TAYLOR FRY

# Ministry of Social Development

## Social Outcomes Modelling – 2021 Results

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**IDI disclaimer:**

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

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

# 1 Executive summary

The purpose of this report is to provide information to the Ministry of Social Development (MSD) about long-term trends in benefit and public housing dynamics, offering insight into how the benefit and public housing systems are changing over time.

This report uses the Social Outcomes Model (the Model) to provide a view of how people move into, through, and out of the benefit and public housing systems, and their interactions across government services. In this way, the Model estimates future service use for the population of New Zealand, based on past experience and future economic assumptions. A summary of the Model is set out in Appendix C of this report.

The Model is developed inside the Stats NZ Integrated Data Infrastructure (IDI). The IDI is a large research database which holds administrative data about people's life events like education, income, benefits, migration, justice and health. The data comes from government agencies, Stats NZ surveys, and non-government organisations, and is linked together and de-identified. Further information about the IDI can be found on the Stats NZ website.

For this report, the Model takes data available up to 30 September 2021. In doing so, it builds on the experience of people seen in the pre-COVID-19 period, as well as most of the first two years of the pandemic. The future economic assumptions used in the Model are those provided by The Treasury in their 2021 Half Year Economic and Fiscal Update (HYEFU 2021). All assumptions used in the Model are set out in the 2021 Social Outcomes Modelling Technical Report.

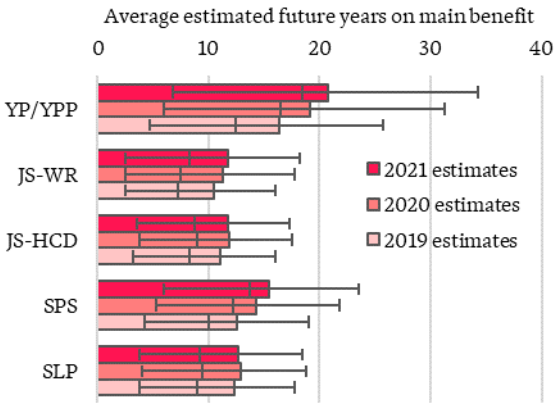
Through the findings outlined in this report, the Model shows the future outcomes we may expect to see, if current policy and social settings remain unchanged and economic forecasts hold true.

A glossary of terms and acronyms are set out in Appendix A of this report.

The outputs from the Model are not official statistics, and due to the range of data used, the numbers in this report may not match to official figures.

Set out below are brief statistics of some key findings. A fuller description of these findings then follows.

## **Key finding 1:** Current clients are estimated to spend more time on a main benefit up to age 65 compared to the client population two years ago




### The increase in estimated time spent on benefits is mainly due to lower rates of leaving benefit for JS-WR and SPS clients

Over the period mid-2017 to late 2019 the quarterly rate of leaving benefit reduced from 16.7% to 12.7% for JS-WR clients and from 6.6% to 4.4% for SPS clients

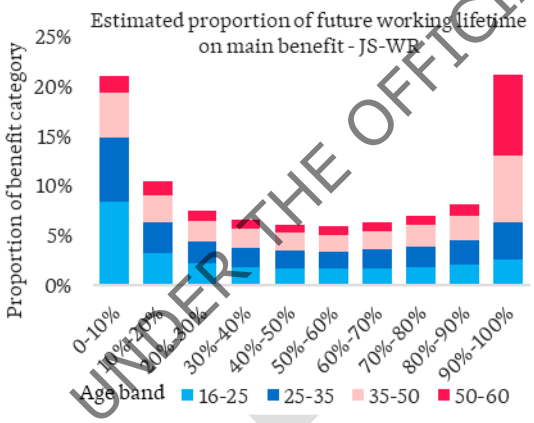
### This impact is greatest on youth clients

In 2019, 25% of YP/YPP clients had an expected 26 future years on benefit. By 2021, 25% of YP/YPP clients had an expected 34 future years on benefit

### There was also a large impact on estimated future years on benefit for SPS clients

The average estimated future years on main benefit for SPS clients **increased by 3.0 years** from 12.5 years in 2019 to 15.5 years in this report

## **Key finding 2:** 55,000 current JS-WR clients are estimated to spend more than 50% of their future working-age lifetime (FWLT) on a main benefit



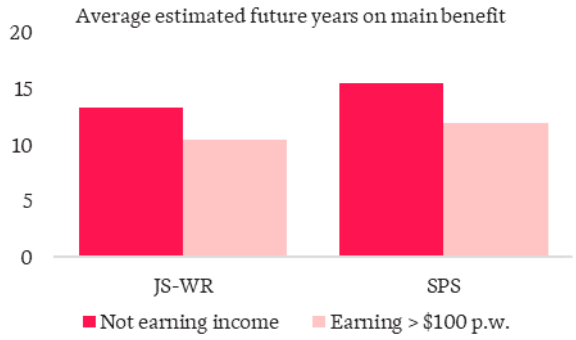

### There is a wide range of benefit outcomes

24,000 current JS-WR clients are estimated to spend more than 90% of their FWLT on a main benefit. Another 24,000 are estimated to spend less than 10% of their FWLT on a main benefit

### Many young clients are estimated to spend most of their FWLT on a main benefit

Of the 55,000 JS-WR clients estimated to spend more than 50% of their FWLT on a main benefit, almost half of them (24,000) are under the age of 35

## **Key finding 3:** Main benefit clients earning part-time income are estimated to spend materially less time on a main benefit in the future up to age 65 than those not earning income




**Connection to the labour market**

Although the longer a person is on main benefits, the less likely they are to exit, maintaining some connection to the labour market through part-time work is correlated with lower estimated future years on main benefit

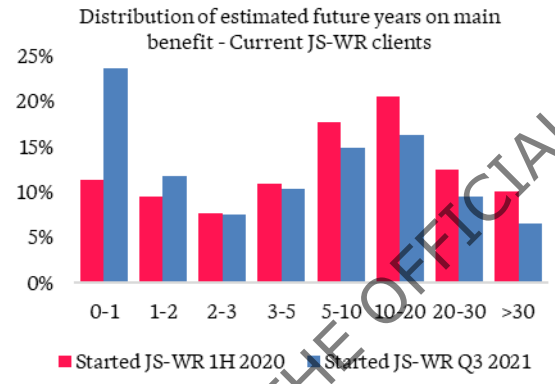
**Difference in estimated future years on benefit**

SPS clients that earn more than $100 pw on average spend **an estimated 3.6 fewer future years** on a main benefit:

15.5 years vs. 11.9 years

Equivalent JS-WR clients spend 2.9 fewer years on benefit (13.3 years vs. 10.4 years)

## **Key finding 4:** There is a risk of unemployment scarring caused by the pandemic – 13,000 JS-WR clients who entered the system in the first half of 2020 remained on benefit at 30 September 2021




**Prolonged unemployment due to pandemic labour market effects is likely to have long-term impacts on some clients**

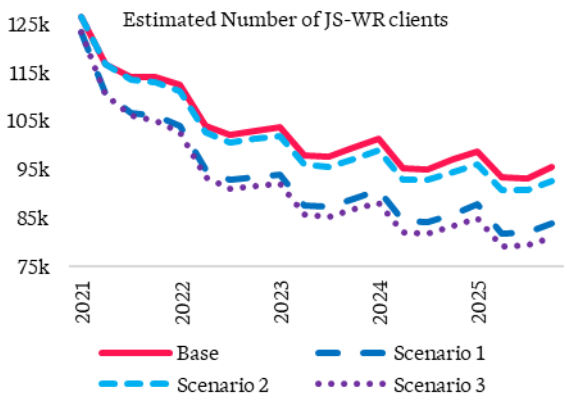
Of the 77,000 clients who entered the system and started JS-WR in the first half of 2020, about 13,000 remained on main benefit at 30 September 2021

**Difference in estimated future years on main benefit up to age 65**

Average estimated future years on main benefit for current JS-WR clients who entered the system in the first half of 2020 is 11.8 years

This is **2.8 years more** than for JS-WR clients who entered the system in the third quarter of 2021

## **Key finding 5:** There would be an estimated 14,400 fewer JS-WR clients by September 2026 if exit and re-entry rates returned to levels broadly consistent with pre-2017




**JS-WR scenarios modelled**

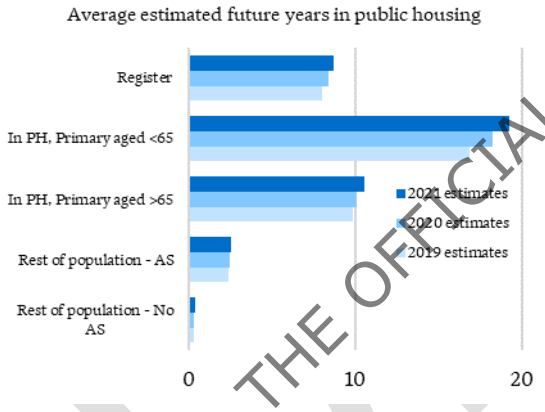
- Base – results from this report
- Scenario 1 – 20% increase to rate of JS-WR and SPS clients leaving main benefit
- Scenario 2 – 20% reduction to rate of former clients re-starting main benefit
- Scenario 3 – scenarios 1 and 2 combined

**Under a return to pre-2017 experience there would be a large impact on long-duration clients**

Of the 14,400 fewer JS-WR clients by 30 September 2026 under scenario 3, 10,000 are clients with duration greater than 1 year

Sustainability of exits is also improved

## **Key finding 6:** Current public housing tenants are estimated to spend more time in public housing compared to tenants two years ago




**The increase in estimated future time spent in public housing is due to a lower rate of tenants leaving public housing**

This is partly driven by long-term compositional trends:

- Increasing average IRRS payments
- Increasing average age
- Increasing duration in public housing

**Difference in estimated future years in public housing**

The average estimated future years in public housing **increased by 2.4 years** from 16.8 years in 2019 to 19.2 years in this report. At the same time, the size of the register has grown by about 75%.

# 2 Introduction

## 2.1 Guide to this report

The report covers core modelling results and output from alternative modelling scenarios, in a structure and format similar to last year's report.

- Section 3 - Core modelling results - Benefit System - In this chapter we explore how the benefit system has changed and how this impacts estimates of people's future outcomes. We consider the experience of the system through five key gateways in, through and out of the system.
- Section 4 - Core modelling results - Public housing - In this chapter we explore how the public housing system has changed and how this impacts estimates of people's future outcomes.
- Section 5 - Alternative scenarios - Recognising the current uncertainty in the benefit system caused by the pandemic, we report on results for three alternative scenarios where key modelling assumptions are changed from the base modelling results reported on in sections 3 and 4.

A range of appendices are also included for reference.

### Status of this report

This is the seventh draft version of the report. It will be superseded by any subsequent drafts and the final version of this report.

## 2.2 The Social Outcomes Model

The Social Outcomes Model is a mathematical model that estimates future outcomes at an individual level. Key aspects of the model are:

- The population being modelled – New Zealand (NZ) residents aged 16 and older, and people entering this population over the next ten years.
- The future outcomes that are being modelled – including benefit receipt, public housing use, income, justice activity, educational factors and health outcomes. Fiscal costs of some outcomes are also modelled. The time horizon over which the future outcomes are being modelled – Every quarter for people's future lifetime.
- Assumptions – The model is underpinned by a range of assumptions which are either implied by the construction and parameterisation of mathematical equations, or explicitly made. The derivation of the mathematical equations is informed by historical data. Explicit assumptions relate to variables that the model does not estimate but are built into model because they are important for estimating future outcomes, e.g. the future unemployment rate as a measure of future labour market conditions.

For every NZ resident aged 16 and older, the model estimates a range of outcomes for every quarter over people's full future lifetimes. Estimated future years on main benefit refers to the future years on main benefit a person is estimated to have from their current age up to when they turn 65. Estimated average future years on main benefit refer to the average future years on main benefit a group of people are estimated to have from their current ages up to when they turn 65.

Further detail can be found in Appendix C. There is also a technical report covering the workings of the model.

# 3 Core modelling results – Benefit System

## Key points from this chapter

- Analysis of key gateways in, through and out of the benefit system shows that entry rates increased and exit rates decreased for most main benefit categories in the period before the pandemic – see Section 3.2.
- Pandemic aside, JS-WR, JS-HCD and SPS clients have become less likely to exit the benefit system. This has been reflected in our modelling assumptions, resulting in:
  - Increased average estimated future years on main benefit e.g. SPS 12.5 years (2019) to 15.5 years (2021) – see Table 3.1
  - Increased range of estimated future years on main benefit within each main benefit population e.g. the upper quartile of YP/YPP clients are estimated to spend at least 34.3 years on main benefit, compared with 25.8 years from the 2019 modelling round – see Figure 3.6
  - In the future, the JS-WR client population are estimated to be more heavily skewed to long-duration clients than pre-pandemic. The proportion with over one year of duration on main benefit is estimated to be about 47% in 2031, compared to about 41% in 2021 – see Figures 3.2.
- Our analysis of change shows the significant increase in estimated average future years on main benefit for current main benefit clients resulting from adjustments to modelling assumptions to reflect pre-pandemic benefit system experience (entry and exit rates) – see Section 3.6.
- Modelling results for main benefit clients who are earning income shows these clients are likely to spend materially fewer estimated future years on main benefit than those not earning income e.g. for SPS, averages of 11.9 years vs. 15.5 years – see Section 3.3.2.
- Expressing modelling results as the estimated proportion of future working-age lifetime on main benefit, shows that about 40,000 JS-WR and SPS clients who are less than 60-years-old are estimated to spend over 90% of the future working-age lifetime on main benefit. Of these, about 37%, or 15,000 people, are less than 35-years-old – see Section 3.4.

In this chapter we analyse how the benefit system has changed over the last two to three years and what this might mean for peoples' long-term outcomes.

We describe:

- How the benefit system population has changed through the COVID-19 pandemic ("pandemic") and how key rates of transition (or "gateways") in, through and out of the benefit system have changed
- The impact of change on peoples' long-term outcomes
- How estimates of peoples' long-term outcomes vary for different population cohorts.

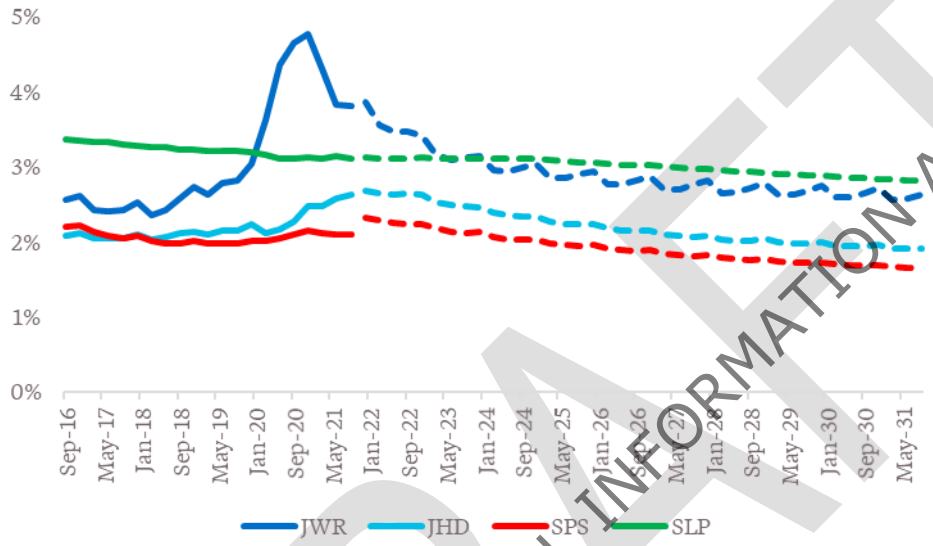
The system has seen significantly more change than at any other time in at least the last decade. Most notably, since early 2020 when the impact of the pandemic first emerged in the system. Also, broader underlying changes in the system were trending before the pandemic. These have combined to create a significant impact on people's estimated long-term outcomes and increasing variation between different cohorts.

## 3.1 Changes in the benefit system population

Figure 3.1 shows the impact of the pandemic, and associated labour market effects, on main benefit counts, with the proportion receiving JS-WR increasing significantly from late 2019. Also note that:

- The proportion of people receiving JS-WR was increasing before the pandemic. This mainly reflects decreasing exit rates – see Section 3.2.1
- While benefit grants increased significantly through the first year of the pandemic, benefit cancellations also increased as some people were able to quickly find alternative employment
- The increase in the proportion of people receiving JS-HCD from late 2019 is partly due to new JS-HCD benefit grants and partly a flow-on effect of more JS-WR clients, some of which subsequently transfer to JS-HCD
- The number of people receiving Accommodation Supplement (AS) and hardship assistance also increased significantly through the first year of the pandemic.

Figure 3.1 – Proportion of working-age population receiving main benefits at quarter end

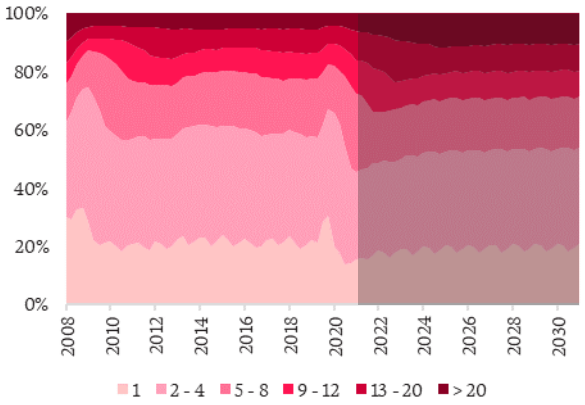



The dashed lines are estimates derived from the modelling. These trend down to levels close to pre-pandemic. Implicit in the modelling assumptions is that the effects of the pandemic diminish and, consistent with Treasury forecasts, economic factors, such as the unemployment rate, revert to a long-term value. Note that the number of SPS clients increases in the first quarter of the model estimates. This reflects about 5,000 clients who were reclassified from JS-WR to SPS in November 2021.

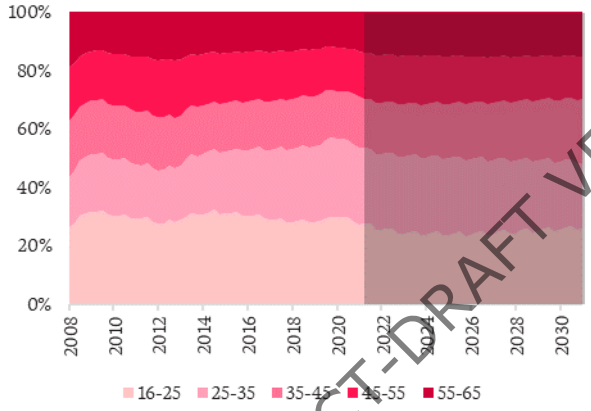
The system inflows and outflows to Jobseeker Support over the last two years mean that the population has changed significantly, particularly JS-WR. In Figures 3.2, we show how the JS-WR population has changed over time. The charts extend to pre-Global Financial Crisis ("GFC") to illustrate how, in some ways, the change in the profile of the population through the pandemic is similar to the change through the GFC. They also include estimates from the modelling, highlighted in the darker shaded areas.

Figures 3.2 – JS-WR clients (darker shaded areas show model estimates)

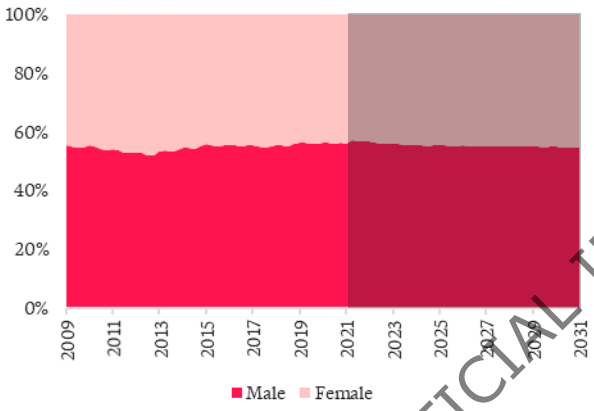
JS-WR clients by number of consecutive quarters on benefit (duration)



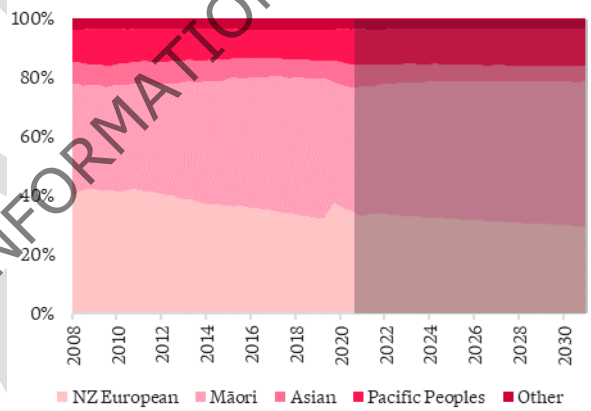

JS-WR clients by age band




JS-WR clients by gender




JS-WR clients by prioritised ethnic group




The key points to note about these charts are that:

- The duration chart shows the influx of new clients in the early part of the pandemic. As a proportion of the whole population, new entrants have since reduced. The influx of JS-WR clients in 2020 flows into higher duration bands through the estimation period. This highlights that there is a group of people who entered the system in 2020 who haven't subsequently exited main benefit. By the end of 2025, the modelling estimates that there will still be a sizeable number of these clients in the system (as reflected by the expanded >20 quarters band). These clients may need support to reconnect with the labour market.
- Also, more people who were on JS-WR prior to the pandemic flow into higher duration bands. Combined with the effect of new clients entering during the pandemic, the proportion of JS-WR clients with over 1 year duration is estimated to grow from about 40% pre-pandemic to a stable long-term level of about 47%. Most of this increase relates to JS-WR clients with over 5 years duration, which grows from about 5% to about 10%
- The proportion of JS-WR clients who identify as Māori has grown significantly over the last 10 years (the early pandemic period aside). This increased trend is estimated to continue. By the end of 2030, the modelling estimates that 49% of JS-WR will identify as Māori, compared to 35% in 2010 and 44% at the end of September 2021.

## 3.2 Movements in, through and out of the benefit system

To describe how rates of movement in, through and out of the benefit system have changed, we focus on five key system gateways. Collectively these gateways explain most of the change to the benefit system over the last few years and the impact this has on our estimates of peoples' long-term outcomes. The five gateways are:

- **Jobseeker Support and Sole Parent Support**
  - New clients receiving Jobseeker Support
  - Exits from Jobseeker Support
  - Exits from Sole Parent Support.
- **Health Condition and Disability benefits**
  - Transition of JS-WR clients to and from JS-HCD
  - Transition to Supported Living Payment.

We express the gateways as rates. While counts are also useful to consider, rates control for the size of the relevant population to give a clearer sense of relative change. For example, as the number of JS-WR clients increased during the first year of the pandemic the count of exits also increased. However, the rate of exit (count of exits *divided by* number of JS-WR clients) actually decreased.

We show rates for historical data for the last 10 years (solid lines) and, in most cases, estimates from the modelling for the next 10 years (dashed lines). Rates have been seasonally adjusted. In general (but not exclusively), assumed long-term future rates have been set at levels consistent with the period preceding the pandemic (i.e. 2017 – 2019). Variation in the near future typically reflects anticipated changes to population profiles and/or the assumed rate of unemployment.

#### COVID-19 effects

The economic impacts of COVID-19 had large visible effects on the five benefit gateways from early 2020 onwards, reflecting quickly changing labour market conditions. While these are interesting effects in their own right, we focus our commentary more on the trends evident before the pandemic. While we can't be certain, we believe these are more indicative of what rates are likely to revert to when COVID-19 effects diminish. Where appropriate, near-term residual pandemic effects have been built into the modelling assumptions.

### 3.2.1 Jobseeker Support and Sole Parent Support

#### New clients receiving Jobseeker Support

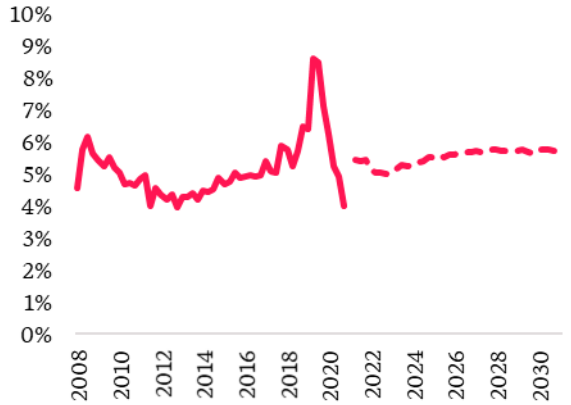
Jobseeker Support is by far the most common entry point into receiving main benefits. 60%-80% of main benefit grants are for Jobseeker Support, largely depending on the time of year. Hence, the rate at which the working-age population enters this benefit category, and whether they are returning clients, is an important measure for the benefit system as a whole. A small, sustained movement in the rate can make a big difference to the size of the main benefit population, because the underlying working-age population is large (circa 3.3 million people).

Figures 3.3 shows entry rates to JS-WR and JS-HCD for:

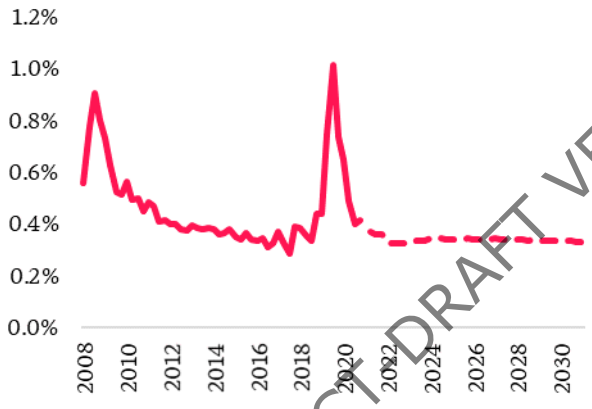
- Those who exited the system in the last 12 months i.e. recent exits
- The wider working-age population, including people who have never received a benefit in the past.

Figures 3.3 – Quarterly entry rates to JS-WR and JS-HCD

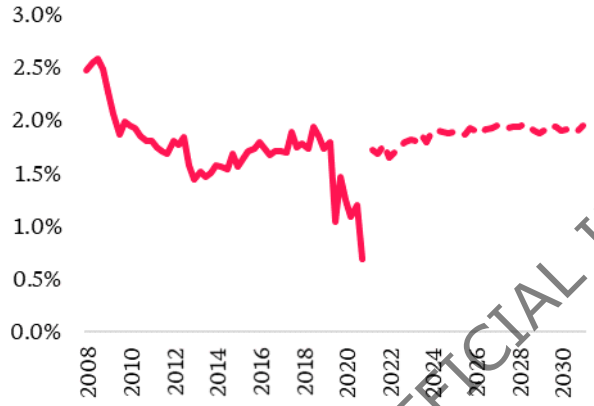
Entry rate to JS-WR – from those who exited the system in the last 12 months



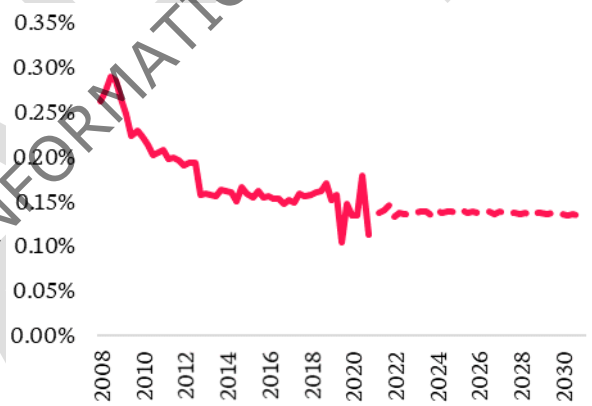

Entry rate to JS-WR – from the wider working-age population




Entry rate to JS-HCD – from those who exited the system in the last 12 months




Entry rate to JS-HCD – from the wider working-age population




The left-hand side charts show a pre-pandemic long-term trend of increasing rates of re-entry to Jobseeker Support for recent exits. These are quite significant changes. For example, the JS-WR re-entry rate increased from 5.1% in late 2017 to 8.6% in late 2019. The low point for this rate is 4.0% in June 2013. Re-entry rates naturally vary over time as the mix of clients (and hence clients exiting the system) changes. However, this sustained trend represents a genuine change in the system.

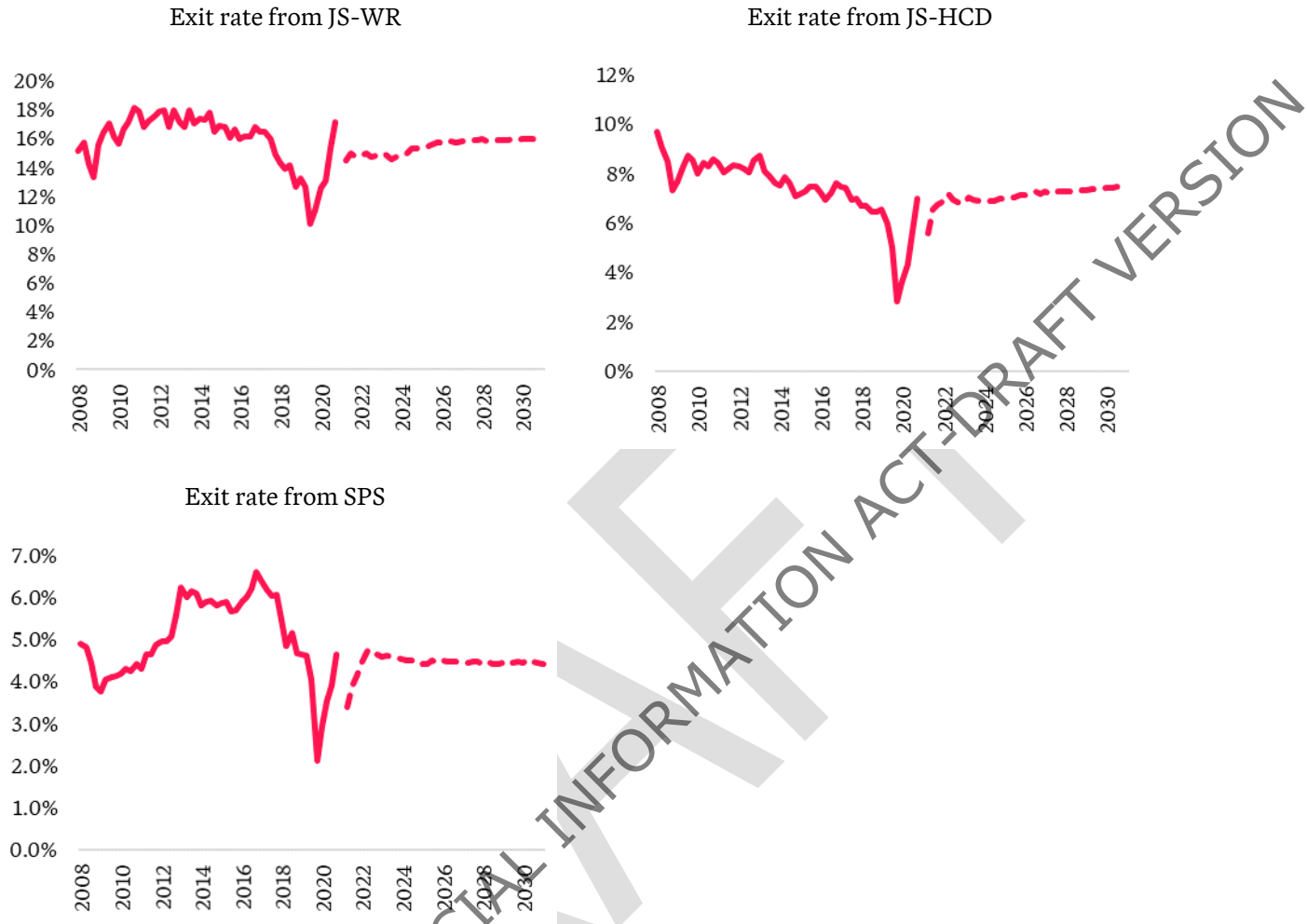
Entry rates from the wider working-age population also show increases from about mid-2017 – see the right-hand side charts. While these are not as large a percentage increase as for re-entry rates, the underlying population these apply to is much larger. Hence, small changes in these rates can have a large impact on client numbers. About two-third of entries come from the wider working-age population.

## Exits from main benefits

While exits from main benefit do not necessarily indicate increased material wellbeing, they represent a degree of financial independence, noting that many exiting clients continue to receive supplementary benefits. Exit rates from work-obligated main benefit categories (JS-WR and some SPS clients) are a good measure of the extent to which clients are achieving a degree of financial independence.

Figures 3.4 shows quarterly exit rates for JS-WR, JS-HCD and SPS.

Figures 3.4 – Quarterly exit rates from main benefit for JS and SPS clients




Exit rates decreased significantly for these three key benefit categories in the period from mid-2017 to late-2019 i.e. pre-pandemic. Over this period:

- JS-WR exit rates decreased from 16.7% a quarter to 12.7%
- SPS exit rates decreased from 6.6% to 4.6%
- JS-HCD exit rates decreased from 7.6% to 6.0%.

The extent to which exits are sustained is also important. Figures 3.3 give a strong sense of this. If the proportion of recent exits that re-enter the system is increasing, as is the case, then this is evidence that exits are less sustainable than before. Note that other research shows that sustainability of exits to June 2020 improved slightly for exits specifically into employment.[1]

Collectively these changes in entry and exit rates represent significant and sustained changes to the system. Since the long-term modelling was first developed (2011), they are the largest we have observed. While we cannot be sure if the pandemic will have a long-term impact on entry and exit rates, it is likely that the pre-pandemic trends we have highlighted will persist to some degree.

Accordingly, we have adjusted our modelling assumptions to reflect this experience.

[1] What happened to people who left the benefit system during the year ended 30 June 2020 - Ministry of Social Development (msd.govt.nz)

### 3.2.2 Transition to high-duration benefits

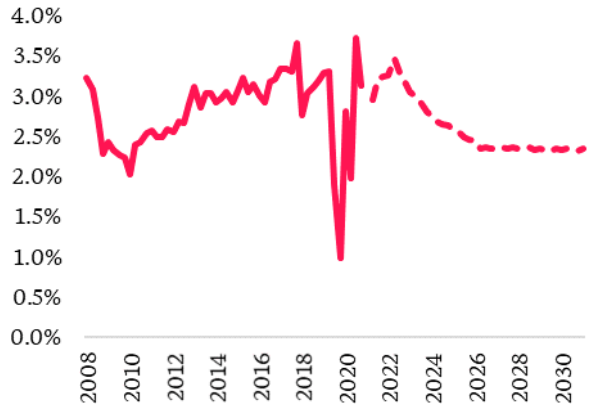
Transition from JS-WR to JS-HCD and transition from any benefit to SLP reflect a reduced likelihood that someone will be able to exit main benefits in the near future. These transitions stem from a client's health condition or disability status and at a system level are reasonable measures of worsening circumstances for clients.

Figures 3.5 shows the following transition rates:

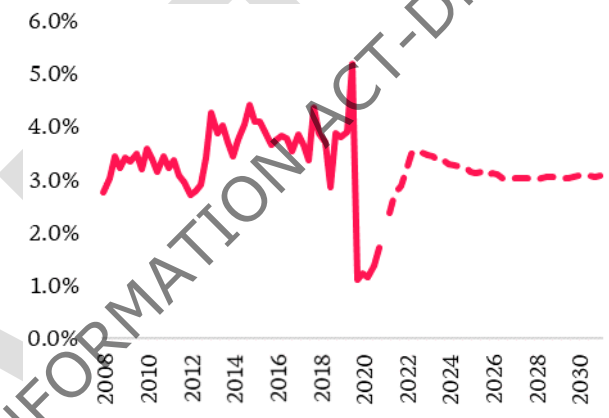
- The rate at which JS-WR clients transition to and from JS-HCD
- The rate at which JS-WR, JS-HCD and SPS clients combined transition to SLP.

Figures 3.5 – Quarterly transition rates

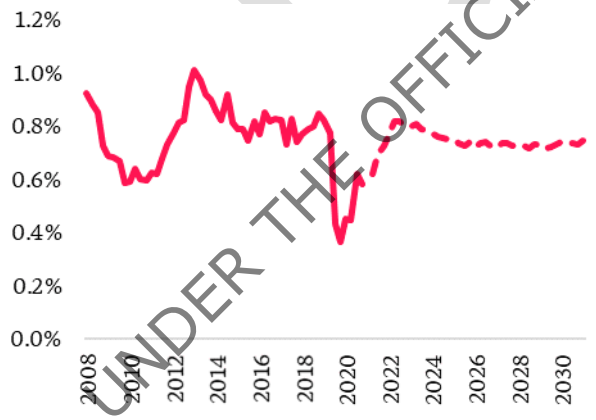
Transition rate from JS-WR to JS-HCD




Transition rate from JS-HCD to JS-WR




Transition rate from JS-WR, JS-HCD and SPS combined to SLP




These transition rates show no discernible trend in the pre-pandemic period. However, rates dropped significantly during the first year of the pandemic:

- This partly reflects lockdowns and people's reduced capacity to consult with medical practitioners and obtain medical certificates
- Medical re-certification requirements for JS-HCD and SLP clients were suspended for a period of time. This is evident in the right-hand side chart of Figures 3.5, where the transition rate from JS-HCD to JS-WR decreases from about 4% to 1% in mid-2020. Now that medical re-certification requirements have been re-instated, this rate is expected to revert to more normal levels.

## 3.3 Future time receiving main benefits

The modelling produces estimates of each person's use of benefits over their future lifetime up to age 65. Each year we recalibrate the model to:

- Update the modelling population to the modelling date (30 September 2021)
- Update assumptions:
  - Economic assumptions underpinning the modelling e.g. inflation, wage growth and rental growth. These assumptions are typically taken from central estimates.
  - Model assumptions determining the rates at which people are estimated to move into, through, and out of the benefit system, including the five key benefit gateways.
  - Model assumptions determining estimates of other social outcomes e.g. public housing use, income and use of mental health–related supports.

The updates to the model assumptions are informed by observed experience, such as that illustrated in Section 3.2. Ordinarily, more weight is given to more recent experience. However, we expect most COVID-19-related effects to be temporary. Hence, we have made assumptions about how long COVID-19-related effects will last. More detail can be found in the technical report[2].

Table 3.1 shows estimates of average future years on main benefit up to age 65 by high-level benefit segments, including segments for people not currently receiving a main benefit. For clarity:

- NOMB – refers to people who are not receiving a main benefit, but are receiving a supplementary benefit e.g. Accommodation Supplement (AS)
- Recent exits – refers to people who are not receiving any benefit, but have done in the year prior to 30 September 2021
- Longer exits – refers to people who are not receiving any benefit and didn't in the year prior to 30 September 2021.

We show last year's modelling results for comparison, plus 2019 modelling results as a pre-COVID-19 baseline.



[2] Social Outcomes Modelling 2021 – Technical Report

Table 3.1 – Summarised benefit system modelling results by high-level benefit category

| Segment | | | Counts | | | Avg. future years on main benefit | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2019 | 2020 | 2021 | 2019 | 2020 | 2021 |
| Main Benefits | Youth Benefit | YP/YPP | 2,061 | 2,265 | 2,136 | 16.4 | 19.1 | 20.8 |
| | Job Seeker | Work Ready | 87,420 | 147,726 | 121,941 | 10.5 | 11.3 | 11.7 |
| | | HCD | 68,304 | 77,898 | 84,693 | 11.0 | 11.9 | 11.8 |
| | | Sub Total | 155,724 | 225,624 | 206,634 | 10.8 | 11.5 | 11.7 |
| | Sole Parent Support | | 61,512 | 67,563 | 73,737 | 12.5 | 14.3 | 15.5 |
| | Supported Living | | 100,758 | 101,439 | 101,514 | 12.3 | 12.9 | 12.7 |
| | Sub Total | | 320,055 | 396,891 | 384,021 | 11.6 | 12.4 | 12.8 |
| NOMB | Supplementary benefits only | | 107,853 | 127,164 | 123,525 | 2.7 | 3.0 | 3.4 |
| Recent Exits | Benefit history within last year | | 97,743 | 98,859 | 145,041 | 5.5 | 6.0 | 5.9 |
| Longer Exits | Benefit history within 1-5 years | | 229,764 | 197,337 | 193,368 | 2.7 | 3.3 | 3.1 |
| | No benefit history within last 5 years | | 2,400,420 | 2,465,148 | 2,430,810 | 0.8 | 1.0 | 1.0 |
| | | | 2,630,184 | 2,662,485 | 2,624,178 | 1.0 | 1.1 | 1.2 |
| Total | | | 3,155,835 | 3,285,399 | 3,276,765 | 2.3 | 2.7 | 2.8 |

Table 3.1 shows some significant changes in estimated average future years on main benefit up to age 65 between the 2019 and 2021 modelling rounds, including:

- Youth Benefit increasing by 4.4 years (or 27%) to 20.8 years
- SPS increasing by 3.0 years (or 26%) to 15.5 years
- JS-WR increasing by 1.2 years (or 11%) to 11.7 years - The average has not increased by as much as for SPS and Youth Benefit because many people who wouldn't usually need to enter the benefit system have entered through the pandemic, resulting in lower estimates than if the client mix had been more typical.
- People currently only receiving supplementary benefits increasing by 0.7 years (or 26%) to 3.4 years.

Most of the change in average future years on main benefit stems from changes to the model assumptions that reflect experience. In particular:

- Decreased assumption for JS-WR exit rates
- Decreased assumption for SPS exit rates.

In practical terms, this means people are estimated to spend more time before they turn 65 receiving main benefit financial support. Compared to the 2019 modelling round, the long-term fiscal cost of providing these people with that support is estimated to increase by more than average future years on main benefit. This reflects ad-hoc increases to benefits in the last two years. A further increase is effective from 1 April 2022 (in addition to indexation increases) to bring rates into line with the recommendations of the 2019 Welfare Expert Advisory Group.

Year-on-year change in estimated future years on main benefit is analysed and reconciled in Section 3.6.

### 3.3.1 Distribution of estimated future outcomes

Figure 3.6 shows the same modelling results as Table 3.1, with some parameters that describe the distribution of estimated future years on main benefit.

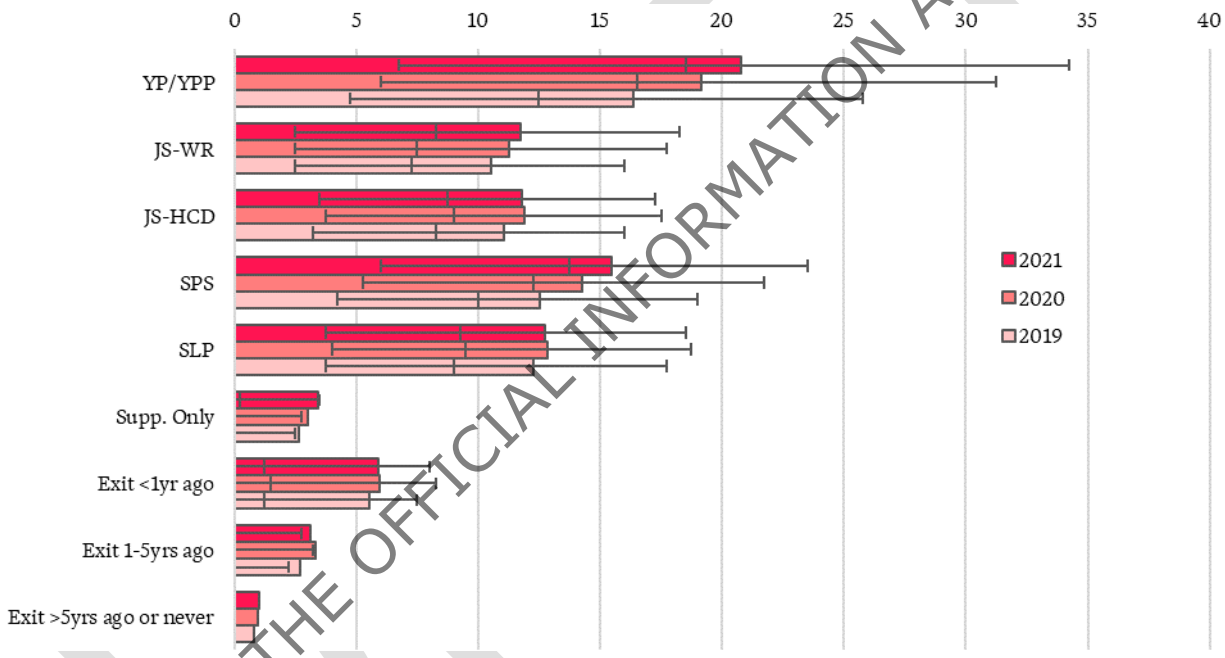
The bars represent mean averages consistent with Table 3.1. The black lines represent the interquartile range. If all people in each cohort were lined up in order of their estimated future years on main benefits or estimated future years in public housing, the interquartile range represents the quarter and three-quarter points on that line. The median is the half-way point and marked somewhere along each black line e.g. for JS-WR clients the 2021 estimates show an interquartile range from 2.5 years to 18.25 years. Another way to express this is that the model estimates that 25% of JS-WR clients will spend less than 2.5 future years on main benefit and 25% will spend more than 18.25 future years on main benefit before turning 65.

This gives us useful information about the distribution of estimated outcomes within each category.

Note some points of interpretation about the interquartile ranges:

- In every case, the median average is lower than the mean average. This highlights that in each category there is a concentration of people with high future estimated years on main benefit.
- For some categories, parts of the interquartile range are not visible e.g. Exit<1yr ago. This is because over 25% of people in these categories have 0 estimated future years on main benefit. Hence, the starting point of the interquartile range is 0.

Figure 3.6 – Average future years on main benefit up to age 65 by high-level benefit category




For most categories we can infer that a large part of the year-on-year increase in estimated average future years on main benefit is due to a greater distributional skew towards people with high estimated future years on main benefit (because the upper end of the interquartile ranges increased in absolute terms more than the lower end). This implies greater disparity within categories and, to some extent, between groups.

As an example, the increase is pronounced for YP/YPP clients. 25% of YP/YPP clients are estimated to spend more than 34.25 future years on main benefit, compared to an estimated 25.75 years in the 2019 modelling round. This same group are estimated to receive at least $962k in future benefit payments, while the top 25% in the 2019 modelling round were estimated to receive at least $555k.

Note also that the lower quartile has increased significantly in relative terms, from 4.8 years in 2019 to 6.8 years in 2021. This highlights that the increases to estimated future years on main benefit affects most YP/YPP clients.

SPS clients also stand out, with the upper-quartile point increasing from 19.0 years to 23.5 years over the two-year period.

The disparity between people less likely to find employment and other main benefit clients, or the wider population, has grown.

### 3.3.2 Main benefit clients working part-time

In Figure 3.7 and Figure 3.8 we show how estimates of future years on main benefit differ for JS-WR and SPS clients who don't earn any income compared to those who earn more than $100 per week. The groups who don't earn income have been weighted to be demographically equivalent[3] to the groups earning more than $100 per week.

The results show that those earning more than $100 per week are, on average, estimated to spend fewer future years on main benefit. In particular, SPS clients earning more than $100 per week are 2.8 times more likely to spend less than a year on main benefit in the future (equivalently 1.9 times more likely for JS-WR clients).

While the relationship between income while on main benefit and future main benefit receipt is not necessarily causal, it is plausible that maintaining a connection to the labour market has a positive impact on future employment prospects. Supporting and encouraging part-time work while on main benefit is likely to be beneficial for material wellbeing in the short term and for longer-term employment prospects.

Figure 3.7 – Distribution of estimated future years on main benefit up to age 65 – JS-WR clients


| Average future years on main benefit up to age 65 | |
|---|---|
| Not earning income | 13.3 years |
| Earning > $100 p.w. | 10.4 years |



[3] In their distributions of people across ages, genders, and prioritised ethnic groups.

Figure 3.8 – Distribution of estimated future years on main benefit up to age 65 – SPS clients


### 3.3.3 Clients who entered the system at the start of the pandemic

In Section 3.1, we highlighted the influx of clients into the benefit system at the start of the pandemic and how many of these people remain in the system and may benefit from support to reconnect with the labour market.

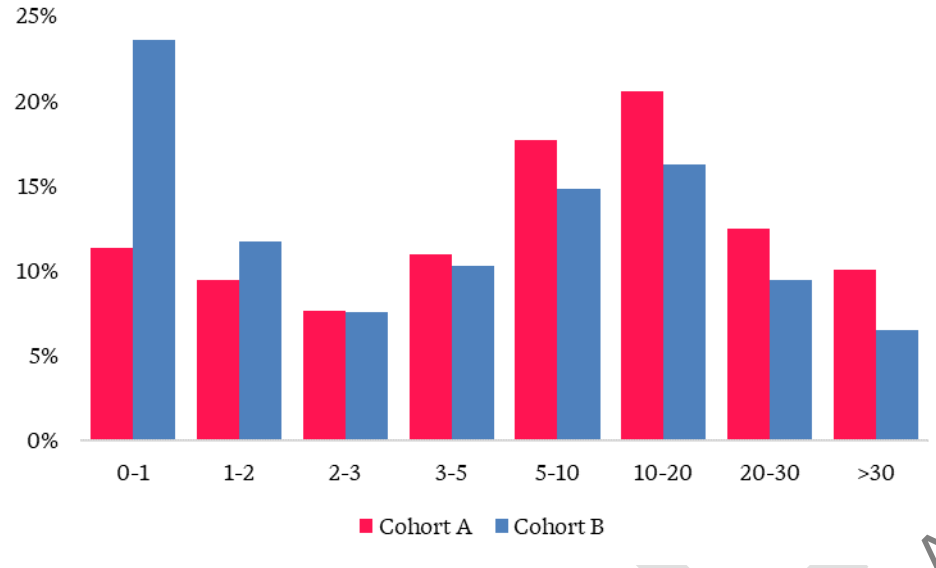
Of the 77,000 clients who entered the system into JS-WR in the first half of 2020, about 13,000 remained on main benefit at 30 September 2021. The modelling tells us that the longer a person remains on main benefit, the less likely they are to exit in the future.

Figure 3.9 shows estimated average future years on main benefit for:

- Cohort A – Clients who entered the system into JS-WR in the first half of 2020 and remained on benefit to 30 September 2021
- Cohort B – Clients who entered the system into JS-WR in the quarter to 30 September 2021, weighted to be demographically equivalent[3] to cohort A.

Cohort A is much more likely to spend a prolonged period on main benefit and much less likely to spend less than one year on main benefit in the future.

Figure 3.9 – Distribution of estimated future years on main benefit up to age 65




During the GFC, we saw a similar group to Cohort A who experienced some degree of unemployment scarring[4] that wouldn't have otherwise occurred. The modelling clearly demonstrates a correlation between time on benefit and future time on benefit. Arguably the risks are greater for this pandemic-related cohort, because the pandemic has concentrated effects on certain industries and regions.

## 3.4 Further distributional detail – Estimated future years on main benefit before age 65

Estimated future time on main benefits is usually framed as a simple time measure, like that in Table 3.1 and Figure 3.6. This is a useful approach for quantifying future main benefit receipt. However, comparing different cohorts on this basis is not straightforward because they differ in age distribution and hence the potential future time period that they could receive a main benefit i.e. to age 65.

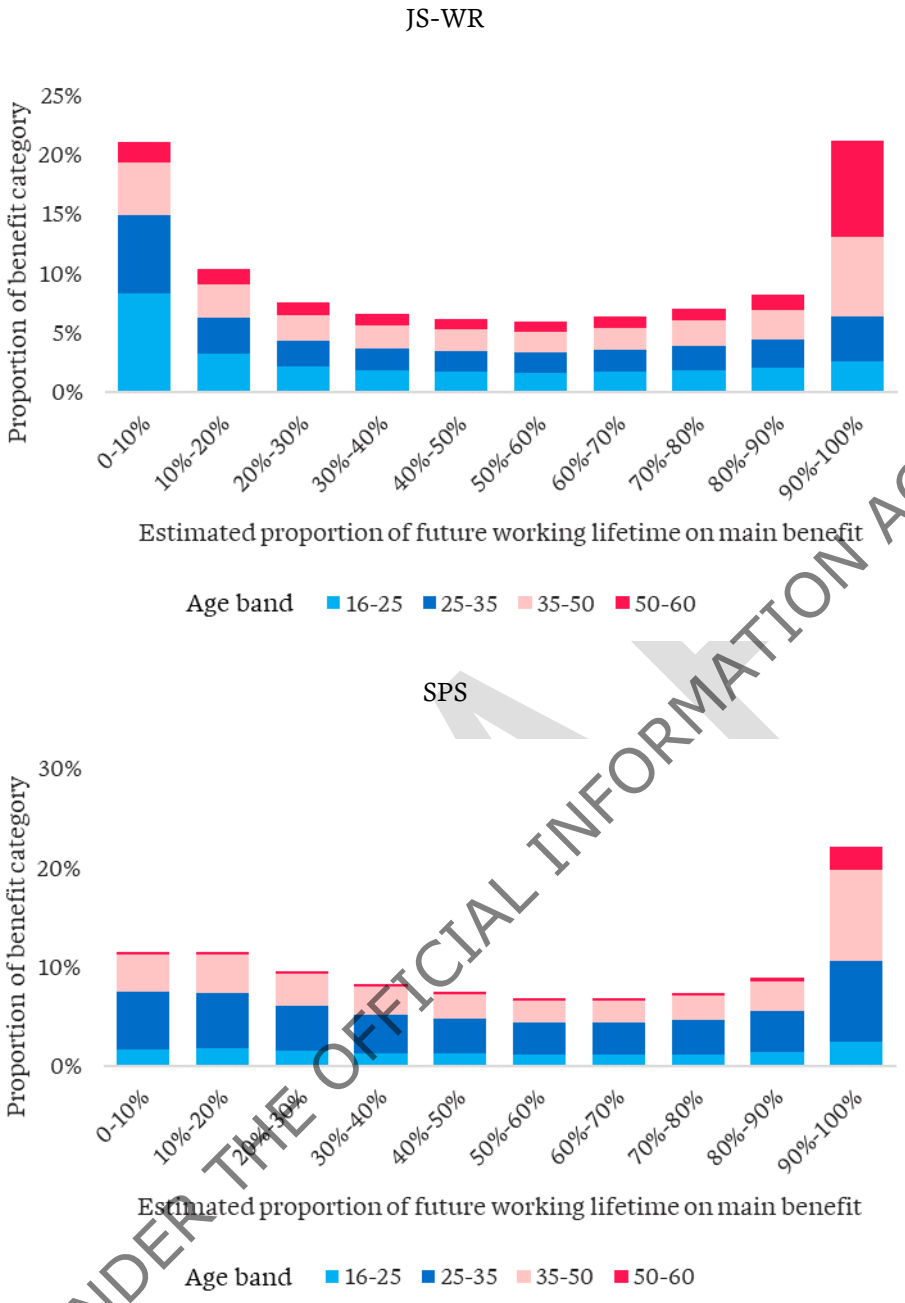
In this section, we express future benefit receipt as a proportion of future lifetime up to age 65 and show the distribution of this measure for key benefit categories – See Figures 3.10. Note that the y-axis scales differ for each chart.

Each bar has been split into four age bands. For the purposes of this analysis, we have excluded people aged over 60, since they are close to retirement age and so have a relatively high likelihood of remaining on main benefit until that point. Including them would skew the analysis.

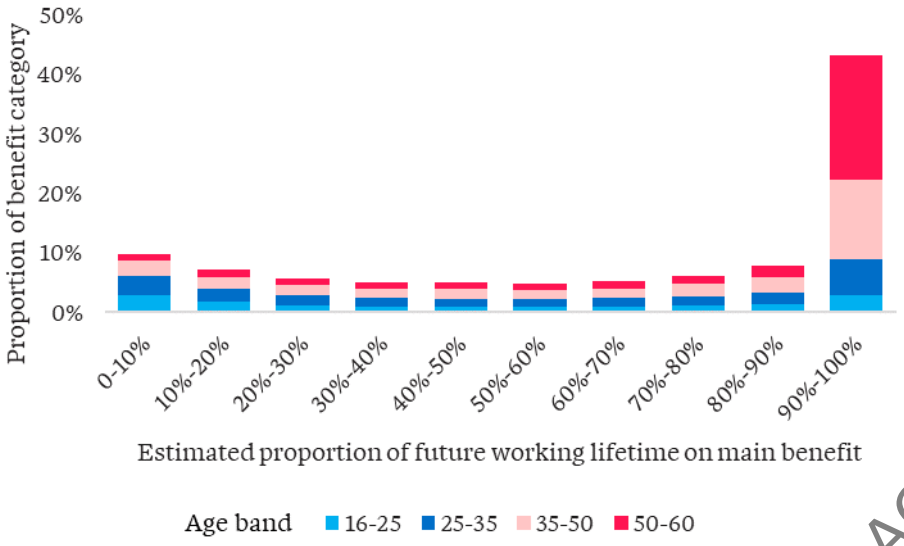


[4] Unemployment scarring refers to the notion that experiencing unemployment (particularly if sustained) increases the probability of a person being unemployed in the future and having lower prospective earnings.

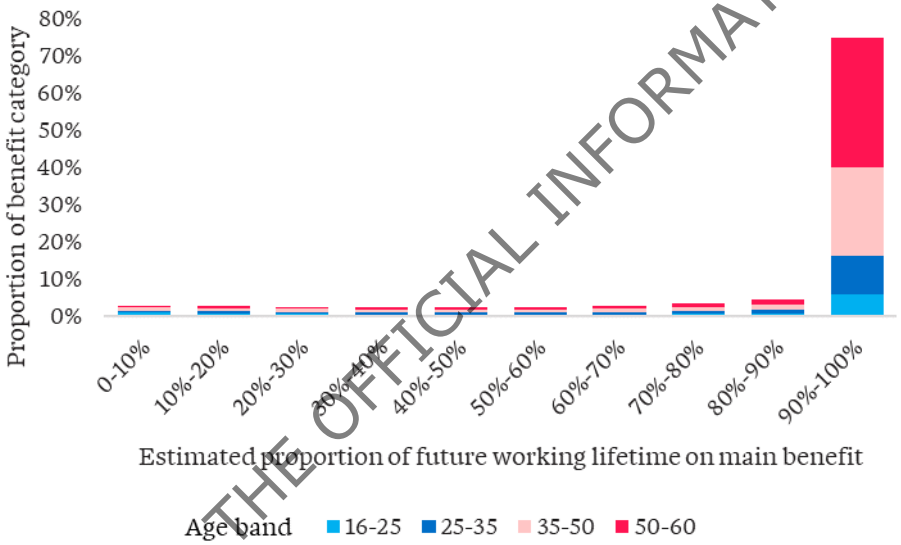
Figures 3.10 – Distribution of proportion of future lifetime up to age 65 on main benefit – main benefit categories



JS-HCD




SLP




This measure gives a different perspective on the benefit system population:

- A relatively high proportion of clients are currently estimated to spend the vast majority (over 90%) of the time before they reach 65 on main benefit. This includes benefit categories with work obligations. In total, 167,000 current clients are estimated to spend over 90% of their future lifetime up to age 65 on main benefit, including 73,000 current SLP clients.
- 65% of main benefit clients are estimated to spend at least 50% of their future lifetime up to age 65 on main benefit (57% if we exclude SLP clients)
- For non-health related benefit categories, the distribution of the proportion of future lifetime up to age 65 on main benefit is reasonably well spread, with larger groupings at '0-10%' and '90%-100%'.
- Nearly 50% of current JS-HCD clients are estimated to spend over 90% of their future lifetime up to age 65 on main benefit. Many in this group may transfer to SLP at some point.

- While, in general, older age bands are more likely to spend a high proportion of their future lifetime up to age 65 on main benefits, there are many young clients (in all benefit categories) who are estimated to spend more than half on main benefits. For example, 46% of JS-WR clients and 56% of SPS clients are estimated to spend more than 50% of their future lifetime up to age 65 on main benefits are under the age of 35.
- For JS-WR and SPS, variation within client populations is at least as large as the variation between client population averages and averages for the wider population not on main benefit.

We have also considered how those who are estimated to spend a reasonably large proportion of their future lifetime up to age 65 on main benefit compare to their peers in respect of other outcomes. We show this for JS-WR clients in Figures 3.11, comparing:

- Cohort A - People who are not currently receiving a benefit, weighted to be demographically equivalent[3] to cohort C
- Cohort B - JS-WR clients who will spend less than 25% of their future lifetime up to age 65 on main benefit, weighted to be demographically equivalent[3] to cohort C
- Cohort C - JS-WR clients who will spend more than 25% of their future lifetime up to age 65 on main benefit

Figures 3.11 – Average proportion of the next 10 years accessing different services


* Or to age 65 if earlier, in the case of receiving a main benefit
** Mental health and addiction service events as defined by the Social Wellbeing Agency (excluding potential pharmaceuticals)

The key message is that use of other services is correlated with main benefit receipt and vulnerabilities extend to related wellbeing domains such as health and housing.

## 3.5 Other social outcomes

Figure 3.12 to Figure 3.18 show a range of other modelling results for a range of social outcomes, including measures for:

- Public housing use
- Earned income
- Being proceeded against by Police
- Use of mental health–related supports
- Enrolment in tertiary education.

Figure 3.12 – Average future years in public housing by high-level benefit category

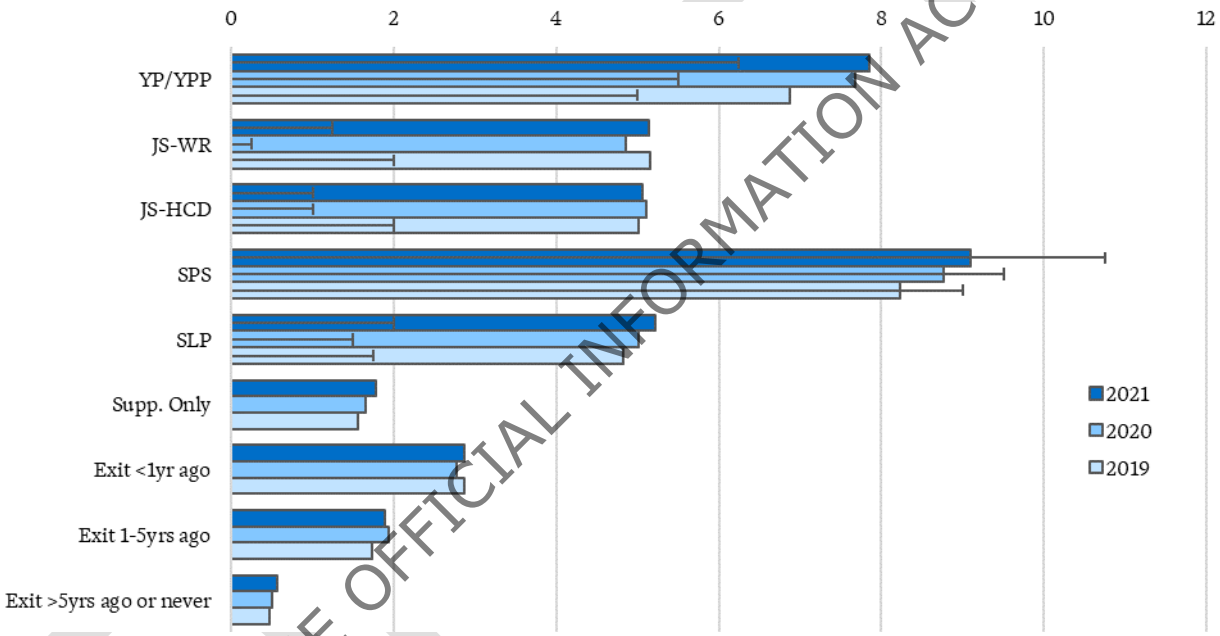


Figure 3.13 – Average future years in public housing by high-level benefit category – Currently in public housing

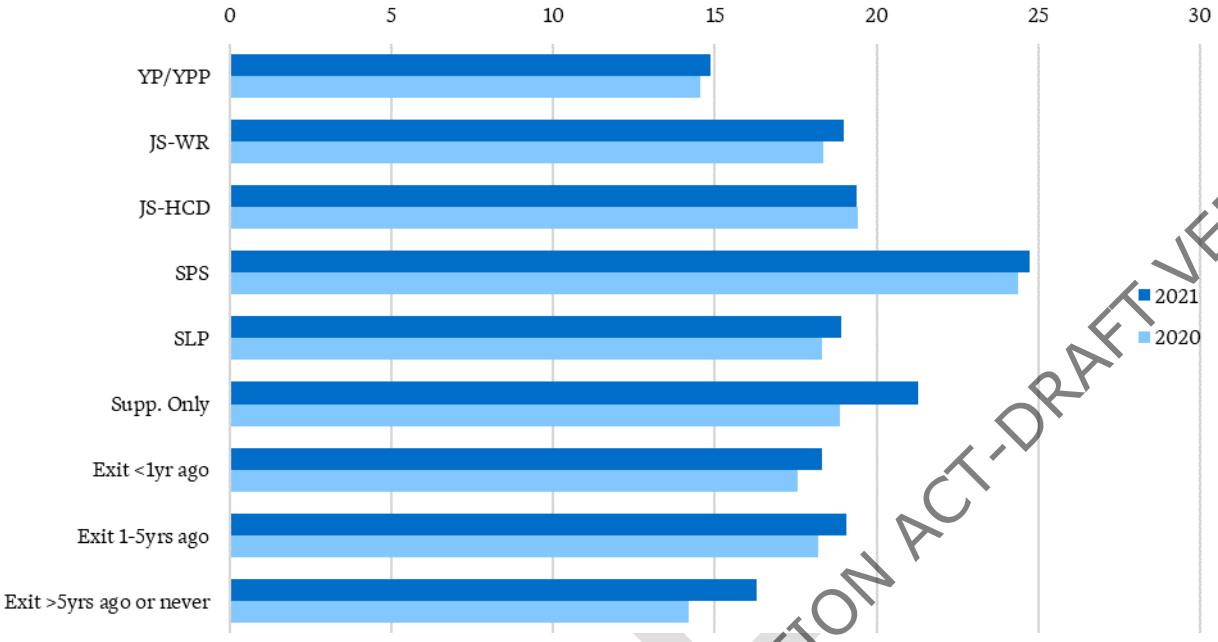
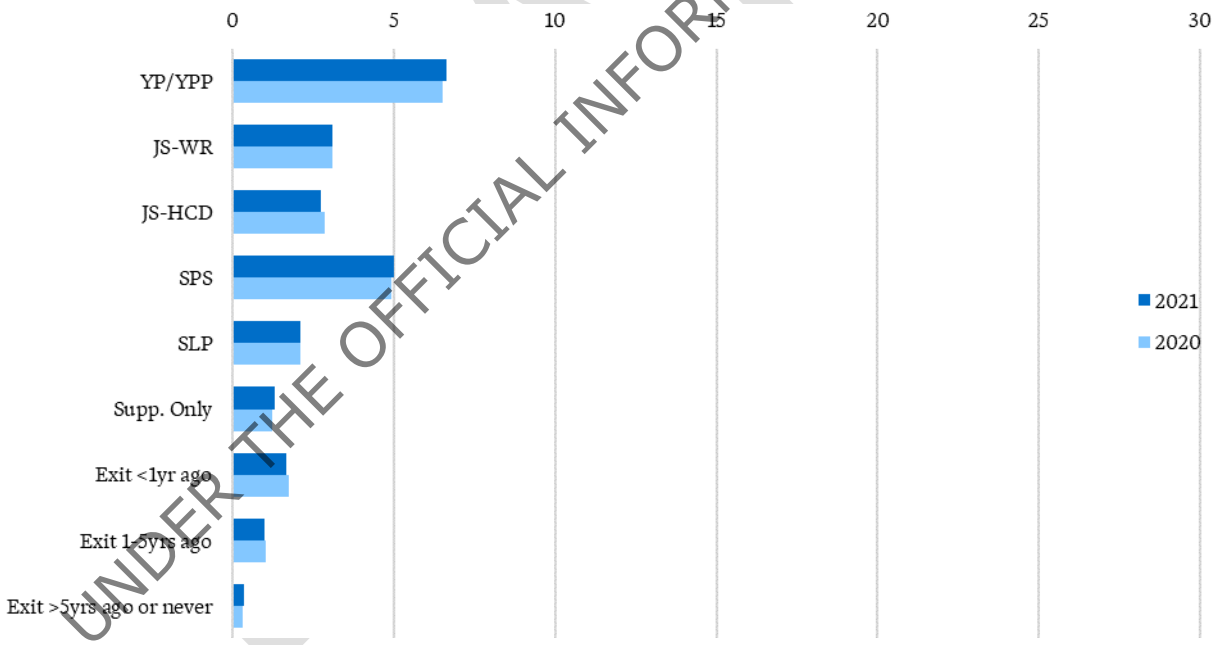
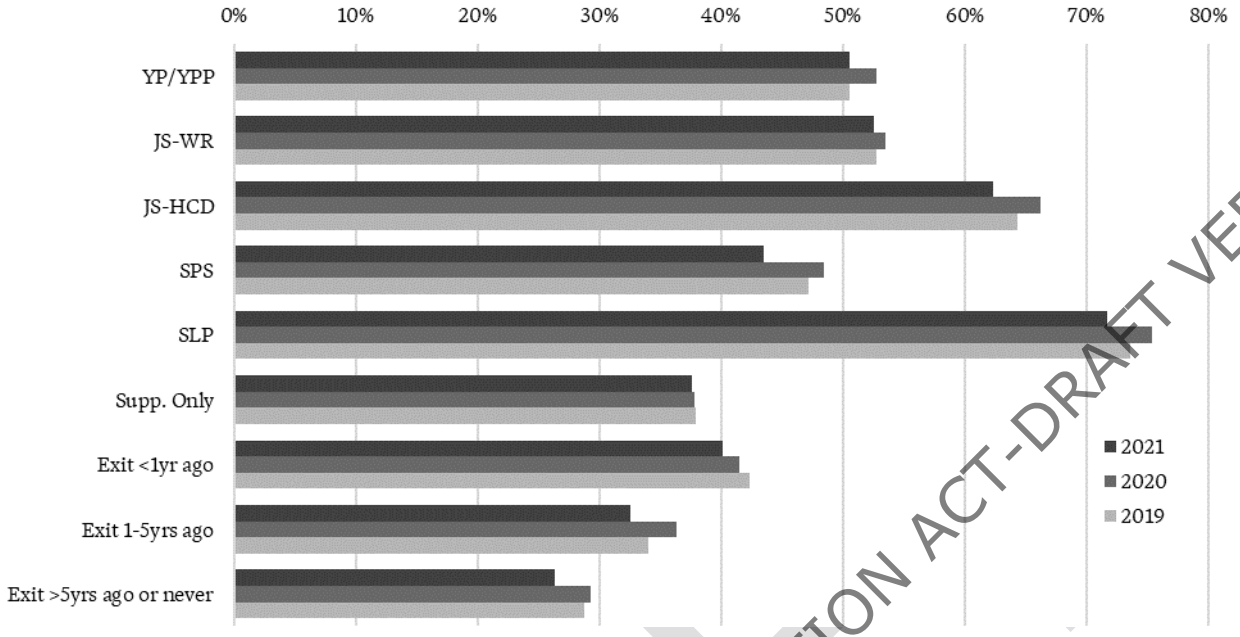



Figure 3.14 – Average future years in public housing by high-level benefit category – Not currently in public housing




Note: Approximately 14% of main benefit clients are in public housing

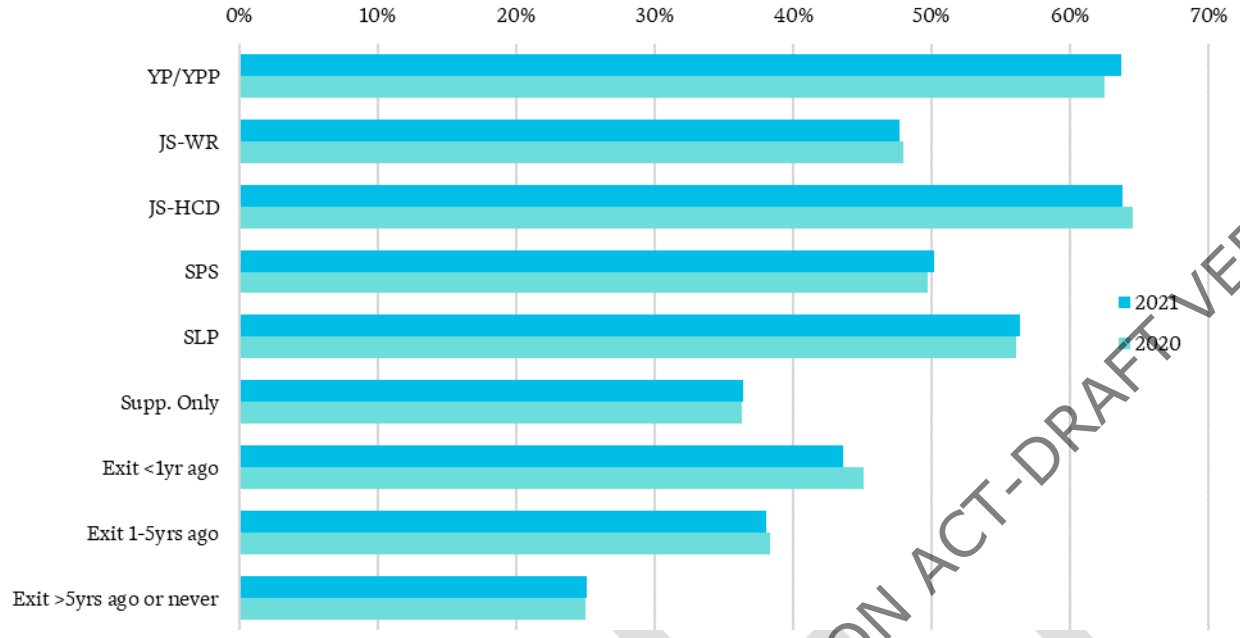
Figure 3.15 – Average proportion of future lifetime to age 65 estimated to be earning below income threshold*




* Threshold = Earning the equivalent of at least 40 hours per week at the minimum wage (increased with average wage growth).

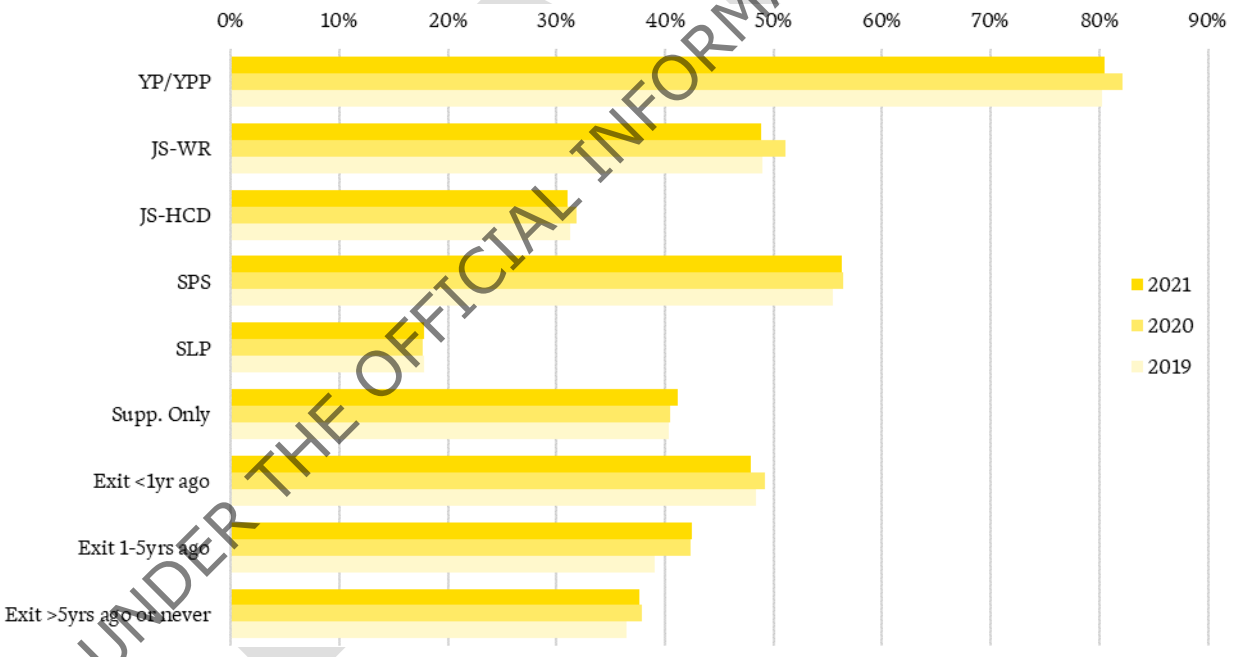
Figure 3.16 – Proportion of people estimated to be proceeded against by the police in the next 10 years

Figure 3.17 – Proportion of people estimated to access mental health–related supports* in the next 10 years




* Mental health and addiction service events as defined by the Social Wellbeing Agency (excluding potential pharmaceuticals)

Figure 3.18 – Proportion of people estimated to be enrolled in tertiary education in the next 10 years




* Tertiary education = Education at a Tertiary Education Organisation or Industry Training Organisation

Year-on-year changes in these charts are more muted than for estimated future years on main benefit. However, there are some key points to draw from these charts:

- The high future use of mental health–related supports by main benefit clients compared to the rest of the population. The modelling also shows that their interactions will be more skewed towards specialist services (i.e. outpatient and inpatient specialist services).
- The proportion of people estimated to have a police proceeding against them in the next 10 years has decreased for most categories, with a few seeing marginal increases. This reflects a general decrease in police proceedings following the Policing Excellence programme introduced in 2009, which saw a

transfer in policing activities from reactive to preventative policing. This continues to flow through into the modelling output as fewer and fewer people have been proceeded against by the police.

- Average estimated future time in public housing has increased across most categories. This is principally for people currently in public housing.

## 3.6 Analysis of change

This section describes core modelling results and how they have changed since the 2020 modelling round. We describe the detail of this analysis in Section 3.6.2 and summarise the key points in Section 3.6.1.

### 3.6.1 Analysis of change – summary of key points

- The total estimated future years on main benefits up to age 65 for people receiving a benefit (or who have in the prior 12 months) has increased by 5.2% from 5.88 million years in 2020 to 6.18 million years in 2021. There were two key factors driving this result:
  - An improved economic forecast (HYEFU 21) resulting in a reduction of 0.23 million years
  - Changed rates of benefit transition (especially reduced rates of benefit exit) pre-pandemic reflected in the modelling assumptions resulting in an increase of 0.55 million years

  So, the impact of the reduced rates of benefit exit on total years is somewhat masked by the improved economic forecast.
- For all benefit categories, the impact of changed rates of benefit transition pre-pandemic is far greater than the overall increase in average estimated future years on main benefit. For example, the average estimated future years on main benefit up to age 65 for JS-WR clients has increased by 0.4 years from 11.3 years to 11.7 years, whereas changed rates of benefit transition increased the average by 1.2 years. This is important because the factors that counterbalance the 1.2 years (e.g. improved economic forecast, changed client mix) could unwind going forward, and the overall JS-WR client average increase above 11.7 years.
- Most of the increase in average estimated future years on main benefit up to age 65 for JS-WR clients related to clients who started their current main benefit spell less than seven quarters prior. The average estimated future years on main benefit up to age 65 for these clients increased by 1.3 years from 9.8 years to 11.1 years (compared to 0.1 years from 13.3 to 13.4 years for longer-term JS-WR clients). Their future employment prospects have been impacted by long-term unemployment through the pandemic period.

### 3.6.2 Analysis of change - detail

Changes in modelling results over time can stem from a range of factors including:

- Changes to the population being modelled – As time passes, the population naturally changes. This can have a significant effect on modelling results, as it has done through the pandemic.
- Updates to model assumptions – These might be assumptions for factors external to the benefit system (such as the unemployment rate), or assumptions reflecting the behaviour of people and their interactions with various government services. Changes to the population being modelled and updates to model assumptions are often related e.g. the behaviour of people (which informs model assumptions) influences the size and mix of characteristics of the benefit system population.
- Modelling methodology changes – Sometimes changes are made to the modelling methodology e.g. to accommodate new outcomes to be estimated. Typically, these have little impact at total population level, but they can have significant impacts at cohort level. This year there have been no material modelling methodology changes.

Understanding the contributions of these factors to changes in modelling results helps us understand the extent to which:

- Change was expected or unexpected – Some year-on-year change is expected, particularly as the model estimates move along the unemployment rate assumption curve and the modelling population naturally evolves.
- Change related to factors that MSD can or can't influence – For example, MSD has limited influence over labour market conditions, but may be able to influence peoples' employment prospects.

In this section, we show an analysis of change, to break the change in modelling results down into these factors.

The analysis of change can be performed for any cohort of people, for any outcome estimated by the model and over any future time horizon. We show four core sets of analysis:

Table 3.2 – Sets of analysis of change

| Set | Population | Outcome | Time horizon |
|---|---|---|---|
| 1 | All people receiving a benefit at 30 September or who have in the prior 12 months | Total future years receiving a main benefit | Future lifetime up to age 65 |
| 2 | For populations in each main benefit category at 30 September | Average future years receiving a main benefit | Future lifetime up to age 65 |
| 3 | People receiving JS-WR at 30 September who started their current main benefit spell less than seven quarters ago i.e. mainly since the start of the pandemic | Average future years receiving a main benefit | Future lifetime up to age 65 |
| 4 | People receiving JS-WR at 30 September who started their current main benefit spell more than or equal to seven quarters ago i.e. all pre-pandemic | Average future years receiving a main benefit | Future lifetime up to age 65 |

Set 1 is a system-level view framed around an 'at-risk' population definition. It is analogous to the way analysis of change was reported in 2017 and prior.

Set 2 is mainly covered in Appendix B.

Sets 3 and 4 focus on the benefit category that has seen the most amount of population change through the pandemic – JS-WR. Sets 3 and 4 split JS-WR between those who started their current main benefit spell before or after the start of 2020. This helps demonstrate the impact of the pandemic and how the change in modelling results differs significantly for these two cohorts.

Figure 3.19 to Figure 3.22 show the analysis of change for these sets in a consistent format. These 'waterfall' charts show the 2020 and 2021 results at either end in grey and the contributions to the change from different factors of change (increases in blue and decreases in red). Table 3.3 describes what each of these factors of change mean and whether they represent expected or unexpected changes.

Table 3.3 – Description of analysis of change stages

| Stage of analysis | Commentary | Expected or unexpected change |
|---|---|---|
| 1. 2020 result | The 2020 modelling results as at 30 September 2020, based on the population and modelling assumptions set at that point i.e. the results disclosed in last year's report. | N/A |

| Stage of analysis | Commentary | Expected or unexpected change |
|---|---|---|
| 2. Use actual economics | Stage 1 results, restated to replace economic assumptions for the period from 30 September 2020 to 30 September 2021 with actual economic outcomes e.g. unemployment rate, inflation rate.<br><br>*The difference between stage 1 and 2 shows the impact on results from the difference between using actual economic inputs for the year to 30 September 2021 and using what we assumed for the 2020 results.* | Unexpected |
| 3. Roll forward | The roll forward stage uses the stage 2 results to show what we expected the results to be as at 30 September 2021 based on the 2020 model and 30 September 2020 population (and actual economics over the year to 30 September 2021). It incorporates:<br>▪ Expected changes to the client cohort (entries, exits, transfers etc)<br>▪ Expected outcomes over the year to 30 September 2021<br>▪ Other expected changes with respect to people's circumstances e.g. ageing<br>▪ Change implied by the model from actual economics over the year to 30 September 2021.<br><br>*The difference between stage 2 and 3 shows how we expected the results to change from moving ahead in time by one year to 30 September 2021.* | Expected |
| 4. Update client cohort | Stage 3 results with the actual population as at 30 September 2021.<br><br>*The difference between stage 3 and stage 4 shows the impact on results from the difference between the actual population and what we expected the population to be as at 30 September 2021. The difference in population reflects how experience over the year differed to that represented by the 2020 modelling assumptions (allowing for actual economic conditions during the year).* | Unexpected |
| 5. Update future economics | Stage 4 results with updated economic assumptions for the period from 30 September 2021.<br><br>*The difference between stage 4 and stage 5 shows the impact of updating economic assumptions from the 2020 results for the period from 30 September 2021* | Unexpected |

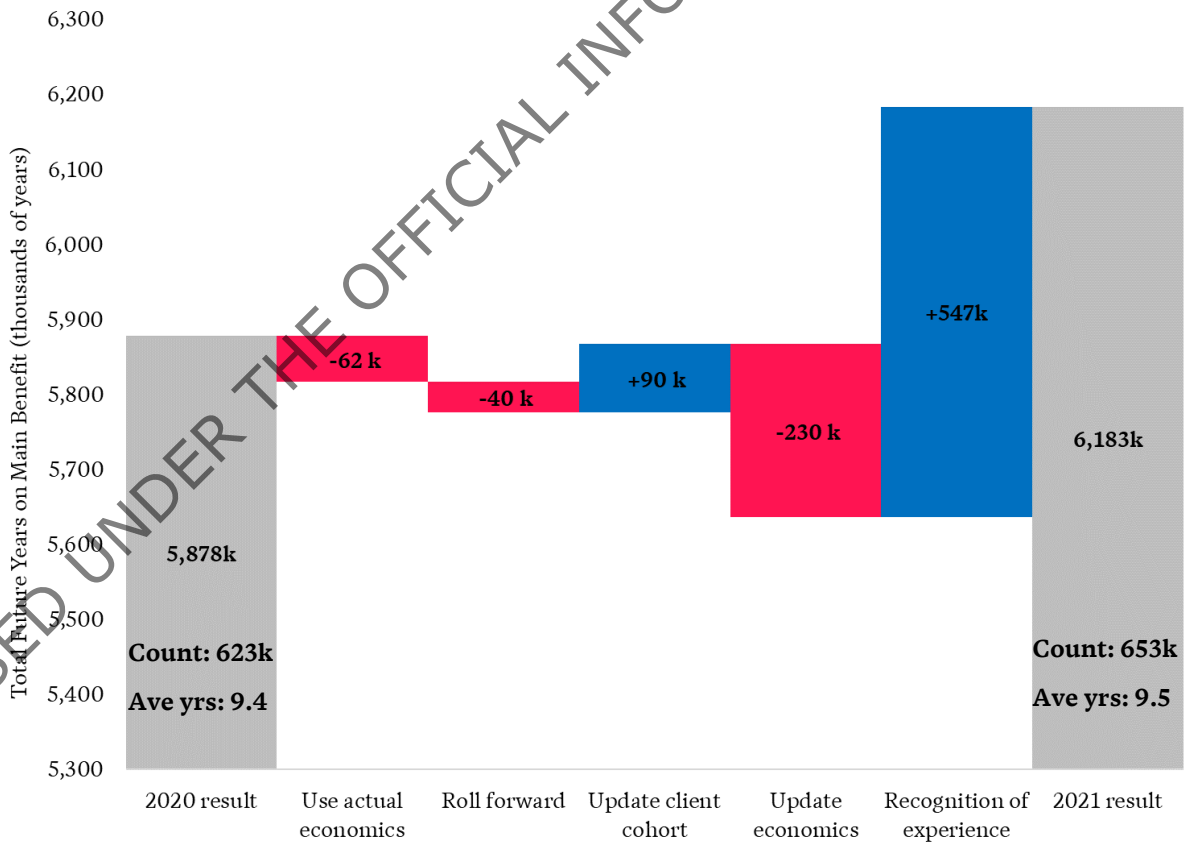
| Stage of analysis | Commentary | Expected or unexpected change |
|---|---|---|
| 6. Recognition of experience | Stage 5 results with updated modelling assumptions (entry rates, exit rates etc).<br>*The difference between stage 5 and stage 6 shows the impact from adjusting modelling assumptions to reflect how an additional year of data informs our view of the future* | Unexpected |
| 7. 2021 result | No changes from stage 6. | N/A |

### Set 1 - All people receiving a benefit at 30 September 2021 or who have done in the 12 months prior

Set 1 defines a population of people receiving a benefit or who are close to the benefit system. Where 'close' is defined as people who are not currently receiving a benefit but have done at some point in the year prior. It reconciles the total estimated future years on main benefit for this population from the 2020 and 2021 modelling results. This gives a high-level view of system change, and the extent to which people currently in or near the benefit system are estimated to spend more or less time on benefit in the future.

We have also noted the count of people in the population and the estimated average future time on main benefit at each modelling date. This allows us to see how much of the increase in total years related to an increase in people and how much relates to an increase in average future time on main benefit.

Figure 3.19 – 2020/2021 analysis of change – Set 1 – Total future years on main benefit up to age 65 – All people receiving a benefit at 30 September or who have in the prior 12 months




The key steps of the analysis to highlight are:

- Update client cohort +90,000 years – This primarily relates to the population being larger than anticipated in the prior steps of the analysis. This was mainly SPS clients, for whom there was a significant increase over the year that was mainly driven by lower than estimated exit rates (there were also circa 5,000 clients who were reclassified from JS-WR to SPS in November 2021).
- Update economics -230,000 years – This reflects a more favourable economic forecast for the 2021 modelling compared to the 2020 modelling
- Recognition of experience +547,000 years – This is the most important step. Not just because it is the largest in magnitude, but because it reflects the long-term effect of accommodating pre-pandemic transition rate experience into the modelling assumptions. This mainly relates to:
  - Assumed lower rates of exit for JS-WR clients
  - Assumed lower rates of exit for SPS clients
  - Assumed higher rates of entry to JS-WR.

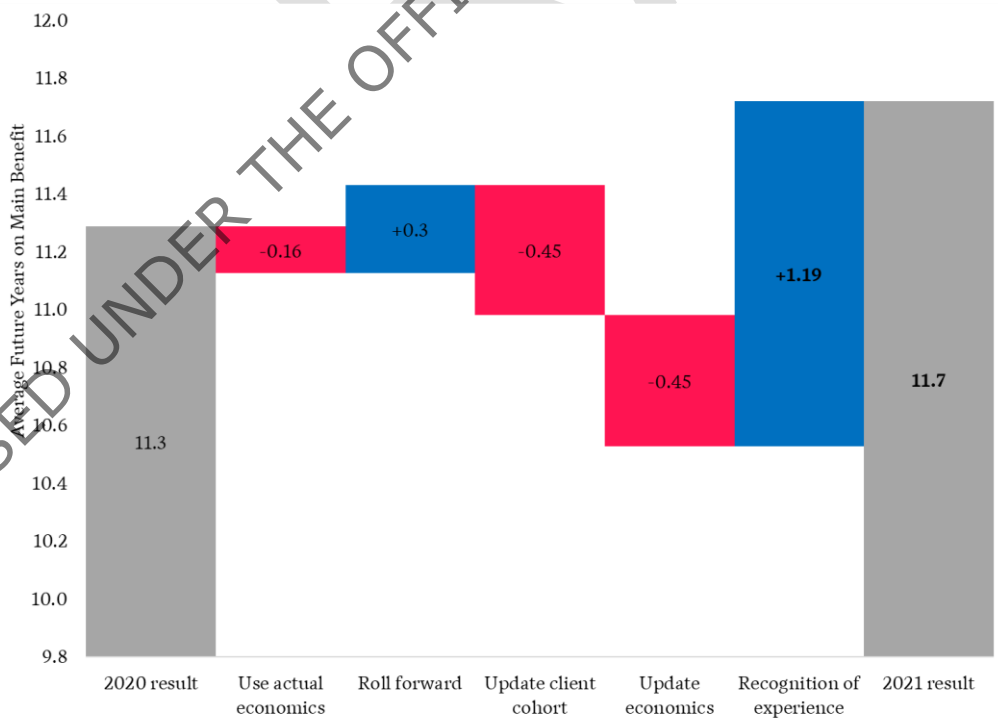
### Set 2 – Populations in each benefit category at 30 September

Set 2 contains subsets of set 1 for populations in each benefit category at 30 September. We show the chart for JS-WR clients in Figure 3.20, with the rest consigned to Appendix B.

This analysis considers average rather than total future years. The key difference compared to analysis for set 1 is that the 'update client cohort' represents a reduction. So, while we noted in respect of set 1 that there were more JS-WR clients than anticipated, the analysis shows that the mix of characteristics of JS-WR clients in 2021 (compared to 2020) imply lower expectations of future main benefit receipt. However, the 'recognition of experience' step more than counterbalances this effect and is driven by assumed lower rates of exit and higher rates of entry.

While there are some differences in the analysis for other benefit categories shown in Appendix B, the increase in average estimated future years on main benefit from the 'Recognition of experience' step is the most prominent difference in all cases. This is driven by assumed changes to JS-WR exit and entry rates.

Figure 3.20 – 2020/2021 analysis of change – Set 2 – Average future years on main benefit up to age 65 – JS-WR clients at 30 September



## Sets 3 and 4 - People receiving JS-WR at 30 September who started their current main benefit spell more or less than seven quarters prior

Effects of the pandemic on the benefit system started materialising from about the start of 2020. The abnormal effect of the pandemic on the labour market meant that the people entering the system into JS-WR in 2020 had different characteristics to short duration JS-WR clients in the system before 2020.

Consequently, we have split the JS-WR population in sets 3 and 4 based on whether they started the current main benefit spell more or less than seven quarters prior to each 30 September modelling date. That way we separate change for:

- Shorter-term JS-WR clients, many of whom started their current main benefit spell after the pandemic started and, for some, whose entry to the system was a consequence of the pandemic.
- Longer-term JS-WR clients who started their current main benefit spell before the pandemic. This enables us to isolate change for the subset of clients whose entry to the system was not a consequence of the pandemic.

This is shown in Figure 3.21 and Figure 3.22.

Overall, we see that average estimated future years on main benefit has increased significantly more for JS-WR clients on main benefit for less than seven quarters. This difference stems almost entirely from the difference in the roll-forward step, +1.16 years for JS-WR clients on main benefit for less than seven quarters and -0.01 years for longer-term JS-WR clients. This is consequence of the large influx of clients in 2020. As at the 2020 projection date (30 September 2020), the influx weights the group who started their benefit spell less than seven quarters prior (i.e. after 31 December 2018) towards short-term clients. Rolling forward to 30 September 2021, the equivalent group who started their benefit spell less than seven quarters prior (i.e. after 31 December 2019) has a much higher average duration of benefit. This results in higher estimates of future years on main benefit for this group.

Again, we see the impact of changes to assumed JS-WR exit and entry rates in the 'Recognition of experience' step.

Figure 3.21 – 2020/2021 analysis of change – Set 3 – Average future years on main benefit up to age 65 – People receiving JS-WR at 30 September who started their current main benefit spell less than seven quarters prior

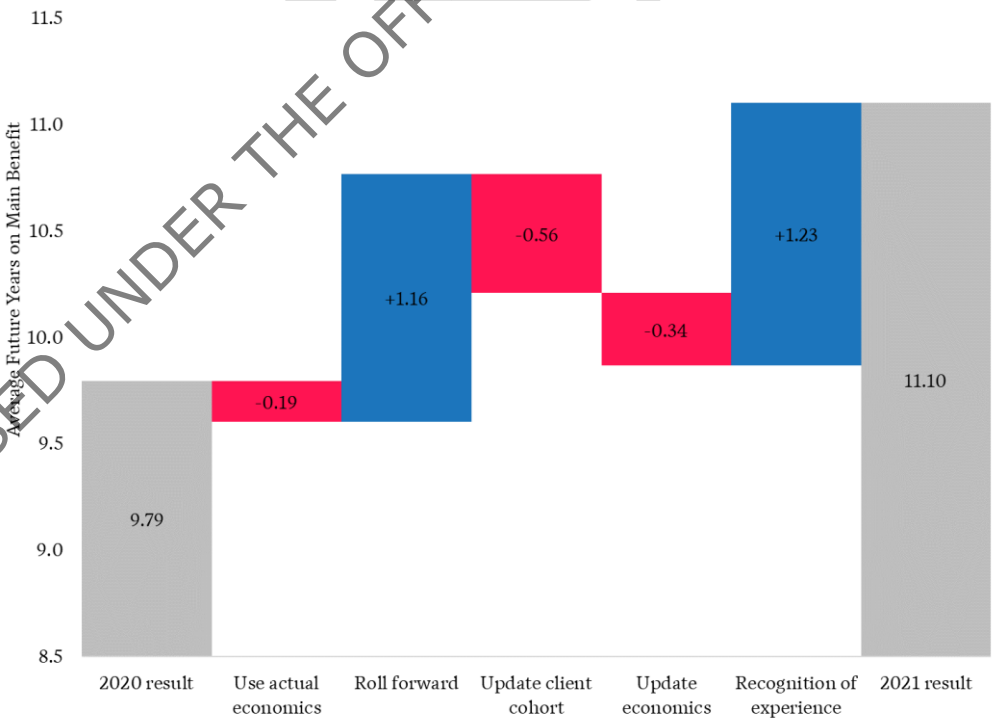
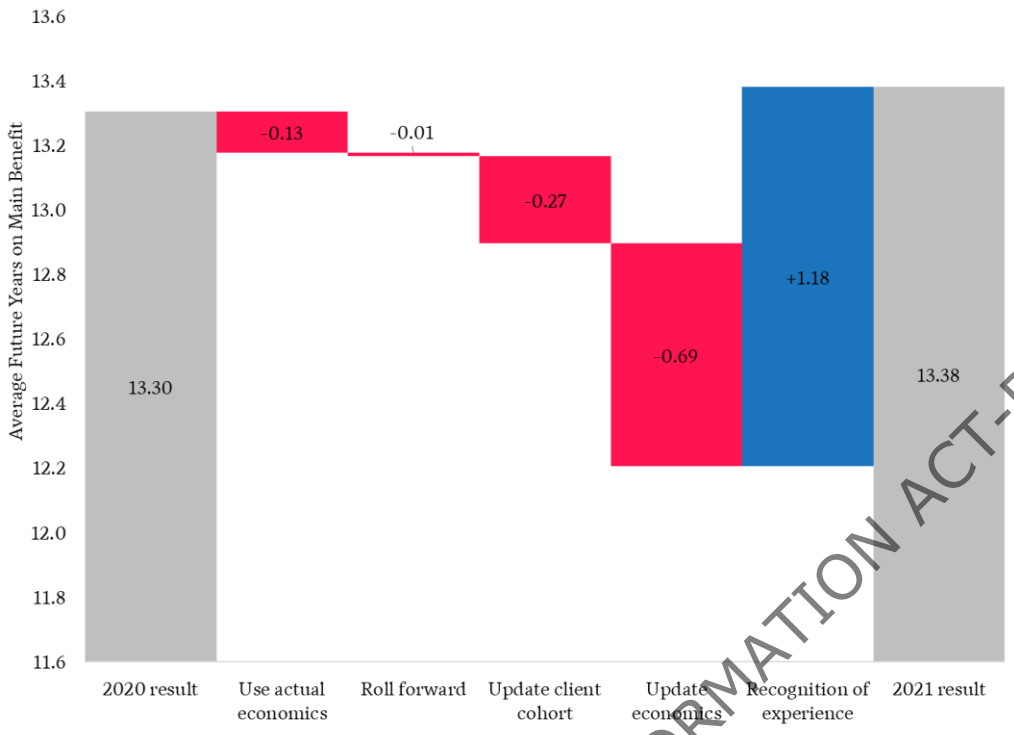


Figure 3.22 – 2020/2021 analysis of change – Set 4 – Average future years on main benefit up to age 65 – People receiving JS-WR at 30 September who started their current main benefit spell more than or equal to seven quarters prior



# 4 Core modelling results – Public housing

## Key points from this chapter

- Average, estimated future years in public housing continued to increase for people in public housing:
  - Ongoing increases were anticipated when we performed modelling in 2020, as it was expected that long-term increasing trends in IRRS payment, tenant age and time spent in public housing would continue. These factors did not increase as much as anticipated.
  - The main modelling factor driving the increase in estimated future years in public housing was a decrease in assumed future exit rates, reflecting observed experience.
- Average estimated future years in public housing has not increased by as much for people on the public housing register. The main reason for this is that the estimated time on the public housing register (and hence not in public housing) has increased.
- Pressure remains on the system with fewer people exiting public housing, and more people needing housing support outweighing increases in public housing stock. Pressure will remain, without change in one or more of these three factors.

In this chapter we analyse how the public housing system has changed over the last two to three years and what this means for peoples' long-term outcomes.

We describe:

- How the population of people in public housing or in the register has changed through the COVID-19 pandemic ("pandemic") and how key rates of transition (or "gateways") in, through and out of the public housing have changed
- The impact of change on peoples' long-term outcomes
- How estimates of peoples' long-term outcomes vary for different population cohorts.

## 4.1 Changes in the public housing population

Given the constrained supply of public housing, and slow rate of movement in and out, the system does not exhibit the same degree of change as the benefit system. Nevertheless, underpinning the system, are changes affecting the full range of housing-related supports including:

- Public housing and the public housing register
- Transitional housing
- Emergency Housing Special Needs Grants
- Accommodation Supplement and Temporary Additional Support.

Collectively these changes highlight a significant increase in demand for housing supports:

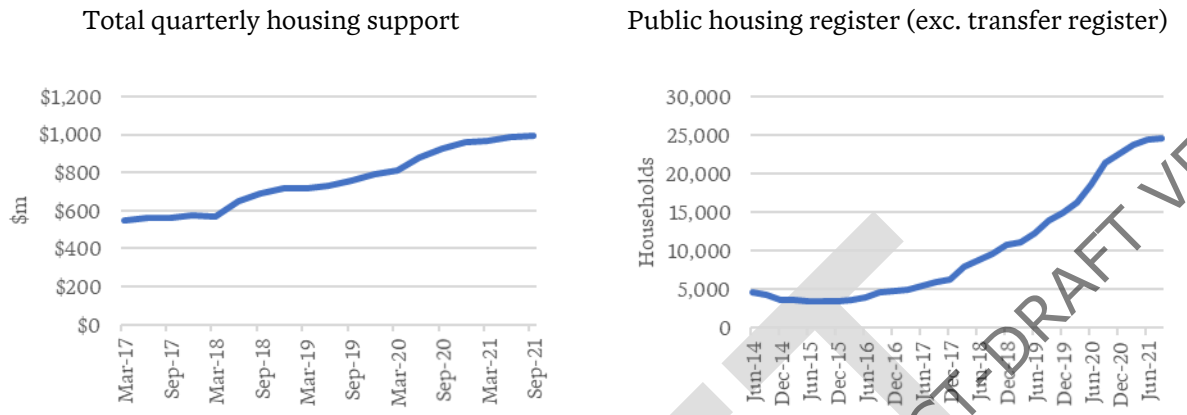
- A 76% increase in quarterly expenditure on housing supports in the last four years, from $563.4m in the quarter to 30 September 2017[5], to $991.5m in the quarter to 30 September 2021[6]. This represents an annualised average growth rate of 15.2% p.a.

[5] https://www.msd.govt.nz/documents/about-msd-and-our-work/work-programmes/social-housing/housing-quarterly-report-sep-2017-00.pdf

[6] https://www.hud.govt.nz/assets/Uploads/Documents/Public-housing-quarterly-report-September-2021.pdf

- A 420% increase in the public housing register over the last four years from 5,844 households at 30 September 2017, to 24,546 households at 30 September 2021.

Figure 4.1 – Housing support and the public housing register




There have also been significant changes in the profile of households on the public housing register, including:

- An increasing proportion assessed as priority A, from 69% at 30 September 2017 to 92% at 30 September 2021. This represents an increase of approximately 18,600 priority A households on the register.
- A higher proportion of households on the register requiring a one-bedroom dwelling – from 45% at 30 September 2017 to 48% at 30 September 2021. As at September 2021, 13.5% of Kāinga Ora's housing stock is one-bedroom. The sizing mismatch between public housing stock and the reported needs of households on the register has increased.

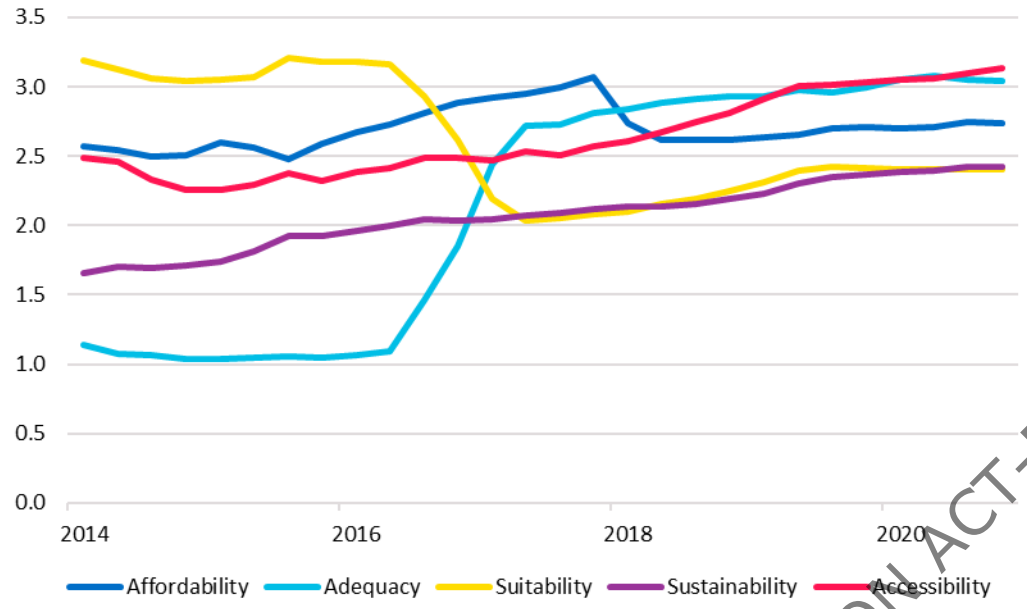
We also show the pattern of public housing application scores over time in Figure 4.2. Public housing applications are scored in five domains:

- Affordability – Whether the household can afford to rent suitable housing privately.
- Suitability – Whether the household's current property is safe and suitable for their medical or physical needs.
- Adequacy – Whether the household's current situation is adequate (property's physical condition, size, access to basic living facilities etc).
- Accessibility – How difficult it is to find a private rental that meets the household's needs.
- Sustainability – Whether the household could manage long term in a private rental.

Scores are shown for Auckland, though the patterns are very similar outside of Auckland. The higher the score the higher the assessed need.

In general, there has a been a long-term drift upwards in scores, consistent with the increasing proportion of households on the register that are priority A. Though it may also partly reflect changes to the assessment process to better recognise the circumstances of people who are homeless, in emergency housing, have multiple and complex needs and/or are experiencing family violence.

Figure 4.2 – Average SAS domain scores by applications in each quarter – Auckland



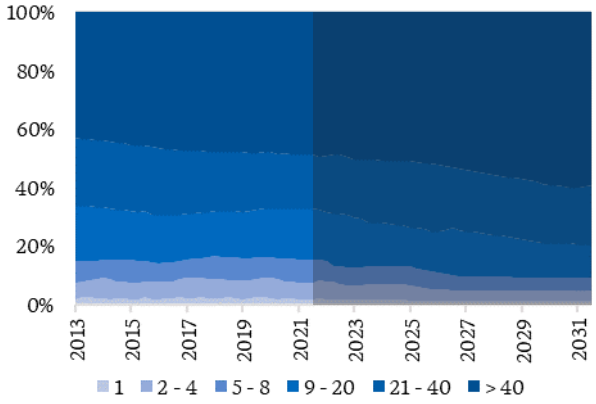

Note: Changes were made to the assessment process in 2016/17 with specific impacts on Adequacy and Suitability scores

We have a continuation of trends in relation to the profile of the public housing population. Specifically:

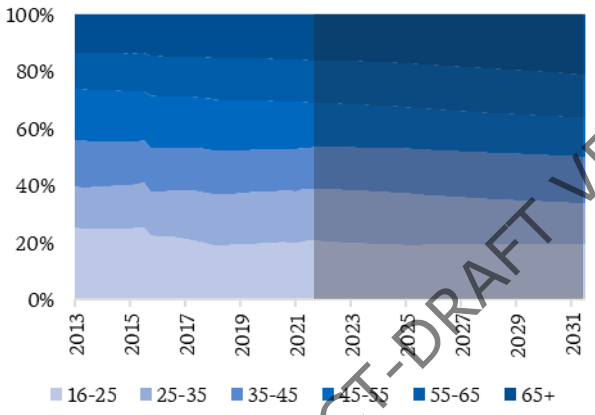
- Increasing average duration – About half of adult tenants have been in public housing for at least 10 years. This is estimated to increase to 60% by 2031.
- A gradual aging of the adult tenant population – One in six are aged over 65. This is estimated to increase to one in five by 2031.
- Increasing IRRS – This is to be expected, as market rents (and incomes) rise. By 2031, we estimate that IRRS will be greater than $500 per week for one in six households compared with about one in thirty-five households currently.

Figure 4.3 – Public housing profile (darker shaded areas show model estimates)

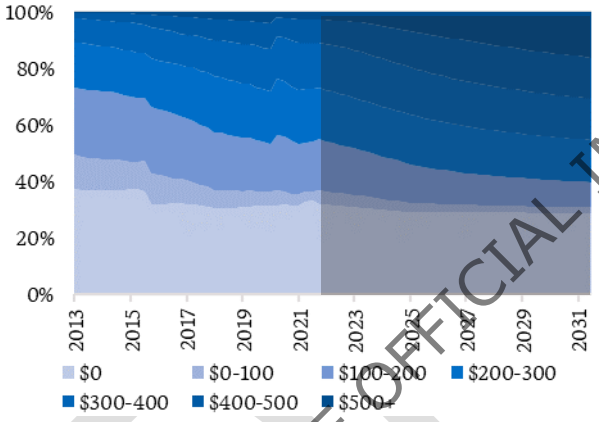
Public housing profile by number of consecutive quarters in public housing (duration)




Public housing profile by age band




Public housing profile by IRRS band




## 4.2 Movements in, through and out of the public housing system

To describe how rates of movement in, through and out of the public housing system have changed, we focus on five key system gateways. Collectively these gateways explain most of the change to the public housing system over the last few years and the impact this has on our estimates of peoples' long-term outcomes. The five gateways are:

- New households on the public housing register
- New clients receiving AS
- Households housed from the register
- Primary tenant exit rate – Under 65s
- Primary tenant exit rate – Over 65s.

We express the gateways as rates. If sustained, a change in rates can have significant long-term implications. The slow-moving nature of the system means that the effect of small changes can accumulate significantly over long period.

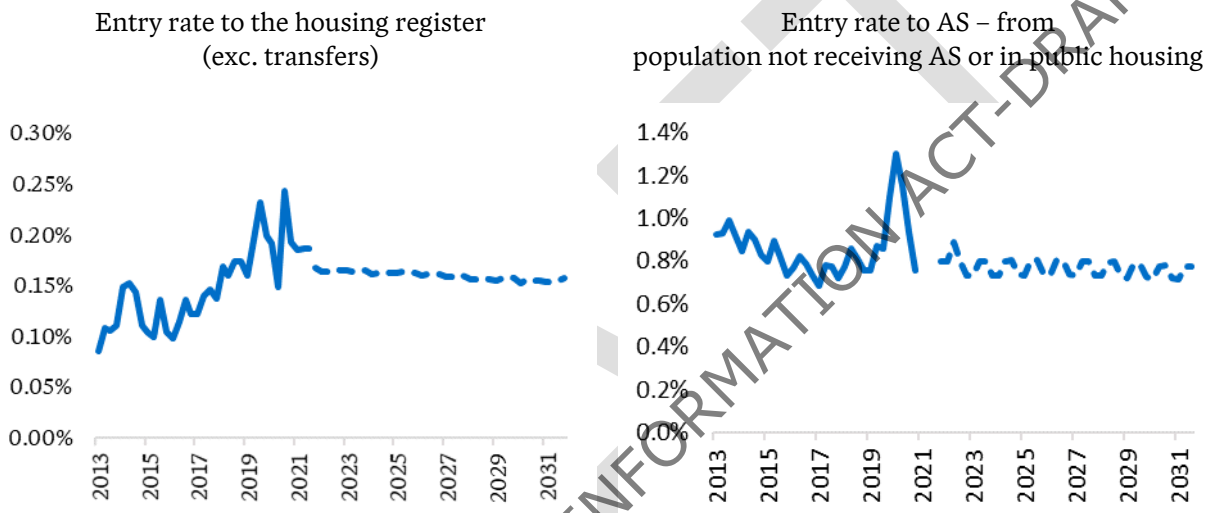
We show rates for historical data for the last 10 years (solid lines) and, in most cases, estimates from the modelling for the next 10 years (dashed lines).

Public housing and AS are the two primary forms of housing support, comprising 83% of expenditure in the last year.[7] Entry to the housing register and entry to receiving AS are the primary entry points into the housing support continuum, noting that people can be on the register and receiving AS.

Figure 4.4 shows entry rates from the whole population to:

- The public housing register
- Receiving Accommodation Supplement.

Figure 4.4 – Quarterly entry rates to the register and AS




The left-hand chart shows the steady increase in the entry rate to the housing register since 2016. The rate has close to doubled. Our modelling assumptions has the rate levelling off just below recent highs. However, we know the rate has been volatile in the past and is likely to be in the future.

The rate at which people start receiving AS had been in a long-term decline until 2017, after which it rose pre-pandemic, before increasing significantly at the start of the pandemic.

The likelihood of a household on the register being housed depends on the specific circumstances of the household, relative to other households on the register, and the availability of a suitable public house to move into. Availability itself is a product of the overall supply of public houses and the rate at which people exit public housing.

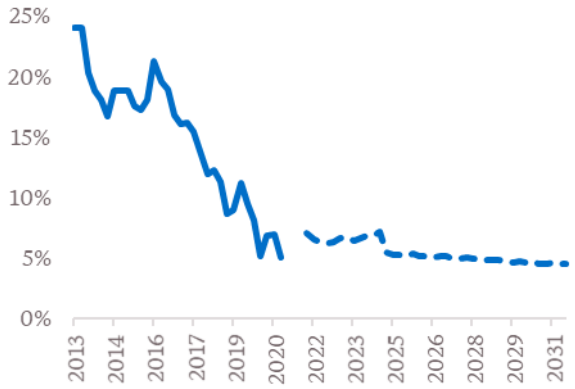
In Figure 4.5, we show the proportion of register households being housed each quarter. Our modelling assumes growth in public supply broadly in line with the Government's public housing supply intentions for the period to June 2024.[8]



[7] https://www.hud.govt.nz/assets/Uploads/Documents/Public-housing-quarterly-report-September-2021.pdf

[8] https://www.hud.govt.nz/community-and-public-housing/increasing-public-housing/public-housing-plan/

Figure 4.5 – Proportion of register households housed each quarter




The decreasing proportion of register households housed each quarter is primarily a product of the increasing entry rate to the register and decreasing exit rates from public housing. This is also reflected in official measures recording the time it takes for households on the register to be housed (amongst those that are housed in a quarter). The median time to house has increased from 50 days in September 2017 to 182 days in September 2021.

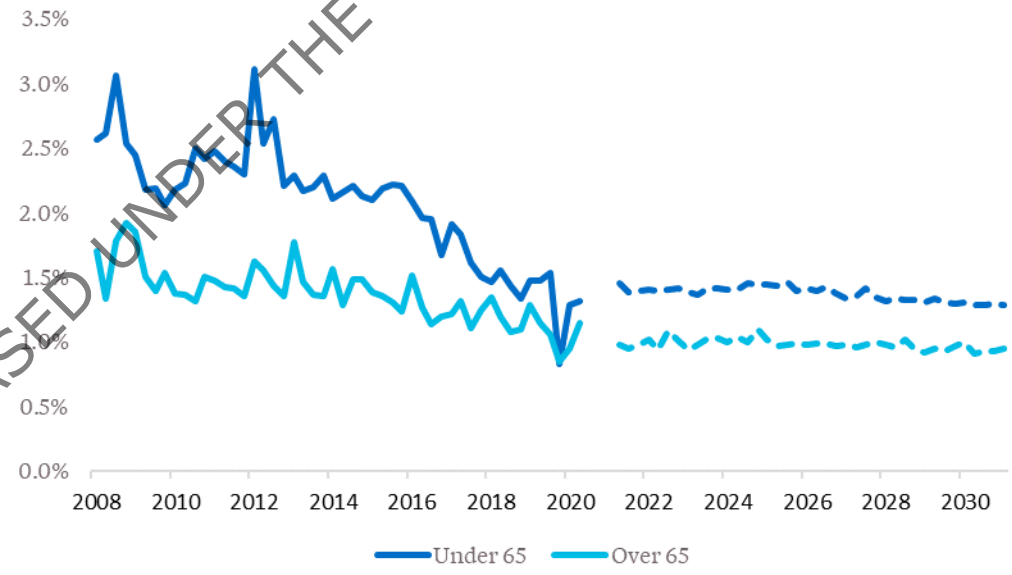
Exits rates for tenants in public housing represent an outcome for the household moving out and an opportunity for a household on the register to move into public housing. Hence, potential unmet need, as reflected by the number of households on the register, is driven by both:

- The inflow of new households on the register
- Exits from public housing.

The increase in the public housing register over the last few years is due to the combination of increased entry rates to the public housing register and decreased exit rates from public housing.

In Figure 4.6, we show exit rates for under 65-year-old and over 65-year-old primary tenants. This split reflects the fact that most exits for over 65-year-olds are due to death, hospitalisation or movement into some form of aged care, whereas exits for under 65-year-olds tend to be driven by other factors.

Figure 4.6 – Quarterly exit rates for primary tenants



Exit rates from public housing have continued a long-term downward trend. This is partly a compositional effect, caused by a combination of compounding factors:

- **Increasing levels of IRRS** due to rents growing at a faster rate than incomes/benefits. Tenants who are further away from being able to afford the private market are less likely to exit.
- **Increasing average age** of tenants. All else being equal, older tenants are less likely to exit.
- **Increasing average duration in public housing.** All else being equal, the longer people have been in public housing the less likely they are to exit.

## 4.3 Future time in public housing

The modelling produces estimates of households' time in public housing (and on the register) over their future lifetimes. Each year we recalibrate the model to:

- Update the modelling population to the estimation date (30 September 2021)
- Update economic and model assumptions

The updates to the model assumptions are informed by observed experience, including that illustrated in Section 4.2. Generally, more weight is given to recent experience.

Table 4.1 shows estimates for average future years in public housing by high-level housing segments, including segments for people not receiving housing supports.

We show last year's modelling results for comparison, plus 2019 modelling results as a pre-COVID-19 baseline.

The updates to the modelling population and the updates to the assumptions impact these modelling results.

Table 4.1 – Summarised public housing modelling results by high-level housing category

| Segment | | | Average Age | | | Ave. future years in public housing | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2019 | 2020 | 2021 | 2019 | 2020 | 2021 |
| On register | Priority A | | 39.4 | 39.8 | 39.7 | 8.4 | 8.8 | 9.0 |
| | Priority B and Other | | 43.4 | 44.3 | 45.5 | 5.9 | 6.1 | 6.4 |
| | Sub total | | 40.1 | 40.4 | 40.3 | 8.0 | 8.4 | 8.7 |
| IRRS recipients, primary aged <65 | Less close / IRRS > $150 | Child in the household | 34.5 | 34.9 | 34.5 | 18.1 | 19.8 | 20.7 |
| | | No child in the household | 44.2 | 43.5 | 44.4 | 16.0 | 16.9 | 17.7 |
| | Closer / IRRS < $150 | Child in the household | 35.5 | 36.3 | 34.6 | 14.4 | 16.5 | 17.0 |
| | | No child in the household | 45.0 | 42.7 | 45.4 | 13.2 | 14.3 | 15.3 |
| | Sub total | | 38.8 | 38.8 | 38.9 | 16.8 | 18.2 | 19.2 |
| IRRS recipients, primary aged >65 | IRRS 65+ | | 63.5 | 63.6 | 64.1 | 9.8 | 10.1 | 10.5 |
| Rest of the population | Receiving AS | | 44.2 | 43.2 | 43.8 | 2.5 | 2.5 | 2.6 |
| | Not receiving AS | | 46.9 | 47.5 | 47.6 | 0.4 | 0.4 | 0.4 |
| | Sub total | | 46.7 | 47.0 | 47.2 | 0.5 | 0.6 | 0.6 |
| Total | | | 46.6 | 46.9 | 47.1 | 1.0 | 1.1 | 1.2 |

Note that the average ages are based on all people in public housing aged 16+, not just the primary tenant.

Average estimated future years in public housing has increased for households currently in public housing, both over the last year and since the pre-pandemic 2019 baseline. This reflects the long-term trend of declining exit rates and is likely to continue.

In practical terms, this means people are estimated to spend more of their future lifetime in public housing, with increased average lifetime IRRS payments. It also means less opportunity for households on the register to be moved into suitable public housing quickly.

The average estimated future years in public housing has also increased for households currently on the register. This also reflects the long-term trend of declining exit rates and the increasing proportion of the register that is priority A. For people on the register, the increase in average estimated future years in public housing is tempered somewhat by longer wait times to be housed.

Year-on-year change in estimated future years on main benefit is analysed and reconciled in Section 4.4.

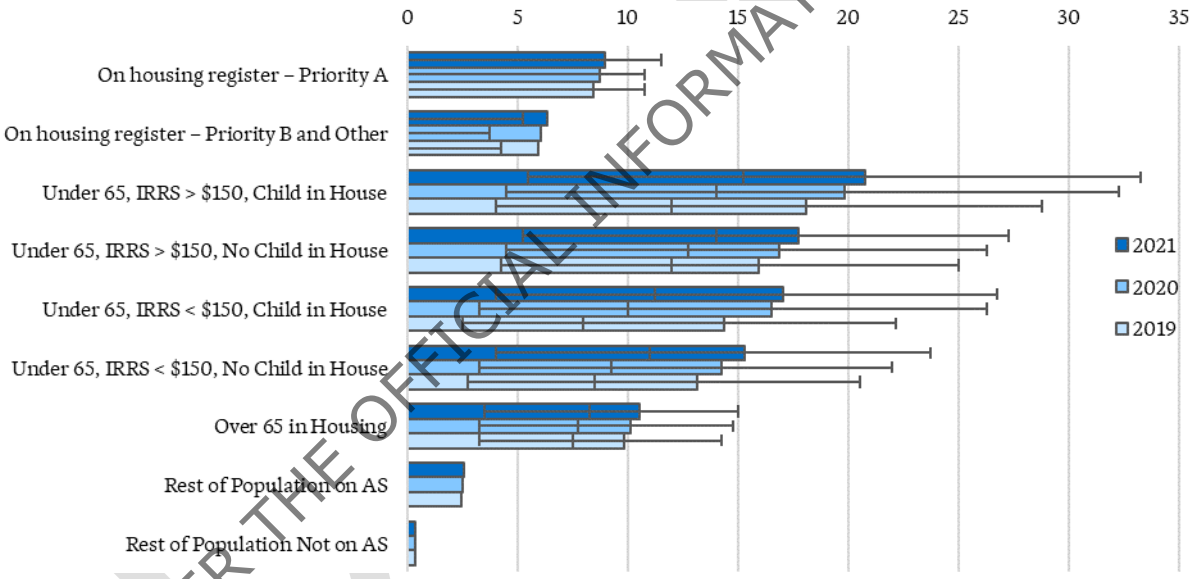
### 4.3.1 Distribution of estimated future outcomes

Figure 4.7 shows the same modelling results as Table 4.1.

Interquartile ranges and median averages are shown. 2020 and 2019 modelling results are also shown for comparison.

The interquartile ranges give a good indication of the range of average future years in public housing for different categories. For example, for the 'Under 65, IRRS >$150, Child in House' category, 25% are estimated to spend less than 5.5 years in public housing and 25% are estimated to spend more than 33.25 years in public housing.

Figure 4.7 – Average future years in public housing by high-level housing category




In general, the upper end of the quartile ranges have increased by more than lower end, reflecting a slight widening in range of future years in public housing.

#### Other social outcomes

Figure 4.8 to Figure 4.14 show a range of other modelling results for a range of social outcomes, including measures for:

- Main benefit receipt
- Earned income
- Being proceeded against by Police
- Use of mental health–related supports
- Enrolment in tertiary education.

Figure 4.8 – Average future years on main benefits up to age 65 by high-level housing category

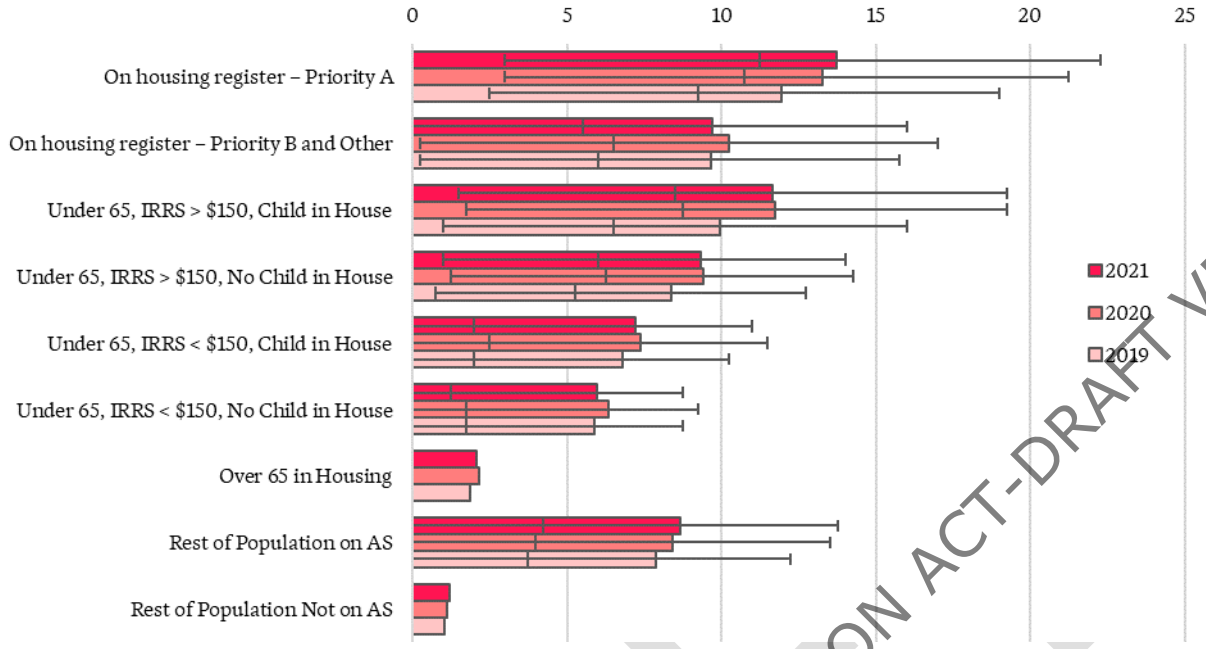



Figure 4.9 – Average future years on main benefit up to age 65 by high-level housing category – Currently on main benefit

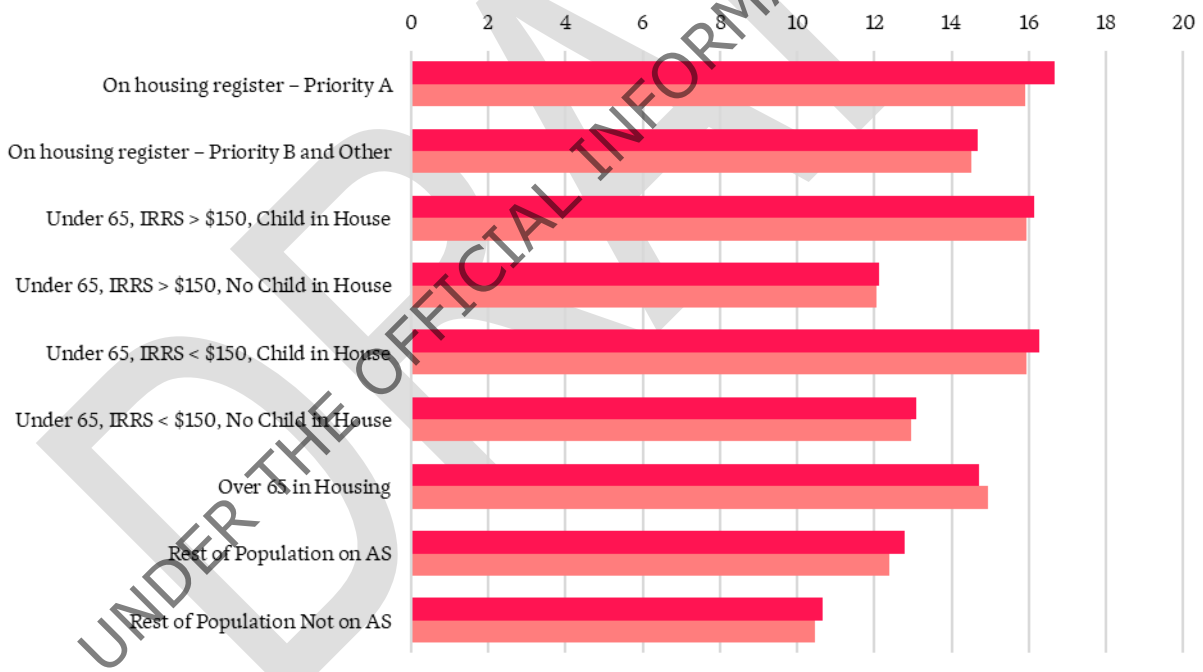
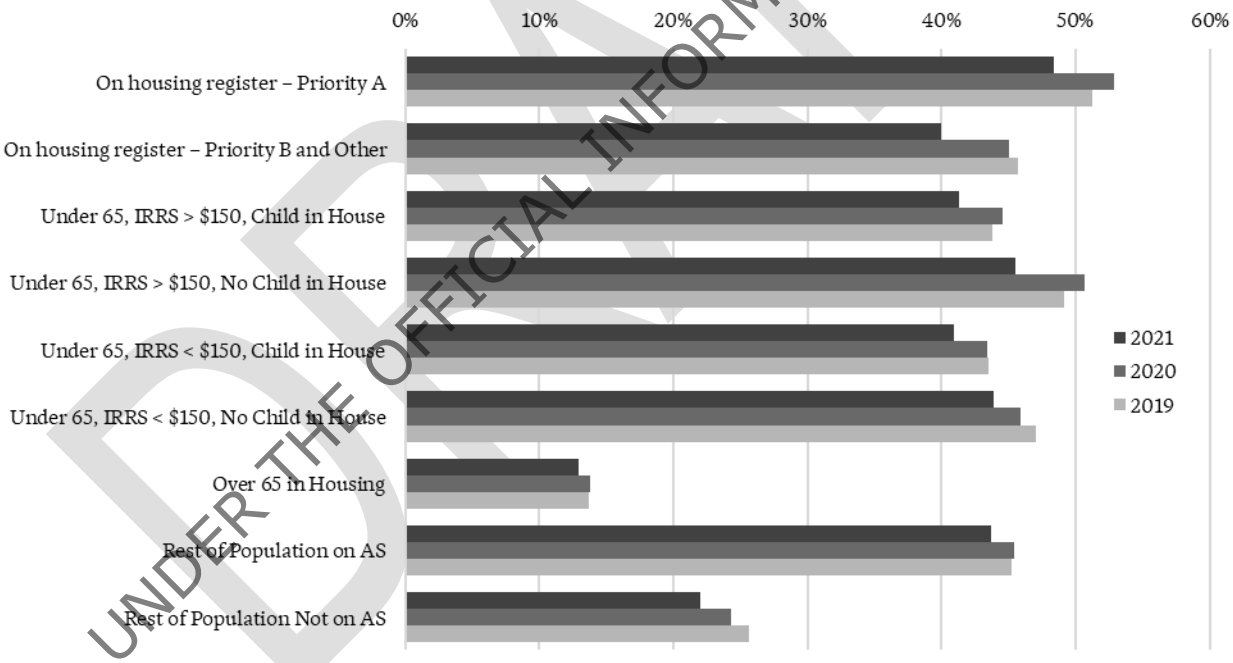


Figure 4.10 – Average future years on main benefit up to age 65 by high-level housing category – Currently not on main benefit


Figure 4.11 – Average proportion of future lifetime up to age 65 earning below income threshold*




* Threshold = Earning the equivalent of at least 40 hours per week at the minimum wage (increased with average wage growth).

Figure 4.12 – Proportion of people proceeded against by the police in the next 10 years

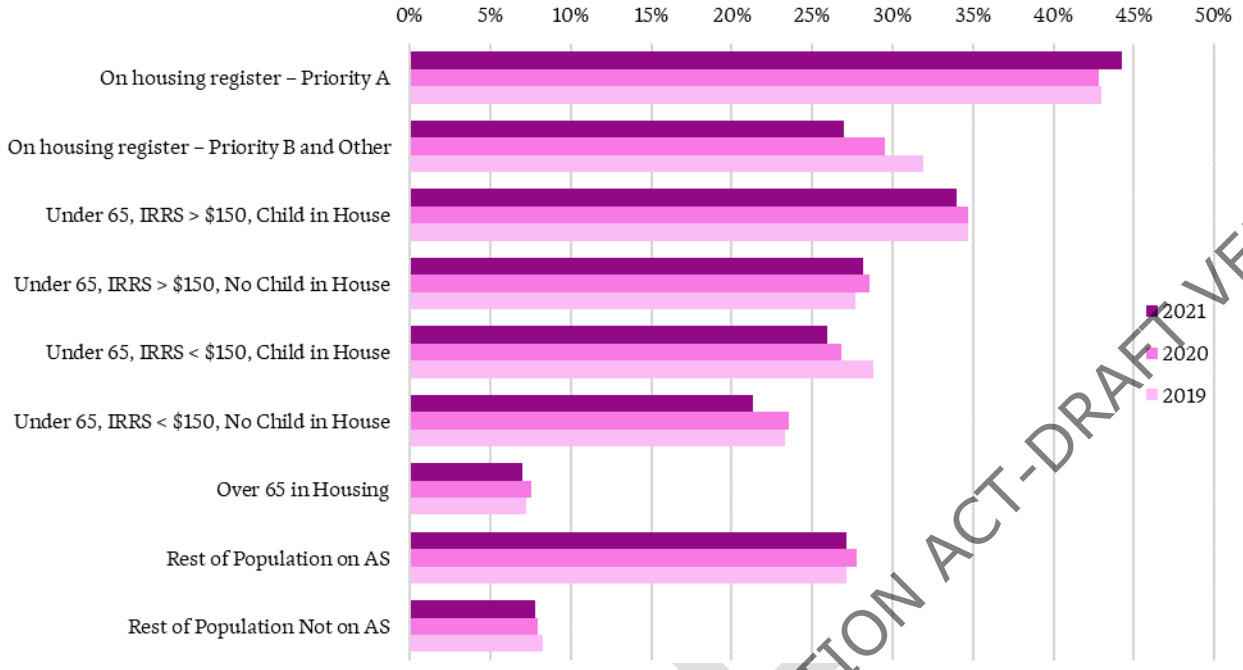
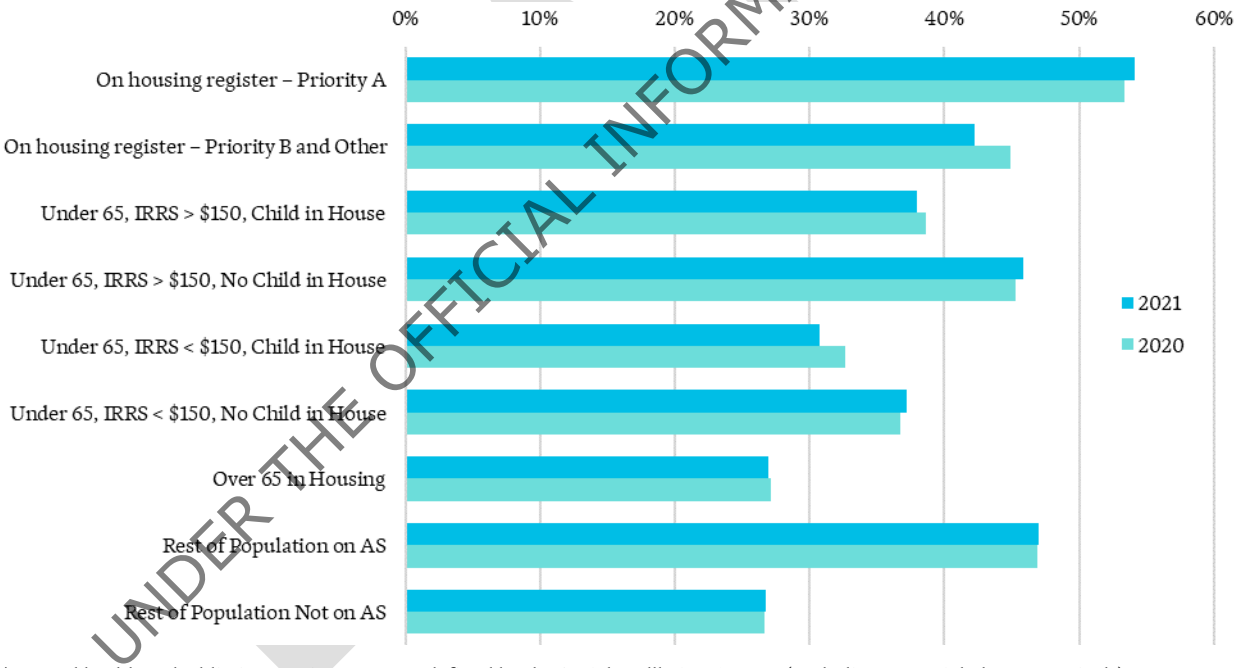
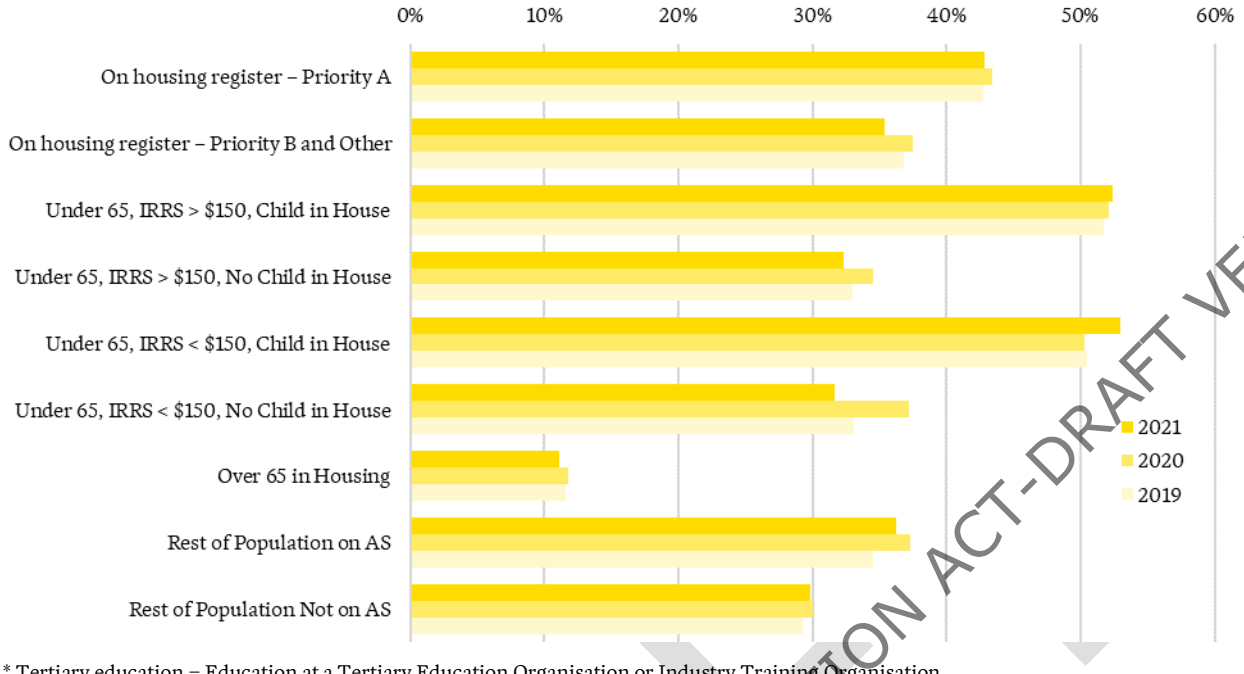



Figure 4.13 – Proportion of people accessing mental health–related supports in the next 10 years




* Mental health and addiction service events as defined by the Social Wellbeing Agency (excluding potential pharmaceuticals)

Figure 4.14 – Proportion of people enrolled in in tertiary education in the next 10 years




* Tertiary education = Education at a Tertiary Education Organisation or Industry Training Organisation

These charts highlight information about the distribution of outcomes and how that has changed year-on-year. Some key point to note:

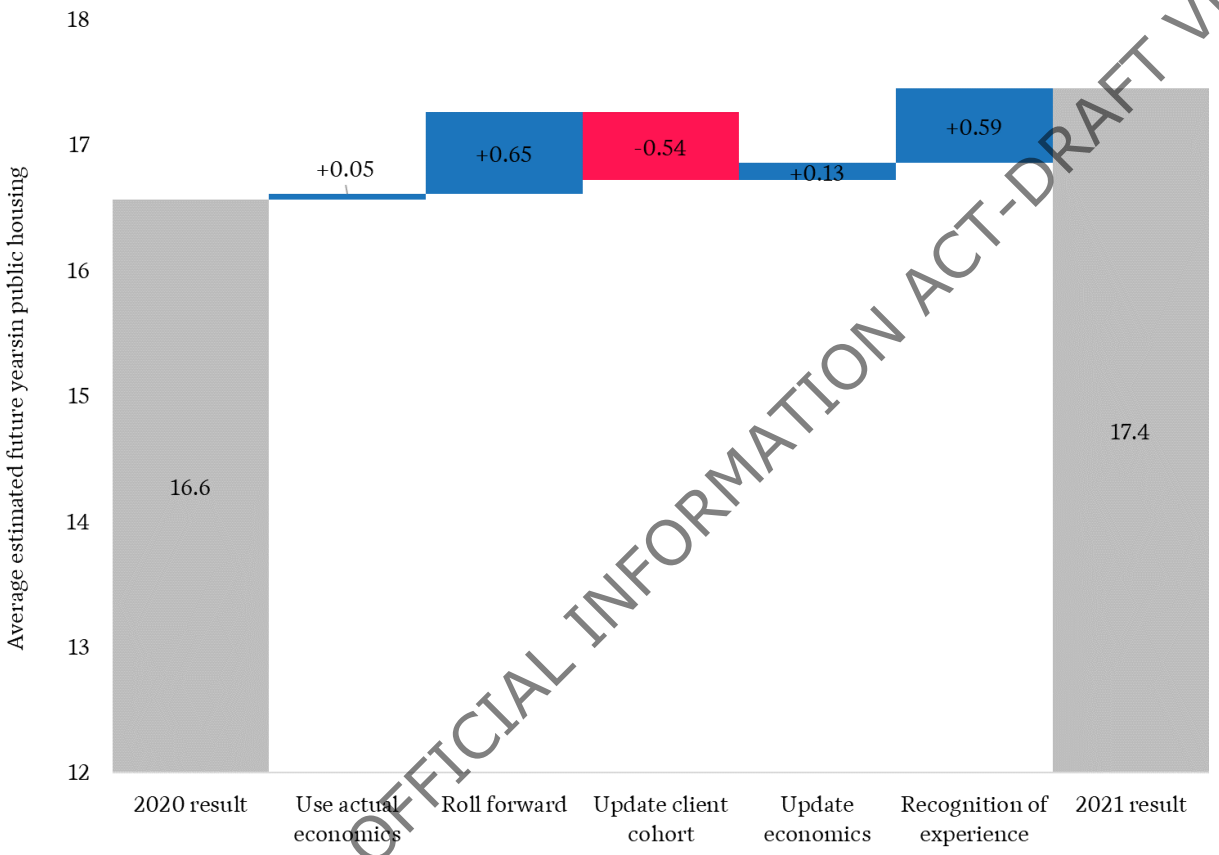
- The proportion of time people are estimated to spend earning less than a minimum wage threshold has decreased since the 2020 modelling across all categories (this was also the case for results by high-level benefit category – see Figure 3.15). We have not investigated the drivers of this change, but it implies a positive change in terms of lower-end wages.
- Priority A people on the register are much more likely than other categories to be proceeded against by the police in the next 10 years – 44% for this category compared with less than 30% for most other categories.
- Priority A people on the register are also more likely to access mental health–related supports in the next 10 years – 54% for this category compared with 27% for people not accessing housing supports.
- Collectively, outcomes for Priority A people on the register imply their need for support may extend beyond just housing support.

## 4.4 Analysis of change

Similar to Section 3.6 for the benefit system, we have performed an analysis of change to break the year-on-year change in modelling results down into contributing factors.

In Figure 4.15 , we show a system view analysis of change. It considers total future years in public housing for the population of people in public housing at 30 September.

Figure 4.15 – 2020/2021 analysis of change – All people in public housing or on the register at 30 September




Overall, there has been a moderate increase in the average estimated future years in public housing, from 16.6 years at 30 September 2020 to 17.4 years at 30 September 2021. The analysis of changes highlights that:

- We anticipated an increase ('Roll forward' step) due to expected continuation in the long-term increasing trends for average tenant age, duration and IRRS payment.
- However, these trends did not continue to the same extent as anticipated over the year to 30 September 2021. So, the 'Roll forward' step was largely cancelled out by the 'Update client cohort' step, +0.65 years vs. -0.54 years.
- The impact of incorporating the lower exit rate experience (highlighted in Figure 4.6) into the modelling assumptions increased average estimated future years in public housing by about 0.6 years ('Recognition of experience' step). There were other minor assumption changes that contributed to this step.

# 5 Alternative scenarios

## Key points from this chapter

- If, for the next five years, the rate at which JS-WR and SPS clients leave the benefit system is 20% higher, and the rate at which these exits re-enter the benefit system is 20% lower, than compared to the base modelling results, estimates show:
  - 14,400 fewer JS-WR clients by 30 September 2026, of which 10,000 (or 69%) relates to clients with greater than one year of benefit duration
  - 2,800 fewer SPS clients by 30 September 2026, of which 2,500 (or 91%) relates to clients with greater than one year of benefit duration.

  The assumptions underpinning this scenario are broadly consistent with pre-2017 experience. The scenario has been produced for illustrative purposes only.
- The sustainability of exits is also improved by the reduced re-entry rates, with the estimated proportion of:
  - JS-WR exits sustained for at least four quarters increasing by 5-6%
  - SPS exits sustained for at least four quarters increasing by 5-7%
- Overall, these differences are significant in the context of total client numbers. Particularly the number of clients with greater than one year of benefit duration. They imply a lower number of people requiring long-term main benefit support and improved income/material wellbeing for some.

The COVID-19 pandemic means there is more uncertainty about future estimates of people's outcomes than in 2019 and previous years. Particularly with respect to benefit receipt. Relationships between benefit receipt and key labour market indicators have changed, in the short-term at least. In particular, the number of main benefit clients is much higher than the historical relationship between the number of main benefit clients and the unemployment rate would suggest. The modelling adjusts for this, but without historical data to inform these adjustments, results in greater uncertainty.

We have modelled three alternative scenarios to the base scenario that underpins the results described in Sections 3 and 4. The alternative scenarios vary the assumed exit and re-entry rates for JS-WR and SPS clients over the next five years, to illustrate the potential impact if experience was to vary from the base assumption in this way.

Table 5.1 describes the alternative scenarios compared to the base scenario.

Table 5.1 – Description of scenarios

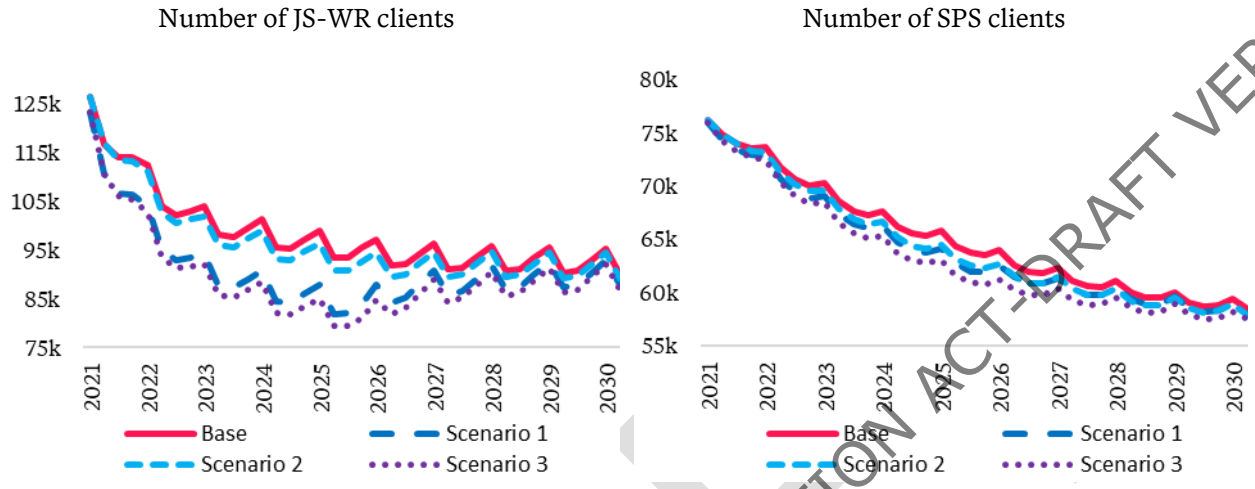
| Scenario | Description |
|---|---|
| Alternative 1 | Rates of exiting the benefit system for JS-WR and SPS clients scaled up by 20% for the 5 years to 30 September 2026 |
| Alternative 2 | Rates of re-entry for clients estimated to exit the benefit system after 30 September 2021 scaled down by 20% for the 5 years to 30 September 2026 |
| Alternative 3 | Alternative 1 and Alternative 2 combined |

The alternative scenarios are intended to be plausible scenarios and are broadly consistent with pre-2017 experience.

## 5.1 Modelling results

We show a range of results in Figures 5.1 to Figures 5.5, to demonstrate how the alternative scenarios impact client counts over the ten years to 30 September 2031.

Figures 5.1 – Estimated client counts over ten years to 30 September 2031

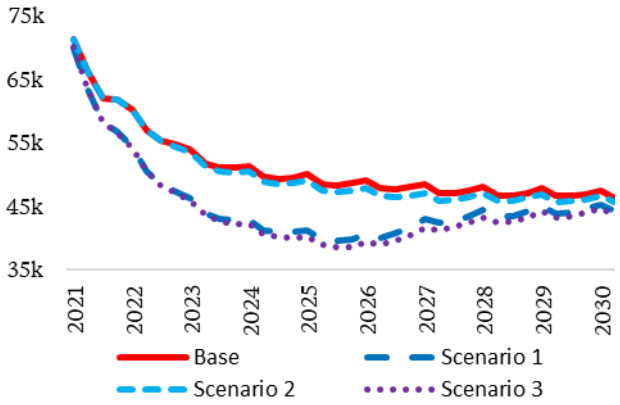



The impact on the number of JS-WR clients is significant, with 11,500 fewer in scenario 1, 2,900 fewer in scenario 2 and 14,400 fewer in scenario 3 at 30 September 2026 (compared to the base scenario). Similarly, for SPS clients, by 30 September 2026, there are 1,600 fewer clients in scenario 1, 1,200 fewer in scenario 2 and 2,800 fewer in scenario 3. Also note that:

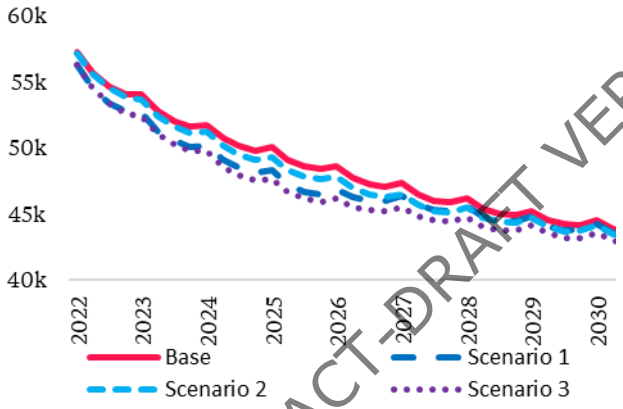
- Beyond the period that the adjustments to exit and re-entry rates have been made for the alternative scenarios (30 September 2026), the client counts start to revert back towards the base scenario. The gap to the base scenario will continue to close beyond the period covered in the charts.
- The gap to the base scenario would continue to grow beyond 30 September 2026 if the adjustments to exit and re-entry rates continued beyond this date. Eventually the base and three alternative scenario lines would approach long-term stable levels (seasonality aside). Hence the gaps would reach long-term stable levels i.e. they wouldn't continue increasing indefinitely.
- Relative to the impact of lower exit rates, the impact of lower re-entry rates is greater for SPS clients. This is because SPS exit rates are relatively low (about 4.5% per quarter) and so scaling up SPS exit rates has less effect on client numbers.
- The additive effect shown in scenario 3 is relatively small i.e. the difference between scenario 3 and scenario 1 is similar to the difference between scenario 2 and the base scenario.

Figures 5.2 – Estimated client counts over ten years to 30 September 2031 – clients with greater than one year benefit duration

Number of clients with duration greater than one year – JS-WR



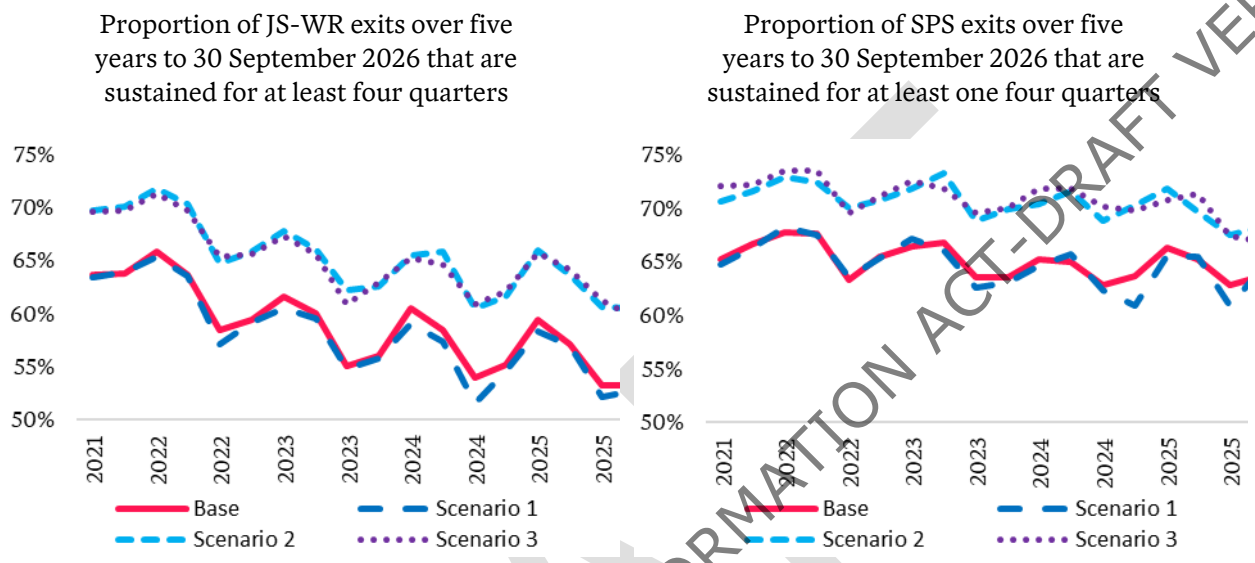

Number of clients with duration greater than one year – SPS



Figures 5.2 look similar to Figures 5.1. The key point is that most of the decreases shown in Figures 5.1 is in clients with greater than one year of benefit duration. For example, 69% of the difference between scenario 3 and the base scenario at 30 September 2026 shown for JS-WR in Figures 5.1 relates to clients with greater than one year of benefit duration (10,000 of 14,400 people).

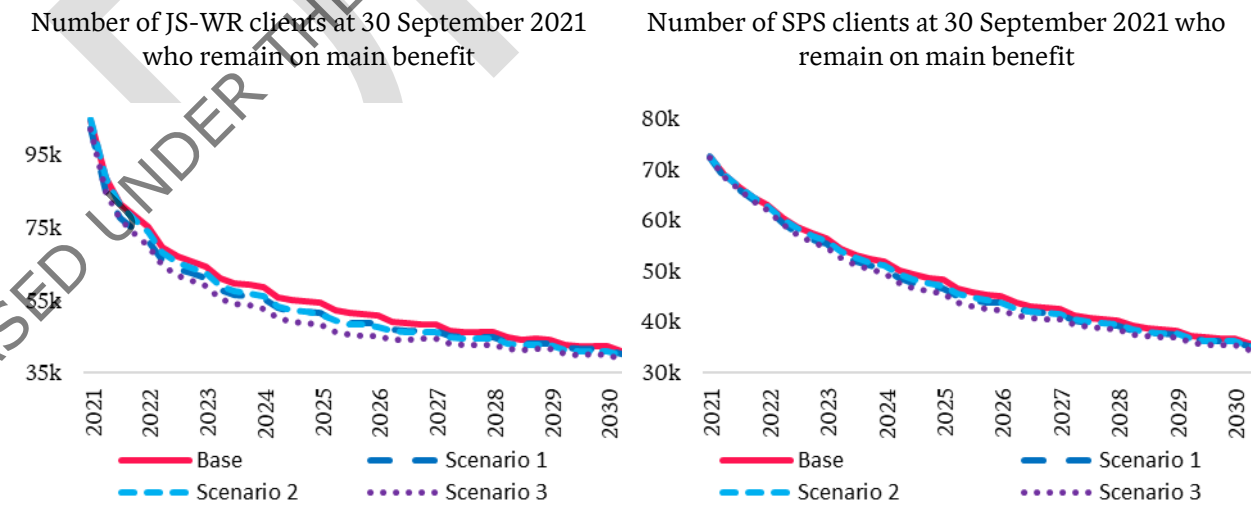
The equivalent figure for SPS is 91% (2,500 of 2,800 people).

Figures 5.3 – Proportion of exits estimated to be sustained for at least four quarters




Figures 5.3 show that there is a significant increase in exit sustainability from a reduced re-entry rate (scenarios 2 and 3), as you would expect. The uplift in estimated proportion of exits sustained for at least four quarters is 6-7% for JS-WR and 5-7% for SPS.

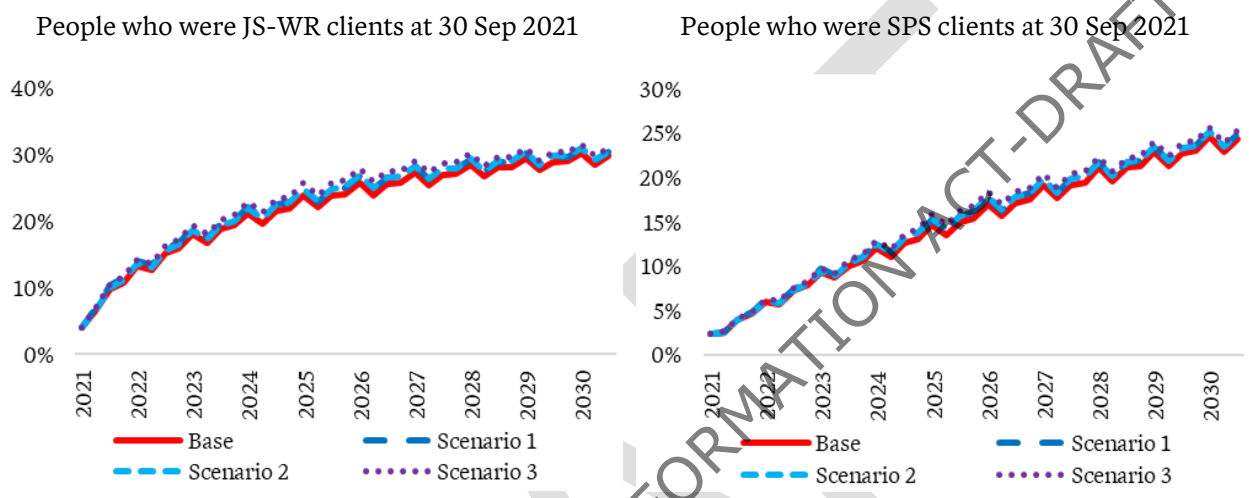
Figures 5.4 – Estimated client counts for those on JS-WR or SPS at 30 September 2021



Figures 5.4 looks at how many of the people who were on JS-WR or SPS at 30 September 2021 are estimated to be on main benefit over the period to 30 September 2031. The wide y-axis scale masks the differences between the scenarios somewhat. However, at 30 September 2026:

- The difference between scenario 3 and the base scenario for JS-WR is 6,000 people
- The difference between scenario 3 and the base scenario for SPS is 2,800 people. Note that this is actually slightly more than the difference between scenario 3 and the base scenario in Figures 5.1. This occurs because in the base scenario some SPS clients at 30 September 2021 are estimated to be on other benefits in the future.

Figures 5.5 – Estimated proportion of people earning over the income threshold*




* Threshold = 52 weeks at 40 hours per week at the minimum wage (increased with average wage growth) - $41,600 in 2021.

Figures 5.5 show the estimated proportion of people earning over a minimum wage income threshold in the future. The differences between the alternative and base scenarios in the proportion of people estimated to earn over the income threshold are small. For example, for people who were JS-WR clients at 30 September 2021, 24.1% are estimated to earn more than the income threshold in the quarter to 30 September 2026 in the base scenario. This compares to 26.2% for scenario 3. So, while the scenarios suggest a large impact on client numbers, very few of the extra people estimated to be off benefit in the future, are estimated to earn above the income threshold.

Collectively these charts show the significant estimated impact of these plausible scenarios on clients counts and exit sustainability. Particularly for clients with more than one year of benefit duration.

# Appendix A Glossary

The following table gives definitions for common acronyms used in this report.

| Term | Definition |
|---|---|
| AS | Accommodation Supplement (and related assistance) |
| Earned income | Taxable income earned from:<br>– Wages & Salaries<br>– ACC weekly compensation<br>– Student Allowance<br>– Withholding payments<br>– Paid parental leave<br>– Self-employed, partnership and company income |
| GFC | Global Financial Crisis |
| HCD | Health condition, disability (sub-set of both JobSeeker Support clients with reduced work obligations and Supported Living Payment clients) |
| HYEFU | Half-year Economic and Fiscal Update |
| IDI | Integrated Data Infrastructure – research database containing microdata about people and households from a range of government agencies, surveys and non-government organisations |
| Income threshold | Income in a quarter equivalent to the minimum wage for 40 hours per week |
| IRRS | Income Related Rent Subsidy – a top-up payment to housing providers to bridge the difference between the income-related rent a client pays and the full rent for a public house |
| JS | JobSeeker Support – benefit type introduced in 2013 (replacing the unemployment benefit and sickness benefit, and partially replacing the Domestic Purposes Benefit) |
| Mental health-related supports | Mental health and addiction service events as defined by the Social Wellbeing Agency. Source code for the definition is available at https://github.com/nz-social-investment-agency/mha_data_definition.<br>On advice from the Ministry of Health pharmaceuticals labelled in the definition as 'potential' have been removed. |
| MSD | Ministry of Social Development |
| NOMB | Not supported by a main benefit but still receiving some benefit system support – supplementary benefits and/or Orphan's Benefit |
| PH | Public housing |

| Term | Definition |
|---|---|
| Police proceeding | An event on which police initiate a legal action against a person |
| Prioritised ethnic group | Ethnic group based on the SNZ source ranked ethnicity in the IDI. Where a person is indicated as associating with multiple ethnicities, a single ethnicity is chosen based on the following priority order: Māori, Pacific Peoples, Asian, Other, European |
| Recent exit | A client who is currently not receiving a benefit but has done in the last 12 months |
| SLP | Supported Living Payment – benefit type introduced in 2013 (replacing the invalid's benefit and domestic purposes benefit – care of sick and infirm) |
| SPS | Sole Parent Support – benefit type introduced in 2013 (partially replacing the domestic purposes benefit) |
| Tenant | Clients are sometimes referred to as tenants where they reside in a property managed by Kāinga Ora or a Community Housing Provider. We usually refer to tenants aged 16+. |
| Tertiary education | Education at a tertiary education provider or industry training provider |
| WR | Work-ready (sub-set of JobSeeker Support clients with work obligations) |
| YP | Youth Payment |
| YPP | Young Parent Payment |

# Appendix B Analysis of change by main benefit category

Figure B.1 – Average estimated future time on main benefit up to age 65 - JS-WR clients at 30 September

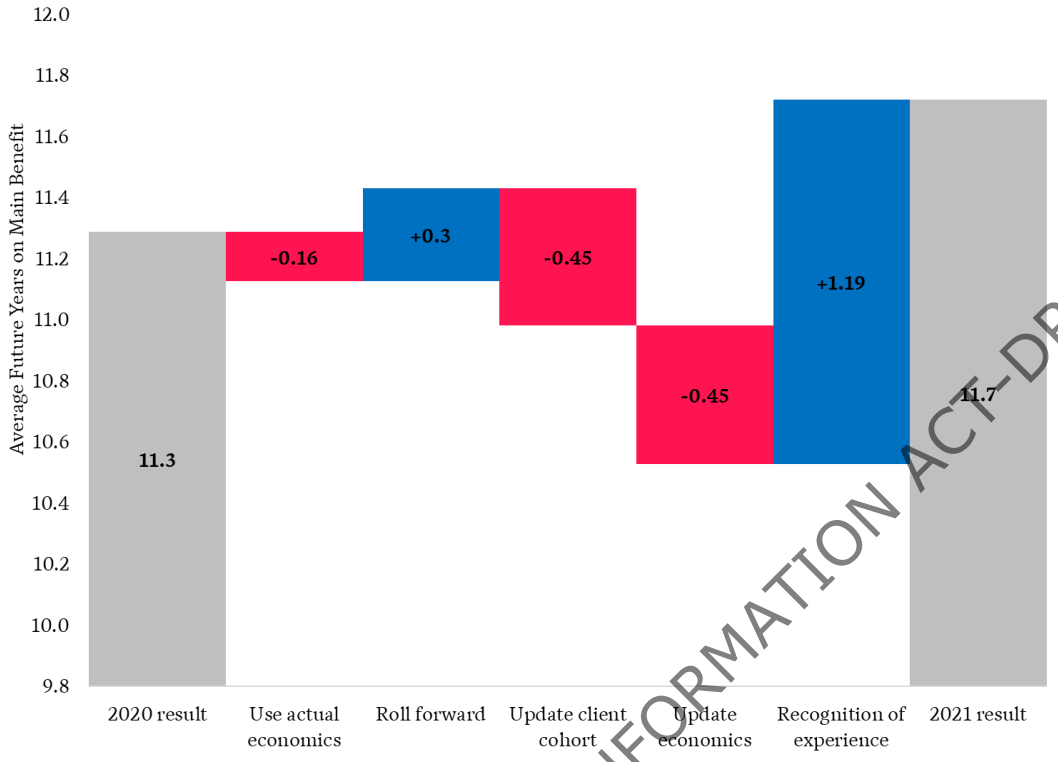



Figure B.2 – Average estimated future time on main benefit up to age 65 - JS-HCD clients at 30 September

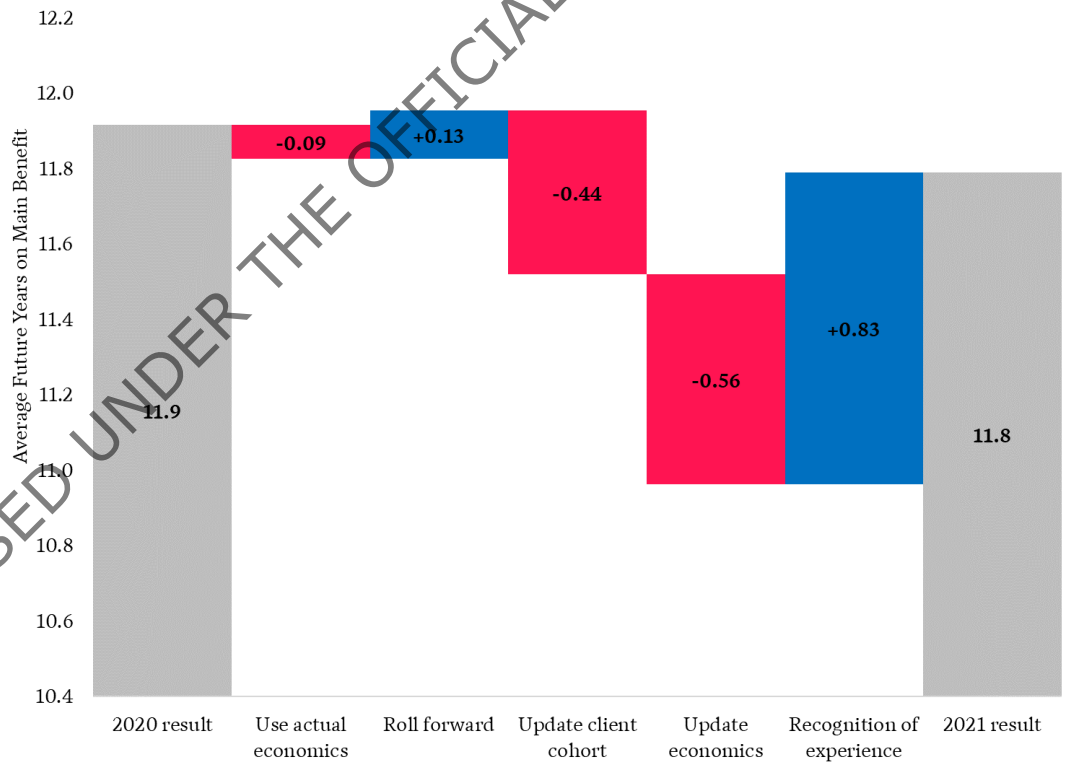


Figure B.3 – Average estimated future time on main benefit up to age 65 - SPS clients at 30 September

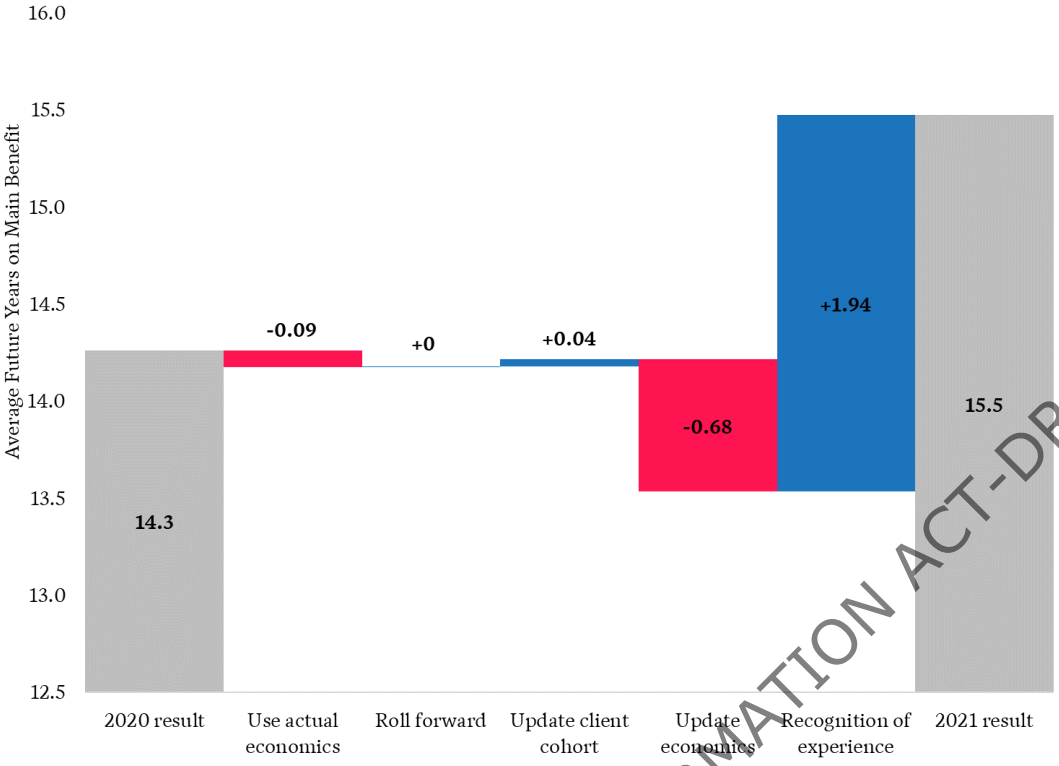



Figure B.4 – Average estimated future time on main benefit up to age 65 - SLP clients at 30 September

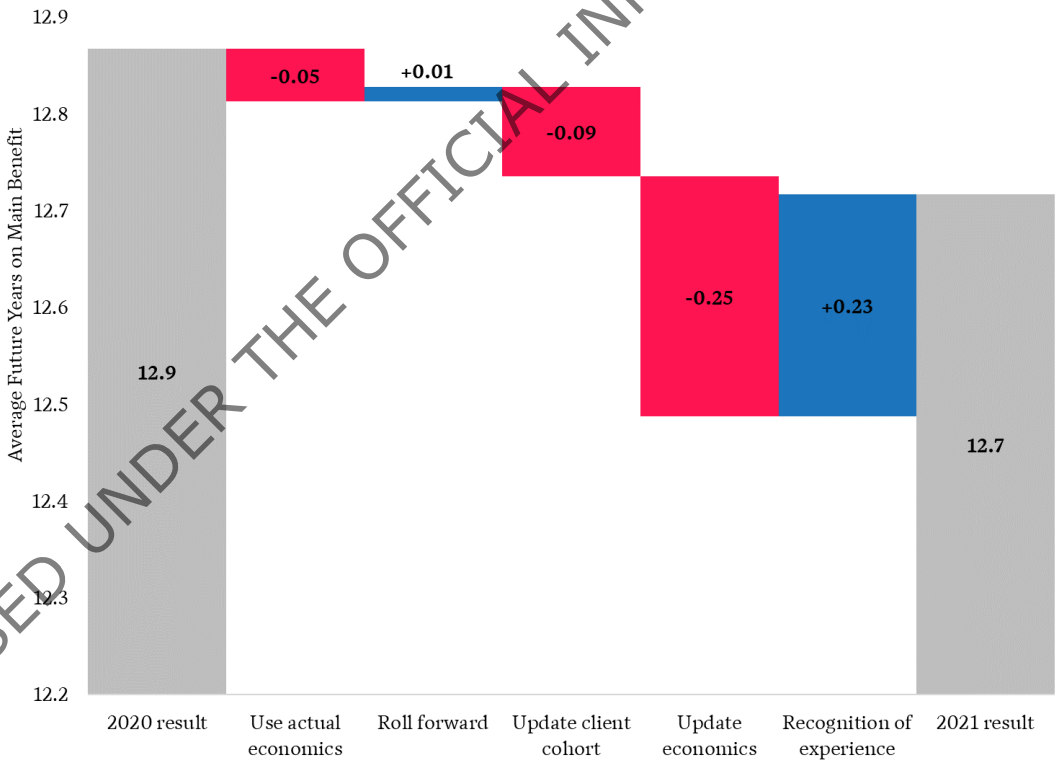


Figure B.5 – Average estimated future time on main benefit up to age 65 - Clients on supplementary benefits only at 30 September

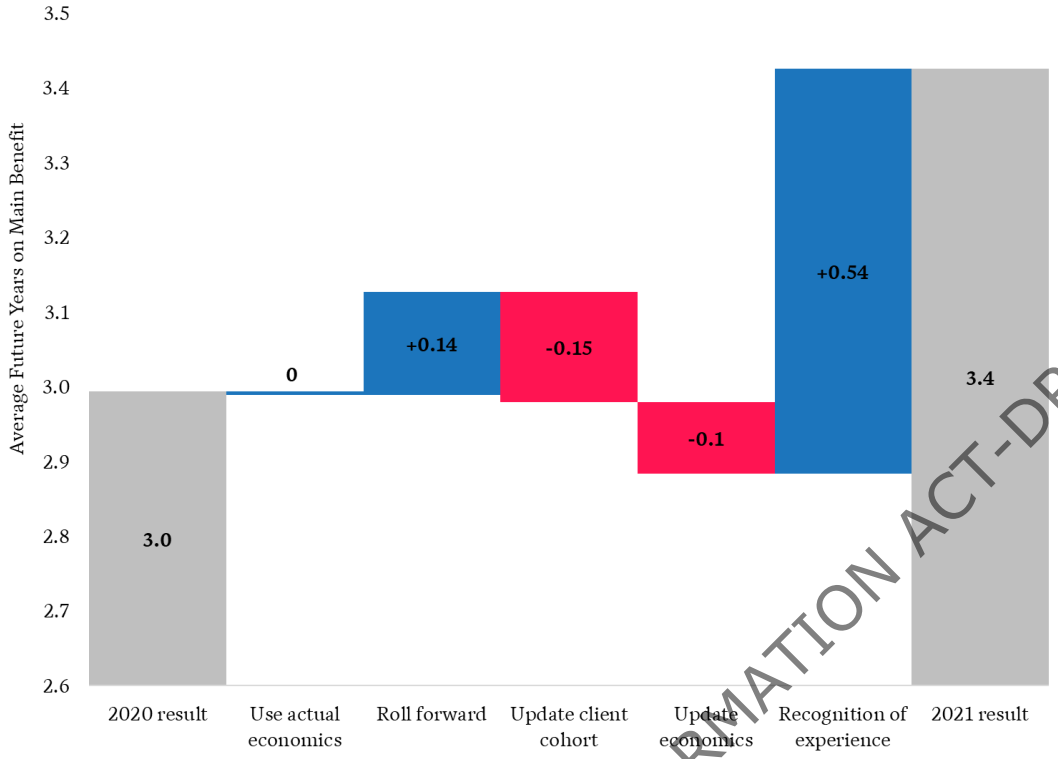
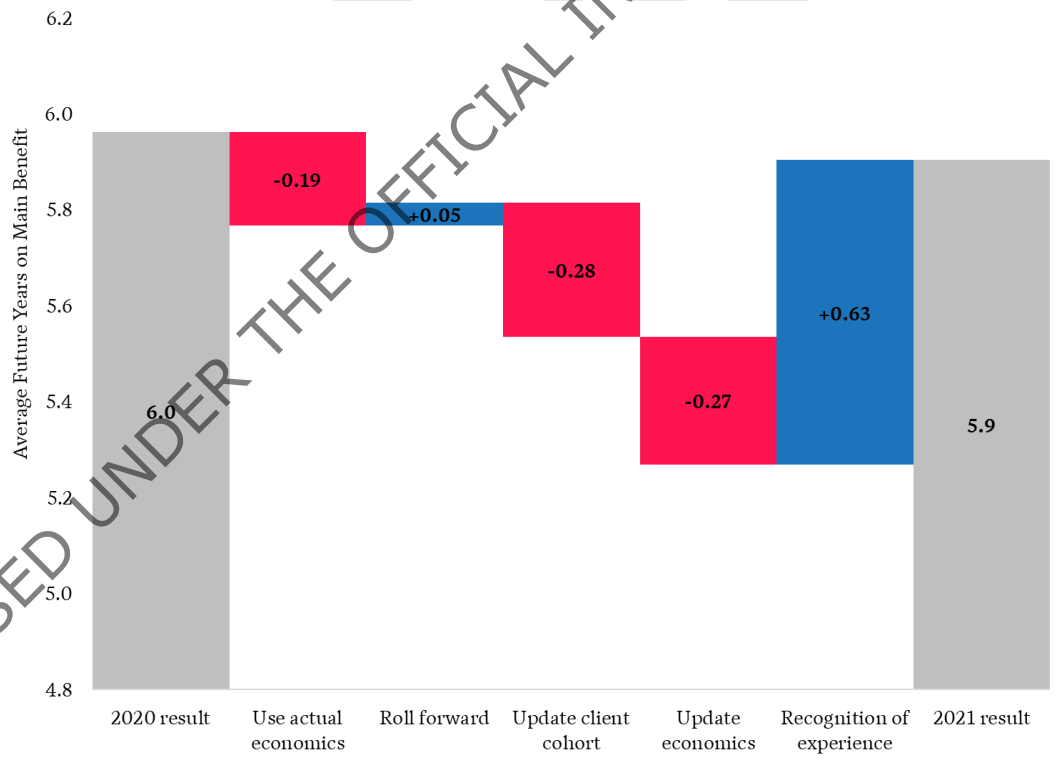



Figure B.6 – Average estimated future time on main benefit up to age 65 - Recent exits at 30 September



# Appendix C Modelling approach summary

This summary is a copy of chapter 2 from the technical report[9]. Further detail on the modelling approach can be found in that report.

We give an overview of the model in non-technical terms, answering core questions:

- What is the model?
- What does the model do?
- What outcomes does the model estimate?
- How does the model work?
- What does the model not do?

## C.1 What is the model?

The term 'model' is broadly used to describe physical, mathematical and conceptual models. This model is a mathematical model. Many definitions of a 'mathematical model' centre on the notion of imitation or simulation i.e. a model imitates or simulates a real-world situation, often in a simplified way because the 'situation' being modelled is complex. In this sense, a model (including this one) might be described as a 'simplification of reality'.

Key aspects of the modelling framework for this project are:

- The population being modelled – In this case, New Zealand (NZ) residents aged 16 or older, and people entering this population over the next ten years.
- The future outcomes that are being modelled – See section C.3.
- The time horizon over which the future outcomes are being modelled – In this case, people's future lifetime.
- The historical data – Used to understand the correlative relationships between variables (or combinations of variables) and the future outcomes being modelled. Variables may be characteristics (e.g. demographics), relate to events (e.g. experience of the modelled outcomes in the past) or be environmental (e.g. measures of labour market conditions). Understanding the correlative relationships informs the construction of the mathematical equations that define the model, and the parameters for these equations.
- Assumptions – The model is underpinned by a range of assumptions which are either implied by the construction and parameterisation of the mathematical equations, or explicitly made. Explicit assumptions relate to variables that the model does not estimate but are built into model because they are important for estimating future outcomes, e.g. the future unemployment rate as a measure of future labour market conditions.

## C.2 What does the model do?

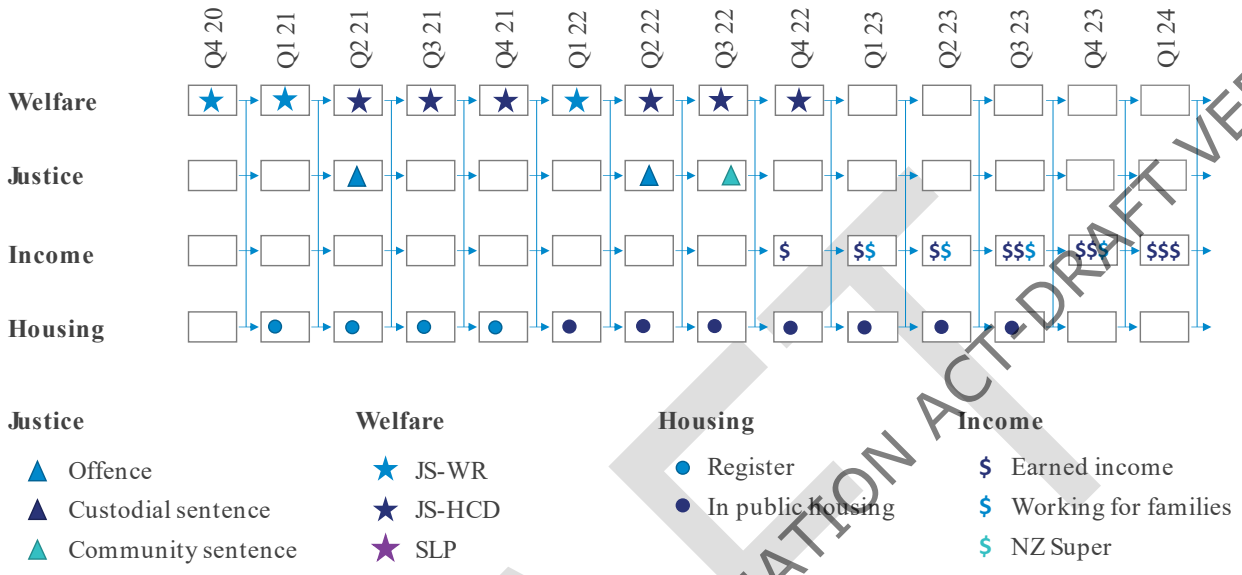
In section C.1 we referred to the model as an estimation of future outcomes for a defined population (over 16-year-old NZ residents) over a defined time horizon (people's lifetimes). It does this by estimating people's status in relation to these outcomes (and other associated characteristics and outcomes) over each quarter-year period in the future. This is indicatively shown in figure C.1 below:

- For one person – a full model run produces estimates for all NZ residents aged 16 and over.

[9] Social Outcomes Modelling 2021 – Technical Report

- Over 14 quarters – a full model run covers all people's future lifetimes and so runs for about 400 quarters.
- In respect of four outcomes – other outcomes are estimated by the model.

Figure C.1 – Estimated pathways




Where relevant, estimated cash flows are modelled in relation to future estimated outcomes. For example, benefit payments are modelled for those in receipt of a benefit and Income Related Rent Subsidies paid to public housing providers are modelled for people in public housing.

In addition to estimating outcomes for the present NZ adult population, the model also estimates outcomes for those entering the population over the next 10 years. Population entry may happen in two ways:

- Ageing-in: children are considered to enter the adult population in the quarter in which they turn 16. We use estimated output from the 2020 Oranga Tamariki children's model.
- Migration: Both children and adults may enter the population via migration (which includes returning New Zealanders as well as foreign nationals).

Once in the population, outcomes for new entrants are estimated in the same manner as those in the present population.

## C.3 What outcomes does the model estimate?

The model estimates a large range of outcomes:

- **Benefit receipt** – This covers the incidence of benefit receipt and the associated payments. Benefit receipt is categorised into main benefit categories and supplementary assistance.
- **Other benefit receipt characteristics** – These include, but are not limited to, partnered status, existence and age of children, and incapacity coding for health-related benefits.
- **Public housing** – This covers entry to the public housing register and associated prioritisation rating, movement off the register (either into public housing or otherwise), Income Related Rent Subsidy, exit from public housing, size and location of house allocated, and future dissolution of households currently in public housing.
- **Income** – This covers personal income, Working for Families (WFF) tax credits and NZ superannuation. The primary industry from which personal income is earned is indicated.

- **Justice activity** – This covers number and type of offences committed as well as community and custodial sentences managed by the Department of Corrections.
- **Education** – This covers secondary and tertiary enrolment in the quarter, secondary attainment, total days of any suspensions or stand downs at secondary school, highest New Zealand Qualification Framework (NZQF) level enrolled and attained at tertiary.
- **Child and protection (CNP) and Youth Justice (YJ)** – This covers the highest level of either type of intervention as well as the total number of days spent in placements.
- **Health** – this covers mental health and addiction pharmaceutical, specialist community and specialist inpatient events, acute hospital discharges and mortality.
- **Location** – this covers the region/TLA/Auckland board where an individual resides.

Most of these outcomes relate to specific indicators within the interim wellbeing framework used for this project.

## C.4 How does the model work?

Figure C.1 highlighted how the model estimates outcomes at each quarterly time step.

Referring to the model as a 'model', implies that it is single model. In fact, it is made up of over 200 individual models. Each of these individual models plays a specific part in the overall modelling construct. Some relate to how a person moves between different outcome states from one quarter to the next e.g. benefit state. Some relate to the evolution of other modelled outcomes e.g. personal income. Others relate to cash flows associated with particular outcomes e.g. benefit payment given an individual is estimated to be receiving a benefit in a quarter.

The vast majority of the models fall into the broad category known as regression models, which means they estimate one variable based on other variables. The remainder of the models are probability table models that attach probabilities to different outcomes.

The models are pulled together in what we refer to as the 'projection code'. Many of the variables that each individual model relies upon are themselves modelled variables. For example, the models relating to transitioning between benefit states from one quarter to the next depend on, say, corrections activity variables which, in turn, are updated each quarter. The projection code runs each model in a set sequence for a future quarter, before moving onto the next quarter and repeating the sequence based on the updated variables. For this reason, the overall modelling construct is sometimes referred to as a 'chained regression model': it chains together regression models over a series of future time steps (in this case quarters).

## C.5 What the model does not do?

The model is not a causal inference model. By this, we mean that the model does not attempt to determine the causal factors relating to different outcomes. Rather, the model is a predictive model, and thus seeks to determine factors that are correlated with outcomes. This difference is important. For example, a key finding of previous work is that long-term dependence on welfare is highly correlated with those who first receive benefits when under twenty years of age. So, age of first benefit is highly predictive of lengthy spells supported by benefit. However, it cannot be concluded that this is the cause of these spells. Nevertheless, knowledge about correlations and relationships between certain characteristics and outcomes is valuable information for policy and programme design and monitoring.

The model is based on simulating individual pathways through various welfare and housing states (including not receiving any benefit/assistance) as well as other characteristics (family information, education, income, corrections sentences etc) over their lifetimes. There are many possible pathways from the modelling date to time of death, so the exact pathway is very uncertain. Results for any particular individual reflect the average for people with similar characteristics and are not intended to be an accurate

prediction of that individual person's future pathway. Results, therefore, should be considered for segments of the population, rather than at an individual level.

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