

**Trends in Wellbeing Indicators for  
New Zealand-born Mothers and their Families, 1981–2006:**

**An Exploratory Cohort Analysis Using Census Data**

**Family Whānau and Wellbeing Project**

**Working Paper**

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## ***Technical Information***

All tables presented in this report are rounded to base 3 as per Statistics New Zealand confidentiality requirements. Figures, percentages and derived statistics were produced from rounded data.

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## **Executive Summary**

This report is the final stage of the Family Whānau and Wellbeing Project (FWWP). This project developed a set of indicators from the census that were designed to measure family wellbeing and to track its course over time, and among different types of families. The aim of this current phase is to apply cohort analysis techniques to document the wellbeing of cohorts of families on these indicators, and also to identify the relative effects for each cohort of both age (that is, life-cycle stage) and period (that is, historical epoch).

This analysis was conducted by tracking cohorts of mothers, as defined by five-year birth periods. These cohorts were followed through six successive New Zealand censuses from 1981–2006, focusing on the main childrearing ages of 20–59. This produced ten cohorts, ranging from mothers born in the period 1932–37 through to 1977–81. Mothers were chosen as the reference person in assigning families to cohorts, for several reasons, including greater stability of cohort composition over time.

The approach is exploratory since previous examples of research using the family as the basic unit of cohort analysis have not been identified in the literature. Thus the method and analytical processes are described in detail. The approach proceeds by first examining data for a given indicator tabulated to reveal age and period effects. It then moves to cohort comparison using traditional within age-group comparison to compensate for compositional differences between cohorts (that is, cohorts covering different age ranges). Interpretation of the findings concludes the section on each indicator.

A summary of comparative outcomes across the range of wellbeing indicators is then presented. Conclusions are then drawn about the relative wellbeing of the various cohorts in the study. While it is difficult to conclude that any one cohort had greater wellbeing overall since cohorts fared better or worse on different indicators and at different ages, the analysis is successful in identifying specific age and period effects, and in documenting different cohort experiences for each indicator. It also allows the identification of areas where the most recent cohorts of families are performing relatively poorly at young ages compared to earlier cohorts. This is a matter of policy interest and should be monitored and addressed.

While education, employment and median income appear to be improving for more recent cohorts compared to earlier cohorts in the analysis, home ownership is declining and receipt of health-related benefits is increasing. Patterns for the other indicators are more complex. The other key outcome is that families with young mothers (age 20–24) in cohorts born since 1967 are showing relative disadvantage compared with mothers of the same age in earlier cohorts.

In summary, cohort analysis and its findings are complex and in this study have been confounded by the limited number of years in the dataset; in other words, there is not a full and comparable age range of data for every cohort. The report concludes with a discussion of the limitations of the method and either how these have been addressed in the analysis or how they could be addressed in future work. Suggestions are made for further research.

# 1. Introduction

## 1.1. Background

The Family Whānau and Wellbeing Project (FWWP) draws on analyses of data from the New Zealand Census of Population and Dwellings over the period 1981–2006. A set of indicators designed to track family/whānau wellbeing over this period has been defined (Milligan, et al., 2006). The Census definition of family has been adopted so we are focusing on outcomes for parent(s) and children living in the same dwelling.

The wellbeing indicators measure aspects of wellbeing that can be identified from the census, such as total family income and attainment in post-secondary education. Variation in the value of an indicator over time is likely to be affected by changes in the social and political environment, the age structure of the family, and the age (or birth) cohort to which the family belongs. These are period, age, and cohort effects respectively.

For example, as enrolment in post-secondary education has increased over time the number of families with members attaining a post-secondary qualification will grow. This is known as a “period effect”. However, as a family’s children age from toddlers to teenagers, there is a greater chance over this life-cycle that one or more family members will acquire a post-secondary qualification. This is an “age effect”. Finally, exposure to a certain event that affects a group defined by age (or date of birth range) may have lasting effects on the wellbeing of families in this group compared to older or younger age cohorts. For example, young people experiencing the student loan scheme may be affected throughout their lives. Influences of this kind that are specific to a particular age or birth cohort are called “cohort effects”.

In this report we wish to disentangle the role that these different effects might play in understanding trends over time in measures of wellbeing for the families of New Zealand-born mothers. This decomposition of overall time trends for family wellbeing measures into age, period and cohort effects is what we loosely term cohort analysis.

A cohort has been described as “a temporally defined group of individuals, all of whom enter a system or given status in the same time period”, e.g. the same year of birth (Myers, 1999), or as we look at it here, being born in the same five year period. With census data, cohorts can be followed through their life-course over successive censuses. The key components of cohort analysis are chronological age and historical period. Each cohort experiences the combination of these uniquely and can be tracked to see how these different experiences affect their outcomes on a range of wellbeing indicators.

The census is a standardised and synchronised collection of data on the entire New Zealand population that is repeated every five years. In principle, information from consecutive censuses is amenable to cohort analysis since it allows systematic observation of age, period and cohort effects over time on the same population. Although the trajectories of individual families cannot be tracked through time, it is possible to ensure that much the same group of families can be followed (for example, by restricting the analysis to those who are New Zealand-born). Therefore, with careful attention to the universe of study, we are able to follow age cohorts of families, for example, by using the age of a stable reference person in the family to track households from census to census. Thus in each census we can identify

groups of families sharing a common 'age', and re-examine the same group in the following census when it is five years older.

While analysis of cohorts of individuals has been common in the research literature since Ryder's (1965) first theoretical paper on the potential value of a cohort approach in the study of social change, a search of the literature shows that little work has been devoted to following cohorts of families. The inherent problem here is how to define a family in a way that can be related over time to indicator data that is primarily collected on individuals or households. A family is not a static entity, but evolving and transitional, from a couple, to the addition of a first child and then possibly successive children, and then the gradual exit of children from the family as they become independent.

In New Zealand, Dickson, et al. (1997) and Jackson and Pool (1994) used household data and the occupier or head of household as proxy for family to carry out some cohort analysis based on individuals within households. A second method, used by Gibson and Scobie (2001a, 2001b) and Scobie and Gibson (2003), and also based on individuals within households, is the age of the 'household head'. Although these researchers used data from the Household Economic Survey, a similar concept is manifest in census records through the household 'reference person', as used by Morrison (2008) in his cohort analysis of housing tenure in New Zealand. Since we are primarily concerned with studying families, not households, and as the selection of the reference person is relatively arbitrary, this approach was not considered appropriate for this research. We have identified and explored in detail other options of how the age of a family should be defined in order to track its passage from entry into the cohort through to exit (Wheldon, 2008). Two possible "markers" of family ageing were explored in depth: age of the oldest child (since family formation begins with the birth of oldest child), and age of the mother.

The decision was made to proceed using age of mother, for the following reasons. Firstly, there are more periods of data available for analysis. Mothers can be identified in the census as long as they have at least one child living at home (and present on census night), whereas the oldest child can only be identified until they leave home. This also affects the stability over time of the reference age marker, as it is lost when the oldest child leaves the family (that is, by the census definition, leaves home). In addition, using the age of the mother permits age-specific comparisons of results, where required, with households without children; we do not undertake such analysis in this report, but suggest it for future research. Finally, for our datasets, using the age of the mother provided greater stability in cohort sizes over time.

A survey of the existing literature on cohort research identified the stability of cohort membership over time – whether individuals or families – as being an important requirement, particularly if the analysis is performed on sample survey data (Glenn, 2005; Deaton, 1997). In the current analysis, of primary concern was that the numbers and identities of families composing each age cohort remain much the same from one census to the next. Since the census is a universal data collection (i.e. encompassing the whole population), the only losses to the population, and thus the analysis, are by death, migration and census undercount (although in-migration will add to membership after cohort initiation). While the universality of the census guarantees comprehensive population coverage, issues still remain in ensuring the stability of cohort membership of families. Thus, new families will form – for



example, women having children later on in life, or new partnerships forming for existing mothers – and other households will disintegrate or re-form.

The suitability of using age of oldest child and age of mother (parent) as a definition of family age were assessed by studying changes in the sizes of family cohorts over the 1981–2001 censuses. The specific events leading to entering into a cohort, ageing, and exiting a cohort were described prior to analysing frequency counts. Because it was not possible to follow specific families from one census to the next, it was assumed that approximate equivalence of cohort size from one census to the next was sufficient indication of membership stability. At the least, a large fluctuation in cohort size is a firm indication of instability. In a working paper exploring the practicalities of cohort analysis using census data, Wheldon (2008) found that age of mother resulted in more stable cohort numbers over time than did age of oldest child.

Key factors affecting the stability of cohorts of families identified through birth cohorts of women who have become mothers are: the age at which they become mothers and hence the family begins; the departure of the youngest child from home; death of the mother; father-headed single-parent families; and in and out migration.

The effect of migration on cohort stability of families identified by the age of mother was found to be small. Wheldon (2008) examined cohort sizes for all families compared with those including families with New Zealand-born mothers only, broken down by census family types at the broadest level. The magnitudes of the differences observed, while small, did differ among the family types examined, and among the cohorts within them (greatest improvements to stability were seen for younger cohorts, born since the 1960s). For this reason, and so as to apply some counter to the effects of migration, the data analysed in this report are limited to families with mothers born in New Zealand.

Myers (1999) points out a further issue related to the stability of the cohort over time; it is the need to be aware of bias as a result of definition of entry and exit criteria. For example, are there characteristics associated with becoming a mother, particularly at a certain age, such as education level, that might affect outcomes on wellbeing measures? The following paragraphs outline how we decided which age groups to include in our dataset, and the implications for potential bias as a result of including those aged 20–24.

Stability at the commencement of the family is affected by the age at which women have children, but as most cohorts of women begin childbearing at a similar time, stability of cohorts of families is best assured by not including age-groups below which a substantial proportion of women have become mothers.

Table 1.1 shows the numbers of women in each cohort who have become mothers by each census date. The age of the mothers is represented in the diagonals (top-left to bottom-right) in the table. For example, the top diagonal represents each birth cohort of mothers at age 70–74 (indicated on table), the second diagonal 65–69, and so on, through to the bottom diagonal which is each birth cohort of mothers at age 15–19. The age-group for each cell in the table is calculated by deducting the birth years (row labels) from the census year (column headings). For example, in the first cell of the table (top left corner), people born in 1907 are aged 74 in 1981, and those born in 1911 are aged 70 in 1981, so there are 3,540 mothers aged 70–74 in 1981. In the next cell moving down the top diagonal, there are 3,882 mothers aged 70–74

in 1986, and so on. Similarly, in the second cell of the left hand column (1981) there are 5,715 mothers aged 65–69 (born 1912–1916).

**Table 1.1 Cohort sizes for families with children, 1981–2006**

Census year	1981	1986	1991	1996	2001	2006
Birth years (mother)	Diagonals represent age ranges, e.g. top diagonal = age 70–74 at each census					
1907–1911	3,540					
1912–1916	5,715	3,882				
1917–1921	10,413	6,024	4,242			
1922–1926	19,881	10,650	6,381	4,287		
1927–1931	32,805	18,336	9,942	6,024	3,969	
1932–1936	42,213	27,243	14,970	8,376	4,860	3,927
1937–1941	57,750	44,889	27,150	14,577	7,914	5,568
1942–1946	68,271	63,246	46,599	27,135	13,995	8,790
1947–1951	82,761	84,606	75,768	53,955	31,230	18,546
1952–1956	67,698	83,079	85,341	76,602	57,180	38,358
1957–1961	34,230	66,561	86,244	91,737	84,657	69,717
1962–1966	5,067	30,546	60,537	82,182	89,232	87,066
1967–1971		4,476	26,628	51,615	72,306	84,033
1972–1976			4,920	25,281	43,980	65,652
1977–1981				4,638	20,460	36,945
1982–1986					3,411	19,167
1987–1991						3,897

Few in any of the cohorts covered by the period for which data were available for this study had begun their families before ages 20–24. This can be seen in the bottom diagonal in Table 1.1, representing mothers at age 15–19, with cohorts ranging in size from 3,411 to 5,067, compared to 19,167 to 34,230 for age 20–24 (the diagonal above). And at the other end, a drop in numbers due primarily to families exiting the cohort with the youngest child leaving home, was evident from age 60 onwards, as seen in the top three diagonals in the table.

Since the years 20–59 are also the prime ages of employment, and as the focus of the aspect of the study covered in this document is the economic wellbeing of cohorts of families, the decision was made to limit the analysis to this range. This translated into ten cohorts of women born from 1932–36 through to 1977–81, for the census periods as indicated by the shaded section in Table 1.1.

However, it is clear from the table that the numbers at ages 20–24 are less than half those that will eventually become mothers in each cohort and thus the cohort had not reached a reasonable level of stability, allowing bias to creep in with the potentially different characteristics of those who became mothers at an early age. The proportion of cohorts' mothers entering motherhood in their 20s has also been declining with more recent cohorts.

Had we limited our analysis to the ages for which there was a more stable number of mothers in each cohort, say at least 50 percent of the total, those aged 20–24 would not have been included. However, having this group in the analysis proved to be useful in identifying potential within-cohort diversity, and changes happening for this group of families with very young mothers compared to previous cohorts at this age. There is a similar gap at the older end of the age spectrum, with similar implications

for bias relating to those who are still parents of dependent children in their 50s. In this exploratory research, these groups are included, and the effects of their inclusion are described in the discussion of the outcomes of using the approach chosen.

A number of other demographic changes relating to families occurred over the period being studied that might impact on their wellbeing. The change in median age at first birth; the change in average family size; later age at marriage and increasing cohabitation and divorce (Statistics New Zealand, 2008) all contribute to changing the life-cycle stage of families with mothers at different ages in different periods. For example, the median age at first birth was 20–24 in the 1960s, 25–29 in the 1980s and 30–34 in 2006 (p.46), while cohorts of women born in the 1930s had 3.5 children on average and those women born in the 1950s averaged 2.4 children (p.36). Marriage cohorts from the early 1980s are much more likely to have divorced after 25 years (one in three) than those married earlier (one in four from the late 1960s). Thus in terms of the cohorts of families in this study, the earliest would have larger families and be more likely to be two-parent families. The middle and more recent cohorts would have fewer children, with the most recent ones having them increasingly later in life.

There has also been an increase in women's labour force participation, with the time spent out of paid work after having children declining for successive cohorts. The result is the increase in dual-income families for more recent cohorts.

## ***1.2. This report***

The aims of this report are:

- to follow the social and economic wellbeing of cohorts of families identified by the age of the mother using data from the 1981–2006 censuses.
- to evaluate the usefulness of the dataset, and of the cohort approach, in comparing measures of family wellbeing over time.

## ***1.3. Methods***

### **1.3.1. Data source and data access**

All data used in this report were derived from the New Zealand Census of Population and Dwellings conducted between 1981 and 2006 by Statistics New Zealand. The research team obtained access to confidentialised unit record data through Statistics New Zealand's secure Data Laboratory facility (datalab) in Auckland. Personal identification data supplied on the original census forms, such as names and addresses, are not carried over to the computer records held by Statistics New Zealand, and these details are therefore not available to any data users. Further details on data access are given in Appendix A.

### **1.3.2. Using census data to measure wellbeing**

This report analyses changes in wellbeing on the basis of a series of indicators that were constructed through an earlier FWWP publication, *Family Wellbeing Indicators from the 1981–2001 New Zealand censuses* (Milligan, et al., 2006), with the natural extension to more recent data for the 2006 Census. For this report, we briefly describe issues around using census data for measuring wellbeing and analysing changes over time, and then present the indicators included in the analyses herein.

The primary advantage of using census datasets is that they allow assessment of continuity and change in societal patterns over a long segment of time. Information obtained from the census covers (almost) all members of the population,<sup>1</sup> so we can examine the wellbeing of all New Zealanders, and also provide information on small population groupings. The census collects information on all individuals living in a common dwelling unit or household, so we can conduct family- and household-level analyses, acknowledging the fundamental interdependence among family members. For example, the FWWP output report, *Measuring Changes in Family and Whānau Wellbeing Using Census Data, 1981–2006* (Cotterell, et al., 2008), analysed a slightly updated set of indicators, for the whole population and for the sub-group of families with at least one Māori parent.

Disadvantages associated with using census data to measure changes in family wellbeing include the limited range and limited depth of information collected and the lack of consistency in collection for some data. The selection of indicators is constrained by the information available from the census. Family wellbeing may be influenced by other factors (for example, the perceived quality of family relationships) for which no census information is available, and such lack of suitable information results in some indicators being indirect proxy measures for the attributes of interest. For example, the only health indicator included examines changes in the proportion of families with at least one adult receiving a health-related benefit, rather than being a real measure of the state of physical health of a family.

The lack of consistent data availability may constrain time series analysis. Some census questions that may be relevant to family wellbeing are no longer asked (for example, housing insulation), while other census information (for example, on smoking) is included on an irregular basis. This means that the monitoring of changes in some domains is at best irregular, and has resulted in such potential indicators being excluded from our analyses.

The lack of in-depth information available from the censuses may place limits on the ability to interpret 'change' for some indicators. For example, income data exist in bands rather than discrete amounts in our datasets, and so the construction of the median equivalised income indicator involves a degree of estimation and inference, itself being based on band medians in the first instance.

Finally, the census definition of 'family' incorporates only those family members who live within the same dwelling. Census-based wellbeing measures may thus be particularly poor indicators for families such as where parents are separated/divorced, and usually share custody of their children. The ability to monitor the wellbeing of those in extended family situations is also constrained by this household-based definition of family. Overall in this report, indicator results refer to parents and children (families) within households; we do know, for instance, that an adult picked up as being 'in receipt of health-related benefits' is indeed a parent, and not another (related or unrelated) adult who may be living in the same dwelling.

The set of indicators that is analysed in this report in terms of age, period and cohort effects is presented in Table 1.2.

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<sup>1</sup> For information on census coverage, see (Statistics New Zealand, 2001b).

**Table 1.2 Family wellbeing indicators used in this report**

Wellbeing domain	Indicator name	Definition
Income	Median equivalised income	Median real, gross equivalised family income. Equivalised income is gross income adjusted for family composition using the Revised Jensen Scale (Jensen, 1988) and expressed in 1999 dollars using the March quarter CPI (base 1999) for the relevant year (Statistics New Zealand, 2005)
	Low income	The proportion of families whose median real, gross equivalised income is less than 60 percent of the overall median equivalised gross family income
Education	Lack of parental educational qualifications	The proportion of families where no parent present in the household has any formal educational qualification
Work	Lack of parental paid work	The proportion of families with no parent present in the household engaged in formal paid employment
	Parental long hours worked	The proportion of families where at least one parent present in the household works more than 48 hours per week
Housing	Lack of home ownership	The proportion of families that do not live in owner-occupied dwellings
	Low rental affordability	The proportion of families living in rented dwellings, whose weekly rent is greater than 25 percent of their gross equivalised household income <sup>2</sup>
	Household crowding	The proportion of families living in dwellings that require at least one additional bedroom to meet the sleeping needs of the household
Health	Health-related benefits	The proportion of families with at least one parent present in the household receiving either a Sickness or Invalid's Benefit

### 1.3.3. Analytical methods

This section explains and provides examples of how to read and interpret the results presented in the following section. These are the findings on the set of indicators used in the study (see Table 1.2), under the domains of income, education, employment, housing and health. Analysis proceeds in three subsections for each measure: age, period and cohort. These are followed by an interpretation section for each indicator suggesting some possible explanations for the findings.

Age and period data for each measure are presented first in a table, supported by graphic illustration, for age of mother and census year (period), with percentages summarised across age-groups and periods using weighted means. Key age and period effects based on comparisons of means across age-groups and across periods are identified in the accompanying text. For the tables in this report, the means are weighted with adjustments for the different cell sizes involved over time / across age-groups.

Table 1.3 is an example of the presentation of age and period data, with census years down the columns and age-groups across the rows. The mean for each census year period across all ages, or the life-course, is shown in the bottom row. The mean for each age-group across all census year periods is shown in the right hand column. In an age by period table, cohort data appear on the diagonals. The

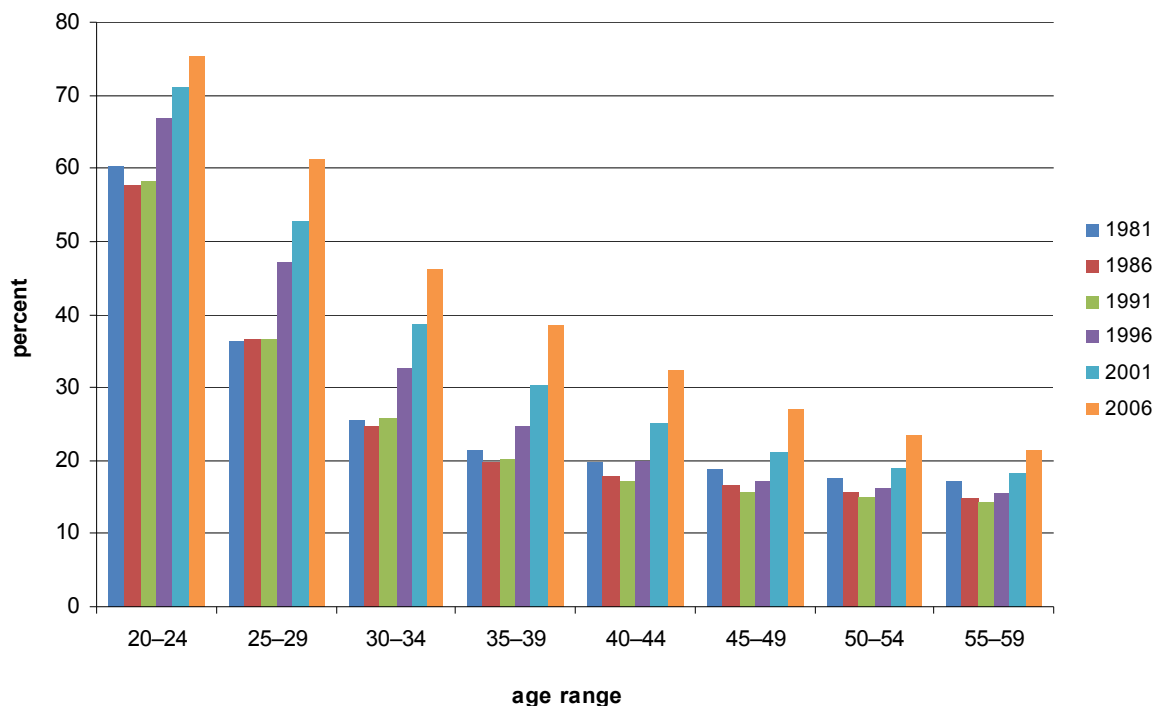
<sup>2</sup> In situations where multiple families live in a single dwelling, the total household income is used; all families in such dwellings receive the same score on this indicator.

first cell contains the data for those who were aged 20–24 in 1981, that is, the cohort born 1957–61. Following the arrow down the diagonal, you then see the data for this cohort at the next census in 1986, when they are aged 25–29, and so on through the life-course. It is difficult to read information along diagonals, so once we have interpreted the age and period effects, we move to a cohort by age table (Table 1.4).

**Table 1.3 Age and period example table: Percentage of families not living in owner-occupied dwellings (rounded) by age-group of mother and census year**

Age-group	1981	1986	1991	1996	2001	2006	Age-group mean
20–24	60	58	58	67	71	75	64
25–29	36	37	37	47	53	61	44
30–34	26	25	26	33	39	46	32
35–39	21	20	20	25	30	38	26
40–44	20	18	17	20	25	32	22
45–49	19	17	16	17	21	27	20
50–54	18	16	15	16	19	23	18
55–59	17	15	14	16	18	21	17
<b>Period mean</b>	27	26	25	30	35	41	

Figure 1.1 illustrates the patterns in the age and period data in Table 1.3. It shows the declining proportion of families without their own home as the age of the mother increases. It also shows the period effect of an increasing proportion within each age-group not owning their own home after 1991.



**Figure 1.1 Age and period example bar graph: Percentage of families not living in owner-occupied dwellings by census year within each age-group**

### 1.3.4. Reading a cohort table

To illustrate with an example, Table 1.4 presents the format of a cohort table using actual data for the set of birth cohorts in this study. Data for the birth cohorts appear down the columns and the age-groups across the rows. The period data now appear on the diagonals. Thus we can read the table across the rows to see how each cohort performed at the same age in different periods. And we can read down the columns to see how each cohort performed as it proceeded through the ages; that is, through the life-course. Different cohorts may hit their peaks and troughs at different ages if there is a strong period effect occurring. On other indicators, the age effect is so strong that all cohorts peak at a particular age, regardless of reaching that age in different periods.

**Table 1.4 Age by cohort example table: Percentage of families not living in owner-occupied dwellings (rounded) by birth cohort and age-group of mother**

Age-group	1932– 1936	1937– 1941	1942– 1946	1947– 1951	1952– 1956	1957– 1961	1962– 1966	1967– 1971	1972– 1976	1977– 1981
20–24						60	58	58	67	71
25–29					36	37	37	47	53	61
30–34				26	25	26	33	39	46	
35–39			21	20	20	25	30	38		
40–44		20	18	17	20	25	32			
45–49	19	17	16	17	21	27				
50–54	16	15	16	19	23					
55–59	14	16	18	21						
<b>Cohort mean</b>	16	17	18	20	24	32	36	44	54	65

Cohort comparison is made difficult by two factors. Firstly, as already identified above, there is a strong age effect (i.e. home ownership is strongly determined by life-course stage). Secondly, none of the cohorts contains the same range of age-groups, with the earliest cohorts covering only the older ages, and the most recent cohorts only the youngest ages. Thus it is not possible to use the same approach as comparing period and age outcomes; that is, a summary statistic such as a weighted mean for each cohort.

One approach to cohort comparison designed to overcome the problem of variable age composition is to compare cohorts within age-groups. This can be seen by looking across the rows for each age-group in Table 1.4. For example it is possible to discern the period effect of highest home ownership in 1991 – these are the values that are shaded in Table 1.4.

We can also see that at all ages, home ownership declined for successive cohorts after the peak period of 1991; that is, the proportions not in owner-occupied housing (the figures in the table) increased.

Cohort analysis also involves reading down the columns to see each cohort's pattern over the life-course, or as they age. For example, looking down the column for the cohort born 1952–56, we see that home ownership was highest in the 35–44 age-groups. By comparison, for the cohort born 1937–41 home ownership was highest in the 50–54 age-group. Looking at Table 1.4 we can see that both of these figures

occurred in 1991, after which home ownership began to decline. Thus different cohorts have different experiences depending on the age they were at the time of a major “period effect” in the indicator being examined.

Two types of cohort by age graphs are used. The line graph is better for comparing cohorts across the age-groups. It is clear to see where peaks and troughs occur, and where there are shifts in cohort performance at different age-groups. Gaps between the cohort lines indicate the degrees of difference between cohorts; where the cohort lines are close together there is little difference between them. The bar graph adds to this by illustrating more clearly the direction of cohort changes within each age-group.

The final subsection for each measure is a brief interpretation of the findings suggesting possible explanations, which are taken up further in the discussion section of the report. We now begin the presentation of the results in section 2.



## 2. Results: cohorts by age of mother, for New Zealand-born mothers only

This section presents the results for the indicators described in Table 1.2, covering the domains of income, education, employment, housing and health, for cohorts of mothers born in New Zealand from 1932 through to 1981, at ages 20–59, their main childrearing years. The results are examined over time, across the six New Zealand censuses from 1981 to 2006.

Analysis proceeds in three subsections for each indicator: age, period and cohort effects. The cohort analysis identifies how age and period effects combine to produce cohort effects for each indicator. A brief interpretation of the findings concludes the presentation of findings on each indicator.

Tables and graphs are presented for various different combinations of these three components in order to help the reader to see the effects being discussed, and to aid interpretation. The means presented as row/column summaries in the age by period tables are **weighted** for the numbers of cases in each cell on which they are based.

The tables and graphs presented in this section cover families in each census year, for mothers born in New Zealand.<sup>3</sup> Available census data do not permit the following of individuals over time; the cohorts examined in this analysis are defined by families with mothers within 5-year age-groups at each census point.

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<sup>3</sup> See section 1.1, p.11, for justification of restriction to NZ-born mothers only.

## 2.1. Median Jensen-equivalised income

Definition: Median real, gross equivalised family income. Equivalised income is gross income adjusted for family composition using the Revised Jensen Scale<sup>4</sup> (Jensen, 1988) and expressed in 1999 dollars using the March quarter CPI (base 1999) for the relevant year (Statistics New Zealand, 2005).

### 2.1.1. By age and period

Table 2.1.1 Median Jensen-equivalised income by age-group of mother and census year

Age-group	1981	1986	1991	1996	2001	2006	Mean
20–24	38,779	34,984	30,965	30,986	29,382	35,557	33,892
25–29	34,725	32,891	33,107	36,253	39,049	41,983	35,884
30–34	34,567	31,522	31,396	33,625	37,684	42,865	35,134
35–39	37,337	34,984	34,391	34,567	37,394	42,095	36,838
40–44	43,823	41,450	40,497	40,820	40,873	45,106	42,131
45–49	48,462	45,717	44,550	46,459	49,395	50,511	47,792
50–54	46,652	43,702	39,945	44,614	50,416	54,725	47,490
55–59	40,549	38,238	31,041	35,927	40,873	48,865	40,093
Mean	39,779	37,026	35,637	37,908	41,261	45,991	

### Age effect

To assess the “age effect”, in the first instance we look at the right-hand panel in Table 2.1.1. In each row, this shows the weighted mean of median income for each age-group across censuses. There we can see, that taken as an average over all censuses, the median family income peaked at \$47,792 in the 45–49 age-group, with the age-groups either side being the next highest. Income was lowest on average in families with mothers in the 20–24 age-group, with the next lowest being in the 30–34 age bracket.

These outcomes are confirmed in Figure 2.1.1. Visually it is apparent that the pattern of income follows an inverted J-curve, with a slow rising trajectory to the 45–49 age-group, followed by a gentle decline.

### Period effect

In determining the “period effect”, we first look at the lower panel in Table 2.1.1. In each column, this shows weighted means of median family income in each census year, for the whole cohort of mothers across the life-course. Looking at these means, the highest values were recorded in 2001 and 2006, with the increase to 2006 being the highest intercensal growth over the whole 1981–2006 period. Family income was at its lowest in 1991.

Looking at a summary of the effects in Figure 2.1.1, two age-groups seem to show a variation from the overall pattern of period effects. Incomes for families with a mother in the 20–24 age-group declined between 1991 and 2001, and for those with a mother in the 40–44 age bracket there was very little increase from 1991 to 2001. However, both of those age-groups showed substantial increases in 2006.

<sup>4</sup> See Appendix C.1 for more information.

The greatest increases from 1991 were seen for mothers in the 25–34 age-group, and those 50 and over.

It is noteworthy that families with mothers aged 20–24 were doing better than those with mothers aged 25–29 until 1991, after which the situation reversed.

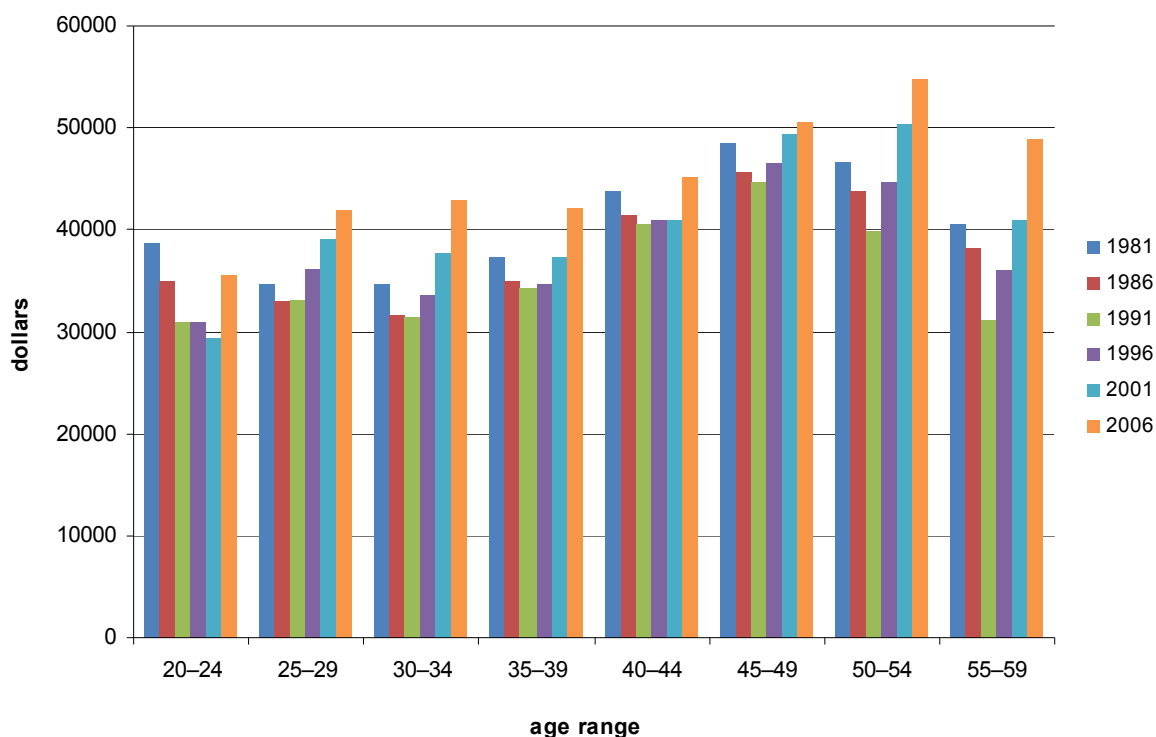


Figure 2.1.1 Median Jensen-equivalised income by census year within each age-group

### 2.1.2. By cohort and age

Table 2.1.2 Median Jensen-equivalised income by birth cohort and age-group of mother

Age-group	1932–1936	1937–1941	1942–1946	1947–1951	1952–1956	1957–1961	1962–1966	1967–1971	1972–1976	1977–1981
20–24						38,779	34,984	30,965	30,986	29,382
25–29					34,725	32,891	33,107	36,253	39,049	41,983
30–34				34,567	31,522	31,396	33,625	37,684	42,865	
35–39			37,337	34,984	34,391	34,567	37,394	42,095		
40–44		43,823	41,450	40,497	40,820	40,873	45,106			
45–49	48,462	45,717	44,550	46,459	49,395	50,511				
50–54	43,702	39,945	44,614	50,416	54,725					
55–59	31,041	35,927	40,873	48,865						

Shaded = low income period effect in 1991.

### Cohort effect

As outlined in section 1.3.4, in order to overcome the problem of variable age composition for the cohorts in the datasets used for this study, cohorts are compared within age-groups rather than with weighted averages across all age groups within each cohort. Looking across the rows for each of the age-groups in Table 2.1.2, it is

possible to discern the period effect of lowest median income in 1991. These are the values that are shaded in Table 2.1.2. Also in line with the overall period effect, there is then an improvement in income through to the last figure for all age-groups, except 20–24.

Among mothers in the 20–24 age-group, there was a decline in median family income from \$38,779 for cohorts born 1957–61 to \$29,382 for those born 1977–81. But at ages 25–29 and 30–34 there was an initial decline through to the column for the cohort born 1957–61, and then income increased for the cohorts following that. Thus, more recent cohorts (born 1962–76) had higher incomes than their predecessors at ages 25–34, in line with period improvements, but they did worse at ages 20–24.

Cohort outcomes on median income continue to be inconsistent at older ages, depending on when the period effect occurred for each cohort. The middle cohorts (1947–66) did best for median income at 20–24 and at the peak income ages of 45–54, which they reached in the peak period of 2001–06, and through to 55–59. The early cohorts (1932–1946) had the lowest median incomes from age 45 to 59 but did better than the middle cohorts at age 35–44 up until 2006.

Another effect can be discerned by looking down the columns to see a shift in the peak age-group over time, from 45–49 for cohorts up to 1947, to 50–54 for those born 1947–56. This shift is depicted in the line graph in Figure 2.1.2, as is the shift happening with more recent cohorts (born since 1967) in the 20–24 and 25–29 age-groups referred to in Table 2.1.2 above.

Other key points apparent in this graph are that the cohort variability, indicated by the gaps between cohort lines, is greatest at the ends of the age range. The direction of this variability is most clearly illustrated in the bar graph in Figure 2.1.3.

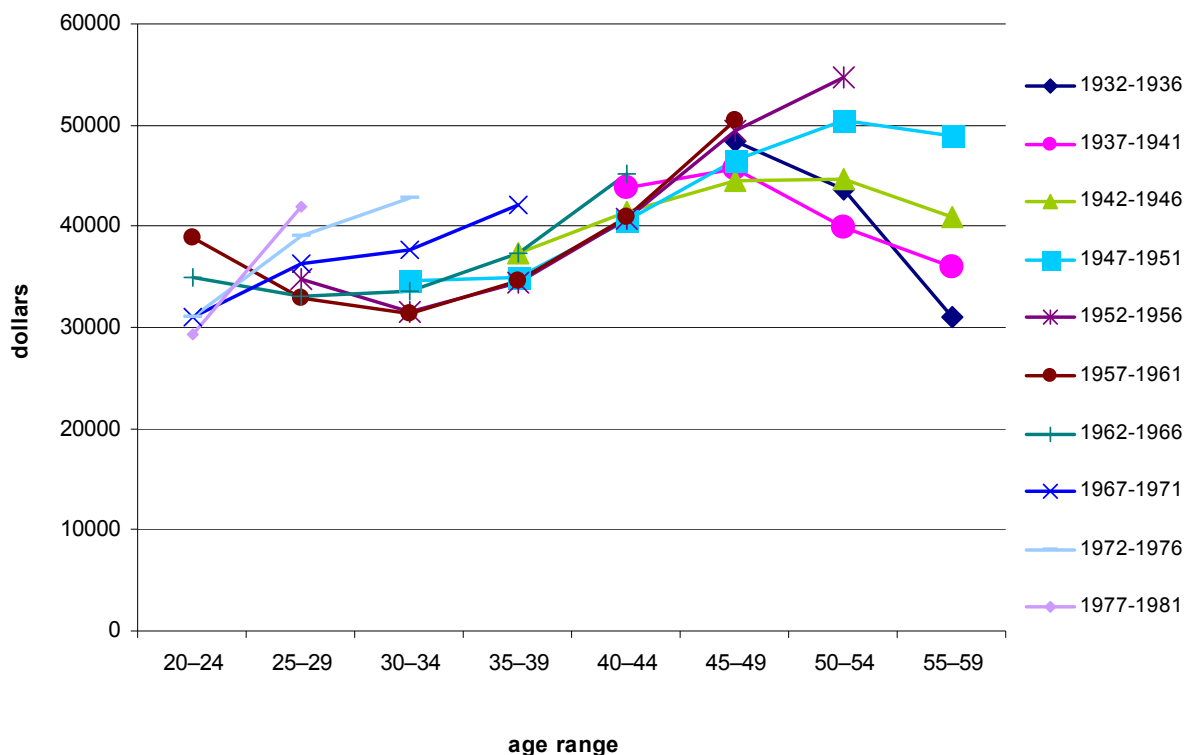


Figure 2.1.2 Line graph: Median Jensen-equivalised income by cohort within each age-group

Reading left to right for each age-group, the bar on the left represents the earliest cohort for which data are available for that age-group, and the bar on the right the most recent cohort for which data are available.

Figure 2.1.3 shows clearly the declining income for the most recent cohorts in the 20–24 age-group, followed by increases at ages 25–29 for those born 1967–81. This graph also shows the increasing income at ages 50–59 for cohorts born 1937–1956.

In summary, the most recent cohorts for which data are available in each age-group except 20–24 have the highest median incomes, reflecting the period effect. But at age 20–24 the period effect of higher incomes from 1996 is overridden by a cohort effect.

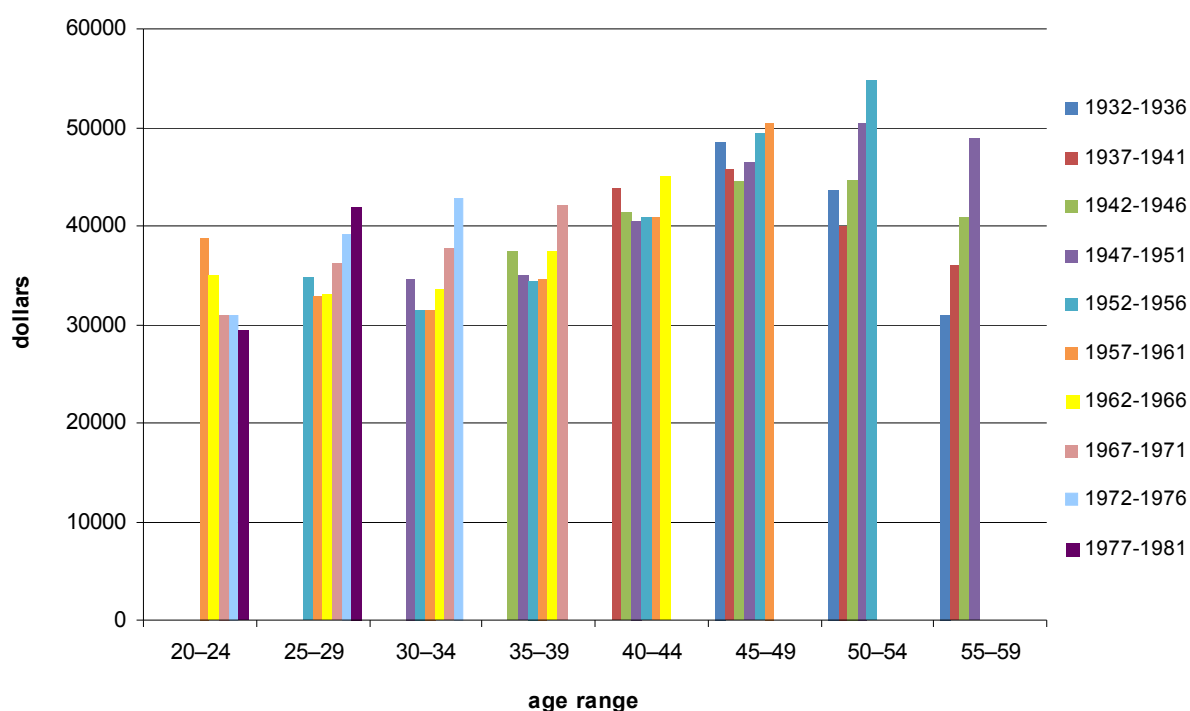


Figure 2.1.3 Bar graph: Median Jensen-equivalised income by cohort within each age-group

### 2.1.3. Interpretation

Table 2.1.1, illustrated in Figure 2.1.1, clearly shows the period impacts of 1991 and 2006. Average incomes for families were at their lowest overall in 1991, and this was consistently so across virtually all age-groups in that year. This was a year of high unemployment and poor economic prospects which affected all families, particularly those on benefits<sup>5</sup>.

<sup>5</sup> While it is possible that the method used to calculate the CPI adjustment overestimates the downturn in 1991 due to omission of the impact of the introduction of GST between 1986 and 1991, the finding of a downturn in median income in 1991 is consistent with the downturn in employment for the same period. And the CPI calculation would not affect the general trend of improving median income from 1996–2006. Also, as the CPI calculation in 1991 is applied to all cohorts except the earliest (1932–1936) it would not affect the comparison of differences between cohorts.

There is also a clear life-course stage effect for incomes, which tended to peak in the middle years when employment is at its highest. In contrast, there was a substantial increase in 2006 for most age-groups, perhaps as a result of a combination of factors such as wage increases negotiated in a tight labour market, the Working for Families package, and increased labour force participation, particularly of women 25–34 and in their 50s.

This last effect is supported by the data. It appears that those age-groups showing the largest increases in income since 1991 are those for which there was growth in female labour force participation. This occurred as women increasingly took less time out of the labour force as they compressed the period of child-bearing and exclusively domestic responsibilities, remaining in and/or entering the workforce both before and after this period of peak family responsibility, and then staying in or returning to the labour force in their fifties (Department of Labour, 2007).

Another contributing factor is that the partners of women in their late fifties are likely to be slightly older, i.e. may be over 60. Earlier cohorts of men were more likely to have retired at 60 but now are more likely to still be in paid work, particularly as the age of eligibility for national superannuation has shifted from 60 to 65.

Cohort comparison within age-groups indicates that the most recent cohorts in each age-group (except 20–24) have higher incomes, reflecting the period effect. The ongoing decline in income for cohorts of families with mothers in the 20–24 age-group until 2001, despite a general period increase from 1991 to 2001, may be due to the shift in age of first birth from 20–24 to 25–29 and 30–34, especially for women who were more highly educated, on higher incomes and/or non-Māori<sup>6</sup>. While the period effect of increasing income from 2001 to 2006 also applied to those families with mothers aged 20–24, they still lagged behind other age-groups, especially compared to their relative positions in 1981 and 1986.

The reason for the lack of comparative increase in the 40–44 age-group between 1991 and 2001 is less clear, but this may also be related to the shift in the age of childbearing so that mothers in this age-group are now more likely to have younger children (i.e. under 10) and are thus less likely to have moved into full-time work again (McPherson, 2005). Earlier cohorts of mothers were more likely to have older children and children leaving home at this age, and so to be back in full-time work. So the two effects combine to create relative stability in this age-group.

Increased female labour force participation by mothers of young children means more dual-income families (Callister, 2001 and 2005). This, together with higher socio-economic women having their children later, means that more recent cohorts (born since 1962) have had higher incomes in their late 20s and 30s than the cohorts that preceded them.

Discussion of likely future cohort trends in median family income is provided in the summary of findings, section 3.1.2.

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<sup>6</sup> Fuller discussion and evidence on this point, which recurs in relation to other measures, is provided in the discussion section of the report.

## 2.2. Low income

Definition: The proportion of families whose median real, gross equivalised income is less than 60 percent of the median Jensen-equivalised gross family income.

### 2.2.1. By age and period

**Table 2.2.1 Percentage of families on low incomes by age-group of mother and census year**

Age-group	1981	1986	1991	1996	2001	2006	Mean
20–24	24.0	23.3	28.7	28.9	35.7	30.9	27.7
25–29	23.6	23.1	25.6	23.9	26.1	25.5	24.5
30–34	23.1	23.5	24.9	24.1	25.0	23.1	24.0
35–39	21.1	19.4	20.7	22.0	23.8	22.9	21.7
40–44	16.2	14.3	14.3	15.9	19.9	20.5	17.2
45–49	14.5	11.9	12.1	12.1	15.3	16.2	13.9
50–54	16.8	13.5	14.4	13.4	15.5	14.7	14.8
55–59	24.8	17.4	20.1	20.9	22.8	18.7	20.7
<b>Mean</b>	20.9	19.0	20.4	20.0	22.1	20.7	

### Age effect

Looking at the right-hand panel in Table 2.2.1, it can be seen that the average proportion of families on low incomes was highest (at 27.7 percent) for those with mothers aged 20–24. This proportion then steadily improved through to age 45–49 before rising again in the 50s age-groups, with the proportion on a low income at 55–59 approximating the percentage at age 35–39. Overall, those families with a mother aged under 35 were worse off than those with a mother aged 35 or over.

These results are illustrated in Figure 2.2.1, where the pattern of this low income indicator follows a J-curve – the highest levels of low income being recorded in the 20–24 age-group, then gently declining to the 45–49 age-group, before rising again. As expected, this is the inverse of the pattern seen in the median income indicator.

### Period effect

Following the means in the lower panel of Table 2.2.1, it is evident that the proportion of families on low incomes was greatest in 2001, at which point it was slightly higher than it had been in 1981, with lower proportions on low incomes between those two points, and also in 2006.

The major period of decline was between 1981 and 1986, followed by slower increases to 1991 and 1996, then a large increase in the mean of the proportion on low incomes to 2001, followed by another relatively large decline to 2006.

This result is depicted in Figure 2.2.1 where one can see that there was a large increase in the proportion of families with mothers aged 20–24 on a low income between 1981 and 2001, and a marked but smaller increase for those aged 40–44. However, while there was another small increase in the 40–44 age-group in 2006, those families with mothers aged 20–24 experienced a substantial decline in the proportion on low incomes in 2006. Smaller increases, or relative stability, were

evident from 1981 to 2006 for those aged 25–39 and 45–49, with a decline for those in the 50s age-groups.

The lack of a simple linear period effect is apparent in the failure of a common pattern to be apparent within age-groups over time. This suggests age played a more important role than period.

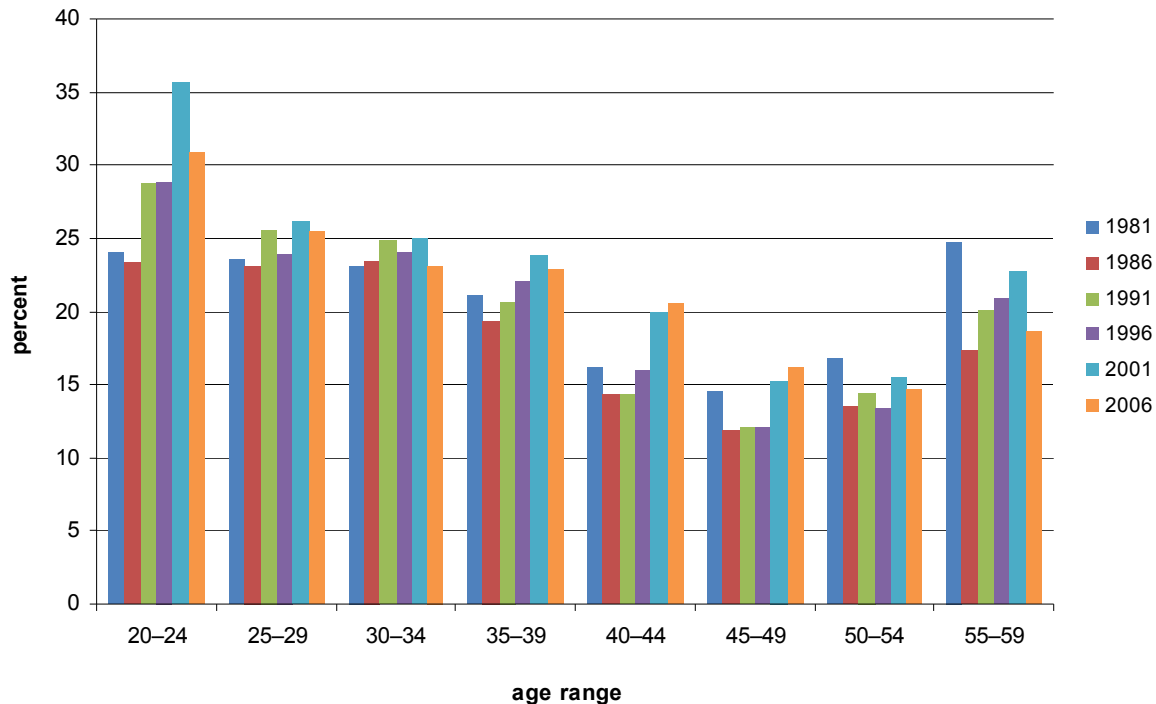


Figure 2.2.1 Percentage of families on low incomes by census year within each age-group

### 2.2.2. By cohort and age

Table 2.2.2 Percentage of families on low incomes by birth cohort and age-group of mother

Age-group	1932–1936	1937–1941	1942–1946	1947–1951	1952–1956	1957–1961	1962–1966	1967–1971	1972–1976	1977–1981
20–24						24.0	23.3	28.7	28.9	35.7
25–29					23.6	23.1	25.6	23.9	26.1	25.5
30–34				23.1	23.5	24.9	24.1	25.0	23.1	
35–39			21.1	19.4	20.7	22.0	23.8	22.9		
40–44		16.2	14.3	14.3	15.9	20.0	20.5			
45–49	14.5	11.9	12.1	12.1	15.3	16.2				
50–54	13.5	14.4	13.4	15.5	14.7					
55–59	20.1	20.9	22.8	18.7						

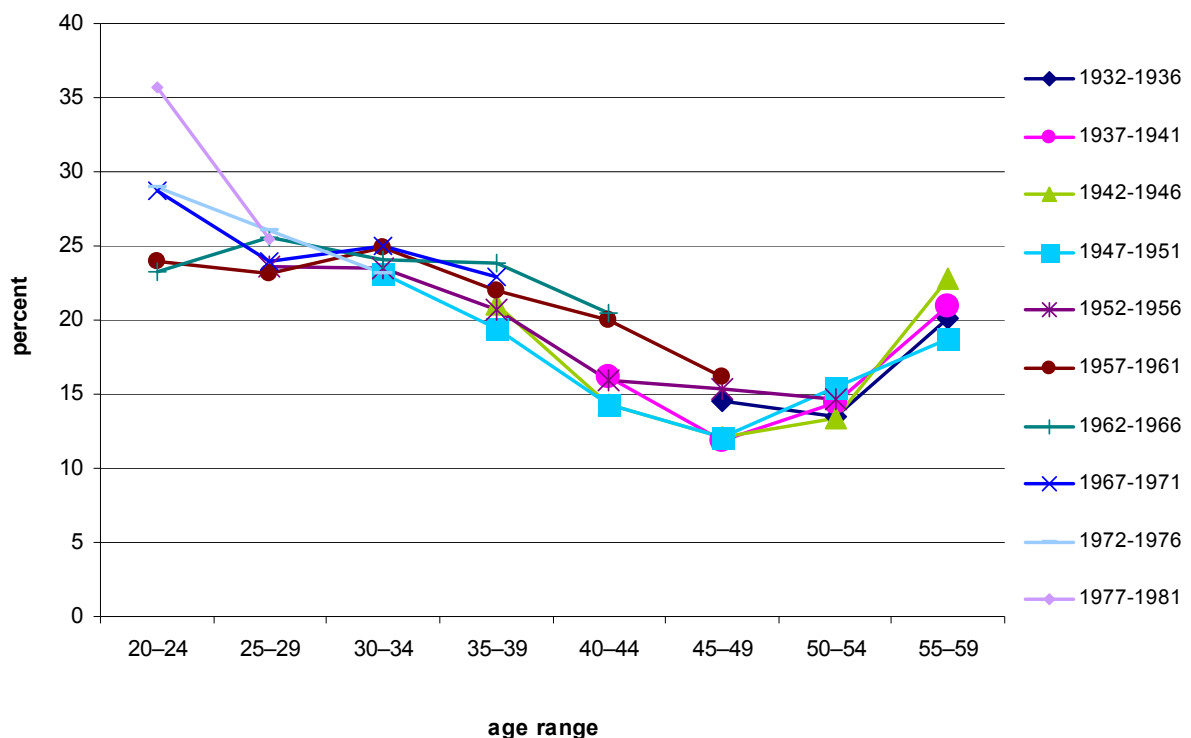
### Cohort effects

As judged by the proportion of families with low incomes, economic circumstances have been generally getting worse for more recent cohorts in most age-groups. The last two figures in each row of Table 2.2.2 are the latest periods for which data are available; that is, 2001 and 2006, except for in the 20–24 age-group where the last



two periods in the table are 1996 and 2001. For most age-groups these most recent periods saw the two highest proportions of families on low incomes, which is consistent with the overall period pattern; the 30–34 and 55–59 age-groups did not follow this pattern.

However, as can be seen from Figure 2.2.2, the degree of cohort difference in inequality varied for different ages, being greatest for the 20–24 age-group and to a lesser extent the 40–44 and 45–49 age-groups, as shown by wider gaps between the lines. Very little difference between cohorts is apparent at 25–34 or in the 50s where the lines are closer together.



**Figure 2.2.2 Line graph: Percentage of families on low incomes by cohort within each age-group**

The nature of this cohort difference in inequality is more clearly depicted in Figure 2.2.3. Reading this graph from left to right within each age-group, with the bar on the right being the most recent cohort in that age-group for which data are available, it is apparent that the proportions of families on low incomes were highest and increased most markedly for the more recent cohorts with mothers in the 20–24 age-group. At 25–34 and 50–54 there is little inter-cohort difference. And in the 40–44 and 45–49 age-groups, while there is also an increase in the proportion of families on low incomes for the most recent cohorts, it is not as marked as for the youngest age-group.

What we are seeing here is the non-linear period and age effects combining to affect cohorts differently, depending on the period in which they reached key ages, and making comparison of individual cohorts on this indicator complex. As noted in the period section, however, the variation by age appears to outweigh the period effect. In summary, the early cohorts did not experience the peak period for low income; the

middle cohorts were at relatively young ages during it; and the most recent group of cohorts were the worst affected, also being in the peak age-groups around 2001.

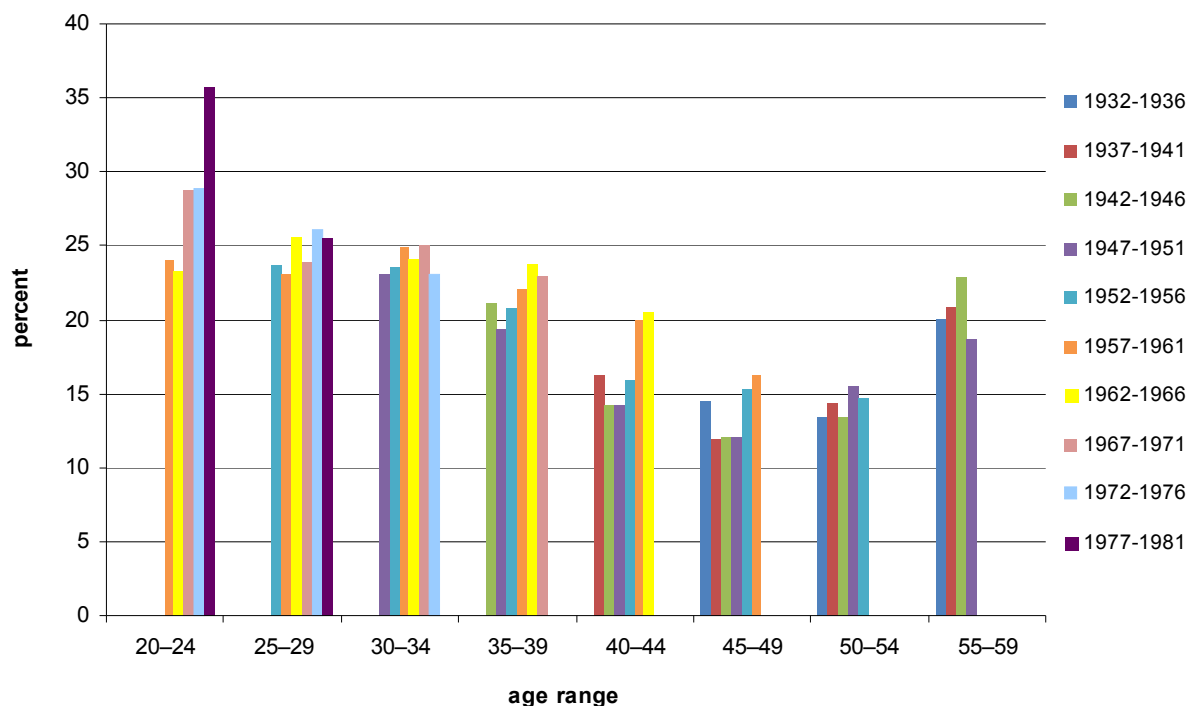


Figure 2.2.3 Bar graph: Percentage of families on low incomes by cohort within each age-group

### 2.2.3. Interpretation

To summarise, the key patterns on the measure of low income are: generally fluctuating inequality from 1981 to a peak in 2001, with a slight reversal in 2006, combined with a peak in income inequality for families with mothers in the 20–24 age-group, followed by those aged 25–39. The result is that more recent cohorts have mostly experienced greater inequality, particularly where mothers are aged 20–24. There has also been a less marked increase in inequality for recent cohorts with mothers in their late 30s and 40s, but the level remains lower than at younger ages.

Conversely, for families with mothers aged 55–59 the most recent cohort shows markedly lower proportions on low incomes. As with the improved median income for families with mothers aged 55–59, the recent reduction in low incomes for these families might be related to a combination of increased labour force participation by women in this age group, and of men in this and early 60s age groups as a result of the increased age of eligibility for national superannuation.

There is little inter-cohort variation at other ages and trying to explain these patterns is more difficult.

Findings on income inequality from other sources do not clearly support the trend of more recent cohorts of families experiencing greater inequality. While there is evidence of increasing income inequality in New Zealand from 1988 to 2004 (Ministry of Social Development, 2008: 58–59), the FWFP main report shows families with dependent children experiencing a decline in proportions on low

incomes from 1981 to 2006 (Cotterell, et al., 2008); that is, an improvement in income inequality.

Crude comparison with data on low incomes for all New Zealanders aged 18–24 in 1990, 1994 and 2001 from the Social Report 2007 (Ministry of Social Development, 2008) shows that the cohort of families identified by age of mother is much more likely to be in the low-income category at age 20–24 than New Zealanders as a whole. This is consistent with the profile of less educated women being more likely to become mothers at a young age for cohorts born since 1962 (see previous section), and with the general economic disadvantage associated with early parenthood, as demonstrated in the Christchurch Health and Development Study in New Zealand (Boden, et al., 2008).

### 2.3. Lack of parental educational qualifications

Definition: The proportion of families in which no parent present (on census night) in the household has any formal educational qualification.

#### 2.3.1. By age and period

Table 2.3.1 Percentage of families without parental educational qualifications by age-group of mother and census year

Age-group	1981	1986	1991	1996	2001	2006	Mean
20–24	26.5	24.9	25.6	26.0	16.8	15.3	23.3
25–29	24.9	21.0	21.3	25.8	13.7	12.1	20.4
30–34	33.1	22.3	21.0	24.7	16.2	10.7	21.3
35–39	39.9	29.6	22.4	24.7	16.4	13.7	23.3
40–44	45.7	34.8	29.6	26.8	17.3	14.7	26.0
45–49	52.0	38.1	34.5	34.2	19.4	15.7	29.5
50–54	58.4	42.3	38.1	40.5	27.3	18.2	34.9
55–59	63.7	45.8	43.2	45.9	33.6	26.1	41.2
Mean	40.3	30.4	27.7	29.8	19.4	15.7	

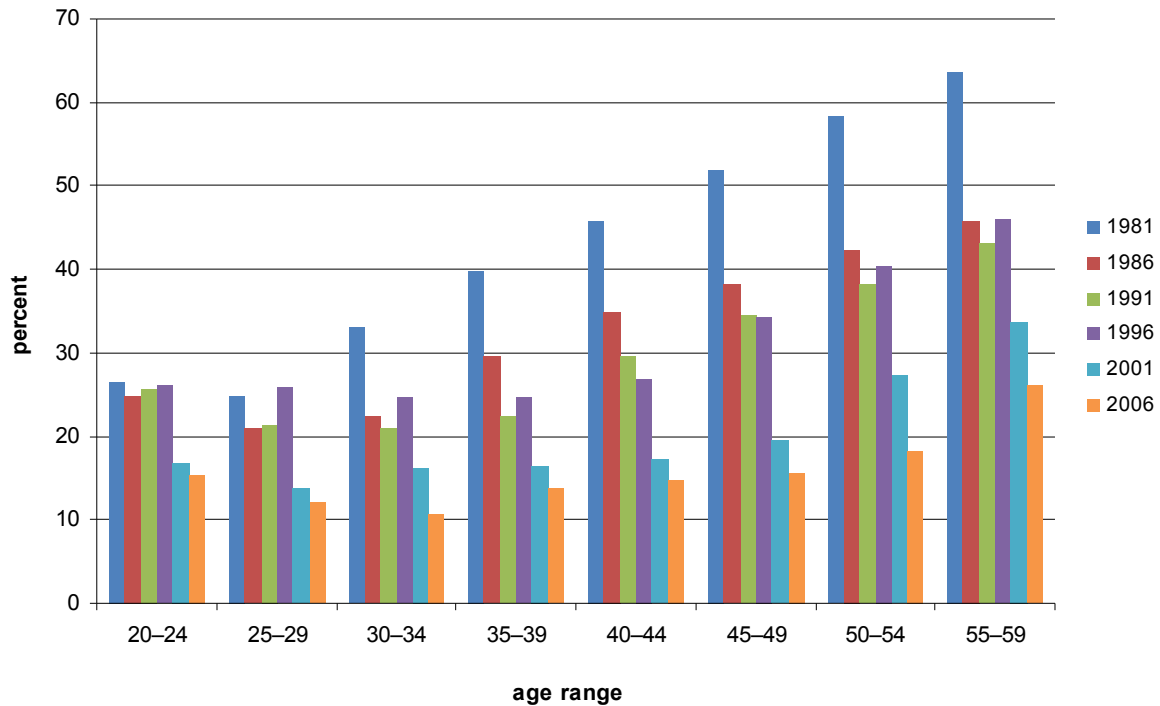
#### Age effect

Looking at educational attainment by age-group using the weighted means in the right-hand panel of Table 2.3.1, there was a steady increase in the proportion of families where no parent had any formal educational qualification as mothers progressed through the life-course, from the 25–29 age-group through to the 55–59. It can also be seen here that families with mothers aged 20–24 were less likely to have a qualification than those with mothers aged 25–29. Figure 2.3.1 illustrates the decline in the age effect over time; by 2006 there was very little difference between age-groups, compared with the strong increase in lack of qualifications with age in 1981, and to a lesser extent in the intervening years.

#### Period effect

The lower panel of Table 2.3.1 clearly shows that there was a steady reduction over time in the mean proportion of families where no parent had any educational qualification. Figure 2.3.1 shows this reduction is evident in all age-groups. The biggest downward shift occurred between 1981 and 1986, followed by a levelling out through to a slight increase in 1996, then another major downward shift to 2001 and a smaller decline through to 2006. However, inconsistencies in data collection and processing (Newell and Perry, 2006; Milligan, et al., 2006) mean it is only possible to say there has been an improvement in educational qualifications over time; it is not possible to say with any certainty in which intercensal periods improvements were greatest. (More detail on this is in the interpretation, section 2.3.3.)

The period effect, as measured by the difference in the mean between 1981 and 2006, was less evident in the 20–24 and 25–29 age-groups, as can be seen in Figure 2.3.1.



**Figure 2.3.1 Percentage of families without parental educational qualifications by census year within each age-group**

### 2.3.2. By cohort and age

**Table 2.3.2 Percentage of families without parental educational qualifications by birth cohort and age-group of mother**

Age-group	1932–1936	1937–1941	1942–1946	1947–1951	1952–1956	1957–1961	1962–1966	1967–1971	1972–1976	1977–1981
20–24						26.5	24.9	25.6	26.0	16.8
25–29					24.9	21.0	21.3	25.8	13.7	12.1
30–34				33.1	22.3	21.0	24.7	16.2	10.7	
35–39			39.9	29.6	22.4	24.7	16.4	13.7		
40–44		45.7	34.8	29.6	26.8	17.3	14.7			
45–49	52.0	38.1	34.5	34.2	19.4	15.7				
50–54	42.3	38.1	40.5	27.3	18.2					
55–59	43.2	45.9	33.6	26.1						

Shaded = aberrant period effect in 1996.

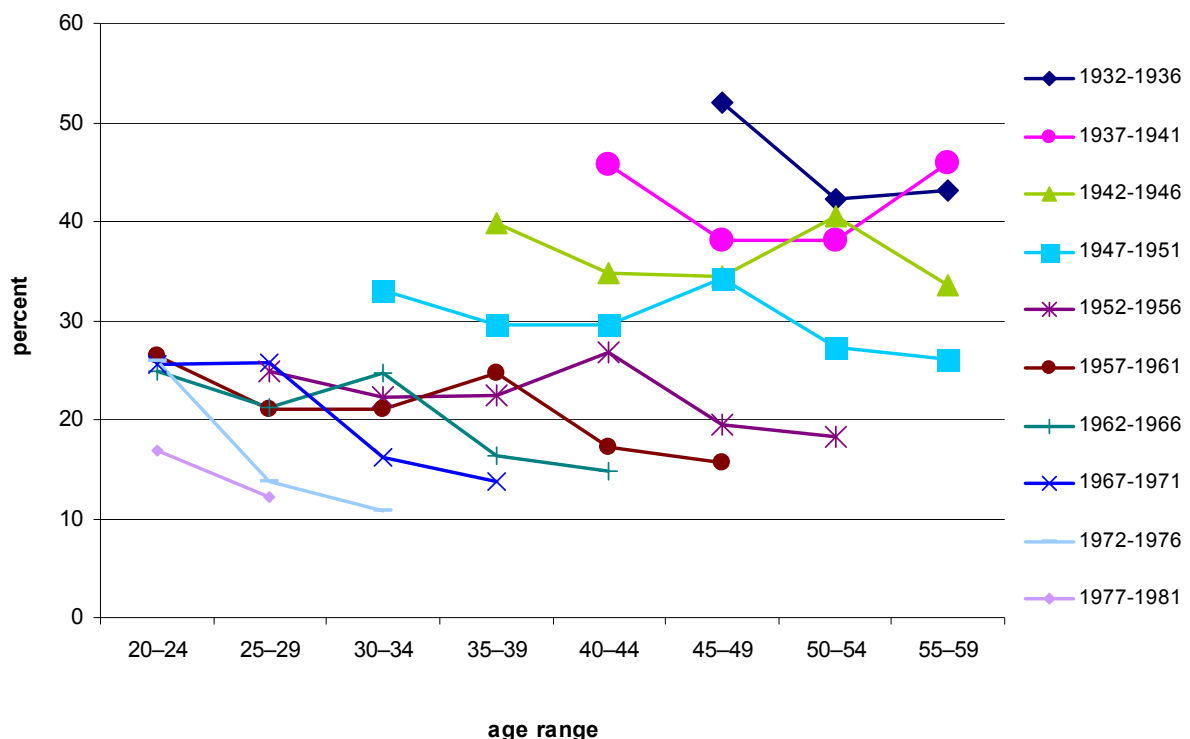
### Cohort effect

Reading across the rows of Table 2.3.2 shows there has been continual improvement for more recent cohorts of mothers in the proportion of their families with at least one parent with some educational qualification, in most age groups, reflecting the general period trend. The exception of the aberrant 1996 data (the shaded cells in the table) is discussed in the interpretation section 2.3.3.

However, it is also evident from reading down the columns in Table 2.3.2 that there was within-cohort improvement over time. There was an age effect, as the proportion of families with no parental qualifications was lower among mothers more

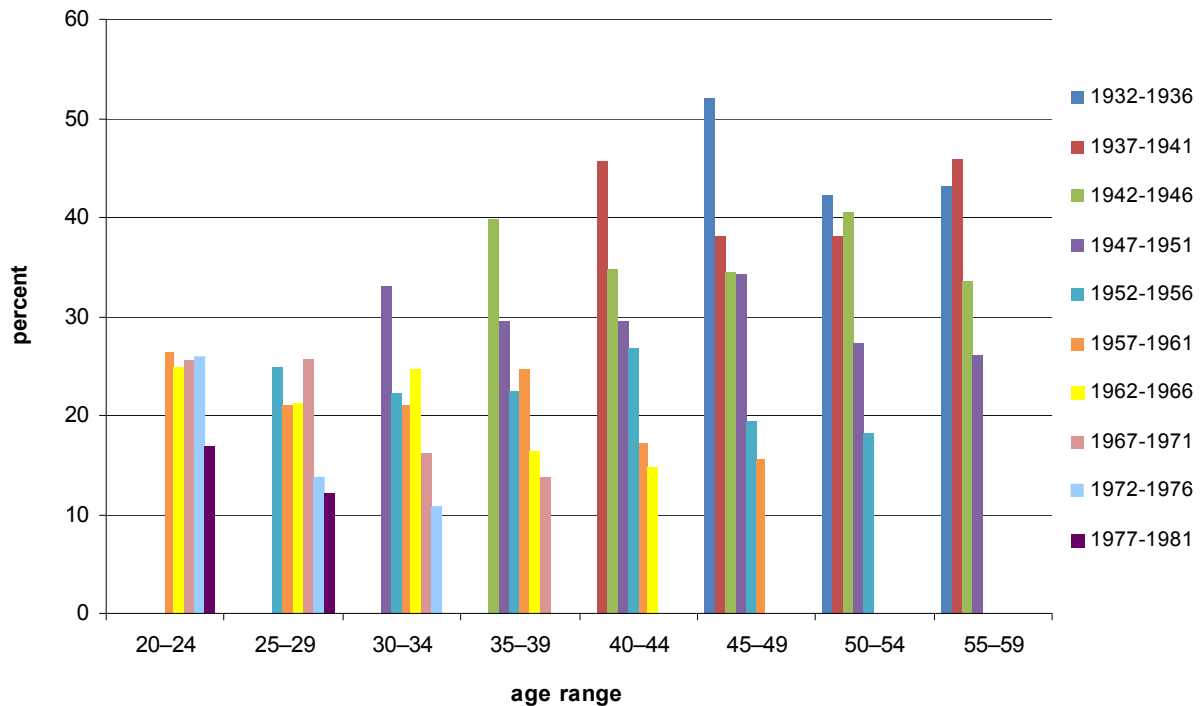
advanced in the life-course through the 30s and 40s age-groups for each cohort. The aberration in 1996 appears to show an increase in lack of qualifications in the corresponding age-group for that year in all cohorts. This should not be confused with the general period effect of improvement at older ages.

These patterns are reflected in Figure 2.3.2, which depicts the general trend of a decline in the proportion of families without parental educational qualifications over time for all cohorts, though again with the exception of the aberrant 1996 data effect. This effect occurs at different ages for each cohort: the 55–59 age-group for the 1937–41 birth cohort (pink/large circles), the 50–54 age-group for the 1942–46 cohort (olive green/triangles), the 45–49 age-group for the 1947–51 cohort (light blue/large squares), and so on.



**Figure 2.3.2 Line graph: Percentage of families without parental educational qualifications by cohort within each age-group**

In summary, there has generally been improvement in educational qualifications among more recent cohorts. While improvements for successive cohorts have occurred at all ages, they have been less marked in the early 20s, as can be seen in Figure 2.3.3.



**Figure 2.3.3 Bar graph: Percentage of families without parental educational qualifications by cohort within each age-group**

### 2.3.3. Interpretation

Results are as expected with the families of more recent cohorts of mothers being less likely to lack parental qualifications at younger ages; this is due to the overall period effect of a decline from 1981 to 2006. The appearances of an increase in 1996 and a large decline from 1981 to 1986 are likely to be due to administrative changes in the data collection process. Newell and Perry (2006) point out that estimates of “no qualification” from 1981 to 1991 are inaccurate due to inconsistencies of coding “other post-secondary qualifications” for those years. And Milligan, et al. (2006) caution against comparing educational attainment data over the period considered in this study because of changes in census questions and classification counts in 1991, 1996 and 2001.

The reducing proportions of families without parental educational qualifications for older age-groups could be due to two main factors: people acquiring qualifications as mature students, and the later joining of the cohort of mothers by those with educational qualifications, as early motherhood is linked to low educational attainment. This could also explain the relative lack of improvement for families with mothers aged 20–24, at least up until 2001, and the fact that they remain less educated than families with mothers aged 25–39 in 2001 and 2006. While the joining of cohorts is related to women becoming mothers, and the link with low education is to early motherhood, there is an assumption here that early motherhood by women with low education is likely to be linked to lower education of the male partner also, or will result in lower family education outcomes even if the father has qualifications.

## 2.4. Lack of parental paid work

Definition: The proportion of families with no parent present (on census night) in the household engaged in formal paid employment.

### 2.4.1. By age and period

Table 2.4.1 Percentage of families without parental paid work by age-group of mother and census year

Age-group	1981	1986	1991	1996	2001	2006	Mean
20–24	11.2	17.2	30.2	26.8	27.0	21.8	21.7
25–29	9.6	12.4	23.0	20.1	18.8	16.6	16.7
30–34	8.6	10.5	19.3	17.6	15.9	13.2	14.4
35–39	7.9	8.4	15.5	15.1	14.0	12.1	12.5
40–44	7.4	8.0	12.6	12.3	11.9	11.0	10.9
45–49	9.1	9.0	13.4	11.4	10.6	9.7	10.6
50–54	15.3	15.6	20.3	16.1	12.5	10.4	14.5
55–59	31.6	33.6	40.0	30.1	22.0	15.1	27.3
Mean	11.9	13.3	20.4	17.6	15.4	12.9	

### Age effect

Reading down the column of means in the right hand panel in Table 2.4.1, the families with the oldest (55–59) and youngest (20–24) mothers were the most likely to have no parent in paid work over the period (27.3 percent and 21.7 percent respectively). The proportion was at its lowest for families with mothers aged 45–49 (10.6 percent).

However, reading across the rows in the table shows that there were changes over time in the relative positions of the different age-groups. Prior to 2001, 20–24 year old mothers were more likely to be in families where at least one parent was in paid work; those with mothers aged 55–59 were the most likely to be in workless families. From 2001 on, families with mothers aged 20–24 were more likely to be without paid work than those with mothers in their 50s. The greater decline in worklessness for families of mothers in their 50s, particularly 55–59, can be seen in Figure 2.4.1.

The other main age shift, seen by looking down the columns in Table 2.4.1, is that from 1996, 45–49 year old mothers replaced those in the 40–44 age-group as being in families most likely to have at least one parent in paid work.

### Period effect

The row of means in the bottom panel of Table 2.4.1 shows that 1981, 1986 and 2006 were the best years for families having at least one parent in paid work, with less than 14 percent out of work. There was a sharp increase in the proportion of workless families, to 20.3 percent in 1991, followed by a more gradual and smaller decline in 1996 and through to 2001, and then a larger decline to 12.9 percent in 2006.

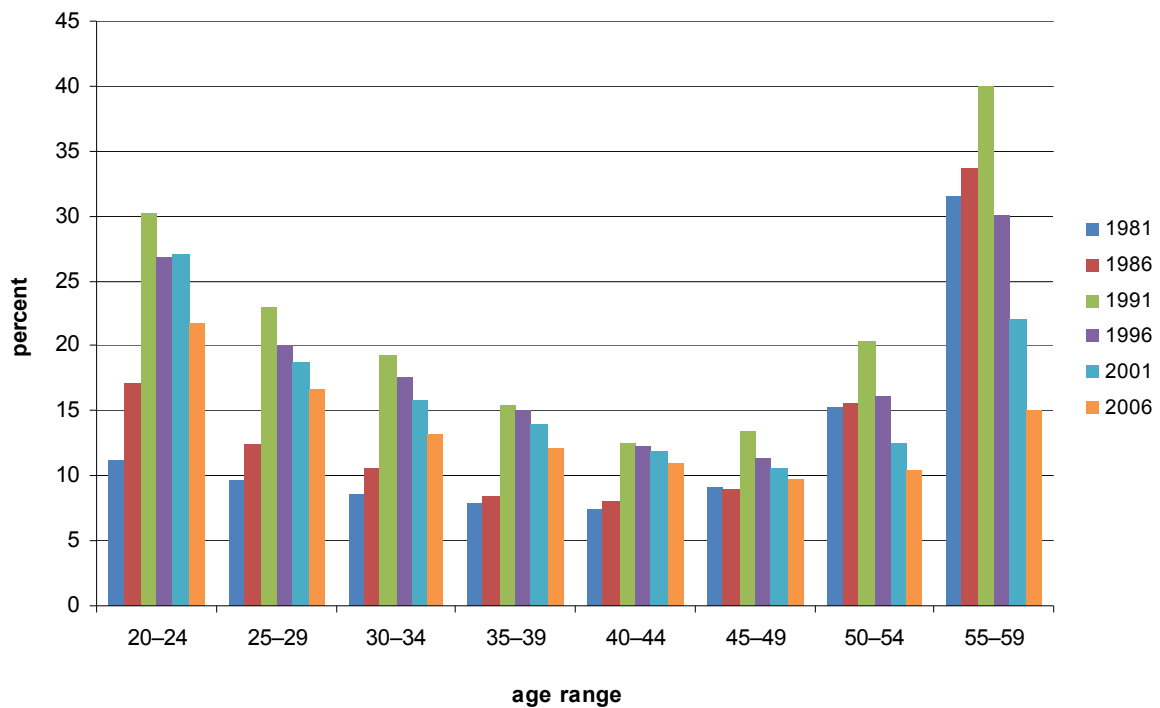
Relative declines within age-groups are best illustrated in Figure 2.4.1. While all age-groups experienced the sharp increase in worklessness in 1991, and a downward trend from then on, the magnitude of these shifts varied for different



age-groups. The most prominent feature in this graph is the large decline in the proportion of workless families with mothers aged 55–59.

Also apparent in this graph is that the decline between 2001 and 2006 was greatest among mothers in the 20–24 and 55–59 age-groups, which were the ones in families that experienced the highest levels of worklessness overall.

Apart from the large increase between 1986 and 1991, age appears to have more of an effect than period in influencing variation in worklessness, as measured by the variation in period effects across the age-groups. It should also be noted that the relative positions of age-groups on levels of worklessness varied over time.



**Figure 2.4.1 Percentage of families without parental paid work by census year within each age-group**

## 2.4.2. By cohort and age

Table 2.4.2 Percentage of families without parental paid work by birth cohort and age-group of mother

Age-group	1932–1936	1937–1941	1942–1946	1947–1951	1952–1956	1957–1961	1962–1966	1967–1971	1972–1976	1977–1981
20–24						11.2	17.2	30.2	26.8	27.0
25–29					9.6	12.4	23.0	20.1	18.8	16.6
30–34				8.6	10.5	19.3	17.6	15.9	13.2	
35–39			7.9	8.4	15.5	15.1	14.0	12.1		
40–44		7.4	8.0	12.6	12.3	11.9	11.0			
45–49	9.1	9.0	13.4	11.4	10.6	9.7				
50–54	15.6	20.3	16.1	12.5	10.4					
55–59	40.0	30.1	22.0	15.1						

Shaded = period effect visible in 1991.

### Cohort effect

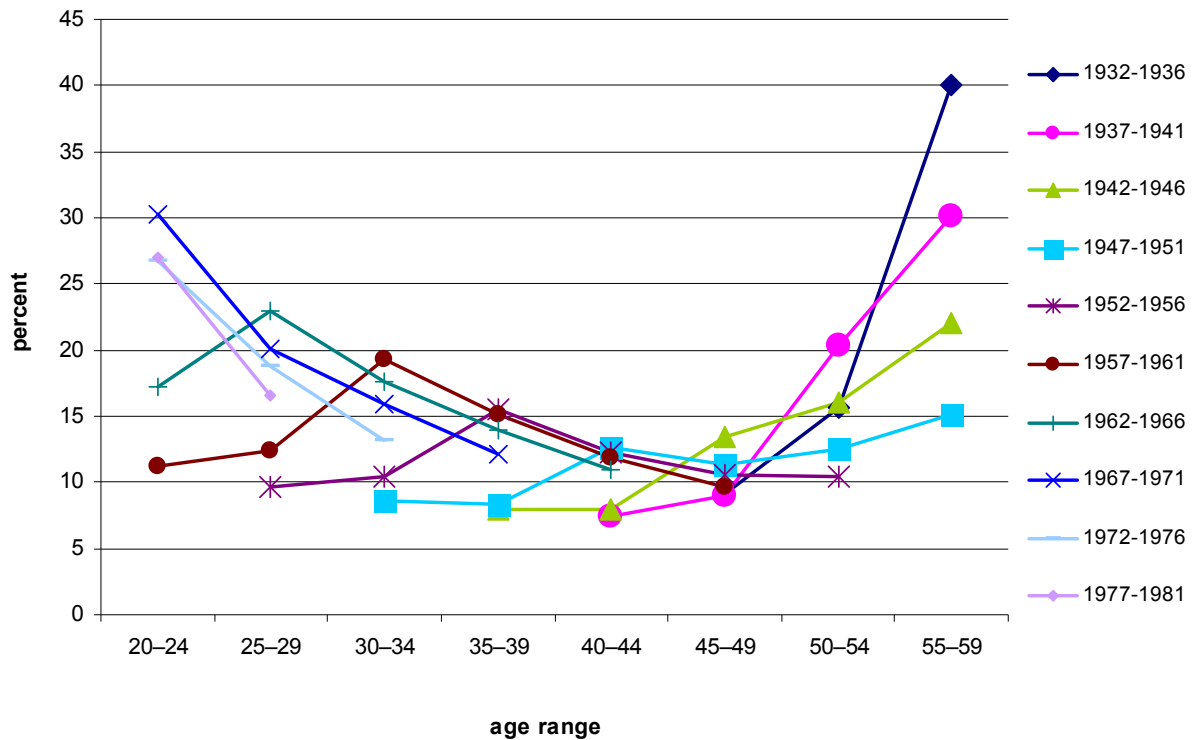
Looking at Table 2.4.2, the middle cohorts – born between 1947 and 1961 – did best, in terms of having families with at least one parent in paid work, with rates on this indicator of only 8 to 15 percent over most of the life-course. The most recent cohorts (born since 1967) appear to have been worst off, with over 15 percent of their families having no parent in paid employment over most of their life-course so far; that is, in their 20s and 30s. The cohorts prior to 1947 experienced the greatest range over the years for which data are available (40s and 50s age groups), from 8 to 40 percent.

To try to disentangle these effects, it is necessary to carry out a within age-group cohort analysis. Reading across the rows in Table 2.4.2, it is possible to discern the impact of the 1986–91 period effect of increasing worklessness across all ages (1991 figures are shaded). However, this pattern was less strong in the older age-groups and for the earlier cohorts (less difference between the 1986 and 1991 figures). These effects can be discerned in Figure 2.4.2, with the level of worklessness peaking for each cohort in each successive age-group, but with each the size of the peak declining also.

Other overall trends apparent in Figure 2.4.2 are the greater variation between cohorts at the two ends of the age range. These are the age-groups with the highest levels of worklessness. This seems to make them the most vulnerable to changes in employment status prompted by the period effects present in the data.

In the 20–24 age-group, because of the period effect of increased worklessness from 1986 to 1991, cohorts of families with mothers born from 1967 to 1981 were worse off than those that preceded them, as can be seen in Figures 2.4.2 and 2.4.3.

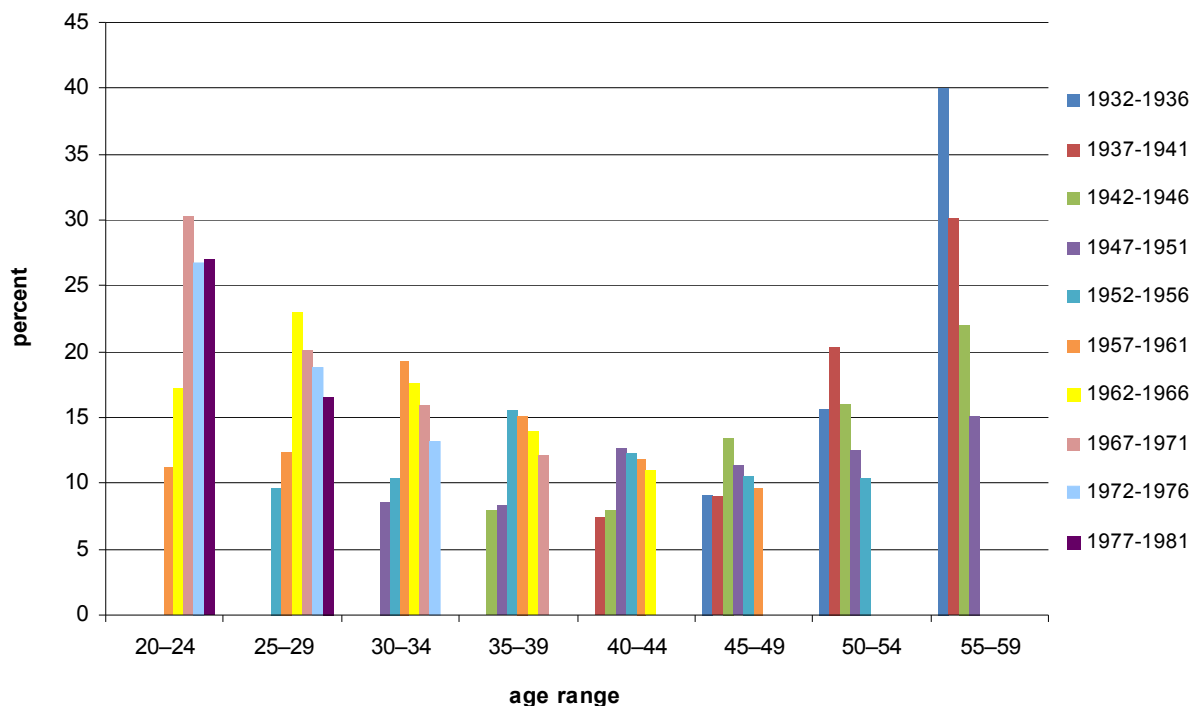
More recent cohorts have fared less well for paid work in the 20–24 age-group than those preceding them. Whether they will be worse off overall depends on trends in worklessness for them as they pass through their 30s, 40s and 50s. With the period improvement occurring since 1996 for all age-groups, the cohorts born 1967–81 are showing that they are doing better than their predecessors in their late 20s and 30s (Figure 2.4.2).



**Figure 2.4.2 Line graph: Percentage of families without parental paid work by cohort within each age-group**

While the earliest cohorts appear slightly worse off than those in the middle, this is partly due to their being in their 50s during a period of high unemployment. By contrast, Figure 2.4.3 shows that families with mothers in the 55–59 age-group had the most improvement for successive cohorts over time. Furthermore, although their earlier years are not covered by this dataset, they were in a time of high employment, so overall these cohorts may not have been relatively poorer in paid work.

In summary, cohort analysis shows a strong period effect resulting in each cohort experiencing high levels of worklessness in a different age-group. In addition, the extreme age-groups show particular vulnerability. However, all age-groups show the period effect of the most recent cohorts having improved levels of paid work, suggesting that the more recent cohorts will do better than their predecessors over their life-course. The 2008–09 downturn in the economy should have less effect on the more recent cohorts than on those at older ages and those just coming into their 20s, given that the peak age-groups for worklessness are the 20s and 50s.



**Figure 2.4.3 Bar graph: Percentage of families without parental paid work by cohort within each age-group**

### 2.4.3. Interpretation

The key effects on this measure are a general improvement in employment, after a low point in 1991, together with peaks in worklessness at each end of the age range. This results in the middle cohorts appearing to have the best outcomes, an effect that is influenced by the fact that data for earlier and later cohorts are restricted to the age-groups at which the greatest proportions of families are without paid work.

The apparently higher level of worklessness in families with mothers aged 20–24, compared to those in their 50s, that has occurred since 1991 – cohorts born since 1967 – is likely due to a combination of a change in social capital level of those who become mothers early in life, and changing employment patterns for older people.

The first explanation for the change in relative employment status by age is the link between employment and education. For more recent cohorts, there is a lower level of education among those who become parents early in life. This is in contrast with the older cohorts, where at one time the predominant norm was to have a first birth at 20–24. There may also be a link to the findings on health-related benefits, (Section 2.9) as these were relatively high for families with mothers aged 20–24 in 1996 and 2001, being the cohorts born 1972–81. However, the overall proportion of families receiving a health-related benefit is small.

The other notable effect is the high level of worklessness for the earliest cohorts in the study when they were in their fifties. This is an outcome that has improved markedly along with the general period trend since 1991, together with an increase in labour force participation for this age-group in recent years (Department of Labour, 2007). This is a combination of the increasing labour force participation of cohorts of women now reaching older ages, together with the impact of the gradual shift in the age of eligibility for superannuation from 60 to 65, beginning in 1992. Another factor

is likely to be that husbands are generally a few years older than their wives, and have also been increasingly likely to remain in the workforce in their late 50s and 60s. The high rate of worklessness for families in the cohort of women born 1932–36, at 55–59, may be partly due to the man being older and retired at 60.

The future outcomes for cohorts yet to progress through their earning years will likely depend on future period trends in employment. Due to a positive trend in employment, recent cohorts were doing better than their predecessors at the time of the last census data period (2006), except at age 20–24. Since then there has been an economic downturn, but that can be expected to affect those cohorts aged in their 20s and 50s during this present period more than the recent cohorts in this study. This means the middle cohorts that had been doing well up until 2006, and until recently looked set to continue that with increased labour force participation in their 50s, may now be faced with increasing levels of unemployment at the end of the family life-cycle stage.

## 2.5. Parental long hours worked

Definition: The proportion of families with at least one parent present (on census night) in the household working more than 48 hours a week.

### 2.5.1. By age and period

Table 2.5.1 Percentage of families with a parent working long hours by age-group of mother and census year

Age-group	1981	1986	1991	1996	2001	2006	Mean
20–24	23.5	28.0	22.6	26.1	23.2	24.8	24.8
25–29	29.9	32.9	29.4	32.9	31.2	29.7	31.0
30–34	33.8	36.4	33.4	36.4	34.5	33.6	34.7
35–39	35.0	38.6	36.3	39.5	36.4	34.9	36.9
40–44	33.1	37.6	37.6	41.9	39.1	36.5	37.9
45–49	29.0	33.6	34.6	41.4	40.8	38.2	37.1
50–54	23.2	26.5	27.7	35.6	37.9	37.7	32.4
55–59	14.9	16.8	17.0	23.8	28.6	31.3	22.9
Mean	28.5	32.4	31.2	35.9	35.2	34.3	

### Age effect

Looking at the column of mean values in the right hand panel of Table 2.5.1, it is apparent that households with at least one parent working more than 48 hours a week were most common – at 37.9 percent on average – in families where mothers were aged 40–44. However, the table also shows, reading down the columns, that the peak age-group for working long hours increased more or less steadily over time. Up to 1986, 35–39 was the peak; in 1991 it shifted to 40–44; and from 2001 it increased again, to 45–49.

### Period effect

The row of means in the bottom panel of Table 2.5.1 shows that the proportion of families with at least one parent working long hours has fluctuated over time. It began at a low 28.5 percent in 1981, rose in 1986, then fell slightly in 1991 before peaking in 1996 at 35.9 percent. There were slight declines in 2001 and 2006, but levels are still higher than they were prior to 1996. Together with a shift over time in the peak age for working long hours, this makes for complex age and period patterns on this indicator.

The shift in the peak age for working longer hours to older ages can be seen when looking across the rows in the table for the year at which each age-group peaked on this indicator. For those under 35, the peak was in 1986, at levels equal to those in 1996 for the 25–34 age-groups. But from age 40–49 the peak shifted to 1996, and from age 50 onwards long working hours peaked in 2001 and 2006. Given that there was an overall downturn on this indicator in 1991, this suggests a stronger age effect.

These patterns can be seen in Figure 2.5.1, although the most apparent visual features are the strong period effects at the older ages, especially 45+. Within each

of these age-groups there is a strong period gradient, while for the younger age-groups there is relatively little difference between census years.

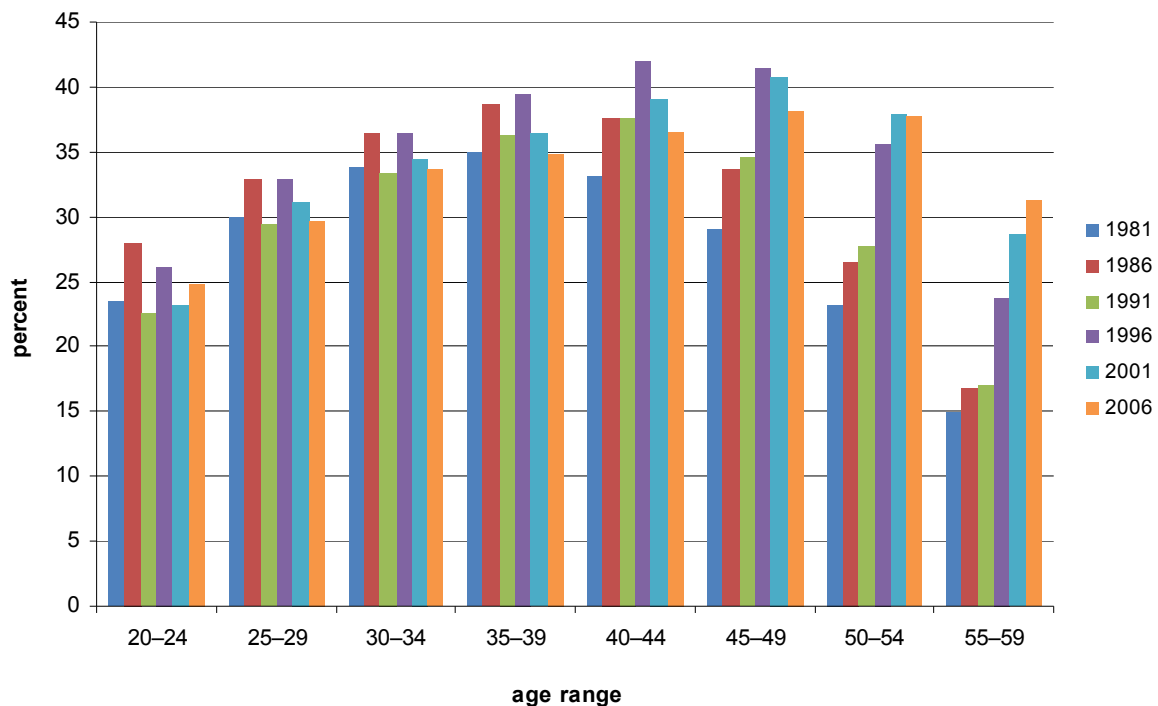


Figure 2.5.1 Percentage of families with a parent working long hours by census year within each age-group

## 2.5.2. By cohort and age

Table 2.5.2 Percentage of families with long hours worked by a parent by birth cohort and age-group of mother

Age-group	1932–1936	1937–1941	1942–1946	1947–1951	1952–1956	1957–1961	1962–1966	1967–1971	1972–1976	1977–1981
20–24						23.5	28.0	22.6	26.1	23.2
25–29					29.9	32.9	29.4	32.9	31.2	29.7
30–34				33.8	36.4	33.4	36.4	34.5	33.6	
35–39			28.6	37.9	40.8	39.1	36.4	34.9		
40–44		33.1	37.6	37.6	41.9	39.1	36.5			
45–49	29.0	33.6	34.6	41.4	40.8	38.2				
50–54	26.5	27.7	35.6	37.9	37.7					
55–59	17.0	23.8	28.6	31.3						

Shaded = period effect visible in 2006.

## Cohort effect

From Table 2.5.2, it can be seen that the middle cohorts of mothers born 1947–61 were the most likely to have families with at least one parent working long hours. This occurred between the ages of 35 and 49, ranging from 37.6 to 41.9 percent. This is likely due to the combined impact of the variable age and period effects discussed above. In other words, it is an outcome of this group being in their late

30s and 40s from 1996 to 2001, which were the peak ages and years for working long hours.

The cohorts with the next highest levels of working long hours were either side of the peak cohorts; that is, those born 1942–46, and those born 1962–66. This latter cohort experienced the high occurrence of long hours worked at age 20–24 prior to 1991. As this cohort was only aged 35–39 in 2001, and as long working hours are now being observed in families with mothers at older ages despite a general period decline, they could be expected to surpass the earlier cohorts for long hours overall by the time they reach 59. Whether the more recent cohorts will exceed their predecessors for working long hours as they move into their 30s, 40s and 50s will depend on future trends in this indicator; that is, the impact of period effects.

From Figure 2.5.2 it can be seen that the biggest cohort differences in working long hours occurred in the 35+ age-groups, as depicted by the wider gaps between the cohort lines. The direction of these cohort shifts varies by age, as seen in Figure 2.5.3, with a decline in the proportion of families with at least one parent working long hours for more recent cohorts with a mother aged under 50, and an increase for the most recent cohorts of families with a mother in the 50–59 age-groups. Families with mothers aged 55–59 were the only ones showing an increase in 2006, against a general period decline from 2001.

In summary, there is such a mixed pattern of age and period effects combining to affect cohorts on this indicator, that while the middle cohorts have been worst off as a result of these combinations to date, the outcome for those cohorts yet to progress into the peak longer hours age-groups will depend on future period trends.

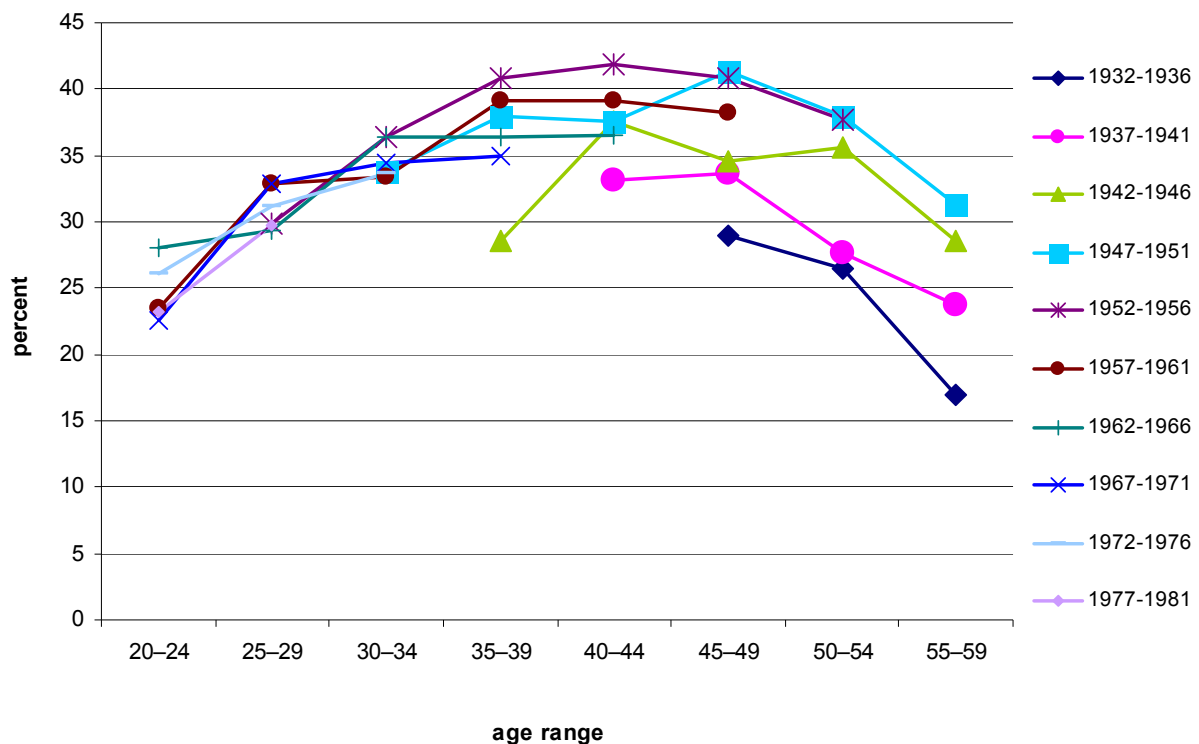
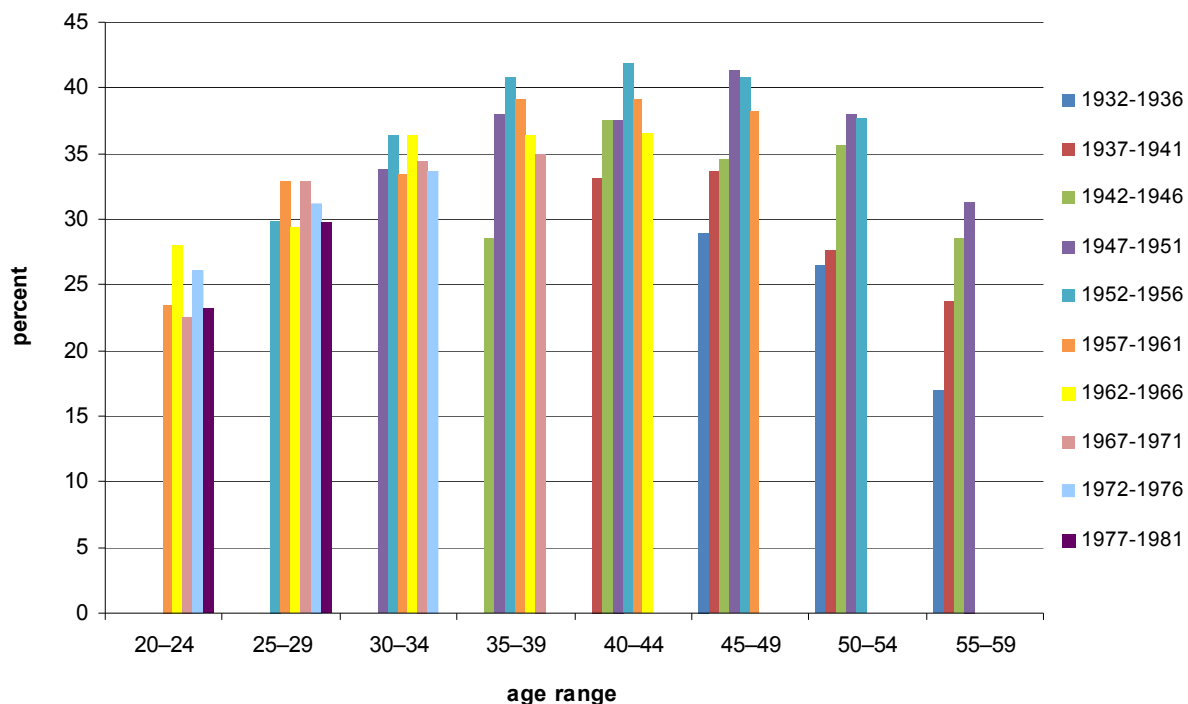


Figure 2.5.2 Line graph: Percentage of families with a parent working long hours by cohort within each age-group





**Figure 2.5.3 Bar graph: Percentage of families with a parent working long hours by cohort within each age-group**

### 2.5.3. Interpretation

The peak period effects (1996–2001) and age effects (35–44) combine to result in the middle cohorts of families, those with mothers born 1947–61, being the most likely to have at least one parent working long hours. There is also a continuing increase in working long hours for those with mothers in their 50s and those aged 20–24, but the younger group is still much less likely to show long hours worked.

Working long hours is likely to be related to needing the income to support a growing family, rising to higher levels of responsibility in the workplace and, more recently, the need to provide financially for retirement. All of these can be related to a shifting age peak in working long hours for later cohorts, since these groups had children later. Additionally, those in their 50s feel a greater need to make their own provision for retirement than earlier cohorts. These factors have occurred at a time when longer hours are being required in some occupational groups.

It would appear that while, in general, the level of working long hours has peaked, showing an overall decline since 1996, it has increased or remained steady for those families with mothers in their 50s or aged 20–24.

Unless there is a further change in the trend for working long hours, the more recent cohorts are likely to experience a lower level than their predecessors on this indicator as they progress through the peak ages for working long hours.

## 2.6. Lack of home ownership

Definition: The proportion of families that do not live in owner-occupied dwellings.

### 2.6.1. By age and period

Table 2.6.1 Percentage of families not living in owner-occupied dwellings by age-group of mother and census year

Age-group	1981	1986	1991	1996	2001	2006	Mean
20–24	60.2	57.8	58.1	66.9	71.2	75.2	63.8
25–29	36.4	36.6	36.7	47.1	52.9	61.2	43.9
30–34	25.5	24.7	25.8	32.6	38.8	46.2	32.0
35–39	21.4	19.7	20.2	24.7	30.3	38.4	26.0
40–44	19.6	17.9	17.1	20.0	25.0	32.4	22.4
45–49	18.8	16.7	15.8	17.1	21.2	27.0	19.8
50–54	17.6	15.8	14.9	16.1	19.1	23.4	18.1
55–59	17.1	14.7	14.3	15.5	18.4	21.4	17.1
Mean	27.1	25.5	25.4	30.0	34.6	40.7	

#### Age effect

As expected, given the time it takes to amass a deposit and reach the earning capacity to service a mortgage, home ownership for families increased with the age of the mother. As can be seen in the right hand panel of Table 2.6.1, the proportion not owning their own home was at its lowest among mothers in their late 50s. The proportion declined as age increased overall, from 63.8 percent at age 20–24 to 17.1 percent at 55–59.

#### Period effect

Following the row of mean values in the bottom panel of Table 2.6.1, it can be seen that what was a slow downward trend in families not living in owner-occupied dwellings from 27.1 percent in 1981 to 25.5 percent in 1986, was levelling out in 1991, before a marked increase to 30 percent in 1996. This upward trend continued through to 34.6 percent in 2001, and rose even more sharply to 40.7 percent in 2006.

The increase from 1991 to 2006 applied at all ages, but for those in their 20s and 30s the increase, though slight, had begun between 1986 and 1991, and was larger than for those at older ages. This can be seen in Figure 2.6.1.

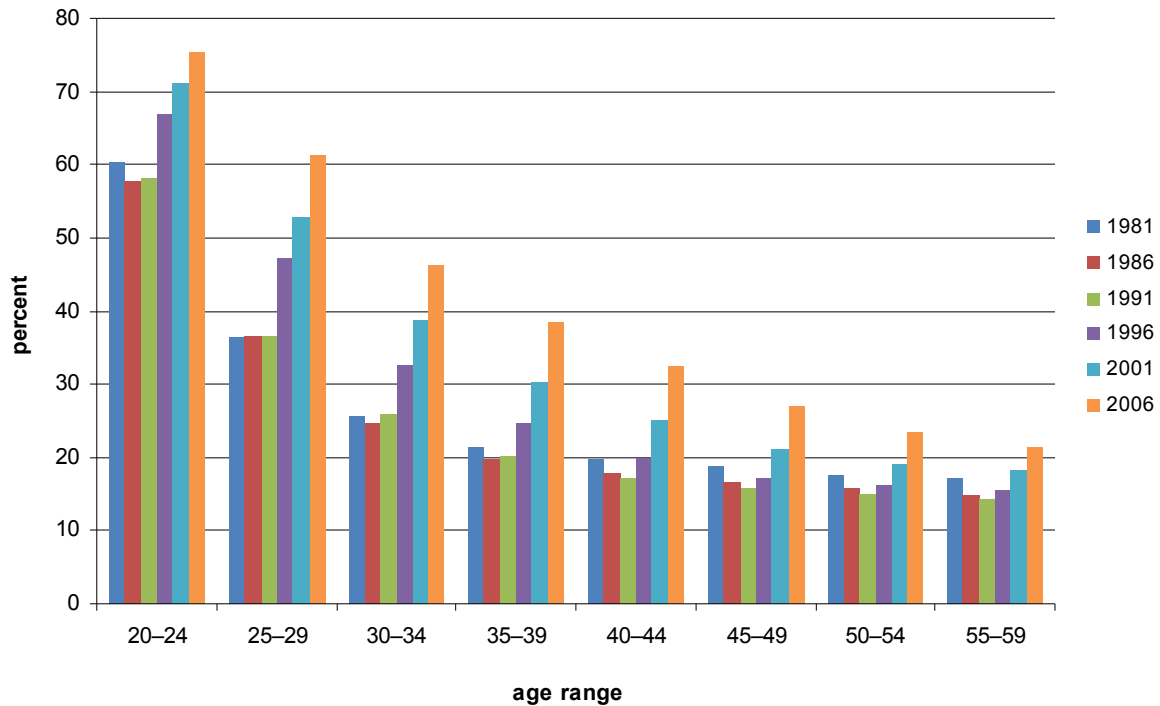


Figure 2.6.1 Percentage of families not living in owner-occupied dwellings by census year within each age-group

## 2.6.2. By cohort and age

Table 2.6.2 Percentage of families not living in owner-occupied dwellings by birth cohort and age-group of mother

Age-group	1932–1936	1937–1941	1942–1946	1947–1951	1952–1956	1957–1961	1962–1966	1967–1971	1972–1976	1977–1981
20–24						60.2	57.8	58.1	66.9	71.2
25–29					36.4	36.6	36.7	47.1	52.9	61.2
30–34				25.5	24.7	25.8	32.6	38.8	46.2	
35–39			21.4	19.7	20.2	24.7	30.3	38.4		
40–44		19.6	17.9	17.1	20.0	25.0	32.4			
45–49	18.8	16.7	15.8	17.1	21.2	27.0				
50–54	15.8	14.9	16.1	19.1	23.4					
55–59	14.3	15.5	18.4	21.4						

Shaded = period effect of a decline in home ownership since 1991.

### Cohort effect

There was a decline in home ownership for the most recent cohorts in all age groups, reflecting the period trend of a decline after 1991.

Looking at cohort differences within age-groups by reading across the rows in Table 2.6.2, it was after 1991 (the shaded cell in each row) that home ownership started to decline for families with mothers aged in their 20s and 30s. This decline in the younger age-groups was, and is, more marked than the decline that occurred at older ages, as can be seen in Figure 2.6.3. This shows that the increasing proportion of successive cohorts not owning their own home was greater at younger

ages. Thus, while the period effect of the decline in home ownership since 1991 can be seen at all ages, there is also an age effect that is greater at younger ages. Taking these two effects together, this translates into the most recent cohorts being more disadvantaged than previous cohorts at the start of the family life-course.

Figure 2.6.2 shows that although cohorts born since 1957 improved their rates of ownership as they aged, by their mid 30s or 40s (for those where data are available) they had not caught up with their predecessors. This is reflected in the fact that the line for each new cohort in Figure 2.6.2 is higher than the preceding one at all ages, despite a general downward trend for each line from the early 20s into the 30s.

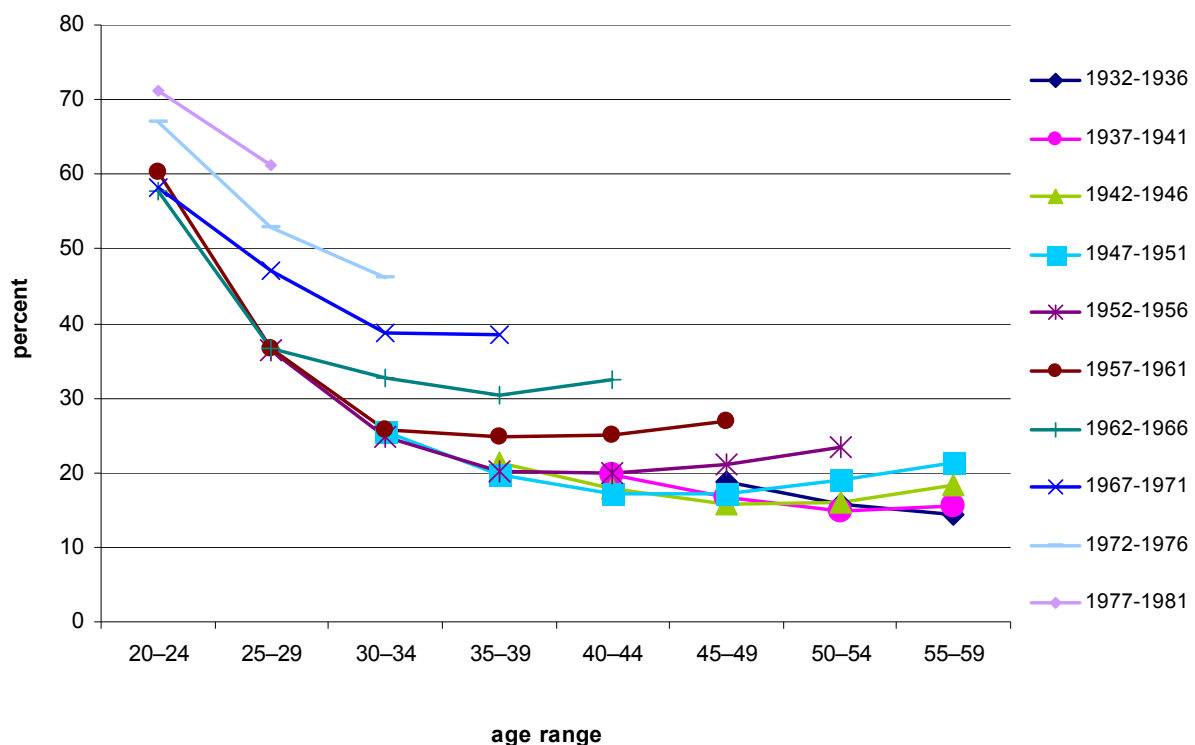
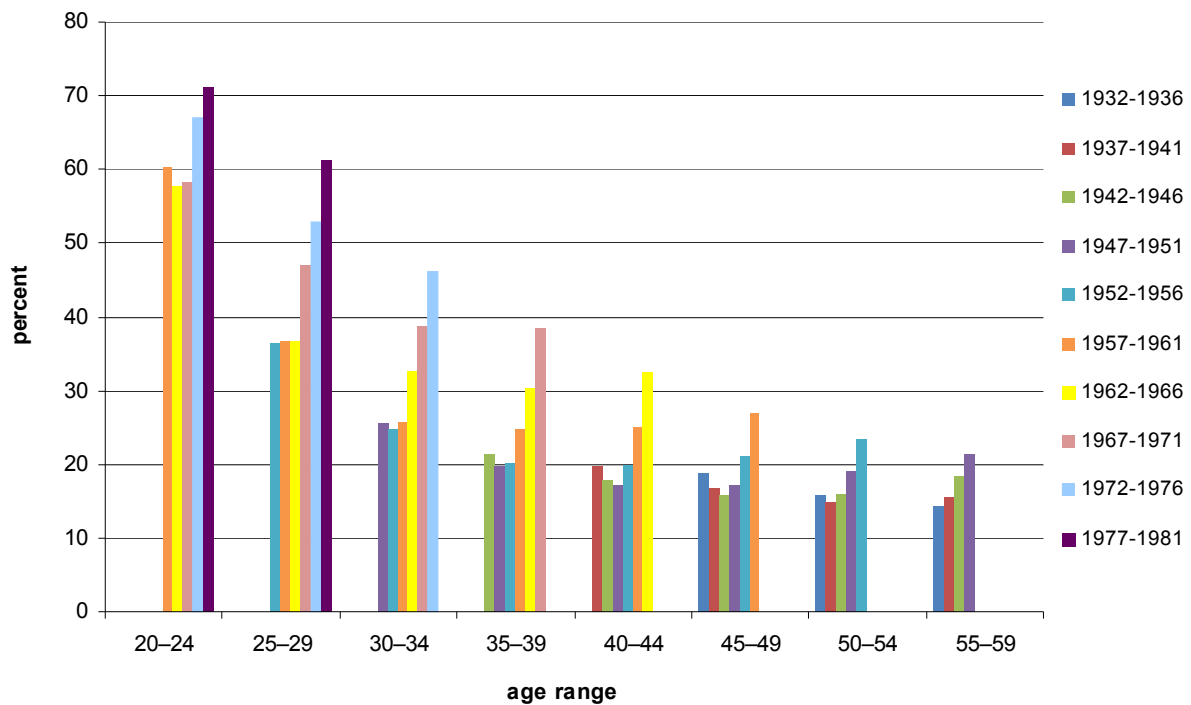


Figure 2.6.2 Line graph: Percentage of families not living in owner-occupied dwellings by cohort within each age-group



**Figure 2.6.3 Bar graph: Percentage of families not living in owner-occupied dwellings by cohort within each age-group**

### 2.6.3. Interpretation

Home ownership increases with age (and income), but has been declining since 1996. As a result, cohorts of families with mothers aged in their 20s and 30s in 1996 and 2001 (born since 1967) had markedly lower levels of home ownership than those that preceded them.

More statistically detailed cohort analysis of housing tenure over the period 1991–2006 by Morrison (2008) confirms that young families experienced a greater decline in home ownership than older families, even after age and census year effects are taken into account. The Department of Prime Minister and Cabinet (DPMC) report (2008) also shows that from 1986 to 2006 the greatest falls in home ownership were at ages 25–29 and 30–34. Morrison’s analysis also showed that this decline is not due just to a delay in the age at which cohorts start buying their own homes, but is likely to be a lifetime decline in home ownership relative to previous cohorts, with the pattern of declining home ownership projected to continue (DPMC, 2008). This is also an international phenomenon that is not just confined to New Zealand.

An example from Morrison’s cohort comparison is that while the cohort born in 1956 had a 75 percent chance of home ownership over a lifetime, for those born in 1971 the level was only 58 percent.

The level of decline is related to income, with those in the lowest quartile experiencing the greatest decline (Morrison, 2007). Family income is related to the number of earners and the level of their earnings, which in turn may be related to education of both parents. Thus the poor home ownership level of those families with mothers aged in their 20s and 30s may also be attributable to the lower education level of these mothers relative to earlier cohorts, as outlined earlier in this report.

## 2.7. Low rental affordability

Definition: The proportion of families living in rented dwellings, whose weekly rent is greater than 25 percent of the gross equivalised household income.

### 2.7.1. By age and period

Table 2.7.1 Percentage of families living in rented dwellings with low rental affordability by age-group and census year

Age-group	1981	1986	1991	1996	2001	2006	mean
20–24	23.2	26.2	41.4	49.8	49.9	47.6	38.1
25–29	27.7	29.7	44.6	49.8	47.8	46.1	41.2
30–34	30.6	34.4	50.9	57.7	53.3	50.8	47.5
35–39	29.2	31.9	49.8	59.8	55.9	53.6	48.9
40–44	24.0	25.6	41.0	53.9	51.9	50.3	43.9
45–49	20.9	21.9	34.8	46.8	43.1	43.9	37.4
50–54	20.3	19.0	32.5	45.8	39.2	37.9	33.3
55–59	21.4	17.7	30.7	48.5	41.0	37.9	32.7
Mean	25.5	27.8	43.3	52.5	49.6	47.5	

### Age effect

As can be seen from the column of mean values in the right-hand panel of Table 2.7.1, the highest proportions of families experiencing low rental affordability – nearly 50 percent of those in rental accommodation – occurred for those with mothers in their 30s, followed by those younger and those in the 40–44 age-group. From the 45–49 age-group, the rate of low rental affordability steadily decreased with age. About one-third of families with mothers aged in their 50s and living in rented dwellings experienced low affordability.

The peak ages for low rental affordability in all census years included in this analysis were for families with mothers aged 30–39. A slight shift was apparent between 1991 and 1996, from 30–34 to 35–39 as the highest age-group, as seen in Table 2.7.1.

### Period effect

The proportion of families experiencing low rental affordability was at its lowest before 1991. From 1986 to 1991, and through to 1996, there was a steady and relatively steep increase in levels of low affordability, from 27.8 percent to 52.5 percent, as shown in the row of mean values in the bottom panel of Table 2.7.1. From 1996 this trend reversed, with a less steep decline in the proportions experiencing low affordability through to 47.5 percent in 2006.

The peak year for low rental affordability was 1996, for all age-groups of mothers except 20–24, where it remained stable in 2001, as depicted in Figure 2.7.1.

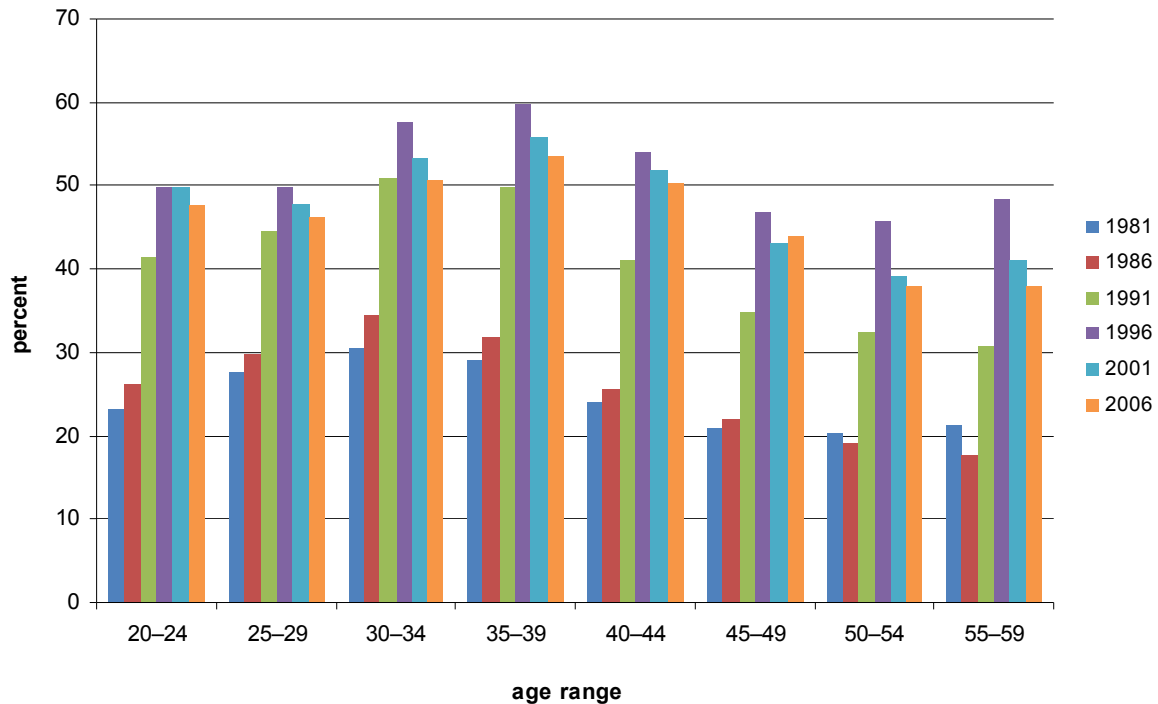


Figure 2.7.1 Percentage of families living in rented dwellings with low rental affordability by census year within each age-group

## 2.7.2. By cohort and age

Table 2.7.2 Percentage of families living in rented dwellings with low rental affordability by birth cohort and age-group of mother

Age-group	1932–1936	1937–1941	1942–1946	1947–1951	1952–1956	1957–1961	1962–1966	1967–1971	1972–1976	1977–1981
20–24						23.2	26.2	41.4	49.8	49.9
25–29					27.7	29.7	44.6	49.8	47.8	46.1
30–34				30.6	34.4	50.9	57.7	53.3	50.8	
35–39			29.2	31.9	49.8	59.8	55.9	53.6		
40–44		24.0	25.6	41.0	53.9	51.9	50.3			
45–49	20.9	21.9	34.8	46.8	43.1	43.9				
50–54	19.0	32.5	45.8	39.2	37.9					
55–59	30.7	48.5	41.0	37.9						

Shaded = period effect visible from 1996.

## Cohort effect

There was a very strong period effect of low rental affordability in 1996 apparent for all cohorts (the shaded cells in Table 2.7.2). Conversely, the age effect peak at 35–39 seen in Table 2.7.1 is not strong overall – the peak age-group is different for each cohort (seen by looking down each column) as the peak age-group for most of the cohorts occurred in 1996. These effects translate into a cohort effect of peak levels of low rental affordability for families of the cohorts of mothers born 1957–71 (for those cohorts for whom data are available at ages 30–39), with just over half of them experiencing this disadvantage.

Cohorts of families with mothers born 1967–1981 experienced low rental affordability at very high levels when the mothers were in their 20s and early 30s: almost half of them, compared with around a quarter for earlier cohorts at these ages (see Figure 2.8.3). There is a cohort effect of declining affordability for families with mothers aged 20–24 from 1996, which is inconsistent with the general period improvement. If this were to continue, it would adversely affect the recent cohorts that are yet to reach the peak ages for low rental affordability as experienced by previous cohorts.

Reading down the columns in Table 2.7.2 it can be seen that the more recent cohorts have not experienced such a large decline in affordability as earlier cohorts as they have moved into their 30s. This is due to an upward period trend following the 1996 low point for them at these ages. These patterns can be discerned in Figure 2.7.2 where the families of cohorts of mothers born 1957–66 show high and increasing rates of low rental affordability in their 30s, while those born since 1967 show lower levels for these age-groups.

If the period trend of a positive direction in rental affordability seen 1996–2006 continues, these cohorts are not likely to experience lower levels of affordability than the older cohorts did from 1991 to 2001. But if rental affordability declines again, these cohorts could also experience low rental affordability when mothers are in their 30s, and thus equal or surpass the earlier cohorts in this respect.

In summary, while there is some improvement for the most recent cohorts in every age-group except 20–24, they still do not experience the level of rental affordability enjoyed by the earlier cohorts that reached each age-group prior to the low levels of 1996. This can be most clearly seen in Figure 2.7.3.

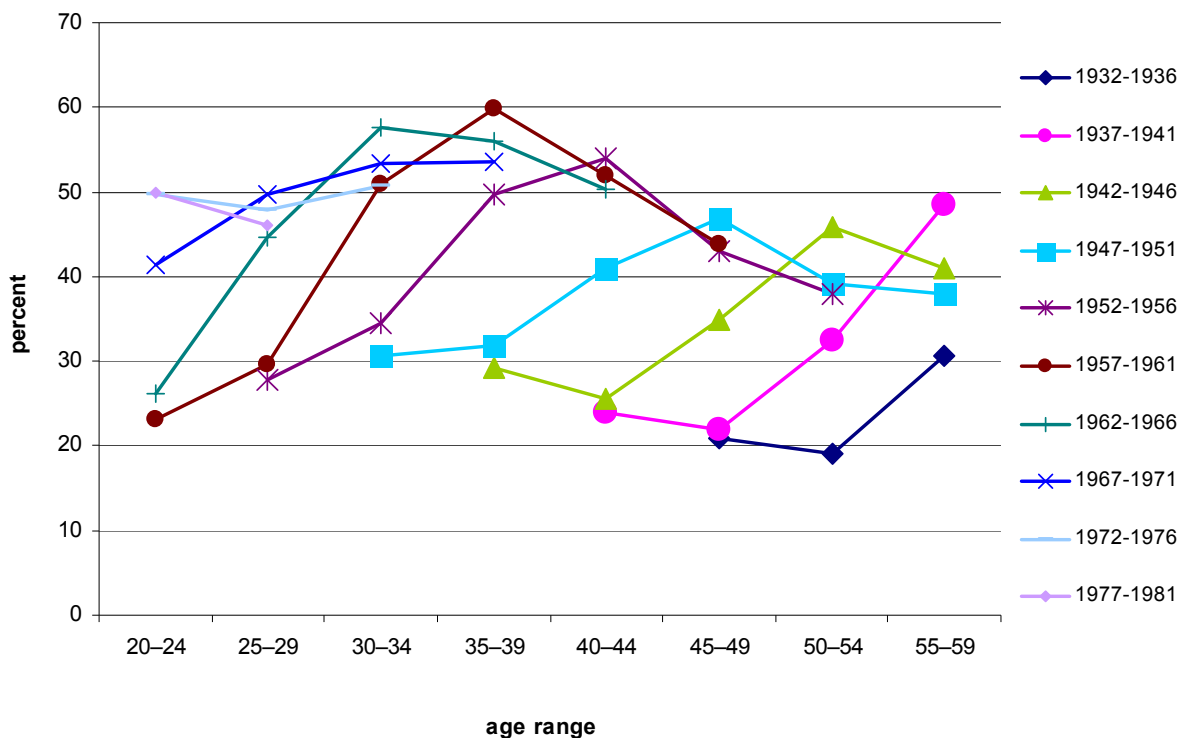
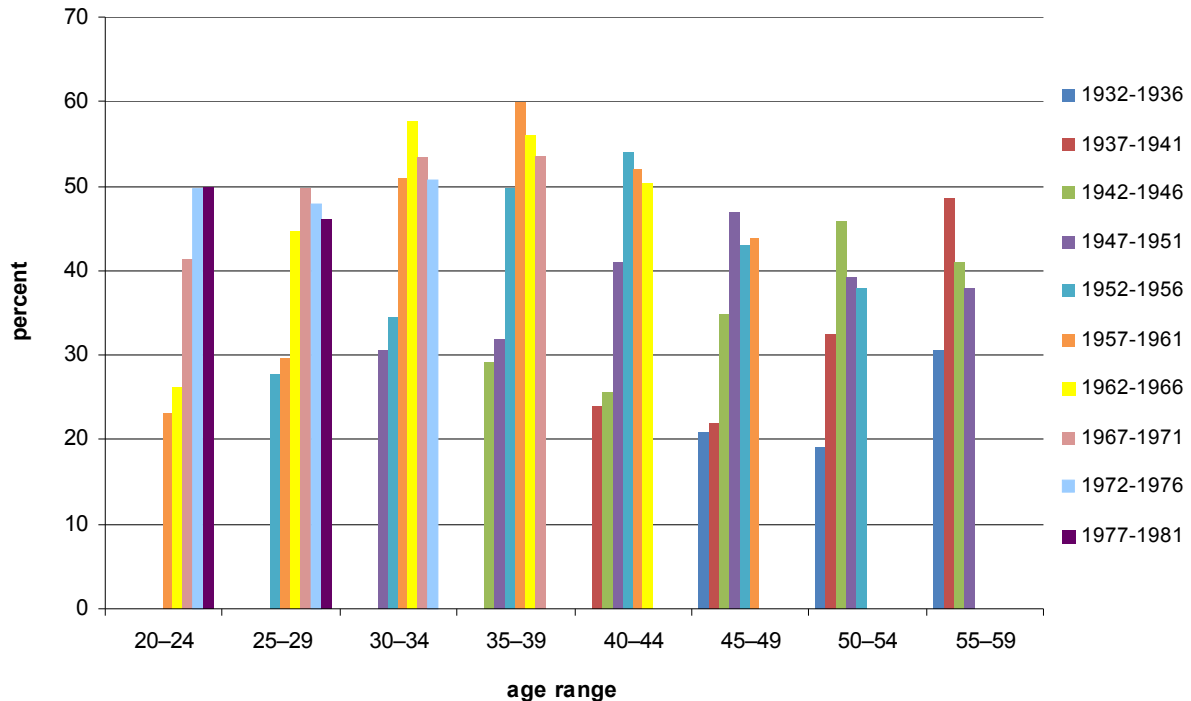


Figure 2.7.2 Line graph: Percentage of families living in rented dwellings with low rental affordability by cohort within each age-group





**Figure 2.7.3 Bar graph: Percentage of families living in rented dwellings with low rental affordability by cohort within each age-group**

### 2.7.3. Interpretation

Low levels of rental affordability in the 30s and early 40s age-groups, combined with declining affordability since 1986, have resulted in the highest levels of rental difficulty for cohorts with mothers born 1957–71. The other key pattern emerging is the low levels of affordability that more recent cohorts are showing at earlier ages.

This is largely a period effect of changing affordability of rental housing, in part related to the move to market-based rents introduced in 1993. However, it is combined with the fact that recent cohorts of young families are more likely to be less educated and therefore on lower incomes when compared with parents in their early 20s in preceding cohorts. The difference there is that for earlier cohorts, the early 20s age-group was the main one for people of all socio-economic levels to begin families. Families are also more likely to be on a single income when children are very young (McPherson, 2005).

The DPMC report (2008) identifies those under 45 (and particularly under 25), those on low incomes with children, and those who are not in paid work as experiencing the greatest problems with rental affordability.

Callister’s (2006) analysis of cohort data by age showed that the proportion of couples with both members employed has increased across cohorts and age-groups, with the strongest growth at ages 25–39. He notes that this reflects increased employment of mothers, especially those who are well-educated. At the same time there has been a polarisation of families into those with no parent in work and others with dual incomes (Singley and Callister, 2003). These effects are likely to flow through into housing outcomes for cohorts of families.

## 2.8. Household crowding

Definition: the proportion of families living in dwellings that require at least one additional bedroom to meet the sleeping needs of the household. For more detail see Appendix C.2.

### 2.8.1. By age and period

Table 2.8.1 Percentage of families living in crowded dwellings by age-group of mother and census year

Age-group	1981	1986	1991	1996	2001	2006	Mean
20–24	7.3	10.8	10.8	12.1	11.0	11.7	10.4
25–29	7.3	8.6	8.2	8.6	7.5	8.8	8.1
30–34	16.9	16.0	13.3	11.6	9.9	9.7	12.9
35–39	29.5	23.3	18.2	15.1	12.6	11.6	17.6
40–44	27.1	21.0	14.7	11.7	11.0	11.2	15.0
45–49	16.5	13.2	9.1	6.2	6.1	7.1	8.9
50–54	8.4	7.2	5.6	3.9	2.8	3.8	4.9
55–59	4.1	3.9	3.5	2.8	1.9	2.0	2.9
Mean	14.8	13.8	11.3	9.6	8.1	8.2	

### Age effect

Household crowding for families peaked when mothers were aged 35–39, followed by 40–44, as can be seen in the column of means in the right hand panel of Table 2.8.1. Looking down the columns in the main part of the table shows that this applied for all census years included in this study.

### Period effect

There was on average a continual downward trend in household crowding for all families over time from 1981 to 2001, with the main drop happening between 1986 and 1991 (bottom panel, Table 2.8.1). There were two smaller intercensal drops through to 2001, then the rate of household crowding stabilised, increasing only marginally in 2006 from 8.1 to 8.2 percent.

The period effect varied for the different age-groups. The biggest declines in household crowding happened in the peak age-groups of 35–39 and 40–44 between 1981 and 1991, as can be clearly seen in Figure 2.8.1.

The 20–24, and to a lesser extent 25–29 age-groups, showed a different pattern to the older groups, with a slight increase between 1981 and 1986, and relative stability from 1986 to 1991. By contrast, crowding at older ages was declining during this time.

Figure 2.8.1 also shows that the overall increase in crowding between 2001 and 2006 occurred in all age-groups except 30–34 and 35–39, the latter being the peak age-group on this indicator.

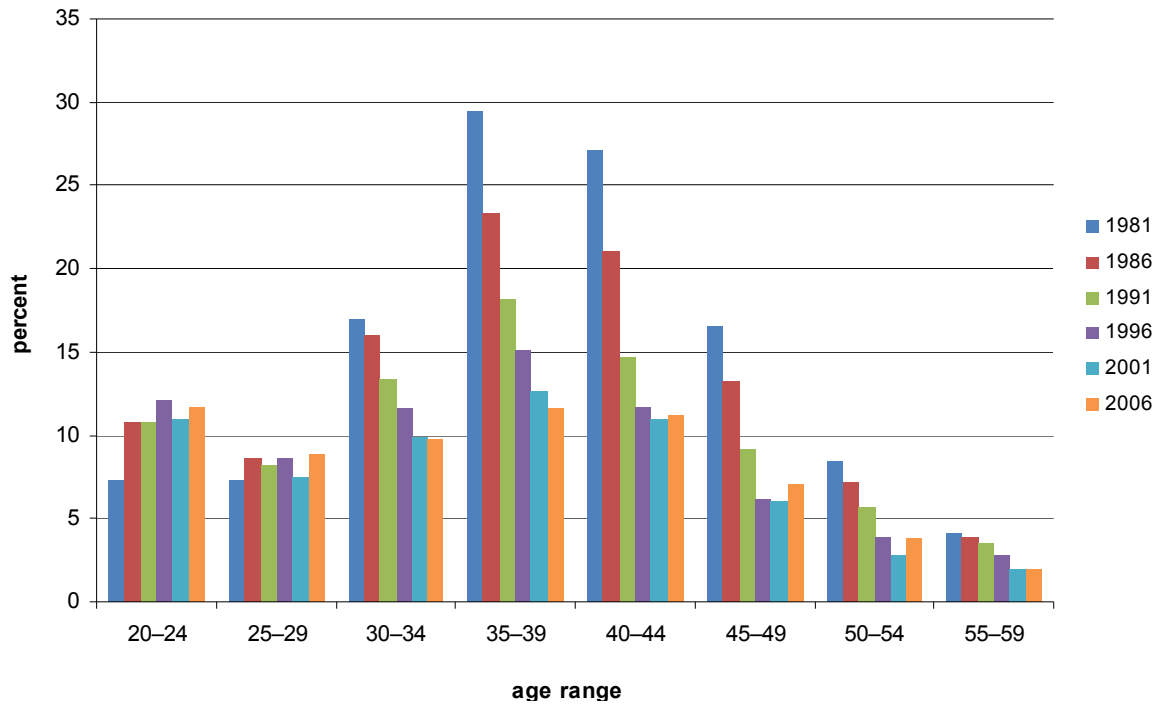


Figure 2.8.1 Percentage of families living in crowded dwellings by census year within each age-group

## 2.8.2. By cohort and age

Table 2.8.2 Percentage of families living in crowded dwellings by birth cohort and age-group of mother

Age-group	1932–1936	1937–1941	1942–1946	1947–1951	1952–1956	1957–1961	1962–1966	1967–1971	1972–1976	1977–1981
20–24						7.3	10.8	10.8	12.1	11.0
25–29					7.3	8.6	8.2	8.6	7.5	8.8
30–34				16.9	16.0	13.3	11.6	9.9	9.7	
35–39			29.5	23.3	18.2	15.1	12.6	11.6		
40–44		27.1	21.0	14.7	11.7	11.0	11.2			
45–49	16.5	13.2	9.1	6.2	6.1	7.1				
50–54	7.2	5.6	3.9	2.8	3.8					
55–59	3.5	2.8	1.9	2.0						

### Cohort effect

The variable age and period patterns for household crowding translate into a complex cohort pattern. However, the high periods of 1981 and 1986 and the peak age groups of 35–44 combine to produce the highest proportions of families living in crowded dwellings for the cohorts born 1937–51 between the ages of 35 and 44, ranging from 21 percent to 29.5 percent (Table 2.8.2). These peaks are clearly depicted in Figures 2.8.2 and 2.8.3.

The most recent cohorts in the study showed a different pattern, having higher levels of crowding at 20–24 than their predecessors, and being closer to or surpassing those at older ages, as can be seen in Figure 2.8.3. These recent cohorts, born 1972–76 and 1977–81, experienced crowding at a young age, even though in a

period of relatively low crowding overall, 1996–2001. But they also showed a decline in crowding as they moved into their late 20s, as seen in Figure 2.8.2. Thus it is hard to say what their experience will be once they reach the peak crowding ages for families in the past of 30–44. Figure 2.8.2 shows that previous cohorts saw sharp increases in crowding as they moved into the 30–34 age-group, but it is also apparent that the levels of crowding at 30–34 and 35–39 have been lower for the most recent cohorts reaching these ages, up until those born 1972–76 (which equalled the previous cohort at age 30–34).

In summary, there is no clear cohort pattern, with the patterns within each age-group differing. Over age 30, more recent cohorts are generally doing better, especially in the 35–44 age-groups. At 20–24 the recent cohorts are doing worse and at 25–29 there is little difference among cohorts. This indicator is generally improving for families, but there is within-cohort diversity of outcomes, with families with younger mothers not showing improvement.

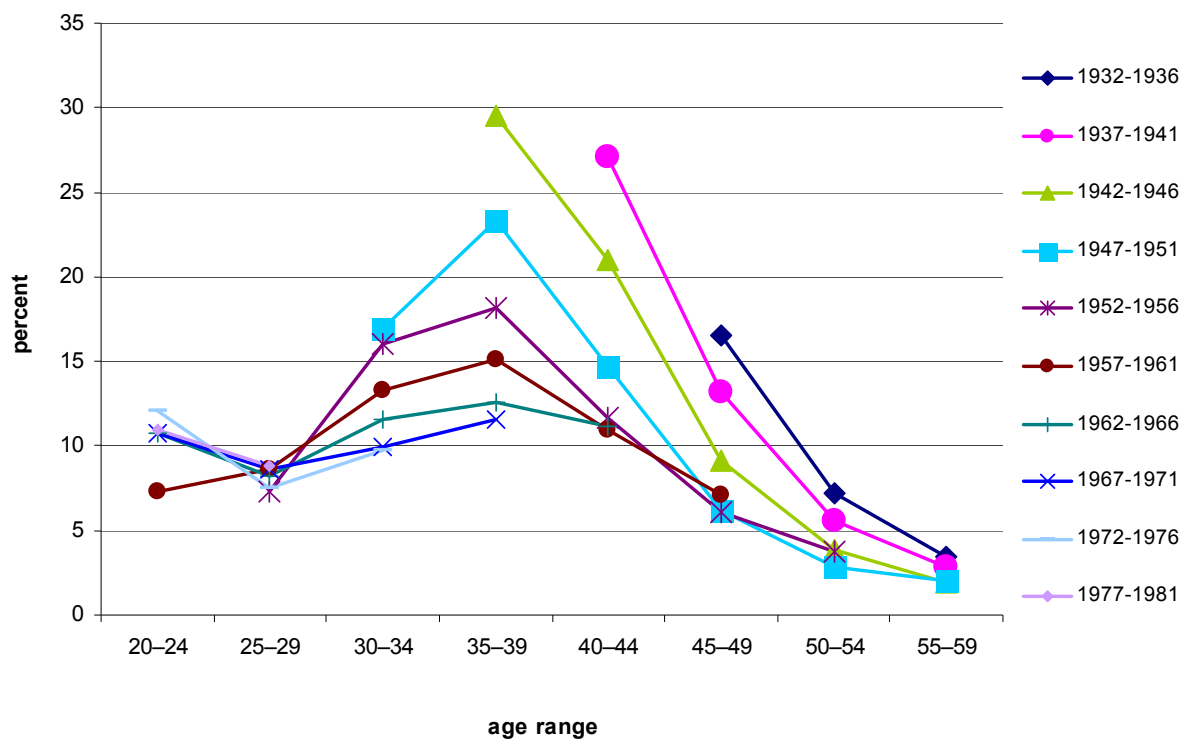
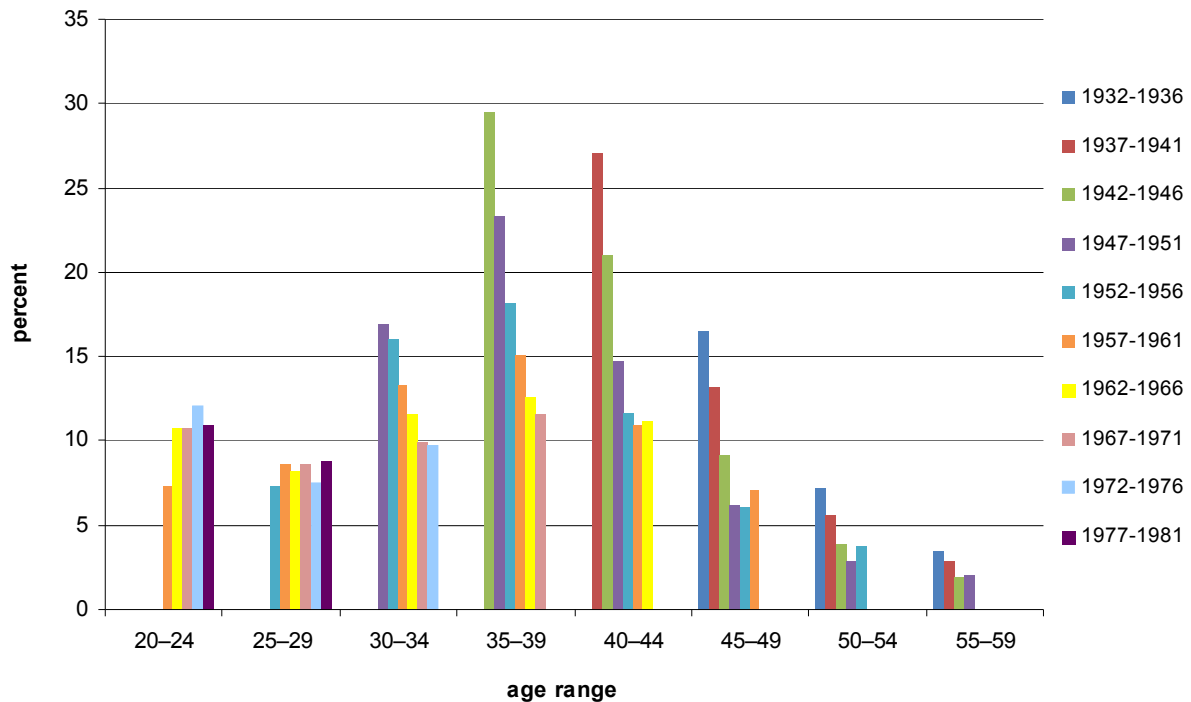


Figure 2.8.2 Line graph: Percentage of families living in crowded dwellings by cohort within each age-group



**Figure 2.8.3 Bar graph: Percentage of families living in crowded dwellings by cohort within each age-group**

### 2.8.3. Interpretation

While there is no clear cohort pattern, crowding is generally declining, and if that continues, more recent cohorts of families coming through the peak ages of 35–44 in the future could be expected to experience lower rates of crowding than the cohorts that preceded them.

However, these most recent cohorts in the analysis, born 1972–81, have shown relatively more crowding in their early 20s, and though their situation improved at 25–29, they have not so far followed the pattern of lower levels than their predecessors at 30–34.

The indications so far are that the cohorts born since 1972 are not doing better than their predecessors on this indicator, despite these cohorts having smaller family sizes than earlier cohorts. This may be due to a combination of disadvantage factors associated with those who became parents in their early 20s in recent cohorts compared to previous cohorts in that age-group. They have had lower incomes and relatively high levels of worklessness, been more likely to be receiving a health-related benefit, and been experiencing higher rates of low rental affordability.

Peak household crowding in the late 30s and early 40s may also be due to a combination of factors: having more children than in earlier years of the family life-course but not yet having reached the ages at which incomes, particularly dual incomes from female labour force participation with mothers working full-time as children get older, allow purchase of larger accommodation.

As mothers age into their later 40s and 50s, the oldest child is more likely to start leaving home, thus reducing household crowding at the older ages. The cohorts in this study with the highest levels of household crowding at these ages, those born 1937–51, generally had more children than the cohorts that followed.

Data from the Social Report 2007 (Ministry of Social Development, 2008) shows that the decline in household crowding plateaued in 2006. However, Cotterell, et al.'s (2008) analysis of crowding for different family types from 1981 to 2006 shows that while it plateaued for couples with dependent children in 2006, it increased for single parents with dependent children.

## 2.9. Health-related benefits

Definition: The proportion of families with at least one parent present (on census night) in the household receiving a sickness or invalid's benefit.

### 2.9.1. By age and period

Table 2.9.1 Percentage of families with a parent in receipt of a health-related benefit by age-group and census year

Age-group	1981	1986	1991	1996	2001	2006	Mean
20–24	1.3	3.4	3.4	6.8	5.8	6.4	4.3
25–29	1.0	1.9	2.1	3.9	3.6	4.1	2.7
30–34	1.0	1.8	2.0	3.5	3.6	3.9	2.6
35–39	1.2	1.7	2.3	3.6	4.1	4.5	3.0
40–44	1.5	2.2	3.1	4.2	4.7	5.6	3.8
45–49	2.3	3.3	4.6	5.3	5.8	6.4	4.9
50–54	2.9	4.3	6.4	7.3	7.6	8.1	6.4
55–59	3.2	4.4	6.6	8.5	10.0	10.3	7.5
Mean	1.7	2.7	3.4	5.0	5.4	6.1	

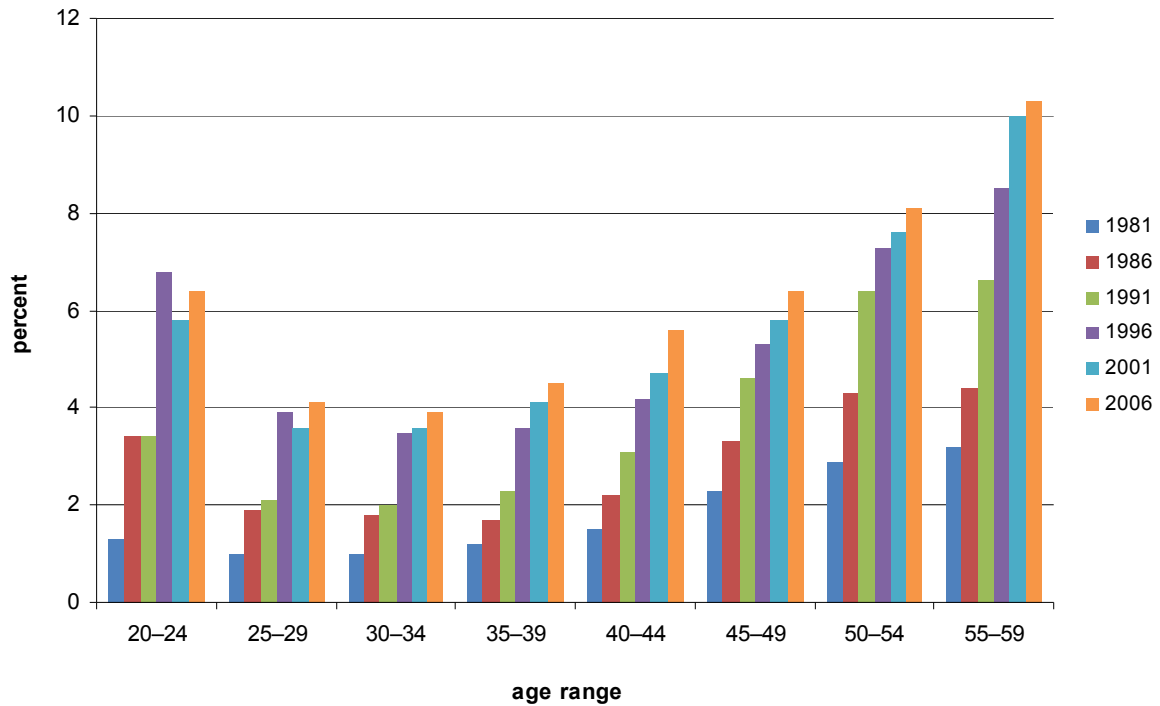
### Age effect

The proportion of families with at least one parent in receipt of a sickness or invalid's benefit generally increased with age to peak at around 7.0 percent when mothers were in their 50s, as shown in the right hand panel of Table 2.9.1. However, those with mothers aged 20–24 also had relatively high levels of health-related benefits at 4.3 percent, when compared with the rates of 3 percent or less for the 25–39 age-groups.

### Period effect

The proportion of families with at least one parent in the household on a sickness or invalid's benefit showed a continual upward trend during the period under study. The increase occurred mostly from 1981 to 1996, when the mean went from 1.7 to 5 percent. A slight levelling off followed through 2001, and then a further increase to 6.1 percent in 2006 (bottom panel, Table 2.9.1).

Different age-groups of mothers saw increases in the rates of receipt of health-related benefits in their families in different periods, as can be seen in Figure 2.9.1. For example, there was little increase between 1986 and 1991 for those under 40, but there was a marked increase for age-groups over 40 during this period.



**Figure 2.9.1 Percentage of families with a parent in receipt of a health-related benefit by census year within each age-group**

## 2.9.2. By cohort and age

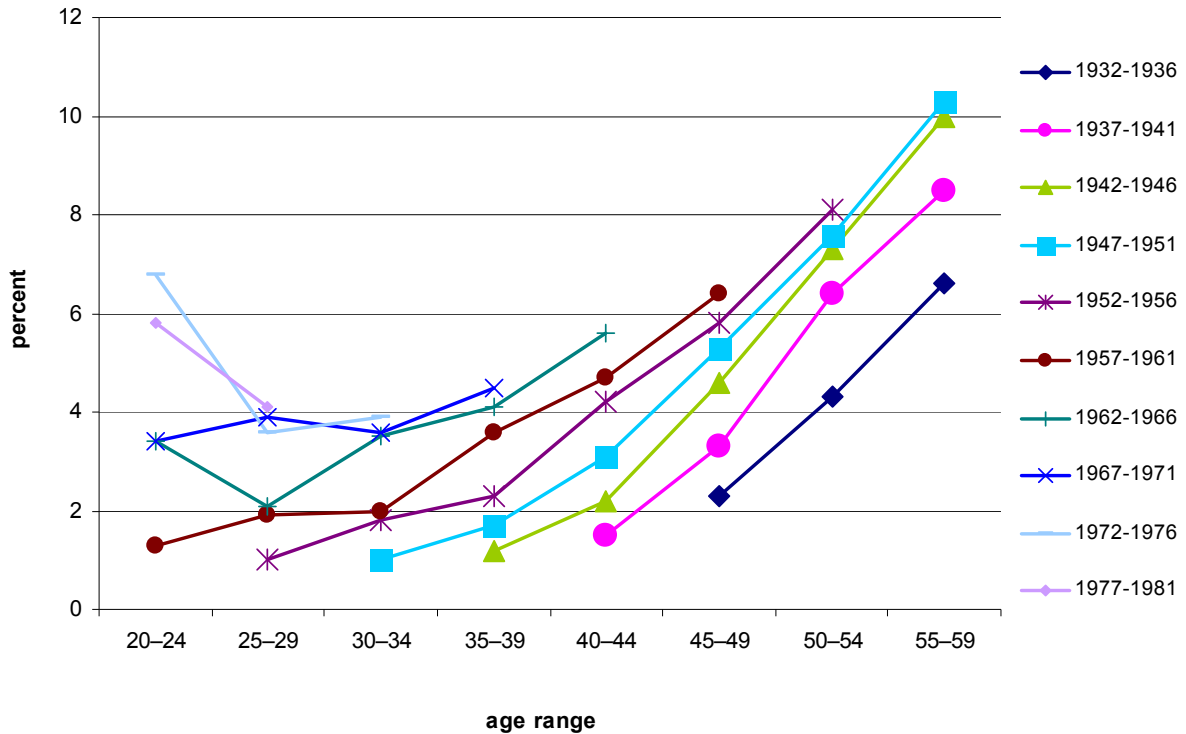
**Table 2.9.2 Percentage of families with a parent in receipt of a health-related benefit by birth cohort and age-group of mother**

Age-group	1932–1936	1937–1941	1942–1946	1947–1951	1952–1956	1957–1961	1962–1966	1967–1971	1972–1976	1977–1981
20–24						1.3	3.4	3.4	6.8	5.8
25–29					1.0	1.9	2.1	3.9	3.6	4.1
30–34				1.0	1.8	2.0	3.5	3.6	3.9	
35–39			1.2	1.7	2.3	3.6	4.1	4.5		
40–44		1.5	2.2	3.1	4.2	4.7	5.6			
45–49	2.3	3.3	4.6	5.3	5.8	6.4				
50–54	4.3	6.3	7.3	7.6	8.1					
55–59	6.6	8.5	10.0	10.3						

### Cohort effect

Reading across the rows in Table 2.9.2 shows that successive cohorts of families have had higher levels of health-related benefit receipt at all ages, reflecting the general period trend of continual increase over time. The exception to this was mothers in their 20s. This is illustrated in Figure 2.9.2, where the successive cohort lines are parallel to each other from 30–34, but cross over each other or head in different directions prior to age 30.

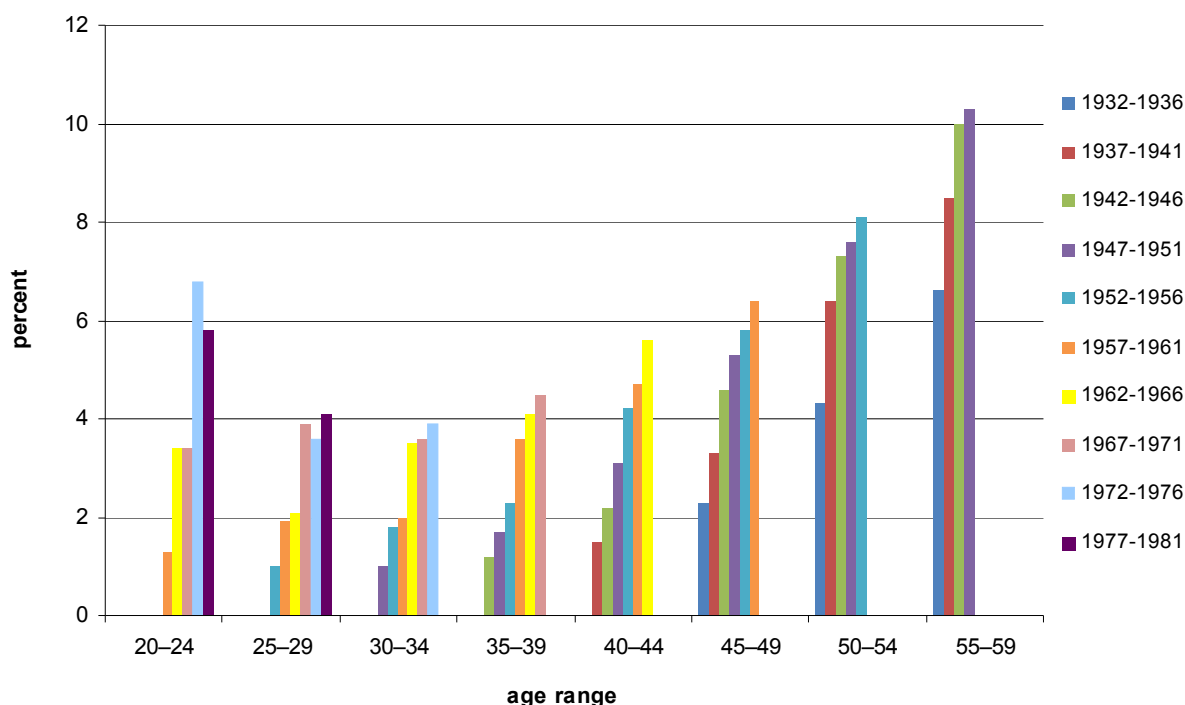




**Figure 2.9.2 Line graph: Percentage of families with a parent in receipt of a health-related benefit by cohort within each age-group**

The dynamics for families with mothers in their 20s are more clearly seen in Figure 2.9.3. Large increases in the rates of receipt of health-related benefits from 1991 to 1996 can be seen in the difference between the third and fourth bars at 20–24 and 25–29. Both of these age-groups saw some reduction in 2001; at 25–29, where data are available, the level increased again in 2006.

In summary, there has been a general upward trend in the health-related benefits indicator for all age-groups due to period effects. Unless there is a reversal of this trend in future, the families of recent cohorts of young mothers will continue to experience higher levels on this indicator than their predecessors as they progress through the life-course. It should be noted, however, that the proportions of families with at least one parent receiving a health-related benefit are small in every case.



**Figure 2.9.3 Bar graph: Percentage of families with a parent in receipt of a health-related benefit by cohort within each age-group**

### 2.9.3. Interpretation

There has been a trend of higher overall levels of health-related benefits over time, as well as an age effect of higher levels from age 45 on. However, families with mothers aged 20–24 also have relatively high levels of receipt of health-related benefits.

There is also an overall period effect of higher levels for the most recent cohorts in all age-groups. However, the actual proportions of families receiving health-related benefits is small compared to the proportions experiencing disadvantage on other indicators such as housing tenure, rental affordability and low income.

Changes and outcomes may be due to changes in managing benefits, such as moving from the Domestic Purposes Benefit or Unemployment Benefit to a Sickness or Invalid's Benefit as a result of work testing during the 1990s, i.e. a period effect, combining with the ages most likely to need benefits. Alternatively, there could be some association between poor health and early motherhood for cohorts born since 1972 to account for the relatively high levels among families with young mothers.

Data from the Ministry of Social Development's 2006 statistical report (Ministry of Social Development, 2007) confirms a steady growth in numbers on sickness and invalids' benefits from 1981 to 2006. Age-group analysis of trends in health-related benefits from 2002–2006 shows increases in all age-groups, but that at 20–24 was lower than those for older age-groups (Ministry of Social Development, 2007). This suggests that the high levels of health-related benefits found in families with 20–24 year old mothers is related to being a mother as it does not apply to all members of the population in this age-group. Data by age-group were not available in earlier Statistical Reports from the Ministry.

At the same time there was a decline in the proportion of 20–24 year olds on the Domestic Purposes Benefit, evidence of which was available from 1996 (Ministry of Social Development, 2002).

Findings from the 2006/07 New Zealand Health Survey (Ministry of Health, 2008) show lower scores on mental health for 15–24 year olds compared with those at older ages.

## **3. Summary and Discussion**

### ***3.1. Summary of findings***

#### **3.1.1. Cohort effects**

No one cohort or group of cohorts was disadvantaged on all indicators. Cohort disadvantage varied by indicator, and sometimes also by age-group within an indicator. This means it is virtually impossible to conclude that a particular cohort of families has been more disadvantaged than others in overall wellbeing, unless there were some way of weighting indicators as more or less indicative of disadvantage.

This difficulty is compounded by the limited number of years for which data are available for this study. There are few really comparable cohorts in the sense of having data for all of the census years available, and those that do have full sets of data are all at similar ages at similar times. For the others we have data either only at young ages or only at older ages.

We applied the traditional cohort analysis technique of cohort comparison within age-groups in order to overcome the different age composition of each cohort. This showed that median income, employment and education were improving for the most recent cohorts in all age-groups, except 20–24 for income. Conversely, home ownership and health-related benefits were doing worse for the most recent cohorts at all ages. Household crowding is improving at older ages but not for the families of cohorts of mothers in their 20s. The most recent cohorts in the study, born 1967–81, also appear to be more disadvantaged than preceding cohorts at early ages in the areas of rental affordability and inequality of income.

For the purposes of broad summary comparison, the cohorts in this study can be categorised into three groups: early (the first three, born 1932–46), middle (the middle four, born 1947–66) and recent (the last three, born 1967–81). Table 3.1 presents a summary of outcomes on the wellbeing indicators by these three broad groups of cohorts. From this it can be concluded that the early cohorts did best on home ownership, health-related benefits and not working long hours, and worst on education and household crowding. The middle cohorts did worst in working long hours. The recent cohorts did best for education and median income (except at ages 20–24), but worst for home ownership and health.

Results were not consistent for income inequality, being in paid work and rental affordability; that is, different groups of cohorts did better and worse at different ages. Similarly, there is no consistent result across age groups for whether the early or middle group of cohorts did worst on median income or whether the middle or most recent group of cohorts did best on household crowding.

**Table 3.1 Summary of outcomes comparing three broad groups of cohorts**

	<b>Done best</b>	<b>Mixed – outcome varies by age-group*</b>	<b>Done worst</b>
<b>Early cohorts (1932–46)</b>	Long hours Home ownership Health	Median income Low income Paid work Rent	Education Crowding
<b>Middle cohorts (BBs)</b>		Median income Low income Paid work Rent Crowding	Long hours
<b>Recent cohorts (1967–81)</b>	Median income (except 20–24) Education	Paid work Low income Rent Crowding	Home ownership Health

\* Mixed indicates different direction at different ages.

We now look at the results in more detail within each of the indicator domains: income, education, employment, housing and health.

### **3.1.2. Income**

Results on the two indicators for income are inconsistent. The proportion of families with low incomes has continued to increase within most age-groups for successive cohorts, while median equivalised income has improved in most age-groups. The middle cohorts (1947–66) did best on median income at 20–24 and the peak income ages of 45–54, but generally did worse with income inequality than the early cohorts. The early cohorts (1932–1946) had the lowest median incomes from 45–59, as they experienced the 1991 period low in their peak earning years. However, with the exception of the 55–59 age-group, these cohorts generally did better on income inequality, as the peak period of 2001 occurred after they had passed through their 50s. Income equality and median incomes at older ages may also have improved as labour force participation improved in the 50s and the early 60s with the increased age of eligibility for superannuation, and cohorts of women who had continued in or returned to paid work after having children came through into these ages.

Both measures showed the more recent cohorts (1967–81) as more disadvantaged at early ages, but measures for these cohorts are only available for the 20s and 30s, i.e. prior to peak earning years. The available data do show lower incomes at 20–24 for families of more recent cohorts of mothers, and although they pick up in median income as they move into their later 20s and 30s, they continue to have higher proportions of families on low incomes than earlier cohorts did. For the most recent cohorts this was partly due to the peak period of 2001 coinciding with them going through the age-groups that also had relatively high levels of low income. These cohorts barely experienced the period low of 1991 for median income.

The poor outcome for the recent cohorts at 20–24 is likely due to an increasing divergence between education and motherhood in the early 20s. This means that mothers in this age-group are less educated, more likely to be Māori, and from lower income backgrounds. Becoming a mother early is a known socio-economic

disadvantage, but we also know that fewer women become mothers this early now, so as a long-term cohort effect, this is not likely to influence total cohort outcomes. While the father's income also contributes to family income for couple-based families, in general either the father's education and earning power are similar to the mother's, or they are higher, but the relative total family income is still lower due to the mother's circumstances.

In conclusion, it is very difficult with the limited number of years of data available to define any cohort as better or worse off. There are, however, indications that the more recent cohorts will do better than their predecessors due to greater likelihood of dual incomes for most of their family life and a smaller proportion becoming mothers in their early 20s and therefore being economically disadvantaged. At the moment recent cohorts are showing increased income disparity (Callister, 2001, 2006). Callister (2005) notes a trend of polarisation for families with dependent children into work-rich and work-poor households, those with dual incomes and those with no parent in paid work. This is reflected in the outcomes on the low-income indicator, which is a proxy for income inequality.

For the future it would seem that families of more recent cohorts of mothers will do better overall for median equivalised income as they have had a better start due to increased female labour force participation and older age at first birth. Furthermore, they should continue this advantage throughout their life-course as they have already gone through having very young children at a time when mothers' labour force participation was lowest. The trend of increased labour force participation through into older ages is also likely to continue as a result of increases in life expectancy, the age of eligibility for national superannuation, and demand for older workers as smaller cohorts of young people enter the labour force due to structural ageing of the population.

### **3.1.3. Education**

Education is more straightforward, with earlier cohorts being less likely to have any qualification and the most recent cohorts doing best. However, this is relative to the period effect of the earlier cohorts having spent most of their employed years in times when qualifications were not so necessary for most jobs, as they are today. Overall, therefore, this is not necessarily representative of economic disadvantage.

This inability to adjust for the relative "purchasing power" of education in longitudinal analysis, together with a distortion of effects between censuses due to coding and classification changes, particularly affecting the 1996 data, makes education a less reliable indicator of comparative cohort wellbeing than other indicators used in this study.

### **3.1.4. Employment**

Results on the two indicators used for this domain are not consistent. There is also a great deal of variability at different ages. The middle or baby-boom cohorts were most likely to have a parent in paid work at younger and older ages, but did less well in their 30s and 40s, which occurred around the peak period of unemployment in 1991. However, as these are generally ages when unemployment is at a low, this group of cohorts did not reach high levels of worklessness overall. The earliest (1932–41) cohorts showed the most variability over the age range. They had particularly high levels of worklessness at 55–59, the age-group they were in during

the peak years for unemployment around 1991. The most recent (1967–81) cohorts were most likely to have no parent in paid work in their 20s. However, within age-group analysis shows an improvement in all age-groups, in line with the period trend since the low in 1991, suggesting that the younger or more recent cohorts will do better as they progress through the life-course. They were barely affected by the period low of 1991.

Conversely, the middle cohorts (1947–56) were most likely to have at least one parent in the household working more than 48 hours a week, as they reached the peak ages for working long hours during the peak periods for such working patterns. The earliest cohorts (1932–46) were least likely to work long hours, being past the peak ages when the peak period for long hours occurred.

Given the trend towards increasing numbers working long hours, the most recent cohorts could be expected to surpass their predecessors if the trend of working long hours continues. However, the 2006 data on this measure show a small decline in all age-groups except 20–24 and 55–59, which have the lowest levels of working long hours anyway. This is supported by unpublished analysis of 2006 census data provided to the author by Paul Callister in July 2007 (Callister: pers. comm., 2007), which shows a slight decline in working long hours since 2001, especially for men. This suggests that rates of working long hours may have peaked, and younger cohorts of families will remain less negatively affected by this variable than those that preceded them.

In summary across the two indicators for employment, on the basis of current employment trends, the most recent cohorts can expect to do better than the group of cohorts immediately preceding them (1947–66), unless there are major period declines on these indicators in the future. The current 2008–09 economic downturn and rise in unemployment is more likely to affect those cohorts currently in their 20s or 50s.

### **3.1.5. Housing**

There are consistent period-related outcomes for all age-groups on the home ownership indicator, but results for rental affordability and household crowding are more variable by age, and there is not always consistency across the three indicators.

The pattern for rental affordability suggests a strong 1996 period low effect. After this point, the more recent cohorts in every age-group except 20–24 trended towards higher levels of affordability. However, they were still worse off than the earlier cohorts that reached each age-group prior to 1996. The within age-group patterns for household crowding are more complex, with more recent cohorts tending to do worse than their predecessors at young ages and better at older ages.

The more recent cohorts (1967–81) were less likely than their predecessors to own their own home in their 20s and 30s, due to experiencing the 2001–2006 period peak during the peak ages for low home ownership. They also experienced lower rental affordability than the group of early cohorts, especially at 20–24, due to coming into this age-group during the peak period for poor rental affordability from 1996 to 2006. In other age-groups though, they did show some improvement compared to the cohort immediately preceding them. The earliest cohorts in the study (1932–41) did best on home ownership, and on rental affordability in their late 30s and 40s, but we do not know how they compared in their earlier years.

Those earlier cohorts of families with mothers born 1937–51 were the ones that experienced the highest levels of overcrowding, being in the peak ages of 35–44 during 1981–86, the peak period for crowding. The most recent cohorts (1967–81) also showed higher levels of crowding at 20–24 than the cohorts preceding them, despite being in improving periods for this indicator.

Household crowding appeared to be in decline up to 2001, although 2006 data showed a reversal in that trend with a slight increase. The Ministry of Social Development Social Report (2008) showed an overall levelling off in 2006, while Cotterell, et al. (2008) found no decline for couples with dependent children and an increase for single parents with dependent children.

In general, given predicted housing trends and findings from this study supported and extended by those of Morrison (2008), it appears that the families of cohorts of mothers born since 1972 will experience greater housing disadvantage than their predecessors, particularly in relation to home ownership and rental affordability.

### **3.1.6. Health**

The measure for health is clearly related to age with the highest levels in the 50s, but this is compounded by an increase in proportions on invalids' and sickness benefits since 1996. Data from the Ministry of Social Development on trends in health-related benefits and domestic purposes benefits are consistent with the possibility that some of this increase may be due to changes in the way benefits are managed, with some shifts to health-related benefits from other types of benefits.

The period effect appears to outweigh the age effect, with the most recent cohorts in each age group having the poorest outcomes.

The data also show a relatively high proportion of families from the most recent cohorts (1972–81) with a resident parent on a health-related benefit when mothers are only in their early 20s. Comparison with population data shows that this is not a trait shared among all 20–24 year olds and is therefore related to being a mother at this age. Although there is an improvement as these cohorts move into their late 20s and early 30s, they are still higher than previous cohorts at these ages, as they have experienced high period effects in their early years.

However, while differences between cohorts and over time can be discerned, it is important to note that total proportions of families in receipt of health-related benefits are small in comparison to proportions on other indicators.

Smoking would make a more useful health risk indicator, but is not included in the census frequently enough to be useful for cohort analyses.

### **3.1.7. Age and period effects**

Clear period effects can be seen for all indicators, but the relative impact compared with age varies by indicator. Many of the negative period effects occurred during the 1980s and 90s, with most indicators showing an improvement since then. Table 3.2 shows that employment (both long hours and worklessness), median income and rental affordability were worst in the 1990s. Home ownership, income inequality and health-related benefits have become worse since the 1990s, but the downward trend on these indicators began in the late 1980s or 1990s. Only education and household crowding were at their worst prior to 1986, and the relative advantage of education is very period related so this cannot be considered a disadvantage in real terms.



**Table 3.2 Summary of period outcomes by measures of wellbeing**

	Census years: ✓ = best; X = worst					
	1981	1986	1991	1996	2001	2006
Income						
Median equivalised income			X			✓
Low income		✓			X	
Education						
Any qualification	X					✓
Employment						
Worklessness	✓		X			
Long hours	✓			X		
Housing						
Tenure			✓			X
Rental affordability	✓			X		
Crowding	X				✓	
Health						
Health-related benefits	✓					X

Age effects are generally more complex patterns and interrelated with period effects. They are not linear – that is, they do not always peak in the 50s – and the peaks shift over time. For example, the peak age for median income is not the same for all cohorts, but has shifted from 45–49 to 50–54 for more recent cohorts reaching that age. Peak and low ages for cohorts are often directly related to the age that the cohorts are at when a major period effect occurs; for example the 1991 low for median income and the 1996 peak for low rental affordability. Period effects on an indicator are not experienced evenly by all age-groups; for example relative cohort differences in median income are greater at either end of the age range than in the middle. Finally, age has a variable impact relative to period for different indicators. For example, the period downturn in home ownership applies regardless of age and results in recent cohorts doing worse at older ages than their predecessors. Conversely, recent cohorts of families with mothers aged 20–24 have done worse than their predecessors at that age, despite a general period improvement in median incomes.

Table 3.3 shows that those under 30 did worst on both income measures (median and low income) and home ownership. Those over 50 did worst on education, worklessness and health-related benefits. Those in their 30s and 40s did worst for long hours, rental affordability and household crowding. But those in their 30s and 40s are most advantaged in terms of income (both measures), and being in paid work. In comparison those in their 50s are advantaged in terms of long hours and all housing measures. Those under 30 are only advantaged in terms of having secondary level education, which as argued above cannot be regarded as a real advantage when making comparisons over time.

Furthermore, the 20–24 age-group in more recent cohorts has also done worse than their predecessors in that age-group on many measures.

**Table 3.3 Summary of age-group outcomes by measures of wellbeing**

	Age-groups: ✓ = best; X = worst							
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59
Income								
Median equivalised income	X					✓		
Low income	X					✓		
Education								
Any qualification		✓						X
Employment								
Worklessness						✓		X
Long hours					X			✓
Housing								
Ownership	X							✓
Rental affordability				X				✓
Crowding				X				✓
Health								
Health-related benefits			✓					X

### 3.2. Discussion

This section discusses the respective contributions and limitations of the method of cohort analysis employed in this study to assess the relative wellbeing of families over time using census data. An extensive search of databases on cohort analysis and family wellbeing found no previous attempts to measure the relative outcomes of families over time on a range of wellbeing indicators using cohort analysis.

The first contribution this study makes is the creation of a dataset of family-based indicators from the census using the Statistics New Zealand datalab. For example, the research team has created a family income measure, as opposed to the traditional household or individual income measures. This includes just the income from the nuclear family members within the household – both parents in couple-based families – excluding those of other household members.

The second methodological development by the team was the scientific basis underlying the choice of reference person in the family to follow a cohort of families using the census, which is based on individual data. Previous studies have relied on household data and used head of household or occupier as the reference person. This study, with its specially created family dataset, was able to be more specific. Two key choices of reference person for the birth of a family were the birth of the first child and the age at which a woman in a birth cohort becomes a mother. Extensive statistical exploration of which option created the most stable cohort for following over time resulted in the choice being made to follow cohorts of families through the mother.

A key aim of this study once the dataset and method had been established was to investigate the relative age and period effects on the cohorts of families as they progressed through the life-course. This study has identified age and period effects on the different cohorts for each indicator, illustrating the different experiences of each cohort at each age or life-cycle stage, depending on the particular period effects at that time. For example, some cohorts experienced lower median income

than those on either side of them when their peak earning years coincided with the 1991 period low for income.

The study has also demonstrated the contribution that cohort analysis of families can make to monitoring their relative wellbeing, thus identifying and signalling where the more recent cohorts are experiencing disadvantage early in the family life-cycle stage compared to their predecessors. This was seen for example in housing and income inequality, despite improvements for those same cohorts in education and median income. This approach also identifies within-cohort disparity of outcomes, such as poorer outcomes for families of those who become mothers at young ages. The potential to identify these outcomes will increase as the dataset grows with the addition of future census years. In addition this will enable greater retrospective exploration of the effects of policy approaches on families at different stages of the life-cycle.

There are three main potential limitations to the method used in this study: the difficulty of measuring family outcomes from either individual or household data, the stability of the cohort, and the limited number of census years available for analysis. The first has already been addressed above. The last has been addressed in this study by doing cohort comparisons within age-groups, a more traditional cohort analytical approach. However, as Callister (2006) notes, as more years of data become available through the datalab in the future, it will be more beneficial for useful cohort analysis.

A further issue is the stability of the cohort over time, and the need to be aware of bias as a result of definition of entry and exit criteria (Myers, 1999). While initial exploration found that using the mother as the reference person for the cohort produced greatest cohort stability, it appears that this has also introduced bias in the education level of those who join the cohort of mothers at an early age, and hence associated economic disadvantage in income, employment and housing.

The main age-group of first birth for all women in the 1960s and 70s was 20–24; 72 percent of first births were to women under 25 years in 1971, falling to just 14 percent in 2001 (Statistics New Zealand, 2007). The result is that those women who are now mothers by 20–24 are mostly from lower socio-economic groups. Analyses by Statistics New Zealand (2001), Khawaja (2007), and Boddington and Didham (2008) show links between higher education level and childlessness. This was stronger for cohorts born since 1962. Thus women aged 20–24 in the 2006 census with no qualification were twice as likely to be mothers as those with graduate degrees (96 percent to 47 percent (Khawaja, 2007)).

In future analyses of cohorts of families based on age of mother, where the aim is to compare the differences in cohort wellbeing overall across the life-course, it would therefore be better to exclude the 20–24 age-group where less than 50 percent of the birth cohort of women have become mothers, in order to achieve greater cohort stability. However, this is a real effect in that if we are interested in the outcomes of mothers or families, those who begin or join the cohort at an early age will experience disadvantage, which has been apparent in this analysis over most indicators, and has been documented elsewhere (Boden, et al., 2008). It is important to identify within-cohort as well as between-cohort differences.

While fathers' education and income also contribute to the outcomes for two-parent families, it is the characteristics of mothers that have been linked to poorer economic

outcomes. The father's characteristics will either be similar to those of the mother, or if they are different, the relative family outcome will be affected by the relative characteristics of the mother.

There are also issues with some of the indicators and measures of economic and social wellbeing chosen for this analysis. Education may be useful for comparing different groups at one point in time, but is a less useful indicator of disadvantage or advantage when comparing groups at very different points in time when there is a large period effect about the economic value of education. Education is not adjusted for purchasing power as income is.

The census does not have a good measure for cohort analysis of health, with the key risk factor of smoking data only available in some censuses, and with administrative changes in the way people are assigned to different benefits possibly distorting outcomes on this measure.

Summarising across the five domains of wellbeing used in this study, the most recent cohorts are doing worse at the early stages of the family life-course in home ownership and rental affordability, and showing a high level of income inequality with a high proportion on low incomes. This is reflected in employment outcomes with these recent cohorts having a high proportion with no parent in paid work early in their family life-course.

The other indicators, health and education, are not particularly useful in measuring change over time, but the impact of an increasing trend to more highly educated women not having children should be investigated further as a factor in the economic disadvantage of families, as should what appears to be a relatively high proportion of young mothers or their partners on health-related benefits, although small in absolute terms.

While there are limitations in the data coverage of these more recent cohorts at the older ages they have not yet reached, other studies have pointed to potential greater disadvantage in various ways, for cohorts born since 1972 (McPherson, 2003; Pool, et al., 2007). Callister (2006) notes the diversity of experience in economic outcomes for this group, which suggests that their progress and needs should be monitored for the assistance required to provide adequately for the next generation.

## 4. Conclusion

This exploratory analysis of family wellbeing in New Zealand from 1981–2006 using census data has made a useful contribution to understanding the relative positions of families moving through the life-course at different points in time, and identifying the respective age and period effects involved. It has also made a contribution to developing cohort analysis methodologically for the application to such an aim through developing a dataset of family based indicators and statistically investigating the choice of reference person for following cohorts of families with census data. While there are still some limitations inherent in a dataset that does not have comparable age ranges for the set of cohorts being compared, steps have been taken to identify the extent of that impact using within age-group analysis, and despite this limitation, some substantive conclusions can be identified. In general, this exploratory study has demonstrated the complexity of cohort analysis and the lack of a consistent outcome across all indicators of wellbeing. More particularly, it has highlighted the relative position of the more recent cohorts starting out in the family life-course compared to those that preceded them.

Given that the most recent cohorts in the study are showing some evidence of disadvantage at early stages of the family life-course in key areas like housing, employment, income inequality and health, they potentially could be more disadvantaged than their predecessors, but it will depend on future period effects in relation to employment, housing and wage levels. Their health could be better in their 50s compared to previous cohorts due to better preventive care and treatment, but then again high levels of obesity could make them worse off. While they are more likely to be better educated than their predecessors, as an indicator of economic advantage this is relative to the level of qualification needed to gain employment in the current and future knowledge and technological economy compared to the industrial and agricultural ages of the past when formal education was less relevant to employment and income.

Also, as those in the same birth cohorts who do not become mothers until their 30s join the cohort of mothers, this is likely to lift their education, employment, income and housing status as this group will be more educated than those of their age-group who became mothers earlier in life. But families of those women who became mothers in their 20s will need monitoring for potential long term effects of this early disadvantage. This within-cohort diversity, also noted by Callister (2001, 2005, 2006), is an important outcome of cohort analysis that should not be lost sight of in inter-cohort comparisons.

A major impediment to continual improvement for younger cohorts of families as they progress through the life-course is increased family breakdown and periods of sole parenthood. Current trends show an increase in the age at which couples divorce, now in the mid-40s, and that divorce is less likely to involve children under 18 (Statistics New Zealand 2008), but the number and proportion of single-parent families with dependent children continues to increase (Cotterell et al, 2008). Any move back from the recent trend of increased family friendly/work life balance in the workplace to accommodate women with young children would also see a reversal in labour force participation by mothers of young children, and hence a reduction in family income. Similarly, any reversal of current policies of family support, such as the Working for Families package, would contribute to a change in relative income levels for recent cohorts of families.

However, the benefits of increased family income have to be weighed against the possible effects on children's wellbeing of the total number of hours worked by parents.

Further research should involve continuing this cohort analysis as new sets of census data become available. In addition, research into the development and application of more sophisticated analytical techniques could be explored to identify and adjust for age and period confounding effects in the cohort comparisons.

It would also be useful to compare cohorts of mothers with cohorts of individuals who do not become mothers, by age-group, to separate out the impact on families versus wider cohort impacts. Similarly, within-cohort comparisons of those who become mothers before the age of 25 and those who delay parenthood, would be interesting. As Māori as a group begin childbearing earlier than non-Māori, an ethnic breakdown within cohorts would also be useful.

Further detailed matching of related policy initiatives and changes to key period effects and cohort differences could also be undertaken. For example, a detailed consideration of income support and housing assistance policies that applied during the key childrearing years for each cohort.

Finally, to enable better overall cohort comparison across the range of wellbeing indicators used in this study, a single index of wellbeing across the measures would need to be developed.

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## **Appendix A. Working with data from the census**

Access to the data used in this study was provided by Statistics New Zealand in a secure environment, the Data Laboratory. This is designed to give effect to the confidentiality provisions of the Statistics Act 1975. Personal identification information supplied on the original census forms, such as name and address, is not carried over to the computer records held by Statistics New Zealand, and these details are therefore not available to any data users. Further omissions eliminate the possibility of linking individual-level records in the Data Laboratory datasets back to respondents.

In addition, all Data Laboratory output is subject to confidentiality rules set by the department to further protect respondent confidentiality. In particular, all frequencies in this report are randomly rounded to one of the nearest multiples of 3 (for example, a count of 5 could become 3 or 6) to further guard confidentiality (Statistics New Zealand, 2001c). All percentages are calculated based on rounded counts. Derived statistics, such as the mean values shown in tables, are not rounded. Given that the numbers presented in this report are typically very large, rounding is not expected to have any discernible impact on the conclusions drawn.

## **Appendix B. Subject population and units of analysis**

The subject population for all tables and analyses is the census-defined “usually resident population”. This population is “all people counted in New Zealand on census night excluding overseas visitors and New Zealand residents temporarily overseas” (Statistics New Zealand, 2001b). From this group, only those individuals usually resident in private dwellings were included in the analyses, because family units cannot be identified among people resident in non-private dwellings. This means that people usually residing in communal or non-private establishments such as retirement homes, public hospitals or convalescent homes, religious, educational or penal institutions, or defence establishments are excluded from the analysis.

In the construction of the wellbeing indicators, families were excluded from the calculations where relevant information for some members was missing. For example, if one parent had missing education information, even if the other parent was recorded as having no educational qualification, that family was not included in the ‘Any educational qualification’ indicator calculation.

### ***B.1 Standard census enumeration units: households, families and individuals***

A detailed overview of how families and households are enumerated by the census, and the data available for each, is given in Milligan, et al. (2006: 39–42). Further information can be found in Statistics New Zealand’s classifications and standards for dwellings, families and households (Statistics New Zealand, 1999a, 1999b, 1999c) and the census definitions and questionnaires documents (Statistics New Zealand, 2001b). Importantly, families and households as identified in the census have specific definitions that may differ from their intuitive meanings. In particular, the range of family structures that can be identified is limited by the fact that the census is a dwelling-based survey.<sup>7</sup> The highest level at which individuals are grouped is by common dwelling, and as such, interpersonal relationships (familial or otherwise) among individuals living in the same dwelling are discernible, but those among individuals living in different dwellings are not.

Using the census definition of family for this cohort analysis of mothers means that we can only identify them as such in families where the mother and children are living in the same dwelling on census night.

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<sup>7</sup> In the census, a dwelling is ‘any building or structure, or part thereof, that is used (or intended to be used) for the purpose of human habitation’ (Statistics New Zealand, 2001b, p. 23).

## Appendix C. Indicator calculations

### *C.1 Median equivalised income*

Median gross family income is not a suitable indicator of the relative standard of living of a family compared with other families, because it does not take into account household composition. For example, a one-person household with a median annual household income of \$45,000 is likely to have access to a higher standard of living than a two-adult, three-child household with the same income. In order to compare incomes across a range of family types, a transformation – called an equivalence scale – is used to equate gross income, taking into account important differences in household composition.

The equivalence scale used for this study is the Revised Jensen Scale (RJS), a New Zealand scale derived by John Jensen of the Ministry of Social Development. Its reference point is a two-adult, couple-only household, which is given a value of 1. The equivalised income of all other family types is expressed relative to that of the reference, with adjustments made for the number of adults and the age and number of children. The scale contains adjustments that take into account the fact that children typically need less income than adults in order to maintain a comparable standard of living. Gross equivalised family income is calculated by dividing annual gross family income by the appropriate value on the RJS.

For example, a couple only household with an annual income of \$40,000 would have an annual income equivalised with the RJS of \$40,000, as its rating on the Jensen scale is 1. However, if an eight-year-old child were added to the household, the family's RJS Rating would become 1.19, and its equivalised income would be  $\$40,000/1.19 = \$33,613$ .

### *C.2 Household crowding index*

The crowding index is calculated using the equivalised crowding index (ECI), which is used by Statistics New Zealand and takes into account the number of bedrooms in a dwelling and the household composition. The formula weights each individual in a couple relationship as one-half, as in a shared bedroom. Children aged less than 10 years are treated in the same manner, and then all other members of the household are given a weight of one. The result is an equivalised number of people per bedroom. The formula is:

$$\text{ECI} = \frac{[(1/2 \text{ number of children under 10 years}) + (\text{number of couples}) + (\text{all other people aged 10+})]}{\text{number of bedrooms}}$$

Any value in excess of 1.0 represents a crowded dwelling (Statistics New Zealand, 2007b).

## Appendix D. Cohorts analysed

Preliminary analysis carried out including the extreme age-groups 15–19 and 60–74 found that very different outcomes existed for them, due mainly to the small numbers in those groups: of very young mothers, and of older mothers still identifiable in the census as mothers, with older children still at home. These factors distorted cohort comparison, and so the dataset for the cohort analysis of families by age of mother was limited to ages 20–59.

Preliminary analysis also identified tables of age by period and cohort by age as the most useful. The first stage of the analysis for this report was carried out by assessing means and medians for each indicator across three sets of comparisons – by age-group, by census year (that is, period), and by cohort. The second stage was to compare proportions across cohorts and within age-groups in order to counter compositional effects, that is, the effect of not having data on all age-groups for every cohort.

The table below outlines all of the cohort groups that are analysed in this report, and links their different components (age-group of mother, birth period and census year) for quick reference.

**Appendix Table D.1 Summary of cohort groups analysed in this report**

<b>Birth years</b>	<b>1981</b>	<b>1986</b>	<b>1991</b>	<b>1996</b>	<b>2001</b>	<b>2006</b>
1932–1936	45–49	50–54	55–59			
1937–1941	40–44	45–49	50–54	55–59		
1942–1946	35–39	40–44	45–49	50–54	55–59	
1947–1951	30–34	35–39	40–44	45–49	50–54	55–59
1952–1956	25–29	30–34	35–39	40–44	45–49	50–54
1957–1961	20–24	25–29	30–34	35–39	40–44	45–49
1962–1966		20–24	25–29	30–34	35–39	40–44
1967–1971			20–24	25–29	30–34	35–39
1972–1976				20–24	25–29	30–34
1977–1981					20–24	25–29