

**An Examination of the Duration of Child Care Subsidies in Rhode Island:
Impacts of Policy Changes and Cross State Comparisons**

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Executive Summary

We examine the duration of child care subsidies in Rhode Island using three entry cohorts: (1) a cohort of 2,814 families that began receiving child care subsidies between June and November 1996, (2) a cohort of 2,893 families that began receiving child care subsidies between June and November 1997 and (3) a cohort of 3,831 families that began receiving child care subsidies between June and November 2000.

Using the 1996 entry cohort, we examine the dynamics of subsidy use over a seven-year period. We find considerable cycling on and off child care subsidies around the beginning and end of the school year. This cycling may also be related to seasonal employment patterns. An examination of the probability that a family will exit child care in any given month shows clear patterns of exit related to the way in which the child care subsidy program is administered (i.e., re-determination requirements) and to the school year. Using Kaplan-Meier estimates, we find that the median duration of child care subsidies in Rhode Island during the period of our study is 9 months and the mean duration is 13 months. Fifty percent of families in the 1996 entry cohort have two or more spells of child care subsidies during our seven-year follow-up period.

We find that the duration of child care subsidies differs significantly depending on (1) whether a family qualifies for subsidies because of low income or cash assistance receipt, (2) the level of family income, (3) the age/school status of the youngest child in the family, (4) the number of children receiving subsidies in the family and (5) the family's place of residence. Specifically, families that are never observed on cash

assistance receive child care subsidies for significantly longer periods than families that are current or former cash recipients (median duration of 12 months for those never on cash and 9 months for current and former cash recipients). Families with incomes greater than 125% of the Federal Poverty Level (FPL) receive child care subsidies for significantly longer periods than families with incomes less than or equal to 125% of FPL (median duration of 11 months for the higher-income families and 9 months for the lower-income families). Families with younger children receive child care subsidies for significantly longer periods than families with older children, particularly families that have only school-age children. The estimated median duration of child care subsidies for a family whose youngest child is less than age 3 is 10 months, while the median duration for a family whose youngest child is of school age is only 6 months. The estimated median duration of child care subsidies is significantly longer for families with more than one child in subsidized care than for families with only one subsidized child. The duration of child care subsidy spells is shortest in Central Falls and longest in Providence (median duration of 7 months in Central Falls and 10 months in Providence).

To estimate the impact of Rhode Island's adoption of an entitlement to child care in May 1997, we compare child care continuation rates (technically known as "survival rates") for the first spell of child care receipt for the 1996 entry cohort (this cohort entered before child care subsidies were an entitlement) and the 1997 entry cohort (this cohort entered one month to six months after child care subsidies became an entitlement), using a 72-month follow-up period. We find that families in the 1997 entry cohort received child care subsidies for significantly longer periods than families in the 1996 entry cohort. However, the increased duration appears to result from the welfare

reform package as a whole, rather than only from the entitlement to child care subsidies.

To estimate the impact of Rhode Island's increases in reimbursement rates and eligibility expansions that occurred between January 1998 and January 2000, we compare continuation rates¹ for the first spell of child care receipt for the 1997 entry cohort (this cohort entered before these policy changes) and the 2000 entry cohort (this cohort entered 6 months to 11 months after the policy changes), using a 36-month follow-up period. We find that the duration of child care subsidies for the 2000 entry cohort does not differ significantly from the duration of child care subsidies for the 1997 entry cohort. It is possible that Rhode Island's increases in reimbursement rates and eligibility expansions would have increased the duration of child care subsidies if the economy of the 2000-2003 period (the follow-up period for the 2000 cohort) had been as buoyant as the economy of 1997-2000 (the follow-up period for the 1997 cohort).

Finally, using the first spell of child care subsidies for the 1997 entry cohort and a 24-month follow-up, we compare the duration of child care subsidies in Rhode Island with the duration of child care subsidies in five other states. We find that Rhode Island has substantially longer periods of child care subsidy receipt than the other five states. For example, the median duration of child care subsidies for the 1997 Rhode Island entry cohort is 10 months, while Meyers, et al. (2002) report a median duration of child care subsidy receipt in Massachusetts for entrants between October 1996 and September 1998 of only 5 months. Rhode Island also appears to have a much larger number of families who continue to receive child care subsidies for an extended period

¹ In the technical literature continuation rates are referred to as "survival rates." The reason for the term survival rate is that these types of analyses are used extensively in medical research, where the survival of patients is a primary concern.

of time. For example, while 25% of families in the 1997 Rhode Island entry cohort had periods of subsidy receipt which exceeded 20 months, Meyers, et al. (2002) report that 25% of Massachusetts families had durations of subsidies that exceeded 11 months.

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In this report, we examine the duration of child care subsidies in Rhode Island using three different entry cohorts: (1) a cohort of 2,814 families that began receiving child care subsidies during the 6-month period between June and November 1996, (2) a cohort of 2,893 families that began receiving child care subsidies during the 6-month period between June and November 1997 and (3) a cohort of 3,831 families that began receiving child care subsidies during the 6-month period between June and November 2000.

The 1996 entry cohort allows us to examine the dynamics of subsidy use over a seven-year period. Most of the research on subsidy duration to date has used far shorter follow-up periods, most frequently 24 months. Our long follow up allows us to observe both very long periods and multiple periods of child care subsidy usage.

To preview our results, we find considerable cycling on and off child care subsidies around the beginning and end of the school year. This cycling may also be related to seasonal employment. We find that families frequently end child care subsidies during the month after they are required to recertify their eligibility and after receiving subsidies for 3, 9 and 10 months. Three-month spells of subsidies are often related to summer child care, and 9 and 10 months of care often relate to care during the school year. Using Kaplan-Meier estimates, we find that, for the 1996 cohort, the median duration of child care subsidies is 9 months and the mean duration is 13 months. Fifty percent of families in the 1996 entry cohort have two or more spells of child care subsidy receipt during the seven-year follow-up period.

The 1996 entry cohort began receiving child care subsidies a year before Rhode Island established an entitlement to child care subsidies as part of its May 1997 welfare reform package. The 1997 entry cohort began receiving child care subsidies 1 to 6 months after the entitlement to child care subsidies and other portions of Rhode Island's welfare reform were in force. We compare the duration of child care subsidies for these two cohorts to discern if Rhode Island's welfare reform impacted the duration of subsidies. We find that the duration of subsidies for the 1997 cohort was substantially longer than the duration of subsidies for the 1996 cohort. To discern if the impact was due to the entitlement to child care or to other aspects of Rhode Island's welfare reform, we compared the continuation (survival) curves before and after welfare reform for (1) current and former cash assistance recipients and (2) for families that were never observed on cash assistance. While the duration of child care subsidies for both groups is longer after welfare reform, the difference in duration is only significantly different for current and former cash assistance recipients. We interpret these results as indicating that it was Rhode Island's welfare reform as a whole that increased the duration of child care subsidies, not just the entitlement to child care subsidies.²

The 1997 entry cohort began child care subsidies before Rhode Island substantially increased its reimbursement rates for child care subsidies and before the state expanded eligibility for child care subsidies. The 2000 entry cohort began child care subsidies 6 to 12 months after these reforms were completed. We compare the

² Probably the most important features of Rhode Island's welfare reform contributing to the increased duration of child care subsidies were the elimination of time limits on income disregards, elimination of the requirement that to receive cash assistance at least one parent in two-parent families had to be unemployed or disabled (which increased the number of two-parent families participating in the program), creation of a job placement and retention unit to increase duration of employment and imposition of a 60-month time limit on cash assistance receipt. For additional information about the package of welfare reform changes undertaken by Rhode Island as part of its welfare reform program, please see Witte, Queralt & Tauchen (2001).

duration of child care subsidies for these two cohorts to discern if these policy changes impacted the duration of subsidies. We find no significant difference in the duration of subsidies for the 1997 cohort and the 2000 cohort. Interpretation of this finding is difficult because the economy was substantially more buoyant during the follow-up period for the 1997 cohort (1997-2000) than during the follow-up period for the 2000 cohort (2000-2003).

To place the duration of child care subsidies in perspective, we compare the duration of subsidies in Rhode Island to the duration of subsidies in five other states. We find that Rhode Island has substantially longer durations of child care subsidies than the other states.

This report is structured as follows. The Executive Summary included at the beginning presents a comprehensive summary of our findings. In section 1, we describe the setting of the study. Section 2 describes the data. Section 3 contains a discussion of the duration of child care subsidies in Rhode Island. This discussion includes comparisons of the duration of child care subsidies for different groups of families. Section 4 contains our analysis of the impacts of Rhode Island's policy and administrative changes. In Section 5, we compare the duration of child care subsidies in Rhode Island to the duration of child care subsidies in five other states. The final section contains our conclusions.

1. THE SETTING – STATE OF RHODE ISLAND

According to the 2000 Census, the Rhode Island population is 82% non-Hispanic/non-Latino white, 8.7% of Hispanic/Latino origin (of any race), 4.5% black or African American, and 2.3% Asian. American Indians, Alaska natives, native Hawaiians, and Pacific Islanders comprise less than 1% of the Rhode Island population (U.S.

Bureau of the Census, 2002). Compared to their proportion in the State population, a disproportionate numbers of Hispanics and blacks receive child care subsidies in Rhode Island. For example, in April 2001, among those receiving child care subsidies for whom there was racial or ethnic background information in the Department of Human Services (DHS) administrative files (i.e., 84% of child care subsidy recipients), 52% were white, 32% were Hispanic, 17% were black, and 1% were Asian or Pacific Islanders.

According to the 2000 Census, the 1999 poverty rate in Rhode Island for individuals of all ages was 11.9%, somewhat under the 12.7% poverty rate for the U.S. population. For children, the poverty rate in Rhode Island in 1999 was 16.5%, compared to 20.5% poverty rate for children in the U.S. population. However, poverty in Rhode Island is highly concentrated in the core cities, particularly in Providence, Central Falls, Pawtucket, Woonsocket, and Newport. Census 2000 data revealed a poverty rate (among children under age 18) of 40.8% in Central Falls, 40.1% in Providence, 31.3% in Woonsocket, 24.5% in Pawtucket, and 23.8% in Newport (U.S. Bureau of the Census, 2002).

According to the 2000 census, median household income in 1999 in Rhode Island was \$42,090, compared to \$40,816 for the U.S. as a whole. In 2000, 78% of the Rhode Island population 25 years of age and over were high school graduates, and 25.6% were college graduates (U.S. Bureau of the Census, 2002). In contrast, among heads of household in families receiving child care subsidies in Rhode Island in April 2001, for example, only 52% had a high school education and only 23% had some education beyond high school.

2. THE DATA

We use a number of data sets to examine the duration of child care subsidies in Rhode Island, to provide evidence of the impacts of Rhode Island's child care subsidy policy and administrative changes between 1997 and 2004 on the duration of child care subsidy receipt and to compare the duration of subsidies in Rhode Island to the duration of subsidies in other states. To be more specific, we use three different entry cohorts. The first cohort, the 1996 entry cohort, began receiving child care subsidies between June 1996 and November 1996. The second entry cohort, the 1997 entry cohort, began receiving subsidies between June 1997 and November 1997 and the third entry cohort, the 2000 entry cohort, began receiving child care subsidies between June 2000 and November 2000.

We use the 1996 entry cohort to examine the pattern of child care subsidies over a long period of time, and we use it as a control group to evaluate the impact of Rhode Island's entitlement to child care. This 1996 entry cohort entered the child care subsidy program before child care subsidies became an entitlement in May of 1997. We use the first spell of subsidies for this group to evaluate the impact of the May 1997 establishment of an entitlement to child care subsidies. The 1996 cohort also allows us to follow families' use of child care subsidies for an extended period of time (i.e., 7 years through June of 2003). Such long term follow up for child care subsidy usage, as far as we are aware, has not previously been carried out.

We use the 1997 entry cohort as our treatment group to evaluate the impact of an entitlement to child care subsidies. We also use this cohort as our control group to evaluate the increases in reimbursement rates that began in January 1998, the expansions of age eligibility (namely, from age 12 to age 14 in January 1999 and to age

15 in July 1999) and the expansions of income eligibility (i.e., from 185% of FPL to 200% of FPL in January 1999 and to 225% of FPL in July 1999) and to compare subsidy duration across six states. Child care subsidies were an entitlement when this cohort began receiving child care subsidies, but they began their spell of subsidy receipt prior to large increases in reimbursement rates and eligibility expansions. The period of subsidy entrance for the 1997 entry cohort coincides rather well with the entry dates for the five-state cohorts studied by Meyers and her colleagues (2002).

We use the 2000 entry cohort as our treatment group to evaluate the impact of large increases in reimbursement rates and eligibility expansions and to provide an examination of the duration of child care subsidies during a period of very uneven economic growth. Rhode Island completed its major increases in reimbursement rates in January 2000. Eligibility expansions were completed in 1999. Thus, this cohort should show the full impact of the large reimbursement rate increases that occurred between January 1998 and January 2000. As we have shown previously, the reimbursement rate increases greatly increased the availability of subsidized child care in Rhode Island (Witte & Queralt, 2002). In addition, the period from June 2000 through June 2003 includes both a period of economic growth and recession. As far as we are aware, the duration of child care subsidies during such a period has not previously been studied.

We began our data work by selecting the three cohorts, using monthly snapshots of administrative data on child care subsidy recipients for May 1996 through November 1996, for May 1997 through November 1997 and for May 2000 through November 2000. The 1996 cohort consists of 2,814 families, the 1997 cohort consists of 2,893 families and the 2000 cohort consists of 3,831 families.

Table 1 gives the number of families beginning child care subsidies in each month. As can be seen in this table, there is a seasonal pattern to subsidy entrance. For all cohorts, the largest number of families begin subsidies in September, which coincides with the beginning of the school year in Rhode Island. A relatively large proportion of the cohorts also begin subsidies in June, which coincides with the end of the school year and the beginning of the prime tourist season. This is also high season for the marine industry (i.e., fishing and boating) in Rhode Island.

To obtain information on all periods of subsidy receipt, we next cycled through monthly snapshots of administrative data on all child care subsidy recipients. For the 1996 cohort, we cycled through files for the period June 1996 through June 2003. For the 1997 cohort, we cycled through files for the period June 1997 through June 2003 and for the 2000 cohort we cycled through files for the period June 2000 through June 2003. We recorded the date that each spell of subsidy receipt began and the date that each spell of subsidy receipt ended. We also recorded the characteristics of the families (i.e., age of subsidized children, residential location, income and whether the family qualified for subsidies because of low income or because the family was receiving cash assistance).

On a preliminary basis we define a subsidy spell to end if the family is not on subsidies for one month or more. We do this for ease of comparison with Myers et al (2002). We also start with this definition to see the extent to which families miss only a single month of child care subsidies. Such single-month subsidy gaps often occur because of administrative issues and, hence, may be of interest to subsidy administrators.

For the 1996 cohort, we observed a total of 6,409 spells of subsidy receipt (5,921 completed spells and 488 additional spells that were still ongoing in June 2003). The median number of completed periods of subsidy receipt per family was 2. Thirty seven percent of the families in the 1996 cohort had a single completed period of subsidy receipt between June 1996 and June 2003; 27% of the families had two completed periods of subsidy receipt; 19% had three completed periods of subsidy receipt; 10% had four completed periods; 5% had five completed periods; 2% had six completed periods; 12 families had seven completed periods; three families had eight completed periods and three families had nine completed periods of subsidy receipt between June 1996 and June 2003.

The prevalence of multiple spells of subsidy receipt per family is important, particularly when interpreted in light of the seasonal pattern of entry seen in Table 1. This and other descriptive work reported below suggests that many families use child care subsidies seasonally rather than year round. For example, there is a group of families with only school-age children that use child care subsidies only during the summer months. There is also a group of families that only use child care subsidies during the school year.

The median duration of a completed period of subsidy receipt for the 1996 cohort was 8 months, and the mean duration was 12 months. We observe spells of child care subsidies as short as one month (3% of spells) and as long as 81 months (1 family). Almost 20% of the families in the 1996 cohort (488 families) were still receiving child care subsidies at the end of our study period (June 2003). We do not observe when the final spell observed for these families ends. Such spells are said to be "right

censored” and in the next section we use the Kaplan-Meier estimation technique to account for the right censoring of these spells.

The mean gap between periods of subsidy receipt for the 1996 cohort was 5 months, and the median gap was 10 months. Gaps between periods of subsidy receipt often are very short. Specifically, one fifth of the gaps for the 1996 cohort were of only one-month duration. Such short gaps are generally due to such things as administrative churning (e.g., a short period without subsidies due to a delay in paper work), family vacations or centers closing for a vacation period.³

The reader should note, however, that for the descriptive and analytic work that follows, we define a child care spell to be at an end if a family fails to appear in two consecutive monthly files of subsidy recipients. In this manner, we control for administrative churning and other short term factors associated with one-month gaps between periods of subsidy receipt. This definition of a child care spell is consistent with Rhode Island’s and most other states’ definitions for spells of cash assistance receipt.

3. DURATION OF SUBSIDIES

The 1996 cohort allows us to follow low-income families’ use of child care subsidies over a long period of time. As far as we are aware, previous studies of the duration of child care (e.g. Myers, et al., 2002; Lee, et al., 2004; Witte & Queralt, 1999; Witt, Queralt & Witte, 1999) covered a limited period (e.g., two years) and, thus, were not able to consider the long term pattern of child care subsidy usage that we observe in this study.

As noted in the previous section, for this and all subsequent work, we define a child care spell to be at an end if a family fails to appear in two consecutive monthly

³ One-month gaps occur most frequently in June, July, August, September and December.

files of subsidy recipients. As would be expected, when we require a two-month gap, rather than a one-month gap, for ending a period of subsidy receipt, the number of spells of child care subsidy receipt declines and the duration of completed spells increases. To be more specific, the number of spells of subsidy receipt for the 1996 cohort declined by 702 (from a total of 6,409 to a total of 5,707) when we moved from a one-month gap requirement to a two-month gap requirement for an exit from child care subsidies. Forty-two percent of families have a single period of subsidy receipt when two-month gaps are required, compared to 37% when only a single-month gap ends a period. However, the median number of periods of subsidy receipt remains at 2 under both the one-month and the two-month gap requirements. Both the median and mean duration of a completed period of subsidy receipt increase by one month when a two-month gap is required for the end of a period of subsidy receipt, compared to a one-month gap. Specifically, under the two-month gap requirement, the median duration of a completed period of subsidy receipt increases from 8 to 9 months, and the mean duration increases from 12 to 13 months.

Exit from the Child Care Subsidy Program

The timing of exit from the child care subsidy program has both seasonal patterns and patterns related to the way in which the subsidy program is administered. Exits are most likely to occur at the beginning and at the end of the school year and at the end of the calendar year.

Probabilities of Leaving Child Care Subsidies

Figure 1 gives the probability that a family receiving child care subsidies in Rhode Island will leave the subsidy program during each month of subsidy receipt we observe

(month one to month 81 of subsidy receipt).⁴ Child care subsidy recipients who are working (most recipients) are required to recertify their eligibility every six months. Cash assistance recipients in approved activities are often required to recertify their eligibility more frequently (e.g., every three months). As can be seen in Figure 1, the probability that a family receiving child care subsidies will exit the program ranges from 1% to 11%. The average probability of leaving subsidies is highest during the first year of subsidy receipt and at 71 months of subsidy receipt. The high probability of exiting subsidies at 71 months may be due to a child entering the first grade.

High probabilities of exit occur the month after a family is required to recertify its eligibility (e.g., months 7, 13, 19, 25, 31, 37). Low probabilities of exit occur after a family has recently entered the child care subsidy program (month 1 of receipt) and after a family has been recertified for child care (e.g., months 8, 14, 20, 26, 32, 38).

Figure 2 gives a more detailed look at the probability that a family receiving child care subsidies in Rhode Island will exit the subsidy program during the first two years of subsidy receipt. The substantial decline in the probability of exiting child care subsidies after the 13 month recertification peak is much clearer in this graph. Also, note the relatively high probabilities of exit after 9 and 10 months. These exits are probably associated with the end of the school year. The relatively high probability of exit at 3 months may be due to exit after summertime care by parents of school age children.

Comparisons Across Groups

To compare the child care subsidy usage patterns for different groups, we use the continuation (i.e., survival) rate. This is the likelihood that a family receiving child

⁴ This is called the hazard rate in the survival analysis literature, and we estimate the hazard rate using the Nelson-Aalen estimator of the cumulative hazard function. See Schmidt and Witte (1988) for a discussion of various types of survival models.

care subsidies in one month will continue doing so without a two-month gap. For these comparisons (Figures 3 through 9), we use the 1996 entry cohort. To correct for the fact that we do not observe the end of the child care subsidy spell for 488 families (i.e., these families are “right censored”), we use the Kaplan-Meier estimation technique.⁵

Low-Income Child Care versus Cash-Assistance Child Care

We use two different definitions to classify low-income and cash-assistance families receiving child care subsidies. The first definition classifies a family as receiving subsidies because of low income or because of cash assistance receipt on the basis of whether the family qualified for subsidies during the month under observation due to cash assistance receipt or due to low income. We refer to these two groups of families as **low-income** families and **cash-assistance** families. The second definition classifies a family as receiving subsidies because of low-income if the family always qualified for child care subsidies during the period June 1996 to June 2003 because of low income (i.e., the family during this period never received child care subsidies because of cash assistance receipt). This second definition classifies a family as receiving subsidies because of cash assistance if the family at least once was observed qualifying for child care subsidies during the period June 1996 to June 2003 because of cash assistance

⁵ The Kaplan-Meier estimation technique is a non-parametric statistical technique that makes a correction for those child care subsidy recipients that are not observed to exit the child care subsidy program during the follow-up period. In technical terms, it accounts for the “right censoring” of child care subsidy recipients who fail to leave the subsidy program before the end of the follow-up period. If the follow up continued until all sample members had naturally exited the program, then the Kaplan-Meier adjustment would not be necessary.

receipt. We refer to these two groups of families as **never-on-cash** families and **ever-on-cash** families.⁶

Most researchers prefer the second definition, because families move on and off cash assistance with some frequency. Families that only receive cash assistance because of low income tend to be quite distinct from either families that only receive child care subsidies because of cash assistance receipt or families that sometimes receive child care subsidies because of cash assistance receipt and sometimes receives child care subsidies because of low income. The latter two groups tend to behave rather similarly (Witte & Queralt, 2003).

Figure 3 gives the continuation rates for families that qualify for child care subsidies because they are receiving cash assistance (cash-assistance families) and for families that qualify because of low-income (low-income families), using the current month eligibility information. As is clear from the graph, the two lines representing each group of families are different. Low income families have longer duration of child care subsidy receipt than cash-assistance families (i.e., the line for low-income families is everywhere on the graph above the line for cash-assistance families).⁷ Specifically, the estimated median length of time on child care subsidies for low-income families is 12 months, and 25% of low-income families have durations greater than 27 months. In

⁶ In the 1996 cohort, there were 818 spells of family receipt of child care subsidies where, during some months, the family qualified due to low-income and, during some months, the family qualified due to cash assistance receipt.

⁷ Cash-assistance families are heavily affected by the policies of the cash assistance program as well as by the policies of the child care subsidy program. Their probabilities of continuing to use child care subsidies may be affected to various extents by the policies of both programs. Low-income families are primarily affected by the policies of the child care subsidy program; however, to the extent that they cycle in and out of the cash assistance program, their probabilities of continuing to use child care subsidies may be affected not only by the policies of the child care subsidy program but also by those of the cash assistance program.

contrast, the median length of time on child care subsidies for cash-assistance families is 9 months, and an estimated 25% of cash-assistance families have durations greater than 17 months.⁸

As can be seen in Figure 3, the likelihood of continuing to receive child care subsidies declines most rapidly during the first year of subsidy receipt. The difference in the probability of continuing to use child care subsidies begins to widen after the fourth month of receipt, and it peaks in the twelfth month, when low-income families have a probability of continuing subsidies of 47% and cash-assistance families have a probability of continuing subsidies of 34%. The logrank test for the equality of the continuation (survival) functions for low-income families and cash-assistance families indicates that the continuation functions for these two groups of families are significantly different at any normal level of statistical significance (e.g. .0001; $\chi^2_1 = 77.42$).

Figure 4 gives continuation rates for families that never received child care subsidies due to cash assistance receipt (never on cash) and for families that at some point during our observation period received child care subsidies because of cash-assistance receipt (ever on cash). As can be seen in Figure 4, the two lines representing these two groups of families are different. Never-on-cash families have longer duration of child care subsidy receipt than ever-on-cash families (i.e., the line for never-on-cash families is everywhere on the graph above the line for ever-on-cash families). Specifically, the estimated median length of time on child care subsidies for families never on cash is 12 months and 25% of these families have durations greater than 28 months. In contrast, the median length of time on child care subsidies for families ever

⁸ It may be that, at least in part, cash assistance recipients have shorter duration periods than low-income families because they are disproportionately enrolled in approved activities and, therefore, must be re-certified more often than low-income families.

on cash is 9 months, and an estimated 25% of these families have durations greater than 18 months.

Families never on cash always have probabilities of continuing child care subsidies that are higher than families ever on cash, with the difference being greatest in the period between 9 months and 40 months of receipt. The logrank test for the equality of the continuation functions for families never on cash and for families ever on cash indicates that the continuation functions for these two groups are significantly different at any normal level of statistical significance (e.g. .0001; $\chi^2_1 = 51.08$).

Differences by Family Income

We next consider differences in continuation rates for families with incomes less than or equal to 125% of the Federal Poverty Level (FPL) and for families with incomes greater than 125% of FPL. This income demarcation is important because it is the point at which Rhode Island's current co-payment system begins to require substantial co-payments. For example, under the co-payment schedule adopted in February 2004, Rhode Island families with incomes less than or equal to 100% of FPL are required to make no co-payment. Families with incomes between 100% of FPL and 125% of FPL are required to make co-payments equal to 1% of their gross income. Families with incomes between 125% of FPL and 150% of FPL are required to make co-payments equal to 4% of their income. The co-payment rate continues to increase as incomes increase up to the highest income group (i.e., those with incomes between 200% and 225% of the FPL), who are required to make co-payments equal to 14% of their gross income.

Figure 5 shows the continuation curves for families with incomes less than or equal to 125% of the FPL, compared to families with incomes greater than 125% of

FPL. As can be seen in this figure, families with incomes greater than 125% of the FPL have higher probabilities of continuing to receive child care subsidies than families with incomes below this level. To be specific, the estimated median length of time on child care subsidies for families with incomes greater than 125% of the FPL is 11 months, and an estimated 25% of such families have durations greater than 25 months. In contrast, the median length of time on child care subsidies for families with incomes less than or equal to 125% of the FPL is 9 months, and an estimated 25% of these families will have durations greater than 19 months.

Continuation rates for the two income groups (less than or equal to 125% of FPL and greater than 125% of FPL) begin to diverge more markedly after the ninth month on child care subsidies. However, the differences in continuation rates between these two income groups are not as large as for low-income families versus cash-assistance families or ever-on-cash families versus never-on-cash families. The logrank test for the equality of the continuation functions for families with incomes less than or equal to 125% of the FPL and families with incomes greater than 125% of the FPL indicates that the continuation functions for these two income groups are significantly different at normal levels of statistical significance (e.g. .001; $\chi^2_1 = 51.08$).

Differences by Age of Youngest Child

One might well expect differences in the dynamics of child care subsidy usage related to the age of the youngest child in care. For example, families with very young children (infant/toddlers) may have need for care for a far longer period than families with only school-age children. Further, the pattern of child care usage for school-age children is likely to be affected by the school year calendar.

To discern if there are patterns of subsidy usage that differ with the age of the youngest child, we examine continuation rates for families whose youngest child, when they begin to receive child care subsidies, is an infant or a toddler (i.e., 1 week old to 3 years old), a preschooler (i.e., 3-6 years old) and a school-age child (i.e., 6 years or older and attending school).⁹

Figure 6 shows the continuation curves for these three groups of families. As can be seen in this figure, families with infants and toddlers in subsidized care have substantially higher probabilities of continuing to receive child care subsidies than families with only older children in subsidized care. The estimated median length of time on child care subsidies for families with an infant or toddler in subsidized care is 10 months, with 25% of such families having subsidy spells with duration of 6 months or less and an estimated 25% of these families having durations greater than 25 months.

The estimated median length of time on child care subsidies for families whose youngest child in subsidized care is a preschooler is also 10 months, but such families generally have shorter spells than families with younger children in care. Specifically, 25% of families whose youngest child in subsidized care is a preschooler have subsidy spells lasting 5 months or less and an estimated 25% of these families have durations greater than 20 months.

The estimated median length of time on child care subsidies for families whose youngest child in subsidized care is enrolled in regular school is only 6 months. Twenty five percent of such families have subsidy spells lasting 3 months or less,¹⁰ and an

⁹ These age breaks coincide with the age breaks that Rhode Island uses to set reimbursement rates.

¹⁰ This very short duration probably reflects the use of subsidies for school age children for care only during the summer school recess.

estimated 25% of the families have durations greater than 13 months. Part of the explanation for the very short duration of subsidy receipt for families with only school-age children may be that their children age out of child care subsidies. However, we do not think that this is the major explanation for the short subsidy duration of such families because Rhode Island provides child care subsidies for children up to age 16, and only about 1% of child care subsidy recipients in the 1996 entry cohort have children that are older than 12.

Continuation rates for families whose youngest child in care is of school age and for families with younger children in care diverge markedly after the third month on child care subsidies. To be specific, the probability that a family will continue to receive child care subsidies after the third month of receipt is 86% if the youngest child in care is an infant or toddler, 85% if the family's youngest child in care is a preschooler and only 69% if the family only has school-age children in subsidized care. The probabilities of continuing care for preschoolers and for infants and toddlers begin to diverge markedly after the 24th month of care. Specifically, the probability that a family will continue care after 24 months of subsidized care is 26% if their youngest child in care is an infant or toddler, while it is 20% if their youngest child in care is a preschooler. The much lower probability of continuing care after 24 months for families whose youngest child in care is a preschooler may be due to the fact that after 24 months of care almost all preschoolers are eligible for either kindergarten or elementary school.

The logrank test for the equality of the continuation functions for families whose youngest child in care is (1) an infant or toddler, (2) a preschooler and (3) a school-age child indicates that the continuation functions for these different age groups are

significantly different at any normal level of statistical significance (e.g. .0001; $\chi^2 = 240.51$).

Differences by Number of Subsidized Children

One might well expect that the dynamics of child care subsidy usage would vary depending on the number of children receiving subsidized care within a given family. Families with more than one child in subsidized care would be unlikely to exit the child care subsidy program, unless they no longer needed subsidized care for any of the children. To discern if there are patterns of subsidy usage that differ with the number of children in care, we examine continuation rates for families with: (1) one child in subsidized care, (2) two children in subsidized care and (3) three or more children in subsidized care.

Figure 7 shows the continuation curves for families with one, two and three or more children in subsidized care. As can be seen in this figure, families with a single child in subsidized care have substantially lower probabilities of continuing to receive child care subsidies than families with two or more children in subsidized care, particularly as the time on subsidies increases. To be specific, the estimated median length of time on child care subsidies for families with one child in subsidized care is 9 months, with 25% of these families having subsidy spells lasting 5 months or less and an estimated 25% have durations greater than 18 months.

The estimated median length of time on child care subsidies for families with two children in subsidized care is 10 months, with many such families having longer spells than families with a single child in care. For example, an estimated 25% of families with two children in subsidized care have durations greater than 24 months.

The estimated median length of time on child care subsidies for families with three or more children in subsidized care is 9 months, with 25% of such families having subsidy spells lasting 4 months or less and an estimated 25% of these families having durations greater than 22 months.

The logrank test for the equality of the continuation functions for families with (1) one child in subsidized care, (2) two children in subsidized care and (3) three or more children in subsidized care indicates that the continuation functions for the different families are significantly different at any normal level of statistical significance (e.g. .0001; $\chi^2 = 32.85$).

Differences by Place of Residence

One might also expect that the dynamics of child care subsidy usage would vary depending on the place of residence of the recipients. This is because the types of jobs that child care subsidy recipients have differ by location, and such job differences could lead to differences in the ways they use child care subsidies. For example, in Newport, a tourist area, jobs are seasonal, and this could lead to shorter periods of subsidy usage. To examine the effect of residential location on the patterns of subsidy use, we estimate separate continuation (survival) models for families living in: (1) Central Falls, (2) Newport, (3) Pawtucket, (4) Providence, (5) West Warwick, (6) Woonsocket and (7) the Balance of the State.

Figure 8 shows the continuation curves for the two core cities in Rhode Island with the largest number of child care subsidy recipients (i.e., Pawtucket and Providence) and for the Balance of the State (i.e., areas outside the core cities), which also has a large number of subsidy recipients. As can be seen in Figure 8, families living in the Balance of the State have lower probabilities of continuing to receive child care subsidies

than families living in Pawtucket or Providence. Families living in Providence have the longest periods of subsidy use.

As can be seen in Table 2, the estimated median length of time on child care subsidies for families living in Providence is 10 months, with 25% of these families having subsidy spells with a duration of 5 months or less and an estimated 25% having durations greater than 23 months. The estimated median length of time on child care subsidies for families living in Pawtucket is 9 months and many such families have shorter spells of child care subsidy receipt than families living in Providence (i.e., an estimated 25% of Pawtucket families have durations greater than 20 months). The estimated median length of time on child care subsidies for families living outside the core cities (i.e., living in the Balance of the State) is 9 months. Twenty five percent of Balance of State families have subsidy spells lasting 4 months or less, and an estimated 25% have durations greater than 19 months.

Figure 9 shows the continuation curves for four additional core cities (Central Falls, Newport, West Warwick and Woonsocket). As can be seen in this figure, families living in Woonsocket have substantially lower probabilities of continuing to receive child care subsidies than families living in the other three core cities. Families living in West Warwick have the longest periods of subsidy use.

Table 2 shows that the estimated median length of time on child care subsidies for families living in West Warwick is 10 months, with 25% of these families having subsidy spells lasting 5 months or less and an estimated 25% having durations greater than 22 months. The dynamics of subsidy usage in West Warwick is much like that in Providence. As per Table 2, the estimated median length of time on child care subsidies for families living in Woonsocket is 9 months and many such families have shorter spells

than families living in West Warwick; specifically, 25% of the Woonsocket families have subsidy spells lasting 4 months or less and 25% have durations greater than 16 months. This table also shows that the pattern of subsidy usage in Newport is quite similar to that in Woonsocket. The estimated median length of time on child care subsidies for families living in Central Falls is only 7 months. Twenty five percent of Central Fall's families have subsidy spells lasting 4 months or less and an estimated 25% have durations greater than 18 months.

The logrank test for the equality of the continuation functions for families with residence in the seven different areas of Rhode Island indicates that the continuation functions for families living in these different areas are significantly different at any normal level of statistical significance (e.g. .0001; $\chi^2_6 = 31.46$). This significant finding supports our hypothesis that the dynamics of child care subsidy usage vary depending on the place of residence of the recipients. We suspect that these significant variations in the use of child care subsidies across different areas are due to different types of jobs and work schedules of subsidy recipients.

4. IMPACTS OF POLICY AND ADMINISTRATIVE CHANGES

Entitlement to Child Care

To estimate the impact of Rhode Island's adoption of an entitlement to child care in May 1997, we compare the continuation rates for the first spell of child care subsidy receipt for the 1996 entry cohort (this group of families entered the child care subsidy system before child care subsidies were an entitlement) and for the 1997 entry cohort (this group of families entered a month to six months after child care subsidies became an entitlement). The maximum time a family in the 1996 cohort could have received child care subsidies is 84 months, while the maximum time that a family in the 1997

cohort could have received subsidies is 72 months. To equalize the “time at risk” for the two groups, we discarded the last 12 months of observations for the 1996 cohort. Thus, the two cohorts we analyze each has a potential maximum period on child care subsidies of 72 months.

Figure 10 shows the continuation curves for the 1996 and 1997 cohorts. As can be seen in this figure, the 1997 cohort has a higher probability of continuing on subsidies than the 1996 cohort. To be specific, the estimated probability that a member of the 1996 cohort will continue subsidies after the first 9 months of receipt is 46%, while the estimated probability that a member of the 1997 cohort will continue subsidies after 9 months of receipt is 54%.

The estimated median length of time on child care subsidies for families in the 1996 cohort is 9 months, while the estimated median length of time on child care subsidies for families in the 1997 cohort is 10 months. Twenty five percent of families in the 1996 cohort will have subsidy spells lasting 4 months or less, while 25% of families in the 1997 cohort will have subsidy spells with a duration of 5 months or less. An estimated 25% of families in the 1996 cohort will have durations greater than 18 months, while 25% of families in the 1997 cohort will have durations greater than 23 months.

The logrank test for the equality of the continuation functions for families in the 1996 and 1997 entry cohorts indicates that the continuation functions for the families in the two cohorts are significantly different at any normal level of statistical significance (e.g. .0001; $\chi^2_1 = 28.94$).

The above empirical results suggest that Rhode Island’s entitlement to child care subsidies may have increased the duration of child care subsidies. However, these

results do not control for other possible explanations for the significant increase in the duration of subsidies after child care subsidies were made an entitlement. For example, the increase in duration could have occurred (1) because of differences in the characteristics of the families in the 1997 cohort, compared to the characteristics of families in the 1996 cohort, (2) because of differences in the economy during these two periods and (3) due to impacts of other aspects of Rhode Island's welfare reform, which also began in May 1997.

To examine the possibility that differences in either observable or unobservable fixed family characteristics (e.g., age, race/ethnicity, native intelligence and possibly such things as motivation) caused the higher probability of continuing child care subsidies in the 1997 entry cohort, we examine the probability of continuing child care subsidies during the first 12 months for a group of 500 families that appear in both the 1996 and 1997 entry cohorts. The fact that 500 out of 2814 families (18% of the 1996 cohort) entered the child care subsidy system between June and November 1996, exited the program sometime between July 1996 and September 1997 and re-entered sometime between June and November 1997 suggests that there is a strong seasonal component to entry and exit from the child care subsidy system in Rhode Island. As previously noted, such seasonal pattern could be caused by the school year calendar (see, for example, the comparison of the dynamics of subsidies for pre-school and school-age children in Figure 6) or could be due to seasonal employment of the population receiving child care subsidies.

Figure 11 shows the continuation curves for the first 12 months of subsidy receipt for the 500 families in both the 1996 and 1997 cohorts that entered, exited and re-entered the child care system during the time periods specified above. As can be

seen in this figure, for all 12 months, the likelihood that these families would continue child care subsidies after their 1997 re-entry was much higher than the likelihood that they would continue subsidies after their 1996 entrance.

To be specific, the probability that these 500 families would continue child care subsidies 5 months after their 1996 entrance to the subsidy program is 60%, while the probability that they would continue child care subsidies 5 months after their 1997 entrance is 73%. Similarly, we found that the probability of continuing child care subsidies after 12 months is only 1% for the families' 1996 entrance, but it is 37% for their 1997 entrance.

The logrank test shows that the continuation function for these 500 families after the 1996 entry is significantly lower than the continuation function after the 1997 entry (i.e., $\chi^2 = 192.98$, $p\text{-value} = .0000$). The difference in the continuation functions after the families' 1996 and 1997 entries may be related to things such as: (1) changes taking place in the family, such as developing better knowledge of how the child care subsidy system operates, (2) differences in the economy during these two periods, and (3) impacts of other aspects of Rhode Island's welfare reform.¹¹

To examine the possibility that changes in the Rhode Island cash assistance program (e.g., the development of a self-sufficiency plan or the imposition of time limits) may have caused the difference in continuation functions we observe, we compare the continuation curves for the 1996 entry cohort and for the 1997 entry cohort for: (1) families that were never observed on cash assistance (never on cash) and (2) for families that at some time during the study period received cash assistance

¹¹ See Witte, Queralto and Tauchen (2001) for a discussion of other aspects of Rhode Island's welfare reform.

(ever on cash). Figure 12 gives the continuation curves for these four groups of families. As is clear from this figure, families that never receive cash assistance (the top two continuation curves) have significantly higher probabilities of continuing to receive child care subsidies than families that receive cash assistance (the lower two continuation curves). More importantly, the difference between the 1996 and 1997 continuation curves is larger for the ever on cash group than for those that never received cash assistance.

Table 3 gives the 25th percentile, the median and the 75th percentile of the continuation rates for four groups of families (ever-on-cash 96 cohort, ever-on-cash 97 cohort, never-on-cash 96 cohort and never-on-cash 97 cohort). This table clearly demonstrates that the difference in continuation rates between the 1996 and the 1997 cohorts occurs because of the increased duration in child care subsidy spells for the ever-on-cash families (i.e., current and former cash assistance recipients). Logrank tests confirm this observation. These tests indicate that there is a significant increase in the duration of child care subsidies between 1996 and 1997 for families that had at some time received cash assistance (i.e., ever-on-cash), while there is no significant increase in the duration of child care subsidies for families that never received cash assistance (i.e., $\chi^2 = 21.64$, p-value=.0000 for the ever-on-cash group and $\chi^2 = 1.89$, p-value=.1692 for the never-on-cash group).

The above results suggest that it was the package of reforms that comprised Rhode Island's welfare reform, rather than just the entitlement to child care subsidies, that increased the duration of child care subsidies.

Increases in Reimbursement Rates and Eligibility Expansions

To estimate the impact of the increase in reimbursement rates and of the eligibility expansions that occurred between January 1998 and January 2000, we compare the continuation rates for the first spell of child care receipt for the 1997 entry cohort (this group of families entered before these policy changes) and for the 2000 entry cohort (this group of families entered 6 months to 11 months after the policy changes). The maximum time a family in the 1997 cohort could have received child care subsidies is 72 months, while the maximum time that a family in the 2000 cohort could have received subsidies is 36 months. To equalize the “time at risk” for the two groups, we discarded the last 36 months of observations for the 1997 cohort. Thus, each of the two cohorts we analyze has a potential maximum period on child care subsidies of 36 months.

Figure 13 shows the continuation curves for the two cohorts. As can be seen in this figure, the 1997 cohort has a slightly higher probability of continuing on subsidies than the 2000 cohort, particularly after 18 months of child care subsidies. For example, the estimated probability that a member of the 1997 cohort will continue subsidies after 24 months of receipt is 23%, while the estimated probability that a member of the 2000 cohort will continue subsidies after 24 months of receipt is 21%.

The estimated median length of time on child care subsidies for families in both the 1997 and 2000 cohort is 10 months. Twenty five percent of families in both the 1997 cohort and the 2000 cohort will have subsidy spells lasting 5 months or less. An estimated 25% of families in the 1997 cohort will have durations greater than 23 months, while 25% families in the 2000 cohort will have durations greater than 21 months.

The logrank test for the equality of the continuation functions for families in the 1997 entry cohort and in the 2000 entry cohort indicates that the continuation functions for the families in the two cohorts are not significantly different at normal levels of statistical significance (e.g, $\chi_1^2 = 2.96$, p-value=.0852).

The above empirical results do not suggest a relationship between Rhode Island's increases in reimbursement rates and eligibility expansion and the duration of child care subsidies. However, the results do not control for the state of the economy, which was substantially better during the 36 months that the 1997 cohort was followed (June 1997-June 2000) than during the 36 months that the 2000 cohort was followed (June 2000-June 2003). Thus, we cannot rule out the possibility that Rhode Island's increases in reimbursement rates and eligibility expansions may have increased the duration of child care subsidies.¹²

5. HOW DOES RHODE ISLAND COMPARE?

Table 4 gives Kaplan-Meier estimates of the length of subsidy receipt for five states and Rhode Island. Estimates for Illinois, Maryland, Massachusetts, Oregon and Texas are from Meyers, et al. (2002). Our estimates for Rhode Island were made using the first observed child care subsidy spell for the 1997 entry cohort, which was followed up for a 24-month period. For this comparison, we restricted the follow up period for Rhode Island to 24 months so that it would be the same period as that used for the other five states. We chose to use the 1997 cohort to closely approximate the estimates

¹² In previous work (Witte & Queralt, 2002), we provide evidence that increases in reimbursement rates led more providers to participate in the child care subsidy program. Having greater choice of providers may result in higher parental satisfaction and thus longer durations. Similarly, it is reasonable to think that income eligibility expansions would result in a larger proportion of families with incomes above 125% of the FPL participating in the child care subsidy program. Such families tend to have longer durations of child care subsidy receipt.

for the other states, which were made for the period ranging from October 1996 to September 1999. All the comparisons involve the first period of child care subsidies.

As can be seen in Table 4, the families in Rhode Island's 1997 entry cohort have substantially longer durations of child care subsidies than the families in the other five states. However, it should be noted that there are differences between the data used to estimate the continuation curves for the five comparison states and the data we use to estimate Rhode Island's continuation curve, and that these differences could potentially affect the comparison across states. The most notable of these differences are the following: (1) Rhode Island's data ends a spell of child care subsidies after a two-month gap, while the data for the other states ends a spell after a one-month gap, (2) Rhode Island's data contain information for a 6-month (June-November) entry cohort, while the data for the other states are for either a 12-month or a 24-month entry cohort and (3) Rhode Island's data deal with the entry and exit of families (i.e., all the children in the family) to and from the child care subsidy system, while the data for the other states deal with entry and exit of a randomly selected child in each family. Data presented by Meyers, et al. (2002) for the five states suggest that the first two differences should have little effect on the estimates. The third difference should serve to make the estimates of duration for Rhode Island slightly longer than the estimates for the other five states.

Considering all the above, we are reasonably confident that in the late 1990's Rhode Island had, on average, longer durations of child care subsidies than the other five states.

6. CONCLUSIONS

We conclude that it is very important to have an extended follow-up period to adequately describe the dynamics of child care subsidy usage. Extended follow ups do not seem to markedly affect the estimates of duration for a single period of child care subsidy receipt. But extended follow ups in Rhode Island make it clear that there is a great deal of cycling on and off child care subsidies. We see considerable evidence that this cycling is related to the school year calendar. We also suspect that it is related to seasonal employment patterns in Rhode Island.

Much can be learned by examining the probability that a family will exit child care subsidies in any given month (i.e., the hazard rate), as well as the probability that families will continue to receive subsidies (i.e., the continuation or survival rate). The hazard rates depicted in Figure 1 and Figure 2 show clear patterns of exit related to the way in which the child care subsidy program is administered (i.e., the 6-month re-determination requirement) and to the school year calendar.

We find that the duration of child care subsidies differs significantly depending on: (1) whether a family qualifies for subsidies because of low income or because of receipt of cash assistance, (2) the level of family income, (3) the age/school status of the youngest child, (4) the number of children with subsidies and (5) place of residence. We believe that the marked difference in the duration of subsidies depending on the age or school status of the youngest child in the family (see Figure 6) is of particular importance. The relatively short duration of subsidies for families with only school-age children receiving subsidies provides a partial explanation for the short duration of subsidies reported in various studies when all families receiving subsidies are analyzed together or when subsidy receipt for a randomly selected child is analyzed. Many

families with school-age children either use subsidies only for care during the summer school recess, or they use subsidies only for before- and after-school care during the school year. These school-year related patterns of subsidy utilization lead to short subsidy duration, but this type of short duration is of less concern than short durations for younger children. Our analysis of subsidy duration by age of child also reveals distinct patterns of exit related to a child's entry into first grade.

We provide reasonably strong evidence that Rhode Island's welfare reform package, which included an entitlement to child care subsidies, increased the duration of child care subsidies (see Figure 10). However, the increased duration appears to result from the welfare reform package as a whole rather than exclusively from the entitlement to child care subsidies.

We find no evidence that Rhode Island's increase in reimbursement rates or eligibility expansions increased the duration of child care subsidies (see Figure 13). However, it is interesting that the duration of subsidies does not appear to have been affected by the recession and slower growth of the 2000-2003 period. It is possible that Rhode Island's increase in reimbursement rates and eligibility expansions would have increased the duration of child care subsidies if the economy of the 2000-2003 period had been as buoyant as the economy of the late 1990s.

Sorting out the impact of policy changes and the economy requires estimation of multivariate models that seek to explain why families exit child care subsidies. Such models allow control for the state of the economy and other factors and provide firmer estimates of policy impacts. As far as we are aware, no models of child care subsidy exit have been estimated. We believe that this represents a serious gap in the child care literature and that understanding of the duration of child care subsidies may, at this

point, best be advanced by the development and estimation of models for the exit from child care subsidies.

Finally, we find that Rhode Island has substantially longer periods of child care subsidy receipt than five other states (see Table 4). For example, the median duration of child care subsidies for the 1997 Rhode Island entry cohort is 10 months, while Meyers, et al. (2002) report a median duration of child care subsidies of 5 months in Massachusetts for families that began child care subsidies between October 1996 and September 1998.¹³ Rhode Island also appears to have a much larger number of families who continue on child care subsidies for an extended period of time. For example, while 25% of families in the 1997 Rhode Island entry cohort had periods of subsidy receipt which exceeded 20 months, Meyers, et al. (2002) report that 25% of Massachusetts families had durations of subsidies that exceeded only 11 months.

¹³ Most families receiving child care vouchers in Massachusetts are current or former cash assistance recipients that one would anticipate to have short child care durations. In Massachusetts, many low-income families that are not cash assistance recipients are placed on waiting lists for child care subsidies.

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