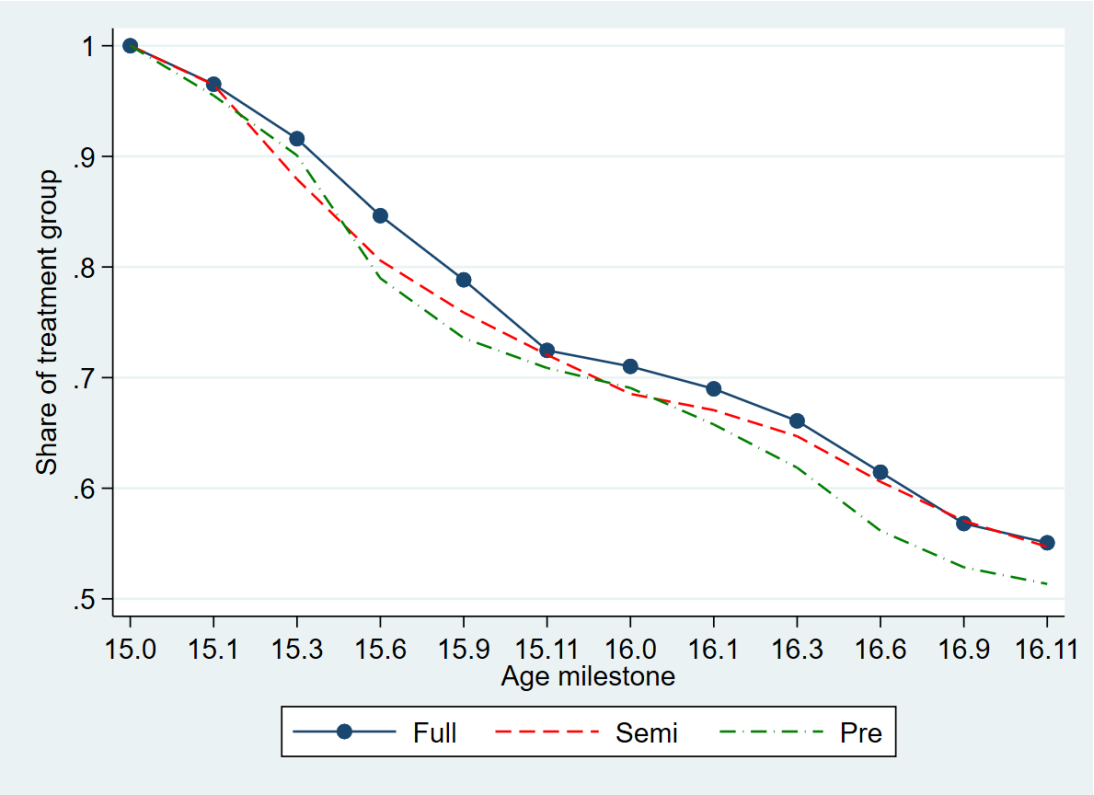
Focusing on rangatahi from the treatment group who recorded placement at age 15 (about 60% of the entire treatment group), Figure B4 presents the share in placement in any subsequent milestone.[48] For example, by construction 100% of the sample was in placement at age 15, while this share dropped to 97% for those who remained in placement at age 15 and 1 month.

The figure suggests a gradual reduction, with about half of the initial sample exiting placement by age 16 and 11 months. During the age of 15, exit from care for rangatahi from the *Full* cohort was less common than for the two cohorts. From age 16, the rate of decline for rangatahi from the *Pre* cohort was steeper. Speculatively, this may be a result of announcing RAC in advance (i.e., months before

[48] Note that this figure excludes re-entries i.e., a rangatahi is removed from the sample once left (even if returned at a later milestone).

implementation), which in turn incentivised rangatahi from the *Semi* and *Full* cohorts to remain in placement for longer.

Figure B4 – Rangatahi in placement by age milestone (treatment group)



Notes: Shares are based on randomly rounded counts in accordance with Statistics New Zealand's confidentiality requirements.

To distinguish between long-term spells versus shorter spells of exits and re-entries, the entry and exit rates for each cohort from the treatment group were calculated as:

$$Entry_t = \frac{\#entered_t}{0.5 * (\#Placement_t + \#Placement_{t-1})}$$

$$Exit_t = \frac{\#exited_t}{0.5 * (\#Placement_t + \#Placement_{t-1})}$$

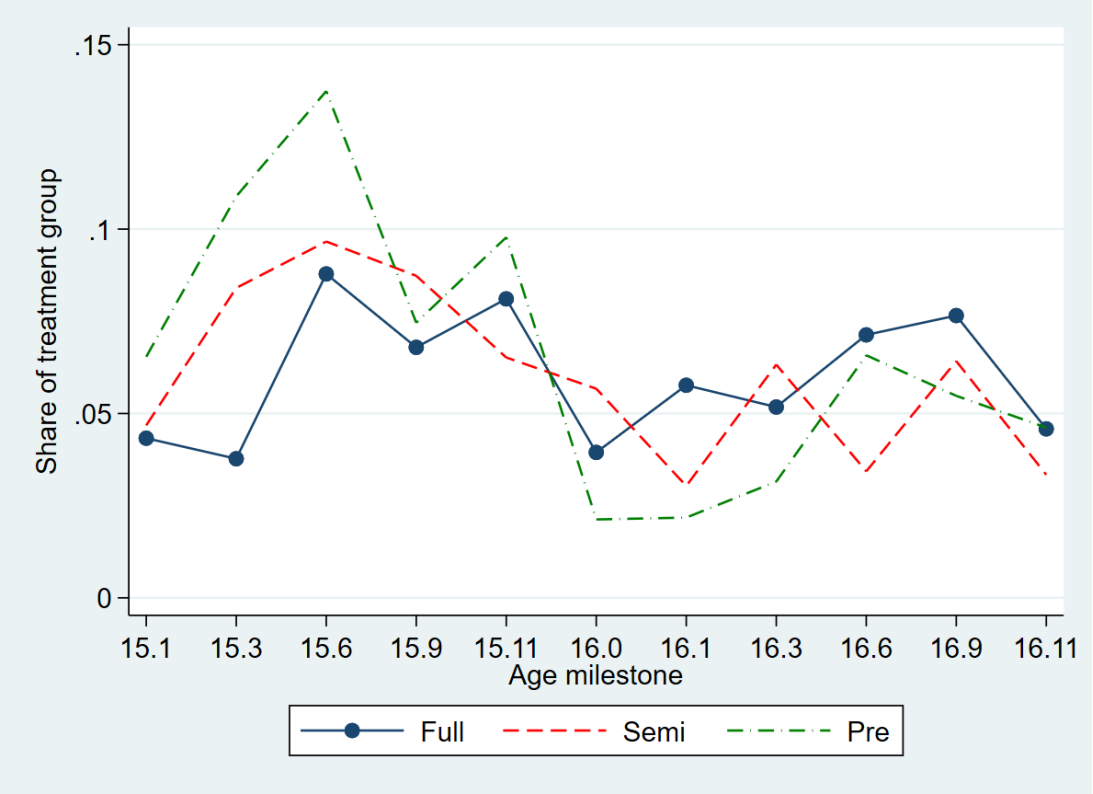
In each milestone, the entry rate captures the number of rangatahi who entered placement (i.e., in placement at milestone t, but not t-1) as a share of the entire placement cohort during that milestone, and the previous. Similarly, the exit rate captures the number of rangatahi that left placement (in placement at milestone *t-1,* but not in *t*) as a share of the placement population (mean of entire cohort in periods t and t-1).[49] Rates are calculated for each cohort separately.

Figure B5 presents the *entry* rate for the three cohorts. Overall, entries represent only about 10% of the overall (i.e., pre-existing) placement population. That is, the

[49] For example, if the placement population for cohort *Pre* was 120 in period t-1, 80 in period t, and 20 rangatahi entered placement in period t, then the entry rate will be (20/(0.5*(80+120)) =) 20%.

majority of rangatahi were in placement during multiple milestones (i.e., longer-term spells). Furthermore, entries become less likely as rangatahi approach the age of 17. The figure also shows a relatively greater entry rate for the *Pre* cohort during the age of 15, and a somewhat lower rate in most milestones at 16. Overall, entry rates for the *Pre* cohort were larger than for the other cohorts with a rate of 6.7% (compared with 6%), suggesting a greater proportion of this cohort is from rangatahi with shorter spells. Finally, the figure shows a somewhat greater entry rate for the *Full* cohort at age 16 and 6-9 months.

Figure B5 – Entry rate by age milestone and cohort (treatment group only)

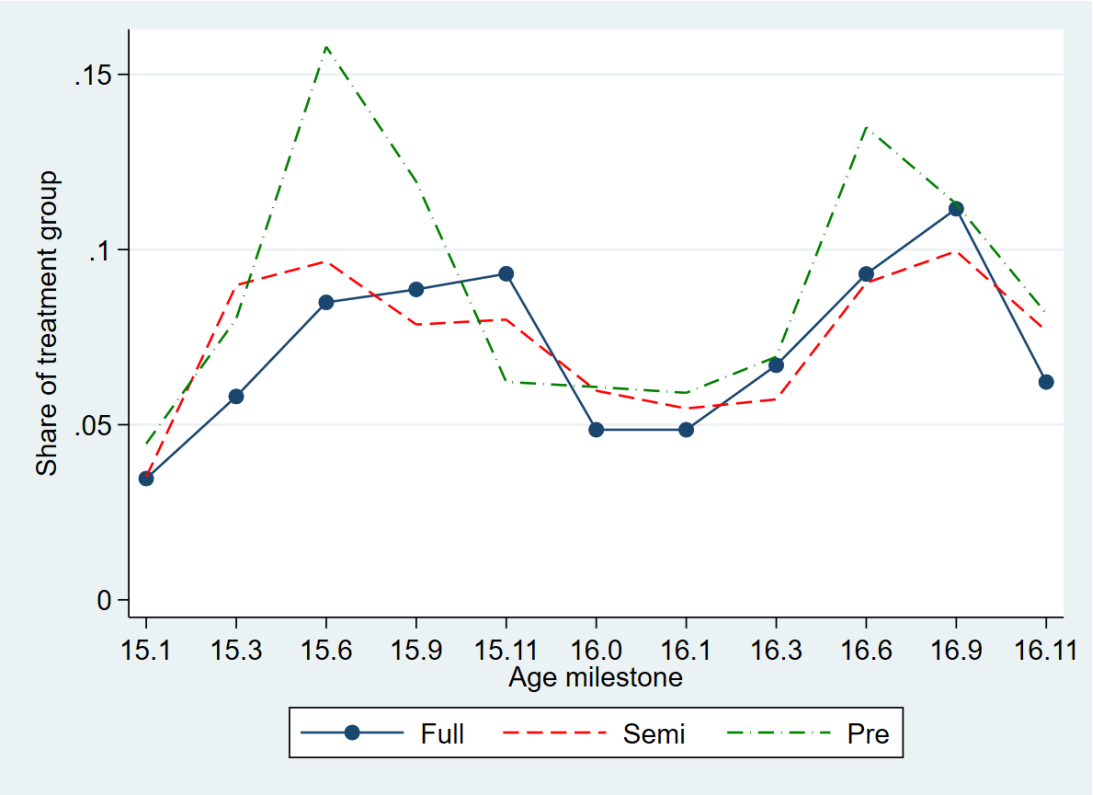


Notes: Shares are based on randomly rounded counts in accordance with Statistics New Zealand's confidentiality requirements.

Figure B6 presents the *exit* rate for the three cohorts. The figure shows spikes for the *Pre* cohort at 15 and 6 months (15%) and 16 and 6 months (14%). This rate was 50-76% greater than recorded for the other two cohorts at age 15 and 6 months, and about 55% at age 16 and 6 months. In all other milestones, differences were not as large. Overall, the (unweighted) mean exit rate across these age milestones was 9.1% in the *pre* cohort, compared to 7.2-7.4% for the *Semi* and *Full* cohorts.

Finally, since the exit rates for cohorts were greater than entry rates, the size of the placement population fell by age milestone. For the *Pre* cohort, the *net* entry rate (entry rate minus exit rate) was about twice the rate for the other two cohorts (-2.4pp compared with -1.4pp and -12pp for the *Semi* and *Full* cohorts, respectively). This suggests that the sharper reduction in the share of cohort in placement for the *Pre* cohort in Figure 1 was more likely to be driven by a greater exit rate, rather than a lower entry rate.

Figure B6 – Exit rate by age milestone and cohort (treatment group only)



Notes: Shares are based on randomly rounded counts in accordance with Statistics New Zealand's confidentiality requirements.

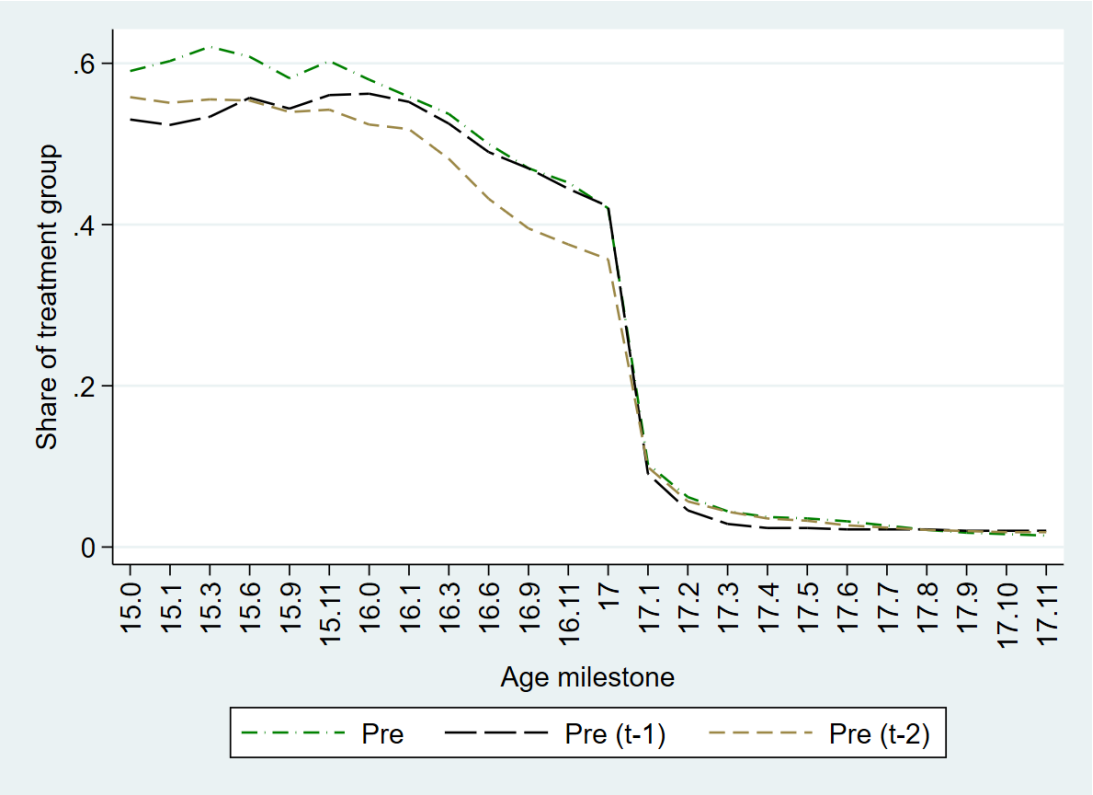
To test whether the greater net exit rate for the Pre cohort is *typical*, rather than due to sampling variations, the placement histories of rangatahi who turned 17 between April 2014 and March 2015 (one year older than the rangatahi from the *Pre* cohort), and for rangatahi who turned 17 between April 2013 and March 2014 (two years older than the rangatahi from the *Pre* cohort) were examined.[50]

Figure B7Figure B7 presents the share of rangatahi from the treatment group's *Pre* cohort as well as these two older cohorts (*pre*, *pre_1*, and *pre_2*). The figure shows that despite the cohorts having different shares at various age milestones, they all follow the same trajectory which includes a relatively stable share of rangatahi in placement throughout the age of 15, decline during the age of 16, and a sharp decline to nearly no rangatahi in placement from age 17.

This suggests that the decline in placements for the *Pre* cohorts observed in Figure 1 is not likely to be due to sampling variation, but rather reflects a more *typical* trajectory for rangatahi in placement in periods preceding the (and announcement and) implementation of RAC. Again, this is in line with the discussions leading to the introduction of RAC, which suggested that RAC would incentivise rangatahi in placement at ages 15-16 to remain in placement for longer periods.

[50] These sample follow the same restrictions as applied to the study's cohorts and treatment groups.

Figure B7 – Rangatahi in placement at different ages as a % of cohort (treatment group)



Notes: All cohorts include rangatahi from the treatment group. *Pre* cohort includes rangatahi that turned 17 between April 2015 and March 2016. *Pre_1* cohort includes rangatahi that turned 17 between April 2014 and March 2015. *Pre_2* cohort includes rangatahi that turned 17 between April 2013 and March 2014. Shares are based on randomly rounded counts in accordance with Statistics New Zealand's confidentiality requirements.

Appendix C – Additional tables

Table C1 – Mean value for a selection of control variables, control group

Characteristic (share of cohort (unless stated otherwise)	Pre	Semi	Full
Female	0.494	0.438	0.521
Māori	0.587	0.582	0.582
Pacific Peoples	0.150	0.171	0.171
Any children	0.038	0.048	0.027
NZDEP18 score	1,090	1,096	1,093
Educational qualifications: any	0.381	0.473	0.404
Educational qualifications: L.2 or above	0.162	0.212	0.178
Any school interventions	0.719	0.705	0.719
Left school before age 17	0.056	0.082	0.082
Any PAH/ASH events	0.431	0.466	0.425
Diagnosed with Chronic Condition/s	0.044	0.048	0.048
Any MHSU service use	0.644	0.685	0.664
Age at first placement (months)	116	115	113
Total days in placement, 0-17	794.63	793.12	837.3
Number of Reports of Concern relating to rangatahi	9.6	9.9	10.4
Number of Family Group Conference referrals	2.1	2.2	2.3
Any Police Victimisation events	0.119	0.240	0.336
Any Police Offence events	0.550	0.521	0.479
Subject of any UBC/OB spells	0.469	0.507	0.541

Notes: All figures are at, or by the time the rangatahi was 17. Educational qualification includes qualification gained in secondary school. Shares and counts are based on randomly rounded counts in accordance with Statistics New Zealand's confidentiality requirements.

Table C2 – Mean value for the outcome variables between the ages of 17 and 18, control group

Outcome (share of cohort unless stated otherwise)	Pre	Semi	Full
W&S: any income	0.431	0.438	0.493
W&S: months receiving income	4.7	4.7	5.3
W&S: total income	3550.6	3837.2	4365.5
Main benefit: any income	0.306	0.253	0.281
Main benefit: months receiving income	3.5	2.9	3.0
Main benefit: total income	2464.1	2017.2	2060.4
Subject of any UBC/OB spell	0.156	0.219	0.199
Any children	0.056	0.048	0.048
Educational qualifications: any	0.613	0.671	0.589
Educational qualifications: L.2 or above	0.469	0.555	0.473
Any PAH/ASH events	0.019	0.014	0.014
Any MHSU service use	0.287	0.267	0.295
Any Police Victimisation events	0.094	0.110	0.110
Any Police Offence events	0.281	0.247	0.240
Any correction sentences	0.100	0.075	0.068

Notes: Shares and counts are based on randomly rounded counts in accordance with Statistics New Zealand's confidentiality requirements.

Table C3 – Mean value for the outcome variables between the ages of 18 and 20, control group

Outcome (share of cohort unless stated otherwise)	Pre	Semi	Full
W&S: any income	0.044	0.048	0.034
W&S: months receiving income	0.2	0.2	0.2
W&S: total income	14945.1	19133.5	17282.4
Main benefit: any income	0.688	0.671	0.740
Main benefit: months receiving income	14.1	13.1	14.7
Main benefit: total income	9451.6	7915.3	10719.7
Any days enrolled in public Tertiary Educational institutions	0.531	0.452	0.432
Educational qualifications: any	0.656	0.719	0.616
Educational qualifications: L.2 or above	0.519	0.610	0.514
Educational qualifications: L.4 or above	0.056	0.048	0.055
Any PAH/ASH events	0.019	0.021	0.034
Any MHSU service use	0.287	0.288	0.281
Any Police Victimisation events	0.175	0.185	0.164
Any Police Offence events	0.369	0.329	0.301
Any correction sentences	0.213	0.171	0.144

Notes Shares and counts are based on randomly rounded counts in accordance with Statistics New Zealand's confidentiality requirements. Health related outcomes are between the ages of 18 and 19. Highest qualification gained outcomes are by the age of 19.

Table C4 – Sample mean by ethnic group (all cohorts and treatment status combined)

Outcome (share of cohort unless stated otherwise)	Entire sample	Māori	Pacific Peoples	Non-Māori-Pacific Peoples
Age 17-18				
W&S: any income	0.429	0.407	0.368	0.483
W&S: months receiving income	4.6	4.3	4.0	5.2
W&S: total income	3341.5	2794.8	2901.5	4346.9
Main benefit: any income	0.369	0.375	0.335	0.384
Main benefit: months receiving income	4.1	4.2	3.7	4.3
Main benefit: total income	2781.2	2799.7	2484.3	2994.7
Subject of any UCB/OB spells	0.135	0.150	0.135	0.111
Any children	0.047	0.056	0.045	0.036
Educational qualifications: any	0.596	0.583	0.594	0.628
Educational qualifications: L.2 or above	0.467	0.458	0.477	0.489
Any PAH/ASH events	0.021	0.021	0.045	0.015
Any MSHU service use	0.362	0.354	0.323	0.396
Any Police Victimisation events	0.132	0.126	0.110	0.147
Any Police Offence events	0.323	0.367	0.297	0.258
Any correction sentences	0.121	0.154	0.129	0.072
Age 18-20				
W&S: any income	0.051	0.058	0.039	0.045
W&S: months receiving income	0.3	0.3	0.2	0.2
W&S: total income	14236.7	12404.2	13625.1	17516.3
Main benefit: any income	0.763	0.793	0.703	0.742
Main benefit: months receiving income	15.5	16.3	13.8	14.9
Main benefit: total income	10611.4	11134.2	9213.4	10364.0
Any days enrolled in public Tertiary Educational institutions	0.469	0.458	0.445	0.508
Educational qualifications: any	0.640	0.628	0.626	0.676
Educational qualifications: L.2 or above	0.516	0.507	0.516	0.538
Educational qualifications: L.4 or above	0.055	0.048	0.045	0.072
Any PAH/ASH events	0.022	0.023	0.039	0.015
Any MSHU service use	0.352	0.349	0.284	0.381
Any Police Victimisation events	0.221	0.223	0.187	0.222
Any Police Offence events	0.379	0.428	0.335	0.303
Any correction sentences	0.230	0.274	0.219	0.156

Notes: Shares and counts were randomly rounded with accordance to Statistics New Zealand's confidentiality requirements. Health related outcomes are between the ages of 18 and 19. Highest qualification gained outcomes are by the age of 19.