MINISTRY OF SOCIAL DEVELOPMENT
TE MANATŪ WHAKAHIATO ORA

# Report of the Enhancing Intake Decision-Making Project

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# Executive Summary

## Background to the Enhancing Intake Decision-Making Project

In 2014, the Minister for Social Development commissioned a project relating to the use of statistical risk modelling within Child, Youth and Family (CYF) intake decision-making. The project was designed to understand whether the use of this information could enhance intake decision-making, where a concern has been raised regarding a child or young person, and a recommendation for a service response must be made. Potential benefits of this project include both a reduction in the number of unnecessary investigations undertaken by CYF, and better identification of those children, young people, and whānau who are a high priority for services. The resulting Enhancing Intake Decision-Making Project was the product of collaboration between Insights MSD, CYF, and the CYF National Contact Centre[1].

## Intake decision-making context

### In New Zealand, notifications regarding the wellbeing of a child or young person are reported to CYF or the Police

Under Section 15 of the Children, Young Persons and Their Families Act (1989), any person who believes that any child or young person has been, or is likely to be, harmed (whether physically, emotionally, or sexually), ill-treated, abused, neglected, or deprived may report this matter to CYF or the Police. As empowered by this legislation, every year CYF receives notifications regarding the alleged abuse or neglect of about 100,000 unique New Zealand children and young people. Often, these children and young people do not experience just one instance of alleged maltreatment, with a significant proportion experiencing repeated notifications across their lifetime.

### The CYF National Contact Centre and FVIARS committees are primarily responsible for making triage decisions regarding these children and young people

The CYF National Contact Centre and the Family Violence Inter-Agency Response System (FVIARS) are the primary organisations tasked with assessing and making decisions regarding these notifications. It is also worth noting that since its establishment in 2014, the Vulnerable Children's Hub has been an increasingly important part of this process. After receiving a notification, the Contact Centre is responsible for a 'triage decision', which involves a judgement about the level of care and protection related concern surrounding a child or young person, and the recommendation of an appropriate service response. The FVIARS committee is responsible for similar intake decisions regarding cases of family violence reported directly to the Police. In 2014, the intake decisions

[1] The National Contact Centre, also referred to as the Contact Centre, provides the initial point of contact for anyone in the community who has concerns about a child or young person's welfare. Notifications can come in the form of calls, emails, letters or faxes from a range of notifiers, including family members, members of the wider community, Health or other practitioners, schools, Police and courts.

made by these two organisations resulted in the referral for further assessment of more than 41 percent of those children and young people notified.

### Intake decision-making is complex and subject to a range of environmental factors

The intake decisions made regarding care and protection notifications are complex and subject to a number of uncertain environmental factors, for example, time pressures and incomplete information. These decisions also have significant consequences for the children, young people, and whānau involved. A failure to intervene when required can result in serious negative outcomes. Similarly, interventions that are not required are costly and may result in additional harm. Despite their importance, these decisions are often made within a time-pressured environment, using information that is uncertain or incomplete. Given these constraints, intake decision-making may benefit from the use of additional tools, which have the potential to improve overall effectiveness.

## Nature of the Project

### This project was designed to determine whether statistical risk model information can support the intake decision-making process

Internationally, a range of aids have been developed, both within the care and protection field and others, which have the potential to improve the effectiveness of decision-making. These tools include statistical risk models developed from administrative data[2], which may be used to improve decision-making, effectively target services, and form part of a strategy to achieve better outcomes for children and young people. This project was designed to assess whether a statistical risk model tool could be used to support intake decision-making within a New Zealand context. The project aimed to explore whether decision-making could be improved by the use of statistical information highlighting the level of underlying risk experienced by those children and young people notified to CYF with a care and protection concern.

### To achieve the overall objective of the project, three phases of work were undertaken

The overall objective of the Enhancing Intake Decision-Making Project was to answer the specific question: Could care and protection intake decision-making be improved by giving social workers access to a statistical risk tool? To achieve this overall objective, three main phases of work were undertaken:

1. Developing a statistical risk model specifically tailored to the New Zealand care and protection intake system.
2. Developing a means of putting this statistical risk model into operation within an intake decision-making environment.
3. Trialling the use of this information within a non-operational context at the National Contact Centre, and collecting feedback from social workers relating to their perceptions of this tool.

[2] Data collected incidentally as part of recording keeping, generally as part of providing a service. This data can include individual's names, demographic information, and the particular service provided.

### A statistical risk model was developed to assess the likelihood of children and young people experiencing a care and protection concern

The first phase of the project was designed to answer the following question: Can administrative data be used to build a statistical risk model that is more accurate than existing intake decision-making? This phase of work initially involved creating a dataset from CYF and Work and Income information, which was then used to develop a measure of *estimated concern* for each child or young person notified to the contact centre. Using this measure, a number of models were designed to predict whether a child or young person required further assessment by CYF, and the accuracy of the best model was compared against existing decision-making.

### The operational use of statistical risk model information was refined through analysis, design, and testing work

The modelling work suggests that a statistical risk tool has the potential to provide important new information to assist social workers making intake decisions. However, putting this information into operation within an intake decision-making context is not straightforward. In order to apply this information within a practice context, the second phase of the project sought to answer the question: How could the output of a statistical risk model be used within an intake decision-making environment? This phase of the project used analysis, design, consultation, and testing work to develop a Background Risk Indicator, which was accompanied by associated guidance and training information. The overall approach reinforced the primary role of professional judgement within decision-making, particularly within cases containing serious care and protection concerns.

### The 'Background Risk Indicator' was trialled within a non-operational context at the CYF National Contact Centre

Following the development of the Background Risk Indicator, the next phase of the project involved answering the specific questions: Would social workers apply the Background Risk Indicator within their decision-making in a safe and expected manner; and, what were the views and perspectives of social workers given access to the Background Risk Indicator? In order to achieve this objective, the trial involved simulating the intake decision-making environment at the National Contact Centre. The trial was designed to assess the impact of different Background Risk Indicator scores across three different levels of care and protection related concern. The trial also involved gathering feedback from social workers regarding the effectiveness of training, their perception of the Background Risk Indicator, and their views on using this information within decision-making.

## Key findings of the Project

### Results from the project demonstrate that a statistical risk model has the potential to improve the effectiveness of intake decision-making

The overall findings of the Enhancing Intake Decision-Making Project suggest that using statistical risk model information, in the form of a 'Background Risk Indicator', has the potential to improve care and protection intake decisions. Results from the trial highlight that when this information is used successfully, social worker decision-making is influenced in a safe and expected manner. These results suggest that the potential for

more effective decision-making provided by the model could be realised, which may result in improved outcomes for New Zealand children, young people and whānau. While further development work is warranted, these results provide a clear platform for progressing towards an implementation phase.

The key findings of the project are summarised in the table below.

**Feasibility testing indicates that a statistical risk model can be developed from linked administrative data held by MSD, which has the potential to improve the effectiveness of care and protection intake decision-making**

- In past years, CYF has received notifications about care and protection concerns for 100,000 unique children and young people each year. In 2014, for a subset of this group with reliable data, about 63 percent were referred to local CYF sites for further investigation or services.
- The project developed a measure of *estimated concern* in order to assess the accuracy of intake decisions. The measure used information about what happened after the referral decision (either further intervention on the part of CYF, or a further report of concern within the following two years) to estimate if there was a care and protection concern for the child or young person. This approach provides a reasonable measure, but will not be correct in all circumstances.
- Based on the measure of *estimated concern* that was developed, existing intake decision-making is accurate in about 60 percent of cases.
- Using historical data, the statistical risk model appears to be around 6 percentage points more accurate than existing intake decision-making. The model was able to refer an increased proportion of children and young people where there was an *estimated concern*, as well as fewer children and young people where there was not a concern.
- As is good practice, ethnicity was not included as a variable in the model. When it was added in order to assess any remaining contribution, it added only a minor increase to the accuracy of the model's decision-making.
- The increase in accuracy provided by the statistical risk model was broadly comparable across different ethnic groups, although the model refers a higher number of Māori children and young people than under the status quo. The reason for this higher referral rate is currently unknown, and further work will be required to better understand this finding.

**A 'Background Risk Indicator' was developed as a way of using statistical risk model information within intake decision-making. The results of a non-operational trial suggest that the Background Risk Indicator would be used by social workers in a 'safe' and 'expected' manner**

- On average, roughly 15 per cent of decisions were changed after social workers saw the Background Risk Indicator. The size of these changes was modest, reaching statistical significance in some cases.
- 74 per cent of social workers made at least one change after seeing the Background Risk Indicator, but only 13 per cent made four or more changes.
- The referral rate of social workers appeared to be slightly more responsive to the Background Risk Indicator when it suggested a higher rather than lower risk, implying that the use of the tool carries a risk of increasing overall rates of referrals.
- No social workers made unsafe decisions in response to the Background Risk Indicator. This meant that in cases where the presenting information suggested a serious care and protection concern, low or medium Background Risk Indicator scores were appropriately disregarded.
- In cases where social workers changed their decision after seeing the Background Risk Indicator, all but two of these changes were in the expected direction ie increases or decreases in the referral rate or urgency of referrals were observed, depending on whether the Background Risk Indicator score was high or low.
- In instances where social workers changed their decision, they indicated that they were broadly comfortable with applying the Background Risk Indicator, and many saw the tool as a positive addition to their decision-making processes.
- A majority of social workers felt the training they received prepared them well for using the Background Risk Indicator, and were confident that they understood the concept of this tool.
- A small number of social workers were not receptive to the Background Risk Indicator, perceiving the tool to be narrowly focused on identifying risk, based on poor quality data, unsuited to a strengths-based approach to social work practice, and unable to account for cultural differences.
- Prior to seeing the Background Risk Indicator, results from the trial highlighted variation in the intake decisions made by social workers on the same case. There was no evidence that the Background Risk Indicator reduced this variation.

Along with these direct findings, the Enhancing Intake Decision-Making Project has also generated considerable insight into future work that may be required to support putting the tool into operation. These considerations are summarised in the table below.

- This work has underlined the importance of the National Contact Centre, local FVIARS Committees, the Vulnerable Children's Hub, and CYF sites to intake decision-making. There would be value in considering whether, and how, to also provide those decision-makers with statistical risk modelling information to help ensure effective implementation.
- Any implementation of statistical risk modelling would be likely to impact on short and long-term referral rates and workloads for CYF and its partners, and this should be understood ahead of any implementation. It is also likely that the implementation of statistical risk modelling will require increased resourcing of preventative services.
- Existing administrative data is not always consistent. Effective use of statistical risk modelling would require resources to be invested in developing robust and consistent administrative data.
- Drawing on a wider range of data from other agencies has the potential to enhance the accuracy of a statistical risk model, and this merits further investigation.
- Social workers stated that their trust in an indicator would be enhanced by a model that drew on familiar and plausible factors. To improve decision-making, they wanted to see these underlying factors presented, as well as the overall indicator.
- Input and governance by frontline practitioners will be an essential part of implementing the model, and ensuring that any associated training is effective.
- Implementation of statistical risk modelling could impact on referral rates for Māori children and young people. Early engagement with Māori academics, service providers, and other stakeholders ahead of any implementation would be highly valuable, particularly given long-standing concerns about the high proportion of Māori children and young people already within the care and protection system. This work would also need to ensure the availability of appropriate services, which could meet the needs of Māori children and young people, and their whānau.
- There should be adequate monitoring, process and impact evaluation of any implementation of a statistical risk tool. One approach for assessing the impact of any tool on decision-making would be the 'before/after' decision approach used in the National Contact Centre trial.
- An IT investment cost will be required to put a statistical risk model into operation.
- Any implementation of the statistical risk model will require an assessment of associated privacy and ethics issues.

# Chapter 1: General Introduction

## Purpose of the Enhancing Intake Decision-Making Report

The purpose of this report is to document the Enhanced Intake Decision-Making Project, which sought to answer the following question: **could care and protection intake decision-making be improved by giving social workers access to a statistical risk tool?** The current project involved the development of a model, pre-testing of trial materials, further model development, and a trial at the Child, Youth and Family (CYF) National Contact Centre. This chapter gives an overview of the relevant context and an outline of the remaining five chapters of the report, before describing the child protection intake system, key considerations for intake decision-making, and the use of statistical risk tools in child protection.

### Background to the project

In 2014, CYF received notifications regarding the alleged abuse or neglect of around 100,000 unique New Zealand children and young people. As part of managing these high volumes, CYF must target its resources to children and young people who have experienced, or are likely to experience, abuse or neglect. Following the completion of an initial feasibility study and ethical reviews in 2014, the Minister for Social Development approved work to understand the capacity of a statistical risk tool to support social worker intake decision-making (Blank et al., 2015; Dare, 2013; Mansell, Ota, Erasmus & Marks, 2011; Wilson, Tumen, Ota & Simmers, 2015). This project is aligned with the current modernisation programme for CYF, of which a core element is the enhanced use of data and analytics to better support decision-making. A statistical risk tool could assist Oranga Tamariki's[3] strategy to achieve better outcomes for children and young people.

#### The Enhancing Intake Decision-Making Project aimed to understand whether statistical risk tools can be used to enhance intake decision-making

The Project is the product of collaboration between three Groups: Insights MSD - the research analytics group for the Ministry of Social Development (MSD); CYF – the MSD service line responsible for helping protect and support children and young people; and the National Contact Centre – where CYF social workers make intake decisions, when a concern has been raised regarding a child or young person, and a recommendation for a service response must be made. The intent of this project is to ensure that no intake decisions are made using a statistical risk tool until its impacts are fully understood.

This project included three separate tranches of work:

1. Developing a statistical risk model specifically tailored to the New Zealand care and protection intake system.
2. Developing a means of putting this statistical risk model into operation within an intake decision-making environment.
3. Trialling the use of this information within a non-operational context at the National Contact Centre, and collecting feedback from social workers relating to their perceptions of this tool.

[3] The Ministry for Vulnerable Children.

## Structure of the report

- Chapter 1 is a general introduction.
- Chapter 2 outlines the development and performance of the statistical risk model.
- Chapter 3 outlines the development of the Background Risk Indicator for use within intake decision-making.
- Chapter 4 sets out the methodology used to trial the Background Risk Indicator, and the quantitative analysis of how the tool influenced decision-making.
- Chapter 5 describes the qualitative analysis of social workers' feedback on using the Background Risk Indicator as part of intake decision-making.
- Chapter 6 outlines the project conclusions, as well as implications and next steps.

## Summary of the general introduction

- The National Contact Centre and FVIARS are the two main points in the child protection system responsible for making intake decisions. Supervisors and social workers at local CYF sites make the final decisions on service response.
- Failing to intervene when required can result in serious negative outcomes for children and young people, while engaging in interventions for low risk cases can also negatively impact on children, young people, families, and overwhelm the system.
- Making intake decisions is inherently difficult as information is often uncertain, incomplete, or time-consuming to access, which is compounded by the restricted time in which decisions must be made and the limit to humans' ability to integrate complex pieces of information or predict the future.
- There is likely to be significant variation in social worker decision-making, due to contextual, individual and case-specific variables. Increased demand or high profile fatalities can also lead to over- or under-estimations of risk.
- A range of risk assessment tools have been developed to support decision-making in child protection. One example is a statistical risk tool, which can use administrative data to identify factors most frequently associated with cases that require CYF help. A tool can combine measures of the child, young person and their family's characteristics in a systematic fashion to produce a single measure of overall risk.
- Statistical risk tools may support better targeting of services and improved decision-making. Moral, ethical, and practical issues of implementation need to be considered.
- The use of statistical risk tools within a care and protection context is a developing field. While a number of prototype models have been developed, Florida is the only example where a tool has been successfully implemented. A statistical risk tool is also being developed for intake decision-making in Allegheny County, Pennsylvania.
- The purpose of the project is to investigate whether care and protection intake decision-making can be improved by giving social workers access to a statistical risk tool. This project builds on previous work by MSD which investigated the feasibility of creating a statistical risk model for care and protection in New Zealand.

# The child protection intake system

### Legislation enables any person with a concern regarding a child or young person to report this matter to CYF, who are then empowered to undertake an investigation

Under Section 15 of the Children, Young Persons and Their Families Act (1989), a person who believes that any child or young person has been, or is likely to be, harmed (whether physically, emotionally, or sexually), ill-treated, abused, neglected or deprived may report the matter to CYF or the Police. As empowered by this legislation, concerns regarding the wellbeing of a number of New Zealand children and young people are notified to CYF each year. Under Section 17 of the same act, any social worker or constable is empowered to organise or complete an investigation into the allegations raised in a Section 15 report of concern.

### The National Contact Centre is a key point of contact for anyone in the community who has concerns about a child or young person's welfare

The National Contact Centre provides a key point of contact for anyone in the community who has concerns about a child or young person's welfare (Section 15 concerns). Notifications can come in the form of calls, emails, faxes or letters from a range of notifiers, including family members, members of the wider community, health or other practitioners, schools, and courts (Office of the Chief Social Worker [OCSW], 2014). In addition to Section 15 concerns, notifications can also be made related to concerns about the behaviour of a child or young person. The Contact Centre also answers advice calls.

### The National Contact Centre makes an intake decision as to whether each notification may require further action by CYF

The National Contact Centre is responsible for an 'intake decision', which is an assessment about whether the level of concern meets the threshold for involvement with CYF and, if so, how quickly CYF may need to respond. If a decision is made that the concerns do not meet the threshold for CYF involvement, the notification is recorded for information purposes as a 'contact record.' If a decision is made that further involvement by CYF is required, the intake social worker creates a 'report of concern' which is sent to the appropriate local site. This report includes a recommendation as to whether there should be further assessment by a site social worker or the provision of family support services in the community.

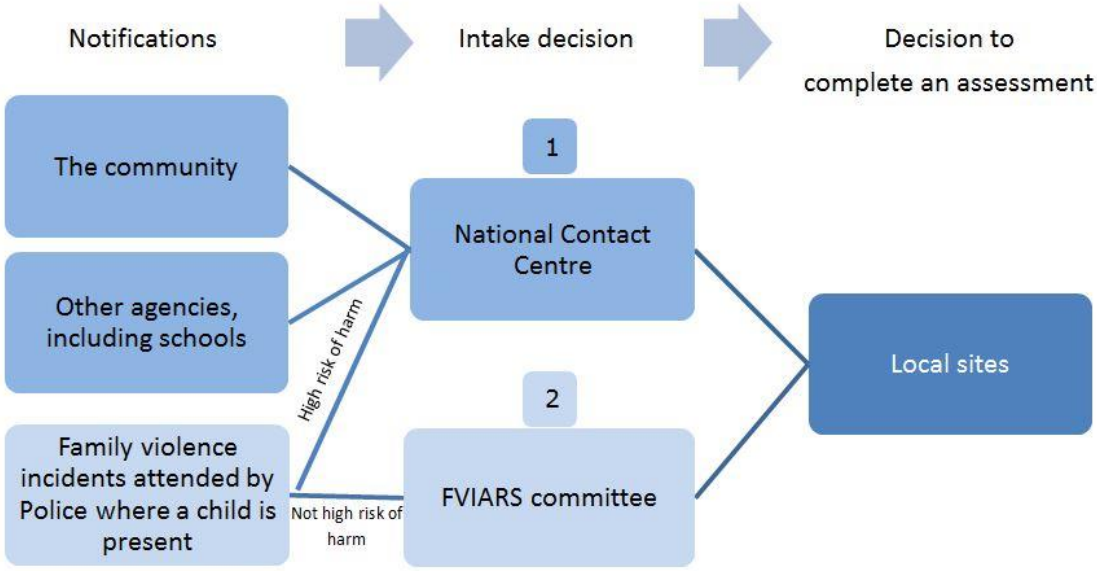
### A notification can be sent to the National Contact Centre or FVIARS committees for intake screening when Police attend a family violence incident that may impact on a child or young person

When the New Zealand Police are called to a family violence incident where a child or young person may be involved[4], a risk assessment is made as to whether there is potential for high risk of harm to the child or young person. If the case is deemed to be high risk, a notification is sent to the National Contact Centre who will complete the intake screening process. If Police assess the risk to the child or young person as not high risk, then a notification may be made to a Family Violence Inter-Agency Response System committee (FVIARS; MSD, 2010; 2015a). The three core agencies involved in

[4] If the child or young person(s) reside with the family violence parties.

FVIARS are the New Zealand Police, CYF (at the site level), and the National Collective of Independent Women's Refuges (NCIWR). Where a Women's Refuge is not available, other community agencies such as Victim Support may also participate. Once an intake decision is made by a FVIARS committee, then this information is sent to CYF who enter it into the CYF database, CYRAS (Child, Youth, Residences and Adoption System). See Figure 1.1 for a summary of the child protection intake system.

**Figure 1.1: Summary of the intake decision-making system**




This figure shows the two main pathways a notification can take to be screened for possible intake and sent to site for consideration: via the National Contact Centre or FVIARS committees. Supervisors and social workers at site make the final decision regarding the appropriate service response for all notifications that have been referred as intakes.

### Additional pathways from notification to site exist

In other cases, an intake decision is not made at the Contact Centre or in FVIARS committees. Frontline professionals and practitioners in Hamilton city, Christchurch city and south Auckland can also raise concerns about children or young people with the Vulnerable Children's Hub, if there are complex, unmet needs, a risk of harm, and a potential for preventative services. Similar to the FVIARS process, Hub social workers make an initial decision as to whether there is high risk of immediate harm, in which case the referral is sent to the National Contact Centre. In other cases, the Hub social worker makes a recommendation as to an appropriate service for the child or young person (Children's Action Plan, 2016).

Notifications can be made by individuals or other agencies directly to a CYF site. In addition, where the court has received information during custody proceedings that imply a child or young person is at risk, Section 15 notifications are sent to the local site for a mandatory assessment.

# Intake decision-making process

### The Intake Decision Response Tool guides decision-making at the National Contact Centre

For social workers, the first part of the screening decision is to consider whether a CYF service response is required. This decision involves three considerations: whether the care and protection concerns are 1) clear, 2) serious, and 3) require a statutory response. The Intake Decision Response Tool serves as the standardised guidance when making screening decisions, and is predominantly a strengths-based approach to assessing notifications (CYF, n.d.[a]). Factors considered include evidence of the responsiveness of the family/whānau, if there any locally available services that might meet their needs, whether protective factors are in place, the vulnerability of the child or young person, or the potential for cumulative harm.

### FVIARS use a range of decision-making aids, including the Intake Decision Response Tool, ODARA, or the Police Risk and Lethality tools

FVIARS committees have largely the same intake screening options as the National Contact Centre. However, FVIARS committees have no standardised requirements as to which decision-making aid should be used. In addition to the Intake Decision Response Tool, some FVIARS committees may also use the Ontario Domestic Assault Risk Assessment (ODARA)[5] or the Risk and Lethality index (NZ Police, 2011). The ODARA is a risk assessment tool which assesses the risk of future domestic assault to a victim, following a domestic assault (Waypoint Centre for Mental Health Care, 2016). The Risk and Lethality Index consists of a series of yes/no strength and risk-based items relating to victim and the offender, whereby higher scores indicate higher risk (e.g. if the score is 24 or over then there is extreme risk – urgent follow-up required).

### The decision to recommend an intake is largely based on the presenting information

Social workers make an assessment about whether the level of concern expressed in a notification meets the threshold for involvement with CYF, and if so, how quickly CYF may need to respond. This intake decision is based predominantly on the presenting information, which includes any information in the email, fax, letter or telephone notification. Social workers also consider case history from previous contact with CYF, which is accessed through CYRAS. This information is generally available, but not if there is no previous contact, the family cannot be identified, or the history predates CYRAS[6]. Social workers can also use Work and Income records to verify an address or the children in an adult's care.

[5] Reporting on the implementation of the ODARA in New Zealand suggests that it produces much higher risk scores than in Canada, which may indicate higher rates of domestic violence or a lack of validity in the New Zealand context (NZ Police, 2012).

[6] The current CYRAS computer system went live in November 2000. Some information on contacts with Child, Youth and Family prior to this date may not be reliable or complete due to issues with the migration of records between other computer systems over time.

### If CYF involvement may be required, a pathway and response time is recommended to the local site

If the intake social worker makes an assessment that serious abuse or neglect is likely to have occurred and a joint response between CYF and Police is required, then they will recommend an investigation. In cases where less serious abuse or neglect is likely to have occurred, then they recommend a Child and Family Assessment (CFA). Social workers also recommend a response time to the local site. The purpose of an assessment is to more fully assess the situation of the child or young person. Further action required within 24 or 48 hours is selected when there is serious risk and no immediate protection available to the child or young person, and within seven or 20 working days for all other cases (CYF, 2014).

The Partnered Response Pathway is recommended in cases where a concern has been raised, but there are no clear indications of danger or harm and the parents are willing and able to address the concern. This pathway is a voluntary non-statutory option, and no response time is recommended to site. See Table 1.1 for additional information on the pathway and urgency response categories available to screening decision-makers.

### Site makes the final decision regarding the appropriate service response for all notifications that have been referred as intakes

Once the local site has received the report of concern, they make the final pathway and urgency decision. The local site has the full range of responses available, and can increase or decrease the urgency, change the pathway, or choose to take no action.

**Table 1.1: Pathway and urgency response categories**

| **Pathway** *urgency* | **Description** |
|---|---|
| **Intake - further action required (report of concern)** | |
| Investigation *24 hour, 48 hour, 7 day* | An allegation of serious physical abuse, sexual abuse, or neglect, or cases where a child or young person witnesses serious family violence and a joint response between CYF and Police is required. |
| Child and Family Assessment (CFA) *24 hour, 48 hour, 7 day, 20 day* | The child or young person is likely to be in need of care and protection and a statutory response is required. For example, a child may be experiencing (or is likely to experience) harm, neglect or abuse, which is having a significant impact on their development, safety, health or wellbeing. |
| Partnered Response (PRP) *No urgency required* | Partnered response is intended to be a way of providing an earlier, comprehensive response to families/whānau with low level issues who require services rather than a formal or statutory response. CYF continues to be involved in supporting appropriate service provision and provides a safety net for the community organisation and the family/whānau. |
| **No intake - no further action required (contact record)** | |
| Contact record (CR) *No urgency required* | The situation does not require CYF involvement. This may also include advice given or support agencies identified, e.g. Health is already involved. Contact records are also sometimes used to record a concern when a case is already open. |

## Key considerations for intake decision-making

### Making intake decisions is inherently difficult

Decision-making in child protection occurs under conditions of uncertainty, as a result of information that is complex, unclear, ambiguous or unreliable, which is compounded by the restricted time in which decisions must be made and the limit to humans' ability to integrate complex pieces of information or predict the future (Mansell, 2006a; b; Mansell et al., 2011). Under these conditions, decision-making errors will be made (Munro, 1999).

### Failing to intervene when required can result in serious negative outcomes for children and young people

It is crucial that the decision-making system is able to respond as appropriately as possible to any concerns regarding children or young people, as failing to intervene or provide support to families who require assistance will result in both immediate and on-going harm. Failing to intervene where required can result in serious harm to a child or young person, and at worst may result in an avoidable death (Mansell, 2006a). In addition, New Zealand longitudinal studies have shown that the experience of abuse leads to poor life outcomes including higher rates of substance abuse, mental health problems, poor educational outcomes, benefit receipt, and juvenile and adult offending (Fergusson, Horwood & Lynskey, 1996; Fergusson & Lynskey, 1997; Tumen et al., 2016).

### Engaging in interventions for low risk cases can negatively impact on children, young people, families, and the system

Conversely, Scott (2006) highlights the negative impact on families involved in unjustified child protection investigations. Investigations can be embarrassing, stressful and disempowering for parents. Intervening in low-risk or no-risk families also puts additional strain on the system which may result in inadequate services to those in need (De Bartoli & Dolan, 2014). Given the finite resources available to achieve this complex task, the value of effective decision-making cannot be overstated (OCSW, 2014).

### Social workers must make intake decisions using information that is uncertain or incomplete

There is variation in the detail and accuracy of information presented to social workers, which is often due to incomplete information on the part of the notifier or the form the notification takes. If the concerns raised about a child or young person are not clear, and the notifier cannot describe specific examples of alleged abuse or neglect, then a notification may not meet the threshold for CYF involvement.

The National Contact Centre processes notifications in the form of phone calls, emails, letters, and faxes. The OCSW (2014) reviewed these processes, and reported that with phone calls social workers felt they were able to talk about concerns, ask questions, as well as clarify and seek additional information, meaning that staff could more effectively assess circumstances and judge whether CYF involvement was required. In dealing with written notifications, the lack of immediate access to contextual information made it more difficult to quickly identify those situations requiring CYF involvement.

**Social workers also consider case history information that is time consuming to access and synthesise**

In addition to considering the notification, or presenting information, social workers also consider case history information from previous contact with CYF and Work and Income. However, they do not have easy access to all the administrative data that could help inform a decision, such as the proportion of a child's life supported by a (parent's) benefit, or the New Zealand Deprivation Index, which is a measure of socioeconomic disadvantage in the neighbourhood in which the child or young person resides. If information on previous contact with CYF is available, it takes time to go through it and make sense of it in order to form a holistic picture of the child or young person. CYF's primary case management database, CYRAS, is unwieldy and difficult to use (Modernising Child, Youth and Family Expert Panel [Expert Panel], 2015a; OCSW, 2014). Social workers may benefit from relevant administrative data being surfaced and synthesised in a systematic and consistent fashion to produce a single measure of overall risk.

**Current research acknowledges the likelihood of significant variation in social worker decision-making, due to contextual, individual and case-specific variables**

A component of human decision-making is the use of heuristics, or short-hand rules of thumb that are based on previous experience. Using heuristics is not by definition problematic; however some conditions lend themselves to an over-reliance on heuristics which can increase the variability and decrease the accuracy of decisions. A range of contextual factors have all been linked to over-use of heuristics, both in decision-making more generally and in social work. These include:

- over-emphasis on KPIs, as markers of the quantity but not quality of practice
- a lack of training and supervision
- uncertain information
- time pressure
- an overly administrative work burden (Munro, 1999; see also De Bartoli & Dolan, 2014; Keddell, 2014a; López, Fluke, Benbenishty, & Knorth, 2015).

Variation in decision-making may also be influenced by social worker specific variables, such as overall risk aversion (intake disposition), the tendency of a social worker to intake a case, as well as attitudes, emotion, experience, and education (Dorsey, Mustillo, Farmer & Elbogen, 2007; Mumpower, 2010). When examining variability in decision-making, it is also important to consider case-specific characteristics, as these may interact with or even supersede the influence of the risk aversion of individual social workers (Benbenishty et al., 2015; Ross, Schuerman, & Budde, 1996; Stewart, 1993). For example, Ross et al. (1996) found that cases which included very severe or insignificant concerns had the least variability in decisions, whereas cases that were unclear or included moderate concerns showed the greatest variability.

**External pressures on decision-making can also lead to over- or under-estimations of risk**

Chid protection agencies may alter their risk thresholds depending on current events, such as high profile child fatalities or an increase in demand (Mansell, 2006b). Following

a high-profile child fatality, child protection agencies may decrease thresholds in order to make sure that cases that require an agency response are not missed (Dorsey et al., 2008; Mumpower, 2010). However, this can result in an increased number of cases sent to site with a recommendation for investigation or assessment, which can overwhelm the system and decrease the quality of interventions for high risk cases (Mansell et al., 2011; Munro, 2010; 2011). Conversely, if child protection agencies respond to high demand with stricter criteria for an agency response, this may increase the likelihood that cases where an intake is appropriate are missed. Regardless, it is difficult to find a balance where cases that require an agency response receive one, and low risk cases do not undergo unnecessary intervention.

## The use of statistical risk tools in care and protection

### A range of risk assessment tools have been developed to support decision-making in care and protection

A movement to structure social work decision-making in order to ameliorate accuracy and consistency has led to the development of a range of decision-making aids (see Barlow, Fisher, & Jones, 2012; Shlonksy & Wagner, 2005; White & Walsh, 2006; Wodarski, Holosko, & Feit, 2005). There are two main types of decision-aids:

1. Consensus-based tools are developed by experts who consider theory and practice knowledge.
2. Actuarial tools include factors that have been identified through research and statistics as significantly associated with the outcome of interest, e.g. the risk of abuse or neglect.

The literature suggests that actuarial tools perform better in assessing risk compared to consensus-based approaches (Shlonksy & Wagner, 2005; White & Walsh, 2006). Consensus-based tools tend to be better accepted and incorporated into practice by social workers, however, actuarial approaches tend to be better at supporting accurate and consistent decision-making for children and young people (MSD, 2014a). Regardless, an important consideration is that these tools need to inform rather than replace professional judgement; since they may not include the most recent or critical information about the child or young person that the social worker has access to. Gaining engagement by users is also crucial for any tool to effectively support decision-making (Barlow et al., 2012; De Bartoli & Dolan, 2014). Tools can be under-utilised where they are resource intensive for front-line operators to administer, or not used as intended (Gillingham, 2011; Vaithianathan et al., 2012).

### Administrative data can be used to build statistical risk models

Development of a statistical risk tool for care and protection related decision-making in a New Zealand context was first proposed in The White Paper for Vulnerable Children, which suggested that considerably more use could be made of the MSD's extensive administrative data resource (MSD, 2012). Administrative data is gathered as part of record-keeping, generally as part of provision of a service, such as financial support in the form of a benefit. The main strengths of administrative data are that datasets tend to be large and comprehensive, there is no 'additional' cost in time or resources to collect the information, and tools can also be developed and validated for the population and outcomes to which they apply (Vaithianathan et al., 2012). These tools should be

regularly tested and updated in response to any shifts in the data or administrative practice (MSD, 2014c).

### A statistical risk tool could be used to support effective decision-making in care and protection

Statistical risk tools can be developed by examining MSD's historical administrative records and using a model to identify the factors that are most frequently associated with cases that require CYF help (for example the number of previous notifications). A model can combine measures of the child, young person and their family's characteristics in a systematic and consistent fashion to produce a single measure of overall risk.

A statistical risk tool could form part of a strategy to achieve better outcomes for children and young people by:

1. Increasing the ability of decision-makers to identify children and young people at high or low risk of abuse or neglect in the future.
2. Helping to identify individuals who may benefit from preventative services who have high needs but are not currently at high risk.
3. Supporting the evaluation of decision-making at the individual or aggregate level (De Haan and Connolly, 2014; MSD, 2015b; Putnam-Hornstein et al., 2013).

### The merit of using statistical risk tools in care and protection is widely debated

There is a lack of consensus regarding the merit of using statistical risk tools within existing literature. Some researchers note the potential value of using insights gleaned from administrative data, via risk modelling, to better target services and improve decision-making. However, discussion and debate is often heavily caveated by the need to consider moral and ethical risks and issues of implementation, with varying views on the degree to which these might be successfully mitigated (Vaithianathan, Maloney, Putnam-Hornstein, & Jang, 2013; Gillingham, 2015; Keddell, 2014b; Wilson et al., 2015).

### A range of challenges to the benefit of statistical risk tools have been identified

Challenges to realising the potential benefit of using statistical risk tools include the following:

- Linkage, reporting and recording errors are likely to be present in the administrative data used to produce these tools (MSD, 2014c).
- Data may be missing key information that predicts or measures the outcome of interest, particularly in the sense that it may not capture either the specific nature of a case or changes in a child or young person's circumstances (Gillingham, 2015; MSD, 2014c). While this information may be present in free-form text or case notes, it may not be easily made available to a model.
- It is unclear whether the degree to which over-representation of some population groups in administrative data is proportionate to real differences in their exposure to risk and experience of harm. If the data overstates risk, then its use in decision-making has the potential to feed a cycle of bias that leads to different population groups (such as Māori) being over- or under-served (Blank et al., 2015; Wilson et al., 2015).

- Privacy issues[7] may arise if a tool uses data from other agencies that was not collected for a directly related purpose (MSD, 2014c).
- MSD's clients need to feel safe when sharing their data, both in that it will not be used punitively or released to the public unintentionally (Data Futures Forum, n.d). If not, unintended consequences may include impacts on relationships of trust and power between service users and practitioners or the State, potentially undermining successful engagement and take-up of services (Gillingham, 2015; Keddell, 2014b).
- Selecting an outcome variable is difficult, as the variable needs to be well defined, well understood, and act as a sufficient proxy for actual incidence. For example, substantiation, whereby abuse has been investigated and a decision is made that it occurred, has been criticised as a poor proxy for 'abuse' due to variable practice and a disconnect between this proxy and actual incidence (Keddell, 2016).
- Risk modelling may produce decision-making that at best is no more effective than the status quo, and may undermine the critical reflexive practice of social workers (see Baumann et al., 2005; De Haan and Connolly, 2014; Keddell, 2014b; Oak, 2015; Peters & Barlow, 2003; Wells, 1997).

Additional issues regarding the proactive use of statistical risk tools, to support prevention efforts by screening *before* a child or young person has been notified because of care and protection related concerns, include the following:

- There are ethical issues associated with screening parents for outcomes which they are not likely to directly consent to, such as an increased risk of child abuse. There is also the potential for a tool to contribute to stigmatisation and labelling (Blank et al., 2015; De Hann & Connolly, 2014; Gillingham, 2015; Keddell, 2014b; Peters & Barlow, 2003).
- The degree to which a tool might provide new information about children who are high-priority for preventive services is unclear (Wilson et al., 2015).

**The use of statistical risk models within a care and protection context is a developing field**

Internationally, a limited number of prototype risk models relating to various aspects of the care and protection system have been developed. These include a model developed in the United States of America (USA) by Deloitte that predicts the likelihood of stable reunifications[8] (Packard, 2016), a model for Allegheny County (USA) designed to identify the risk of adverse future outcomes for children in the child welfare system (Auckland University of Technology [AUT], 2016), and several models developed in other states (Packard, 2016).

[7] Principle 10 (e) of the Privacy Act (1993) states that "An agency that holds personal information that was obtained in connection with one purpose shall not use the information for any other purpose unless the agency believes, on reasonable grounds… that the purpose for which the information is used is directly related to the purpose in connection with which the information was obtained".
[8] When children in temporary out-of-home care return to their families of origin and are not removed again within 365 days.

### Florida has implemented a range of improvements to the care and protection system, including a statistical risk tool

A Florida child protection agency has developed and implemented a statistical risk tool that helps social workers to identify open cases that are high risk for abuse (Eckerd, 2014). Using historical child abuse cases, Eckerd developed a statistical risk model to identify key risk factors and detect these factors in the case notes of open cases. Once a high-risk case has been assessed by a quality assurance staff person, they then meet with the site social worker assigned to the case and their supervisor to discuss safety concerns, make a plan, and ensure a quick response. A number of enhancements were identified following the rollout of this system including improved documentation, supervision of site social workers, safety plans, and visits to families, as well as a reduced number of child deaths. However, it is important to note that implementation was paired with a new process with a focus on quality, rather than quantity, measures of practice, a real-time dashboard using care and protection, school, and youth justice data, as well as a substantial increase in the number of social workers who are available to complete assessments (Heimpel, 2015; Mindshare, 2016).

### The statistical risk tool developed by Allegheny County is designed to support intake decision-making

Allegheny County, Pennsylvania, have developed a tool to support intake decision-making. Referrals into this system can come via email or when a call comes into their child abuse hotline. Social workers are responsible for making a screening decision as to whether further involvement by a child protection agency is recommended (AUT, 2016). This is the same relative decision-point as the screening decision made by social workers at the National Contact Centre in New Zealand. In Allegheny County a statistical risk model was built to assist intake decision-making by identifying the likelihood of two separate outcomes: the likelihood of a child to be re-referred to the hotline, or removed from their current living arrangements and placed in care. Unlike the work in Florida, this model was built using an integrated data system including data-sources such as child welfare, corrections, and health. It is likely that this model will be implemented as a tool in 2016/17, however the exact form this tool will take and the specific use is yet to be determined (Levinson, 2015; Santhanam, 2016).

### The move to develop statistical risk tools in child protection mirrors what is occurring in other fields

In England and America, administrative data has been used to develop statistical risk tools to offer targeted interventions to individuals identified as at risk of negative health outcomes. The use of these tools include identifying patients at risk of re-admission to hospital (Billings, Dixon, Mijanovich, & Wennberg, 2006), and linking low-income first-time pregnant teenagers applying for a benefit with nursing services (Macchione, Wooten, Yphantides, & Howell, 2013).

### Statistical risk tools have been developed for the Justice and Social sectors in New Zealand

A number of Government departments have developed statistical risk tools in New Zealand. These include:

- Work and Income developed a statistical risk tool to identify clients' likelihood of long term benefit receipt (LLTBR), which is used as a screening measure to help target clients for work-related training or employment assistance. While a process evaluation has been completed on the implementation of this tool, the impact on the matching of a client with an optimal service is unknown (MSD, 2011).
- The Department of Corrections developed a suite of statistical risk tools to identify the likelihood of reconviction or imprisonment (Risk of Reconviction and Risk of Imprisonment [ROC ROI]) to support the targeting of rehabilitative programmes (Bakker, Riley, & O'Malley,1999).
- The New Zealand Police have developed a Youth Offender Risk Screening Tool (YORST), to predict youth offending (Mossman, 2011). This tool is intended to support decision-making by providing an aggregate measure of risk, as well as highlighting key factors that may need to be further investigated or included in a plan for next steps. Initial testing indicates that this tool can be used reliably by frontline staff, is a valid measure of risk of youth offending (as it correlates with widely used measures), and is valid for different populations (Mossman, 2016).

### Previous work by MSD investigated the feasibility of creating a statistical risk model for care and protection in New Zealand

Throughout 2013, MSD undertook work examining the feasibility and ethical dimensions of using risk modelling to proactively identify children at risk of abuse and neglect. A prototype New Zealand population-wide model was designed to identify children who are high priority for preventive services at birth. This work also included a technical feasibility report, ethical review of the proposal – including an examination of ethical issues specific to Māori – and a privacy assessment (Blank et al., 2015; Dare, 2013; Mansell et al., 2011; MSD, 2014c; Vaithianathan et al., 2012; Wilson et al., 2015). Overall, this work concluded that the use of risk modelling was technically feasible, but that careful implementation strategies and further trialling were required prior to any widespread operational use.

### The current project investigates whether a statistical risk tool could be used to support intake decision-making in New Zealand

In 2014, the Minister for Social Development approved work to understand the capacity of a statistical risk tool to support social worker intake decision-making. MSD has access to CYF and Work and Income administrative data which can be used to build a reactive tool, which could generate a score once a child or young person has been notified to CYF. Social workers making intake decisions may benefit from relevant administrative data being collected and synthesised in a systematic fashion to produce a single measure of overall risk. The purpose of the current project is to investigate whether intake decision-making can be improved if a statistical risk tool is incorporated into decision-making. The following chapters outline the development of a statistical risk model for use in intake decision-making and the trialling of its use by social workers.

# Chapter 2: A statistical risk model designed to support care and protection intake decisions

## Introduction

The overall objective of the Enhancing Intake Decision-Making Project was to answer the question: could care and protection intake decision-making be improved by giving social workers access to a statistical risk tool?

An important first step in answering this question was to consider the accuracy of a statistical risk model. Statistical risk model information should only be incorporated into intake decision-making if it provides an assessment of cases that is more accurate than existing intake decision-making.

This chapter aims to answer the question: **can administrative data be used to build a statistical risk model that is more accurate than existing intake decision-making?**

The chapter describes the work and results related to this investigation and sets out:

- background information on children and young people notified and intake decisions during 2014
- methodology used to estimate the accuracy of intake decisions
- an assessment of the accuracy of existing intake decision-making
- a description of the approach used in developing a statistical risk model to support intake decision-making
- an assessment of the accuracy of the statistical risk model compared to existing decision-making
- an analysis of current decision-making and the statistical risk model in relation to the ethnicity of children and young people notified to the agency.

The chapter builds on a considerable amount of work that has been previously undertaken by MSD (Mansell et al., 2011; Wilson et al., 2015).

## Chapter 2 summary

- Approximately 100,000 children and young people are notified to CYF every year and almost 70 percent of these children and young people have been notified to CYF in the past.
- A measure of *estimated concern* was developed to estimate care and protection related concern from subsequent outcomes recorded in administrative data.
- Current intake decision-making was assessed against the measure of *estimated concern* and results showed the overall accuracy of current practice was 60 percent. This includes children and young people with *estimated concern* who were referred to site, as well as children and young people without *estimated concern* who were not referred to site.
- Four models were developed to predict estimated concern using administrative data. The 'logistic regression' statistical risk model was selected as the best model, as it performed on par with other models (area under the ROC curve of 0.75) but contained fewer variables, so was easier to communicate to social workers.
- The logistic regression model performed better than current practice, with an overall accuracy of 66 percent, six percentage points higher than current practice.
- The model showed similar improvements in decision-making for children and young people regardless of ethnicity. However, the model referred a larger proportion of Māori children and young people to site than current practice and further research to understand this finding is needed.
- The logistic regression model was more accurate than current intake decision-making; therefore it is suitable to be trialled as a tool to assist social workers in intake decision-making.

## Background to CYF intake decision-making in 2014

**A large number of children and young people are notified to CYF each year**

CYF receives a substantial number of notifications from the community about care and protection related concerns regarding children and young people.

*Notifications* are concerns about a child or young person's care and protection that have been provided to CYF staff. Social workers determine which notifications require further CYF involvement (recorded as reports of concern), which require no further involvement

(recorded as contact records), and which were simply cases where advice was requested (recorded as 'advice given' contact records). It is important to note that the total number of notifications is somewhat imprecise because of the underlying quality of some of the data.

There are two major issues. First, our measure of notifications includes a group called 'advice given' which are not concerns being raised by the public, but purely questions related to a child or young person. This means that administrative data overestimates the true number of notifications. Second, there is inconsistent recording of case recommendations (intake vs. case note) in cases where a notification is made regarding a child or young person who is already the subject of a CYF assessment. We are unsure of the extent to which this over- or under-estimates the true number of notifications. Because of these measurement problems, in the later sections which describe the accuracy of decision-making, we focus on a smaller subset of all notifications where it has been clearly recorded that there was a concern about abuse and neglect.

In 2014, there were 211,516 notifications made to CYF which, because many children and young people were notified more than once during the year, related to 100,725 unique children and young people.

Table 2.1 reports notifications between 2011 and 2014, and shows that the number of unique children and young people notified each year has remained stable during this time.

**Table 2.1: Number of notifications received by CYF each year**

| | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|
| Number of notifications | 191,868 | 192,078 | 199,883 | 211,516 |
| Number of unique children and young people notified | 100,210 | 99,382 | 99,785 | 100,725 |

Table 2.2 shows the number of times each child or young person was notified to CYF during 2014. More than 40 percent of children and young people who were notified to CYF in 2014 were re-notified within that same year.

**Table 2.2: Number of times each child and young person was notified to CYF during 2014**

| Number of notifications | Frequency | Percent of children and young people |
|---|---|---|
| **1** | 58,453 | 58% |
| **2** | 20,039 | 20% |
| **3** | 9,251 | 9% |
| **4** | 4,970 | 5% |
| **5** | 2,860 | 3% |
| **6+** | 5,152 | 5% |
| **Total** | 100,725 | 100% |

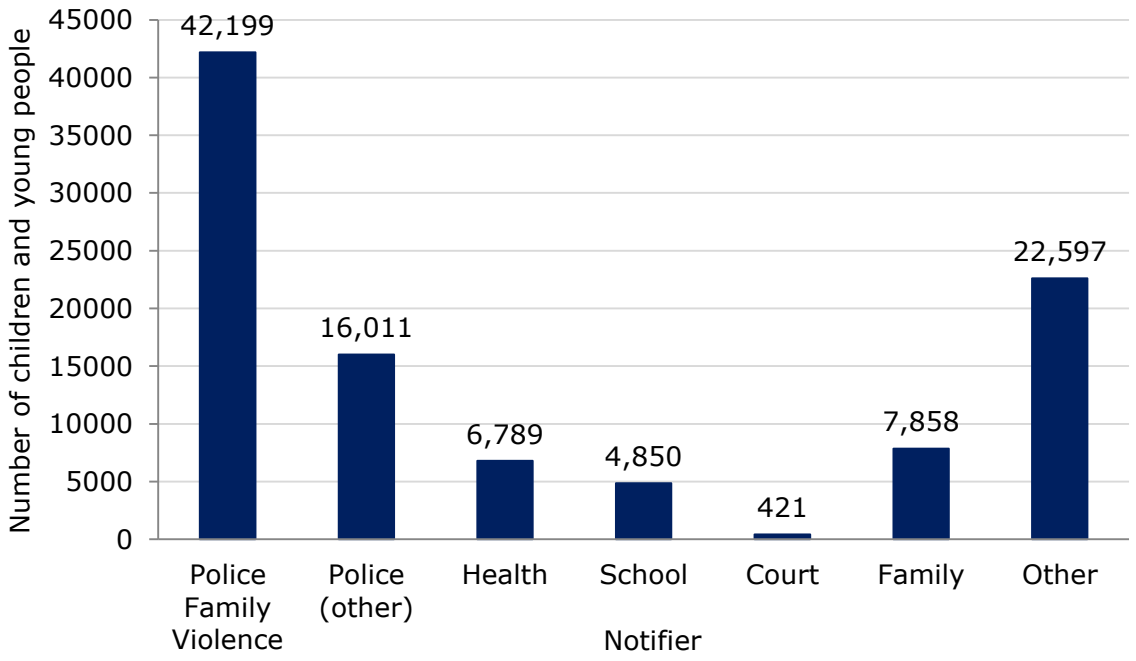
During 2014, approximately 60 percent of care and protection intake decisions were made at the National Contact Centre, while 36 percent were made at Family Violence

Inter-Agency Response System (FVIARS)[9] meetings, and the remaining 4 percent were made at local CYF sites.

### More than half of children and young people notified to CYF are notified by the Police

The Police refer cases to either the National Contact Centre directly or to a regional Family Violence Inter-Agency Response System committee. Family members, health practitioners, schools and courts also provide a smaller but substantial proportion of notifications (see Figure 2.1).

**Figure 2.1: Number of children and young people notified to CYF by different types of notifier in 2014**




*Police Family Violence* notifications include all notifications made by Police as a result of a family violence incident. This includes outcomes from FVIARS meetings as well as notifications directly from Police.

*Police (other)* notifications include all other notifications made by Police that are not included in the family violence category described above.

*Other* notifications include all notifications made by friends, neighbours, non-government organisations, MSD, and other government agencies (e.g. ACC).

### Most children and young people notified to CYF have previously been notified to the agency

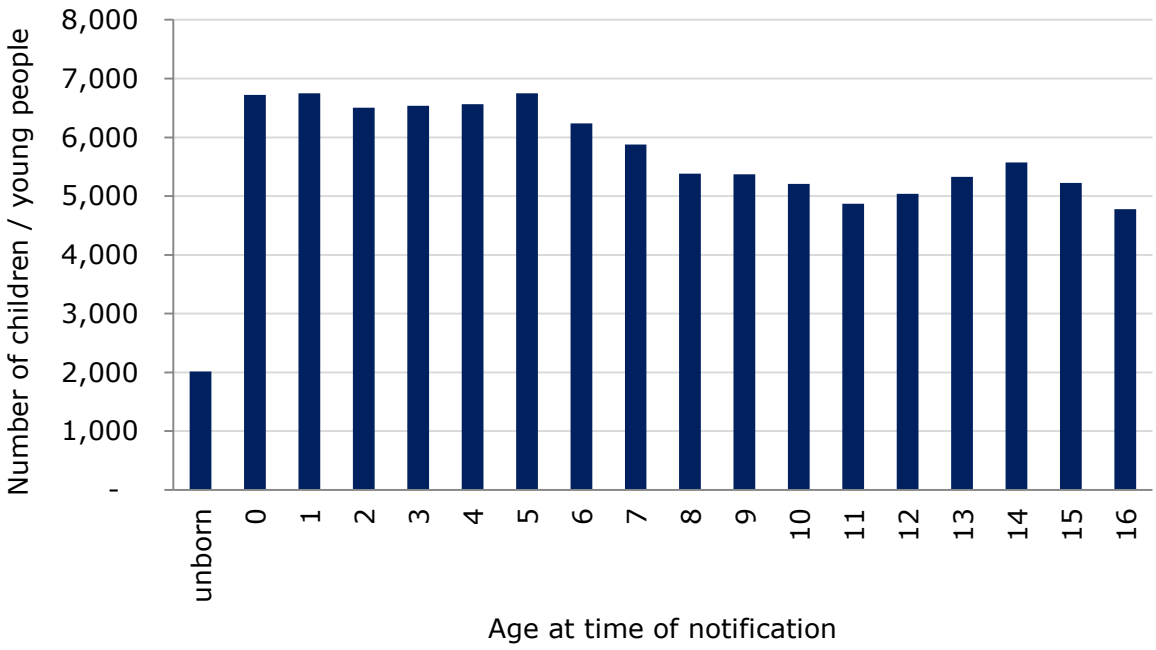
In 2014, just under 69 percent of the unique children and young people notified to CYF had been notified to the agency previously. In most cases, at least one of these prior notifications had resulted in an intake.

[9] This system is an interagency initiative designed to manage cases of family violence reported to the Police, and involves three core agencies: New Zealand Police, CYF, and the National Collective of Independent Women's Refuges (NCIWR).

**Just over half of children and young people notified were less than 8 years of age**

Around 2,000 children and young people were notified to the agency before they were born, and a further 6,700 were under 1 year of age. Information about the age at first notification during 2014 is shown in Figure 2.2.

**Figure 2.2: Age of children and young people at the time of their first notification to CYF during 2014**




### A large proportion of all children and young people notified to CYF were Māori

For children and young people where ethnicity was recorded, just over 50 percent were recorded as Māori. However, it is also important to note that almost 22 percent of children and young people notified to the agency in 2014 did not have their ethnicity recorded (Table 2.3)[10].

**Table 2.3: Ethnicity of children and young people notified to CYF in 2014**

| Ethnicity | Frequency | Percentage (of those where ethnicity was recorded) |
|---|---|---|
| New Zealand European/Pakeha | 25,921 | 33% |
| New Zealand Māori | 39,688 | 51% |
| Other | 3,319 | 4% |
| Pacific (includes Samoan, Tongan etc) | 9,375 | 12% |
| **Total with ethnicity recorded** | **78,303** | **100%** |
| Unknown | 22,422 | - |
| **Total** | **100,725** | - |

[10]Almost 75 percent of notifications with missing ethnicity were from notifications that did not result in an intake. Information on the ethnicity of a child may be self-identified, or based on information available to social workers and other referrers about the primary and other ethnicity of the child or young person.

### Almost half of all notifications made in 2014 were referred to sites

Table 2.4 shows that 41 percent of children and young people notified to CYF during 2014 were recorded as being referred to a site for further assessment. The rate was higher when focusing on unique children and young people.

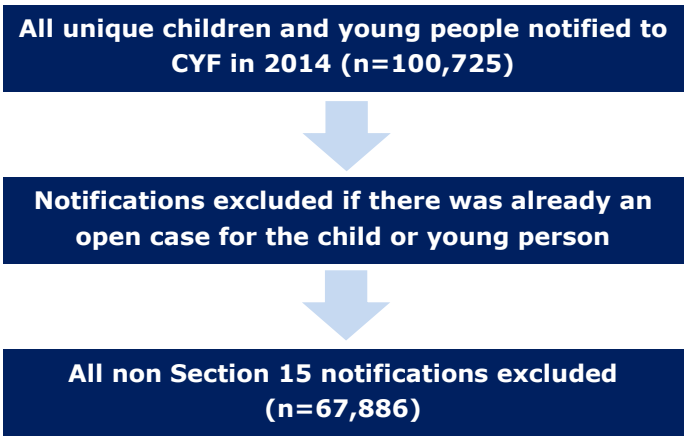
**Table 2.4: Referral rates for notifications made in 2014**

| | Referred to site (intake) | Not referred to site |
|---|---|---|
| All notifications (n=211,516) | 41% | 59% |
| All unique children and young people notified (n=100,725) | 47% | 53% |
| All unique children and young people without an 'open case' who have a Section 15 notification recorded (n=67,886) | 61% | 39% |
| Note: The analysis of unique children and young people is based on randomly selecting one notification for each child or young person | | |

The quality of the underlying data means that there is some uncertainty about the overall percentage of children and young people notified and assessed for possible referral to a site for further investigation.

In order to address this issue, this study focused on a smaller subset of children and young people where notification and decision data are more reliable. This group is children and young people where there was no current open case, and for whom the administrative data shows the concern related to Section 15 of the Children, Young Persons, and their Families Act. Using notifications where there is 'no open case' removes any ambiguity that the notification may have already been previously recorded. Restricting analysis to those that are clearly labelled Section 15 ensures that the cases all involve concerns about care and protection for which an intake decision is necessary[11]. The process for selecting this sub-population is outlined in Figure 2.3.

**Figure 2.3: Process for selecting sub-population included in the analysis of 2014 notifications**




[11] There is an unknown number of cases that do meet the criteria for Section 15, but are not true intake decisions, for example, notifications relating to behavioural concerns.

For the sub-group of 67,886 unique children and young people (67 percent of the original set) the referral rate was 61 percent. In order to maximise the accuracy of findings, analyses presented in later sections of this chapter are restricted to this group, for whom the administrative data is more reliable.

# Accuracy of current intake decision-making

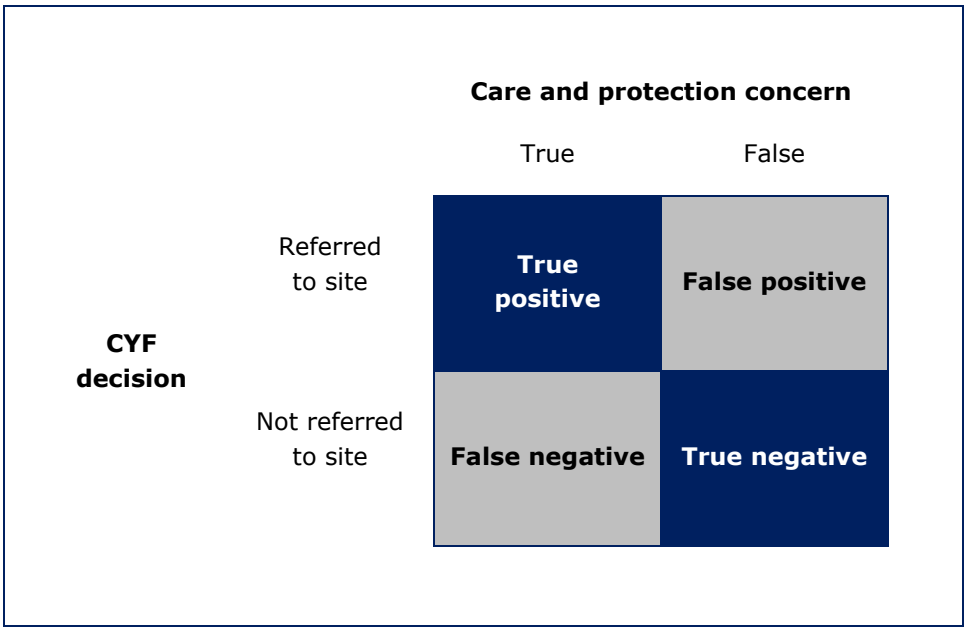
## Assessing current intake decision-making accuracy

### Decision-making accuracy can be distilled to four possible outcomes

In its simplest form decision-making accuracy can be categorised into the following four possible outcomes (Figure 2.4):

1. 'True positive' where a child or young person is referred to a site and the care and protection related concerns are subsequently found to be true[12].
2. 'True negative' where a child or young person is not referred to site and the care and protection related concerns are subsequently found to be false.
3. 'False positive' where a child or young person is referred to site but the care and protection related concerns are subsequently found to be false.
4. 'False negative' where a child or young person is not referred to site but the care and protection related concerns are subsequently found to be true.

**Figure 2.4: Accessing the accuracy of decision-making**




Increased identification of true positives among those referred means more children and young people can receive the help they require. Conversely, increased identification of true negatives means fewer unnecessary assessments which, in turn, means more social work time can be devoted to children and young people who need help.

[12] This does not necessarily mean a 'finding of maltreatment'; simply that there were care and protection related concerns. Substantiated maltreatment is affected by a number of factors outlined on page 38.

A key metric for assessing decision-making 'accuracy' is the percentage of all decisions that are 'true'. In Figure 2.4 this is the percentage of all decisions that fall within the shaded blue 'true positive' and 'true negative' quadrants.

**Data on subsequent events was used to estimate care and protection related concern for children and young people**

In order to determine if a referral decision was correct, it is necessary to have an independent and reliable measure of whether there was a 'true' care and protection related concern for a child or young person. However, finding such a measure is not straightforward.

The gold standard approach is to have an independent panel of experts assess the detailed case-notes recorded for each child or young person and determine whether there was a legitimate underlying concern about the child or young person. However, analysing case-notes in this way is a time-consuming and resource intensive task and cannot practically be done for large groups of children and young people.

An alternative strategy, used in this work, is to estimate the accuracy of intake decisions based on the subsequent events recorded in the case file of the child or young person. We defined these events as one or more of the following occurring within 24 months of the initial notification:

1. A substantiated finding of either physical abuse, sexual abuse, emotional abuse or neglect.
2. A site social worker recommended holding a Family Group Conference (FGC)[13] or creating a Family Whānau Agreement (FWA)[14].
3. The child or young person was subject to a further notification which was assessed as an intake.

The first point above aims to identify children and young people who were the victims of substantiated maltreatment. Previous studies have often used substantiated maltreatment as the single criteria for assessing whether a child or young person was subjected to maltreatment; however, there is increasing evidence that substantiated maltreatment alone is not a reliable measure of actual care and protection related concern[15] so, for this project, two other indicators were developed.

The second point above aims to identify children and young people where site social workers believe there is a care and protection related concern, regardless of whether or not there is a substantiated finding of maltreatment. This proxy for concern is reliant on social work practice, and is not independent of CYF resourcing, policy or practice.

The third point above is designed to identify children and young people where, after a notification, CYF has not identified a care and protection related concern (has not been

[13] Family Group Conference (FGC) is a meeting where CYF meets with a family and the child or young person(s) for whom there are care and protection concerns. The outcome of an FGC is the generation of a plan for moving forward (CYF, n.d.[b]).

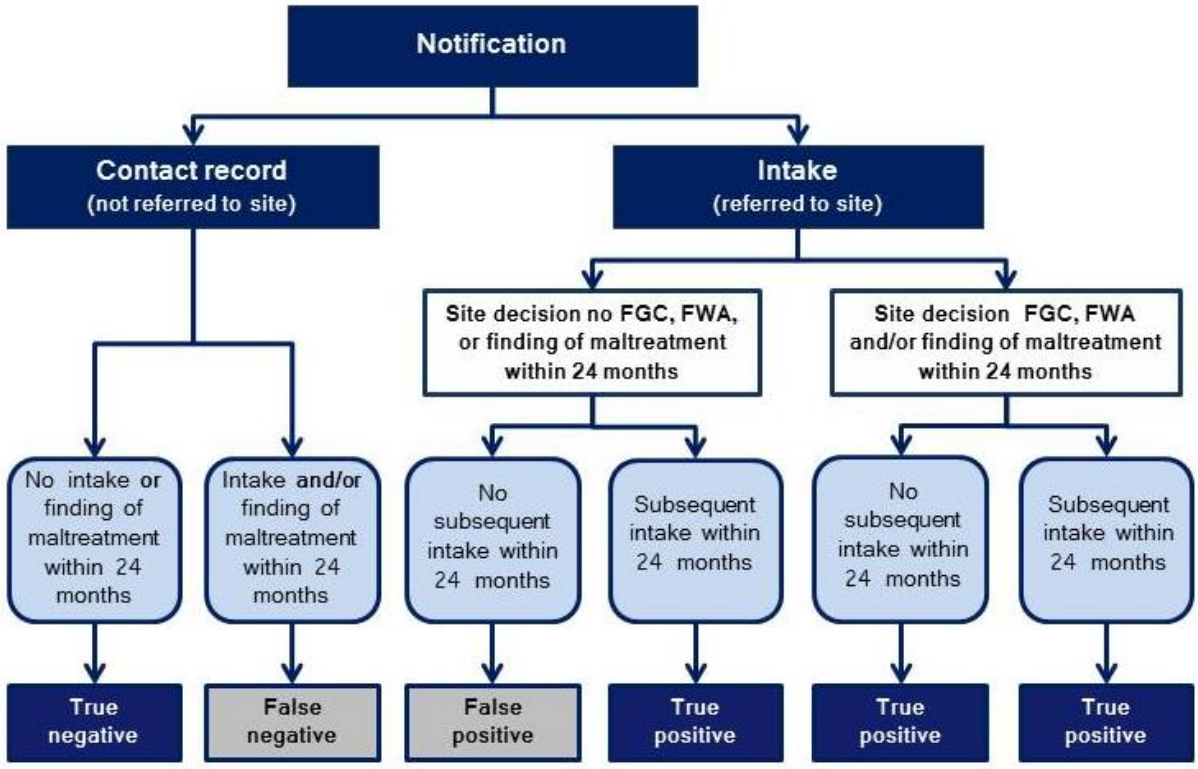
[14] Family Whānau Agreement (FWA) is between the family/whānau and CYF and addresses issues such as how the concerns for their child will be addressed, who will do what, and how CYF will support them. Other people, like counsellors in the community, might also be part of the plan.

[15] Substantiated findings are affected by local site resourcing, culture, and opinions regarding the types of concern that should progress to a finding of maltreatment (e.g. physical, emotional, neglect). In addition, cases can be recorded as 'not-found' where the evidence is contradictory, where for various reasons there was no inquiry, or there was insufficient information collected during the assessment to disconfirm maltreatment.

the subject of an FWA or FGC and has not had a finding of maltreatment substantiated), but the same child or young person has received a second intake within 24 months. This component of the measure is independent of local CYF site practice, and is intended to measure cases where there was a level of risk for a child or young person that was initially left unaddressed.

Figure 2.5 shows how subsequent events translate into whether referral decisions are *estimated* to have been correct or not within current CYF practice.

**Figure 2.5: Constructing an *estimated concern* indicator**




**The measure of *estimated concern* has limitations**

The method of estimating underlying care and protection related concern described previously is a reasonable approximation, but there are some important reasons why it will not be correct in some situations.

First, the measure of *estimated concern* is not fully independent of CYF practice. It relies on current CYF site practice (referral to FGC and FWA and substantiated maltreatment), as well as future intake decision-making (repeat intakes). Variation in current practice may lead to some incorrect classification.

Second, the measure does not take into account social work that occurs between the initial intake but before a referral to FWA or FGC. For example, a social worker may refer to a community agency for partnered response which might address any risk of subsequent notifications. This 'true positive' case would be deemed by the *estimated concern* metric to be a 'false positive'.

Third, the measure does not take into account the changing life circumstances faced by children and young people in the period between initial intake decision and later CYF assessment. For example, an abusive adult may move out of a child's home in the period

between notification and referral for FWA or FGC. Our metric categorises this case as a 'false positive', when at the time of intake decision, it was a 'true positive'.

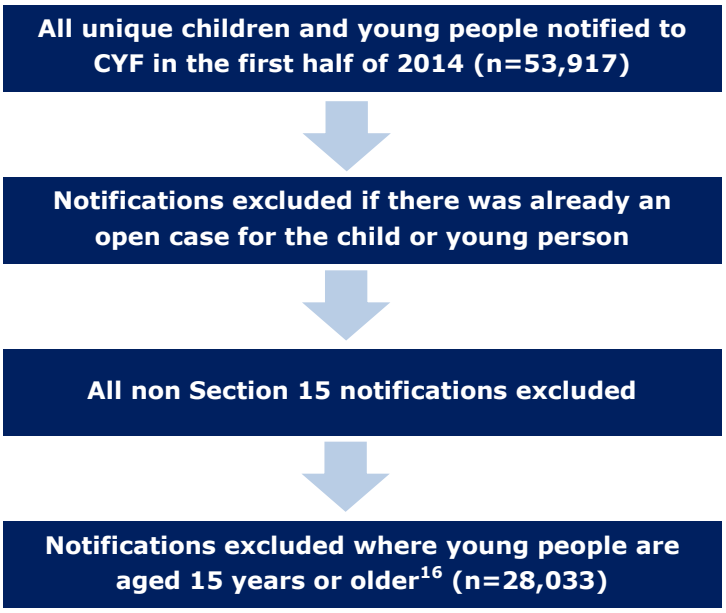
Finally, the measure of *estimated concern* aims to identify underlying chronic risk, while current Contact Centre practice aims to identify immediate presenting risk. Thus, there will always be some amount of disagreement between the two.

## Assessing the accuracy of current intake decision-making

The accuracy of current intake decision-making was assessed using the new measure of *estimated concern* related to care and protection.

Analysis was conducted using a subset of the total population of notified children and young people, for whom the data was more accurate. The process of selecting this subset is outlined in Figure 2.6.

**Figure 2.6: Process for selecting a sub-population to assess the accuracy of current intake decision-making**




Analysis included notifications of 28,033 unique children and young people, 63 percent of whom were referred to a site. Table 2.5 summarises the estimated accuracy of these intake decisions.

Of all the children and young people notified in the cohort, subsequent events indicated that for 49 percent there was an *estimated concern*. Table 2.5 shows the overall accuracy of decisions (percentage correct) was 60 percent[17], and 73 percent of all children and young people with *estimated concern* were referred.

[16] Only notifications of children and young people under 15 years of age were included to allow consistent measurement of care and protection outcomes in the subsequent 24-month period. When a child or young person had more than one notification within the first six months of 2014, one notification was selected at random for the analysis.

[17] This includes children and young people with *estimated concern* who were referred to site as well as children and young people without *estimated concern* who were not referred to site.

**Table 2.5: Estimated accuracy of existing decision-making: unique children and young people notified in first six months of 2014 (n=28,033)**

| Proportion of children and young people | Existing decision-making |
|---|---|
| **Referred to site** (intake) | 63% |
| **Referred to site** where there was *estimated concern* (also called positive predictive value) | 57% |
| **Referred to site** where there was no *estimated concern* | 43% |
| **Not referred to site** where there was no *estimated concern* | 65% |
| **Not referred to site** where there was *estimated concern* | 35% |
| Proportion of decisions that align with the measure of *estimated concern* (percentage correct) | 60% |
| Sensitivity (proportion of children and young people with *estimated concern* who were referred to site) | 73% |
| Specificity (proportion of children and young people with no *estimated concern* who were not referred to site) | 47% |
| Note: Section 15 notifications of unique children and young people aged under 15 years where there was no open case. The correctness of referrals is measured using *estimated concern* criteria. | |

## Building a statistical risk model

Many aspects of the lives of children and young people that are correlated with care and protection related concerns are recorded in MSD administrative data. A statistical risk model can be used to combine this information to provide a single measure of overall risk. The statistical risk model does not provide evidence of a *causal* link between various characteristics and risk. Rather, the model identifies a small set of factors that are *correlated* with risk.

Some important 'risk factors' are not captured in the existing administrative data; for example, poor mental health or drug and alcohol addictions. As a result, it is especially important to assess the performance of any model built, to determine whether or not it performs at an acceptable level.

This section outlines the approach to developing statistical risk models used in this project, including the:

- dataset constructed to develop and test models
- method used to build, validate and select a model
- performance and predictors used in the best performing model.

**A dataset was constructed to develop and test models**

In order to develop a statistical risk model, a dataset was created that consisted of all records of children and young people who were notified to CYF over the period January 2011 to the end of June 2014. The dataset provides a detailed history of the interaction of individuals with CYF from early 2000, and Work and Income dating from 1993.

Because there is no common unique identifier across CYRAS and SWIFTT[18] data, records were matched by name and date of birth using a SAS identity matching tool called Data Flux.

The overall dataset contained records for 246,175 unique children and young people. There was considerable work undertaken to understand and document the variables used in the dataset. The final dataset contained demographic information about the children and young people, records of their interaction with CYF (for example notifications, investigations, findings of abuse and neglect and care placement decisions), and also information about parents and caregivers (for example benefit receipt).

**Administrative data has limitations**

There are limitations and gaps within the administrative data used in this dataset, including:

- administrative data quality is reliant on social work practice regarding how data is recorded in CYRAS. There is variation in data recording by frontline professionals both between individuals and across time
- there is a large amount of missing data within the dataset for two reasons:
    1. only information known to MSD is captured in MSD's administrative data
    2. the data is incomplete for earlier years (i.e. CYF records only reliably go back to 2000) so information is not recorded prior to this point.
- information on individuals is created by linking name and date of birth and this leads to some false identity matches, rendering the model incorrect in a small number of cases.

A more detailed description of these limitations is presented in Appendix 1.

These data limitations may negatively impact on the performance of any statistical risk model built using this dataset. Further work should be undertaken to improve CYRAS data quality going forward as this would likely lead to better performance of future models.

**Models were built using standard methodology**

This project sought to develop a model that would use the information in the administrative dataset to predict whether there was a care and protection related concern. This meant, for each notification, predicting the chance that one or more of the following would occur within 24 months:

- a substantiated finding of either physical abuse, sexual abuse, emotional abuse or neglect
- a site social worker recommended holding a FGC or creating an FWA
- the child or young person was subject to a further notification which was assessed as an intake.

A training dataset was used to develop models using four different modelling algorithms. The models were developed using 60,984 unique children and young people under 15

[18] Work and Income administrative database.

years of age who were notified to the agency in 2013[19]. Models were developed using the following algorithms:

- logistic regression
- decision tree
- random forest
- gradient boosting.

For all the models, variables were selected based on their contribution to the predictive power of the model.

Previous research suggests ethnicity is unlikely to add substantial predictive power to models of this kind, as the predictive power associated with ethnicity can largely be explained by other *covariate* factors (Vaithianathan, et al., 2013). To avoid discrimination based on ethnic group, it is good practice not to include ethnicity in models such as this (Executive Office of the President, 2016). As a result, ethnicity was not included as a variable within the current model. However, ethnicity was used to test the model (see Table 2.9 for further explanation).

Model performance was measured by the area under the ROC curve when predicting outcomes using an out of sample validation dataset[20]. This validation dataset consisted of all the notifications that were not used for the training dataset, and covered the period January 2011 to June 2014.

Table 2.6 presents area under the ROC curve scores for the four different models using the validation dataset. There are only small differences in performance, and the models were stable over time. The performance of the four models can be characterised as 'fair'. The models presented in Table 2.6 show area under the ROC curve scores similar to models built for use in care and protection related decision-making in the USA (AUT, 2016); youth offending in New Zealand (Police, 2011); as well as a medical model for breast cancer screening (Pisano, et al., 2005).

**Table 2.6: Area under the ROC curve for four different statistical risk models (validation dataset)**

| Model | 2011 (n=90,942) | 2012 (n=90,511) | 2013 (n=26,136)[a] | 2014 (n=53,921)[b] | Average |
|---|---|---|---|---|---|
| Logistic regression | 0.74 | 0.74 | 0.75 | 0.75 | 0.75 |
| Decision tree | 0.73 | 0.73 | 0.75 | 0.75 | 0.73 |
| Random Forest | 0.75 | 0.75 | 0.76 | 0.75 | 0.75 |
| Gradient Boosting | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

[a] The results for 2013 are based on 30% of all notifications as the remaining 70% were used to develop the dataset.
[b] The results for 214 are for the first six months of the year to allow for a 2-year follow up period.

[19] The model was developed using a randomly selected 70 percent of the 87,120 unique children and young people notified in 2013.
[20]The area under the ROC curve is a measure of how accurate a model is in predicting an outcome across the entire sample. The measure ranges between random (0.5) and perfect (1). Scores are typically classified as fail (0.5-0.6), poor (0.6-0.7), fair (0.7-0.8) good (0.8-0.9) excellent (0.9-1). For more information see Tape, http://gim.unmc.edu/dxtests/Default.htm.

The Logistic Regression model was selected as the model of choice. The Logistic Regression model's performance is similar to that of the Boosting and Random Forest models; however, this model is easier to interpret as it uses fewer variables.

The model building approach is described in more detail in Appendix 1.

## Performance and predictors of the best model

### The model is reasonably accurate at identifying high and low risk children and young people, but performs less well for the others

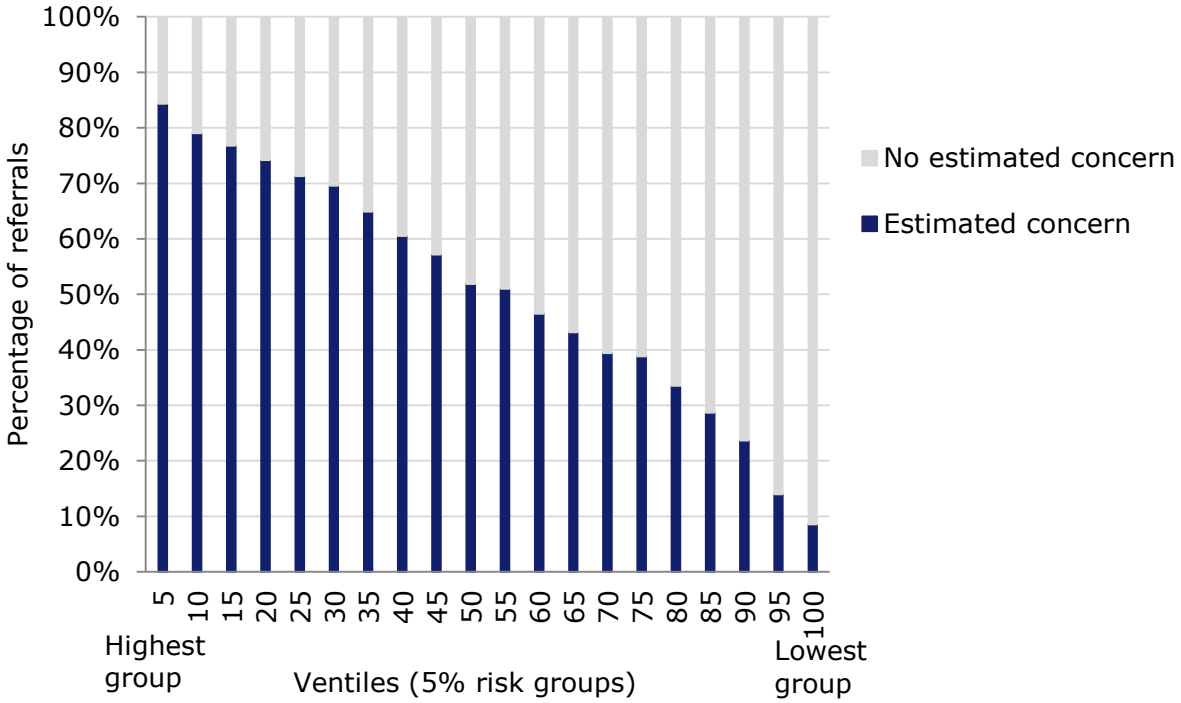
Figure 2.7 shows the performance of the Logistic Regression model when applied to children and young people notified in the first six months of 2014. This test of the model on validation data shows the percentage of each group who subsequently went on to have *estimated concern* i.e. one of the following: substantiated finding of maltreatment, FWA, FGC, or a subsequent intake within 24 months.

Each child and young person received a risk score based on the model that was developed using the 2013 cohort. Each child or young person was then ranked from 'highest' to 'lowest' risk based on their score, and grouped according to their risk level. Twenty groups (ventiles) were created, each containing 5 percent of the total population (e.g. top 5 percent highest risk; 5-10$^{th}$ percent highest risk etc).

In Figure 2.7, the data is arranged from the highest risk to the lowest risk group (from left to right); as such, the proportion of children and young people with *estimated concern* decreases (from left to right). Figure 2.7 shows that within the top 5 percent of children and young people (as rated by the model), 84 percent had *estimated concern* related to care and protection. Conversely, in the bottom 5 percent, only 9 percent had *estimated concern*. The 'perfect' model would show that within the top 5 percent of children and young people, 100 percent would have *estimated concern*; while in the bottom 5 percent 0 percent would have *estimated* concern. These results indicate that the model can discriminate between high and low risk children and young people with reasonable accuracy. However, as expected, discrimination is more difficult for the middle ventiles, where roughly 50 percent had *estimated concern*.

There is potential to improve the predictive power of the model in the future by adding new variables. Options for improving predictive power include developing more variables from the existing dataset. For example, the current model includes variables related to the mother, but similar variables relating to the father could be developed. In addition, data from other agencies could be used to create new variables. For example, Department of Corrections data could be used to determine whether the child is living in the same household as an adult who has recently been released from prison for a family violence related offence. Ongoing development of variables to improve operational models is consistent with work being conducted elsewhere such as Allegheny County, Pennsylvania (AUT, 2016).

**Figure 2.7: Percentage of children and young people with *estimated concern*, by risk group determined by the Logistic Regression Model (all children and young people notified in the first half of 2014; n=53,917)**




## Predictors used by the Logistic Regression model

Access to administrative data from CYF and Work and Income meant there were many possible variables available for the model, but only a subset of 17[21] were selected for inclusion based on their predictive power. The variables used by the model are listed below:

**Child or young person predictors**

- whether the child or young person has previously been the subject of a safety assessment
- the number of previous care and protection notifications
- whether the child or young person was included on a main benefit at the time of the notification
- days since last Section 15 intake
- age of the child or young person at the time of the notification
- gender of the child or young person
- number of previous substantiated findings of maltreatment
- whether the child or young person was already included in an open social worker phase

[21] There were 17 variables in the model, but only 16 listed here, because the child or young person's age was included as two separate variables in the model. See Appendix 1 for further explanation.

- whether the child or young person has had a prior custody or guardianship spell
- level of contact that the child or young person had with MSD

**Caregiver predictor**

- highest level of previous CYF involvement of the caregiver

**Family predictors**

- number of siblings the child or young person had at the time of the notification
- number of contact records for siblings
- whether the mother of the child or young person could be determined at the time of the notification

**Neighbourhood predictor**

- New Zealand deprivation index

**Other predictor**

- notifier type.

## Performance of the model compared to existing decision-making

To determine whether the Logistic Regression model was more accurate than existing intake decision-making, the performance of the model was compared to that of the current intake decision-making system.

For consistency, the same criteria and population that was used to assess intake decision-making, discussed in the previous section, was used here.

To ensure the model referred the same number of children and young people to site for further assessment as current practice, the 'percentage of all notifications referred' (for the model) was set to the rate of existing decision-making.

Model accuracy was compared to existing decision-making. Table 2.7 shows that, of cases referred for further assessment, the model provides 'correct' referrals 61 percent of the time, while current practice provides 'correct' referrals 57 percent of the time. Furthermore, of those not referred to site, the model correctly identified those who did not require assessment 73 percent of the time, while current practice identified those who did not require assessment 65 percent of the time.

Overall the model is six percentage points more accurate than existing decision-making. In this case 'accurate' includes both decisions that refer more children and young people with *estimated concern*, and fewer children and young people who do not have *estimated concern*.

**Table 2.7: Comparing existing and model determined intake decision-making using a measure of *estimated concern*: children and young people notified in first six months of 2014 (n=28,033)**

| Proportion of children and young people | Existing decision-making | Logistic regression model |
|---|---|---|
| **Referred to site** (intake) | 63% | 63% |
| **Referred to site** where there was *estimated concern* (also called positive predictive value) | 57% | 61% |
| **Referred to site** where there was no *estimated concern* | 43% | 39% |
| **Not referred to site** where there was no *estimated concern* | 65% | 73% |
| **Not referred to site** where there was *estimated concern* | 35% | 27% |
| Proportion of decisions that align with the measure of *estimated concern* (percentage correct) | 60% | 66% |
| Sensitivity (proportion of children and young people with *estimated concern* who were referred to site) | 73% | 79% |
| Specificity (proportion of children and young people with no *estimated concern* who were not referred to site) | 47% | 53% |

Note: Section 15 notifications of unique children and young people aged under 15 years where there was no open case. The correctness of referrals is measured using *estimated concern* criteria.

## Assessing the role of ethnicity

A key concern in care and protection related decision-making in New Zealand is that social work practice, and risk models, may be driven by (and, in turn, increase) an over-representation of Māori in the care and protection system that is disproportionate to their share of actual risk (MSD, 2014c). Harcourt (2006) referred to this as the 'ratchet' effect, which feeds a cycle of bias in surveillance and, as a result of that surveillance, in greater CYF involvement for some population sub-groups. At the same time, this may lead to under-serving children and young people at risk in other population sub-groups who consequently make up a smaller proportion of the target population (MSD, 2014c).

**Table 2.8: Referral rates and estimated risk of concern by ethnicity: children and young people notified in first six months of 2014 (n=28,033)**

| Ethnicity | Existing decision-making referral rate | *Estimated concern* |
|---|---|---|
| **European** | 75% | 56% |
| **Māori** | 66% | 61% |
| **Pacific** | 66% | 46% |
| **Other** | 67% | 42% |
| **Unknown** | 39% | 16% |

Table 2.8 highlights the disparity between current referral rates and rates of *estimated concern* amongst different ethnic groups. European and Pacific island children and young people have rates of *estimated concern* considerably lower than their rates of current referral (19 percent and 20 percent respectively). However, Māori children and young people are referred only 5 percent more than their rate of *estimated concern*.

Establishing the relationship between the real burden of risk of maltreatment for sub-populations of children and young people is difficult. Researchers from MSD (2014c) highlighted the uncertainty around whether the over-representation of some sub-groups of children and young people among those with findings of maltreatment is increased by bias in surveillance and substantiation.

This project did not include extensive investigation of these wider issues. However, two investigations were conducted to assess some aspects related to ethnicity and are outlined in the following sections.

**Ethnicity does not substantially improve model performance**

Ethnicity was not included in the statistical risk model as is best practice (Vaithianathan, et al., 2013). The extent to which the accuracy of the model changed if ethnicity was included was assessed.

Table 2.9 shows that including ethnicity as a predictor in the model improves the predictive power of the model by only one percentage point. This provides evidence that a considerable proportion of risk associated with ethnicity is accounted for by other factors already included in the model.

Further analyses found that Māori ethnicity was related to Work and Income variables included within the model, which likely accounts for much of the predictive power that would otherwise be attributed to ethnicity within the model. Further details of this analysis are presented in Appendix 1.

Some of the small increase in accuracy may result from the endogenous feature that many children and young people who are not referred for assessment do not have ethnicity recorded. The finding that ethnicity does not substantially improve model performance is consistent with previous research conducted by MSD (2014c).

**Table 2.9: Comparing existing and model determined intake decision-making using a measure of estimated concern: children and young people notified in first six months of 2014 (n=28,033)**

| Proportion of children and young people | Existing decision-making | Logistic regression model | Logistic regression model with ethnicity |
|---|---|---|---|
| **Referred to site** (intake) | 63% | 63% | 63% |
| **Referred to site** where there was *estimated concern* (also called positive predictive value) | 57% | 61% | 63% |
| **Referred to site** where there was no *estimated concern* | 43% | 39% | 37% |
| **Not referred to site** where there was no *estimated concern* | 65% | 73% | 75% |
| **Not referred to site** where there was *estimated concern* | 35% | 27% | 25% |
| Proportion of decisions that align with the measure of *estimated concern* (percentage correct) | 60% | 66% | 67% |
| Sensitivity (proportion of children and young people with *estimated concern* who were referred to site) | 73% | 79% | 81% |
| Specificity (proportion of children and young people with no *estimated concern* who were not referred to site) | 47% | 53% | 54% |

Note: Section 15 notifications of unique children and young people aged under 15 years where there was no open case. The correctness of referrals is measured using *estimated concern* criteria.

### The model appears to improve accuracy of decision-making across all ethnic groups

The relative accuracy and suggested referral rates of the original model (without ethnicity) across different ethnic groups was assessed.

Using the same methodology as described previously, the model was set to refer the same overall number of children and young people as occurs with existing decision-making.

Table 2.10 outlines the proportion of NZ European, Māori, and Pacific Island children and young people referred for CYF intervention in 2014 compared to the model. These analyses have also been repeated using prioritised[22] ethnicity rather than primary ethnicity, and results were very similar to those shown below but are not reported here.

A key finding of this analysis is that the model appears to improve accuracy of decision-making across all ethnic groups. Thus, more children and young people with *estimated concern* are referred, and fewer children and young people without *estimated concern*

[22] For each prioritised ethnicity analysis (NZ European, Māori and Pacific Island) any child who had the ethnicity of interest listed on their CYF record (whether as primary ethnicity or not) was included as part of that 'prioritised' ethnic group.

are referred.

There are important differences and implications in relation to referral rates. Table 2.10 shows that the model would refer fewer NZ European and Pacific Island children and young people to site than under current practice. Conversely, the model would refer 13 percent more Māori children and young people to site than under current practice.

There are two possible explanations for these changes in referral rates. First, current practice may under-refer Māori and over-refer NZ European and Pacific Island children and young people. Second, the measure of *estimated concern* may be built using target variables (finding of maltreatment, FGC, FWA, repeat intake) that reflect an over-representation of Māori children and young people in the care and protection system that is disproportionate to their share of actual risk. Further work is needed to explore these possibilities, and to ensure the model is able to accurately identify true risk, and does not inadvertently add to any over-representation of Māori within the New Zealand care and protection system.

Taken together, these findings suggest that including ethnicity in our model does not significantly improve its predictive validity. Furthermore, when ethnicity is not included as a predictor in the model, preliminary work suggests the model may be able to improve decision-making across different ethnic groups. However, the model creates a shift in the composition of referrals towards more Māori children and young people being referred to site, so further work in this area is required.

**Table 2.10: Assessing decision-making for notifications for different ethnicities during the first six months of 2014**

| Proportion of children and young people | NZ European | | Māori | | Pacific Island | |
|---|---|---|---|---|---|---|
| | Existing decision-making | Logistic Regression model | Existing decision-making | Logistic Regression model | Existing decision-making | Logistic Regression model |
| **Referred to site** (intake) | 75% | 70% | 66% | 79% | 66% | 60% |
| **Referred to site** where there was *estimated concern* (also called positive predictive value) | 58% | 64% | 65% | 66% | 52% | 55% |
| **Referred to site** where there was no *estimated concern* | 42% | 36% | 35% | 34% | 48% | 45% |
| **Not referred to site** where there was no *estimated concern* | 53% | 63% | 48% | 59% | 65% | 67% |
| **Not referred to site** where there was *estimated concern* | 47% | 37% | 52% | 41% | 35% | 33% |
| Proportion of decisions that align with the measure of *estimated concern* (percentage correct) | 57% | 63% | 60% | 65% | 56% | 60% |
| Sensitivity (proportion of children and young people with *estimated concern* who were referred to site) | 78% | 80% | 71% | 86% | 74% | 72% |
| Specificity (proportion of children and young people with no *estimated concern* who were not referred to site) | 30% | 43% | 42% | 32% | 41% | 49% |

Note: Section 15 notifications of unique children and young people aged under 15 years where there was no open case. The correctness of referrals is measured using *estimated concern* criteria.

# Chapter 3: Development of the Background Risk Indicator

## Introduction

This chapter sets out the analysis, design, consultation, and testing work that was undertaken to develop an approach to using the Background Risk Indicator within intake decision-making.

As outlined in Chapter 2, an essential first step in this Project was the development of a statistical risk model specifically designed for use within an intake environment. Using existing administrative data, a statistical risk model was developed that is able to identify, with a reasonable level of accuracy, the children and young people notified to CYF who are likely to have a care and protection concern.

**This part of the Project involved developing a way of using the Background Risk Indicator within the intake system**

This component of the wider Project sought to answer the question: **how could the output of a statistical risk model be used within an intake decision-making environment?** As outlined in Chapter 1, social workers are faced with having to reconcile a wide range of uncertain information within a short period of time when making intake decisions. Within this decision-making process, the output of a statistical risk model could be communicated, interpreted, and used in numerous different ways. As a primary consideration, it is important that the indicator is put into operation in a manner that allows it to be easily understood, and effectively incorporated into social worker decision-making and professional judgement.

**The rest of this chapter sets out the analysis, design, and testing approach used to put the indicator into operation**

This chapter first sets out a brief consideration of relevant literature relating to incorporating the statistical risk model information within social worker decision-making. The chapter then outlines the overall approach taken to put the statistical risk model into operation, the method used to test and refine how the Background Risk Indicator was communicated to social workers, and the final design that was selected.

## Chapter 3 summary

- When put into operation, the output of a statistical risk model should be used as a supplement to the presenting information associated with a notification.
- A 'Background Risk Indicator' was developed as a means of clearly communicating risk model information to social workers.
- This tool was presented in speedometer form, with the measure of risk described in terms of the number of similar children and young people who had an intervention or subsequent intake within two years.
- Social workers were given training and guidance outlining how to practically incorporate risk model information within their decision-making practice. This guidance was that:
    1. If your initial social work analysis suggests that the case is very high risk, then refer for a safety assessment (irrespective of indicator). This guidance was intended to highlight that only minimal change was appropriate, with any shift from a critical or very urgent referral to beyond seven days considered unsafe.
    2. If the presenting information does not suggest that the child or young person is at very high risk, then have a look at the Indicator. Consider these statements:
        - The Background Risk Indicator is **high**. You should seriously consider that some action by CYF or another agency is required.
        - The Background Risk Indicator is **medium**. You should consider that some action by CYF or another agency is likely required.
        - The Background Risk Indicator is **low**. You should consider that possibly no action is required.

## Existing literature

**Existing research highlights the potential advantages of incorporating statistical risk model tools within decision-making processes**

The use of risk assessment decision-making tools has a long history in numerous disciplines, and since the late 1990s, there has been an increased focus on the use of such tools in the field of child protection. Existing research highlights the limitations and biases of clinical judgement, and argues that the combination of clinical judgement and analytical tools results in more effective decision-making.

As Munro (1999) argues, errors in professional judgement within child protection work are not random, but result from how people intuitively simplify their reasoning processes when making complex judgements. Analytical tools may be used to supplement intuitive reasoning with more rigorous and systematic judgement methods, which has the potential to result in more effective practitioner reasoning and decision-making processes (White & Walsh, 2006).

**When using statistical risk model tools, training and education is important, and the professional judgement of social workers should remain paramount**

Existing research emphasises the role of training and education within the use of risk assessment tools, and highlights the importance of considering how results are communicated and incorporated within practice (Baumann et al., 2005, De Bortoli & Dolan, 2014). Without careful implementation, the incorporation of risk assessment tools can fail to adequately support the decision-making process (Gillingham & Humphreys, 2010). As White and Walsh (2006, p.14) argue, "there is consensus in the literature that, whatever the approach adopted, its efficacy is dependent on skilled, well-trained and supported staff."

While the potential value of using risk assessment tools within decision-making is recognised, research also cautions against an over-reliance on these results, and stresses the need for users to apply realistic caution when applying this information (Munro, 2010). While statistical risk models provide a measure of the average risk for a group, this information needs to be integrated with other information relating to the current circumstances of each child or young person and their family (Shlonsky & Wagner, 2005). Research in this field reflects a consensus that the professional judgement of social workers and other decision makers should remain paramount, with the use of risk assessment tools being an additional consideration within the decision-making process (White and Walsh, 2006).

## Overall approach

**Social workers primarily rely on the presenting information contained within a notification when making intake decisions**

When making intake decisions, social workers primarily rely on the presenting information associated with a notification. Social workers assess this information using the Intake Decision Response Tool, which is the principal decision-making aid used within the intake process. This tool outlines the criteria used to assess whether an intake is required, and the thresholds that govern this decision.

The presenting information that is considered by social workers includes highly specific information relating to the current context of a child or young person, and the particular care and protection concern informing a notification. While social workers may consider case history and a limited range of other information, the presenting information will outline the current circumstances of a child or young person, and is often the overriding factor influencing intake decisions, particularly for more serious cases.

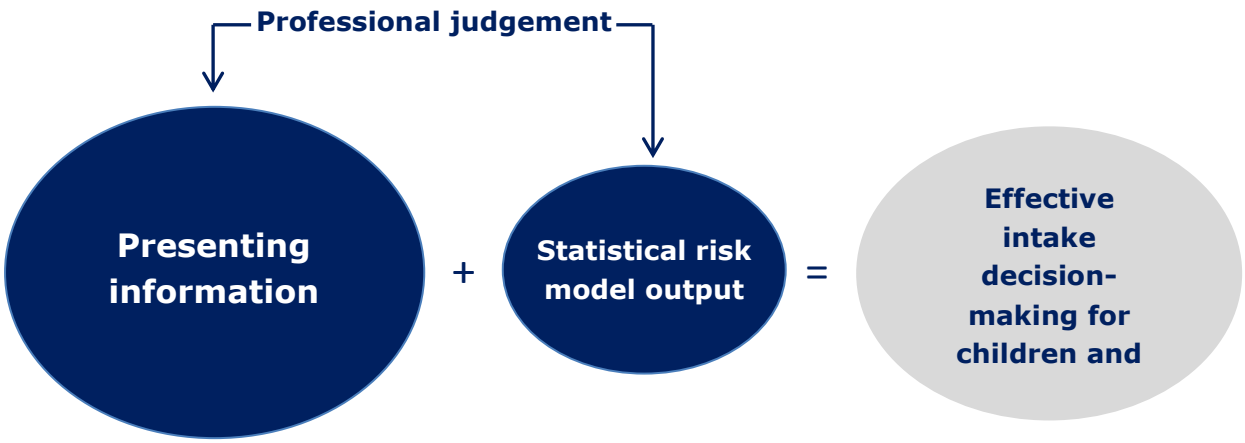
**Decisions made using the statistical risk model should give appropriate regard to presenting information**

When incorporating the output of a statistical risk model within intake decision-making, this information must be balanced with appropriate regard for the presenting information. While the statistical risk model gives a statement of the likelihood that a child or young person requires further involvement with CYF, it is not able to fully account for the current circumstances of a child or young person. For example, while a statistical risk model may give a child a low likelihood of requiring further investigation, based on a range of background information, the presenting information may include

clear evidence that the child has been harmed, such as a broken limb and other information about the circumstances of the case (eg the account of a witness).

Given its central role, presenting information should be viewed alongside statistical risk model information when making intake decisions. Figure 3.1 sets out the overall approach used to put the model into operation, highlighting how the presenting information should remain a primary consideration, with the social worker using their professional judgement to interpret this information, together with the statistical risk model output, when making intake decisions.

**Figure 3.1: Incorporation of the statistical risk model output within social work decision-making**




**To successfully incorporate the output of a statistical risk model, a range of other factors were also considered**

In an effort to maximise the likelihood that the output of the statistical risk model could be successfully incorporated within decision-making, a range of other considerations were also relevant. In order to communicate this information to social workers, it was essential that the output of the model provided a meaningful representation of the level of risk experienced by each child or young person, and that this included appropriate caveats relating to the certainty of this assessment. This information also needed to be communicated in an easily understood manner, with social workers given clear guidance regarding the application of the statistical risk assessment. Finally, it was essential that social workers were given an appropriate training programme prior to using this new information.

**Putting the statistical risk model into operation required significant development, consultation, and testing work**

The process of putting the statistical risk model into operation initially involved a review of existing research on the application of such tools within decision-making. Stakeholders within CYF and MSD, along with two expert informants with intake social work knowledge, were then consulted regarding the most effective approach.

Following these discussions, a pre-test session was held to explore initial ideas and gain further insight from practitioners. This pre-test session involved a focus group with seven social workers at the National Contact Centre. Information from this pre-test was then used to inform a further round of development and consultation work, which also

involved an informal piloting session with a number of CYF social workers with intake decision-making experience. The final method for putting the statistical risk model into operation reflects this background development, consultation, and testing work.

## Development of a 'Background Risk Indicator'

**The statistical risk model taken to trial was named the Background Risk Indicator**

After the pre-test and further development work, the name 'Background Risk Indicator' was selected as a way of describing the statistical risk model output. This term was intended to convey the idea that the indicator should not dominate decision-making, at the expense of social worker professional judgment regarding a notification's presenting information. It was thought that this term accurately reflected the function of this tool, which is to highlight the existence of potential risk factors and provide supplementary information within the intake decision-making process.

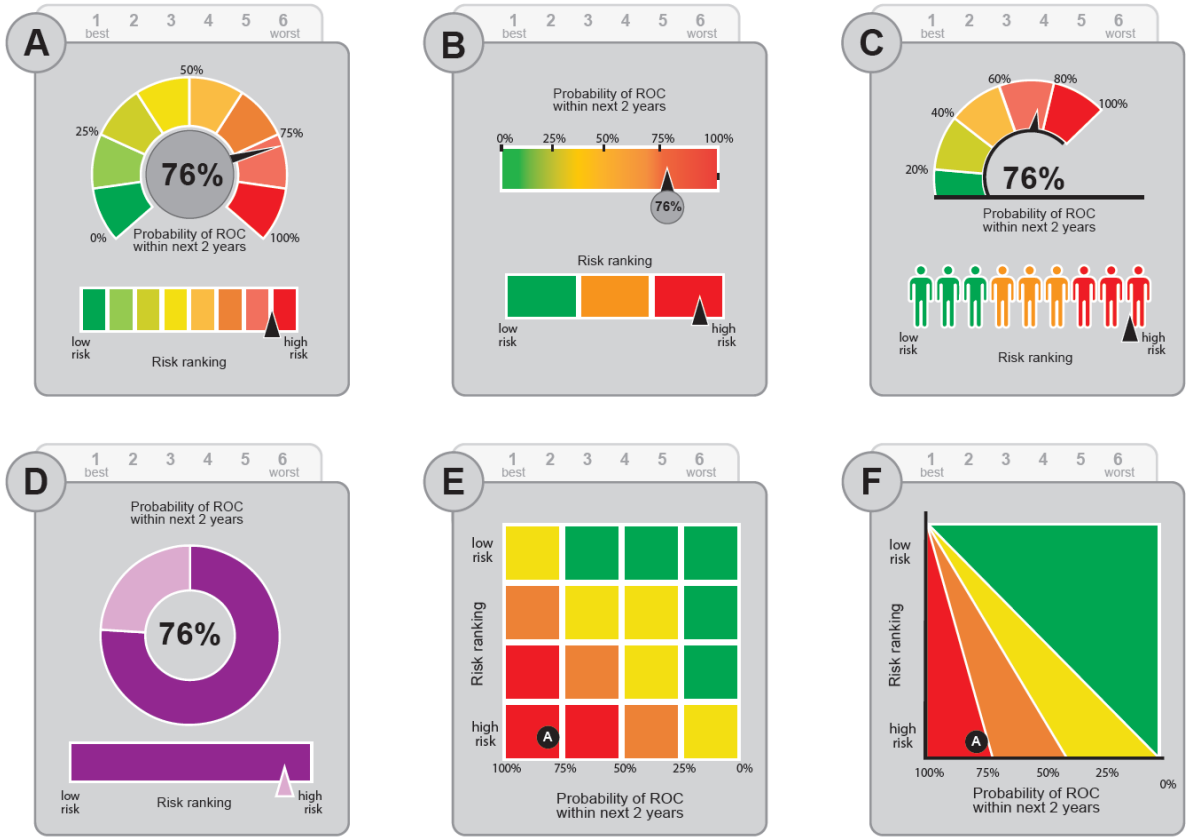
This term was also designed to provide a meaningful representation of the level of risk that a child or young person may experience, including appropriate caveats around the certainty of this assessment. The function of the statistical risk model is to provide an indicative 'indicator' measure of the background risk a child or young person may experience; it is not a precise prediction about the future. The name Background Risk Indicator was intended to reflect the limitations of the tool and provide a realistic representation of the measure of risk.

**The presentation of the Background Risk Indicator was tested within a pre-test session with social workers**

The pre-test session was designed to collect the views of social workers, with this insight being used to inform the final presentation of the Background Risk Indicator. Within the pre-test, information in the form of both a probability score and a risk ranking was tested with social workers. The 'probability score' was a way of conveying the estimated likelihood that a child or young person would require further involvement with CYF, while the 'risk ranking' was an attempt to convey the relative risk associated with an individual, compared to the whole population of interest.

Six different methods of graphically presenting this information were developed and tested. Pre-test participants were asked to rank the graphics and provide feedback on each design. Figure 3.2 shows the six options that were tested.

**Figure 3.2: Six options used during the pre-test**

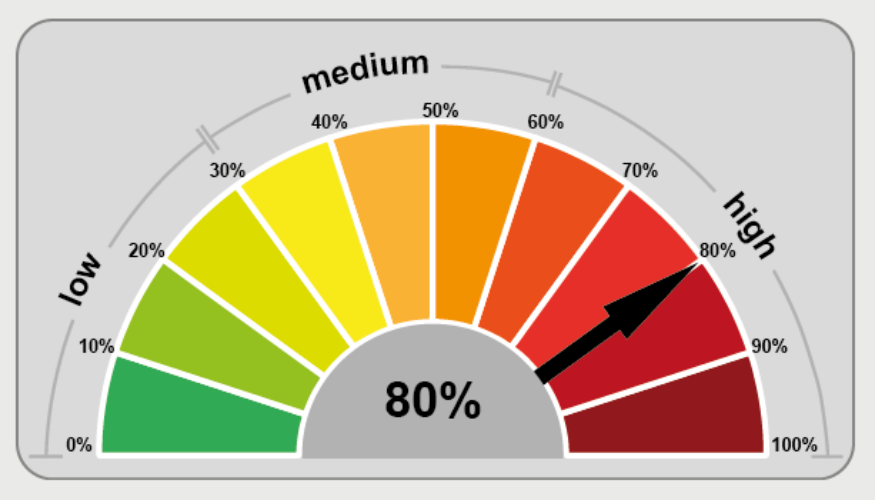



**The final presentation of the Background Risk Indicator was designed to reflect the preferences of social workers**

Options A and B both ranked highly with the pre-test participants, with option A being the preferred graphical representation. The familiarity of the 'speedometer' style and the use of graded colours were mentioned as positives of this approach. Social workers found this form of communication to be the most effective of all the options tested. Focus group discussions with pre-test participants also highlighted that presenting both a probability score and a risk ranking created added complexity, and impeded social workers' ability to consistently interpret the level of risk within a case. Social workers did not have a common understanding of the implications of the score and rank for intake decision-making.

Following this feedback, the 'risk ranking' was removed and a single speedometer graphic showing a measure of probability was developed. Within this Background Risk Indicator, the measure of risk was described in terms of the number of similar children and young people who had an intervention or subsequent intake within two years. Figure 3.3 sets out the final presentation of the Background Risk Indicator. The low, medium, and high categories accompanying this indicator are explained in detail below.

**Figure 3.3: Final presentation of the Background Risk Indicator**




The background risk indicator suggests that for children with similar characteristics and circumstances to **Kesia**, 80% are likely to go on to have a statutory intervention or have a subsequent report of concern within 2 years.

**Guidance relating to the use of the Background Risk Indicator within an intake decision-making context was developed**

Internal consultation undertaken prior to the trial highlighted the importance of giving social workers guidance regarding the appropriate threshold for a service response. Rather than allowing each social worker to individually interpret and apply this information, social workers were provided with additional guidance in the form of 'high', 'medium', and 'low' risk categories. These categories were intended to provide a clear indication of the level of risk a child or young person may experience, and to signal in a non-prescriptive way the service response considered appropriate to address this.

Development and consultation work undertaken prior to the trial also highlighted the importance of developing a clear rule regarding how social workers could safely use the Background Risk Indicator. As discussed, the Background Risk Indicator may have limited application in cases where the presenting information suggests that a child or young person has been harmed, or is at serious risk of this occurring in the immediate future. Given this limitation, and to ensure that the wellbeing of children and young people was protected, a rule was developed that reflected a deliberate judgement regarding the appropriate threshold for safe use of the Background Risk Indicator.

Guidance relating to the use of the Background Risk Indicator within decision-making was developed that reflected this range of considerations. While this guidance was considered appropriate for use within the non-operational trial discussed in the following chapter, this may be revised prior to any further use of the tool.

The guidance developed stated that if a social worker's initial analysis of a case (based on the presenting information) suggested that it contained serious care and protection concerns, then they should make a referral for a safety assessment irrespective of the Background Risk Indicator score. This guidance was communicated to social workers in a manner that emphasised that only minimal change was appropriate in serious cases. This guidance was intended to highlight that any downgrading of a case initially assessed

as requiring a response within 24 or 48 hours to beyond seven days was considered unsafe.

The guidance also stated that if a social worker's initial analysis of the presenting information for a case did not suggest that it was very high risk, then they should consider the Background Risk Indicator information. Three broad statements were designed to sit alongside the corresponding Background Risk Indicator category:

- The Background Risk Indicator is **high.** You should seriously consider that some action by CYF or another agency is required.
- The Background Risk Indicator is **medium.** You should consider that some action by CYF or another agency is likely required.
- The Background Risk Indicator is **low.** You should consider that possibly no action is required.

**A training programme was designed with the aim of ensuring that social workers effectively applied the Background Risk Indicator within their decision-making**

As part of efforts to ensure that social workers were able to effectively apply the Background Risk Indicator within their decision-making, a training session was held prior to any use of the indicator. As discussed, prior to the trial, this training was refined through an informal piloting session, which sought to ensure that the needs of participants were met.

This training session outlined the development of the indicator, the relationship between risk factors and the indicator score, and the guidance for applying the indicator explained above. The training session also included specific examples illustrating how the indicator works, and how this information could be used within decision-making. Training is a core component of ensuring the effective application of this tool, and it is essential that any use of the indicator is accompanied by an appropriate training programme.

# Chapter 4: Non-operational trial of the Background Risk Indicator

## Introduction

This chapter describes the non-operational trial of the Background Risk Indicator, along with quantitative analysis of how this tool influenced social worker intake decision-making in the trial.

The Background Risk Indicator non-operational trial discussed in this chapter builds on two preceding tranches of work within this Project. As discussed in Chapter 2, initial work within this Project involved developing and testing a statistical risk model specifically designed for use within an intake environment. Results from this work provide early indication that the use of statistical risk modelling may improve the effectiveness of the intake decision-making process.

The next stage of the Project involved developing a way of allowing the statistical risk model to be used within an intake environment. As discussed in Chapter 3, following this work, a graphical representation of the statistical risk model information was developed, guidance was produced, and the name 'Background Risk Indicator' was chosen as a way of accurately conveying this new information to intake decision-makers.

**The trial aimed to establish whether information from a statistical risk model could be incorporated within decision-making in a safe and expected manner**

This trial builds on the initial development and testing work discussed, by testing the use of statistical risk model information within intake decision-making at the National Contact Centre. The trial aimed to answer the question: **would social workers apply the output of a statistical risk model within their intake decision-making in a safe and expected manner?** In the context of this trial, the statistical risk model output is referred to as the Background Risk Indicator.

The 'safety' aspect of this question relates to the importance of ensuring that social workers did not overly rely on the Background Risk Indicator, where there was clear presenting information about the risk of harm to a child or young person. The 'expected' component of this question relates to social workers using the information in a manner consistent with what was suggested by the indicator, in cases where the presenting information was less clear.

The trial was designed to test two hypotheses relating to the use of the Background Risk Indicator within decision-making:

1. When the presenting information suggested that the child or young person was at serious risk of harm[23], the provision of a Background Risk Indicator score *would not influence* decision-making in an unsafe manner

[23] Serious risk of harm is defined as a response being required within 24 or 48 hours.

2. When the presenting information suggested that the child or young person was at a lower risk of harm[24], the provision of a Background Risk Indicator score *would influence* decision-making in an expected manner.

In order to test these hypotheses, a non-operational trial was held at the National Contact Centre. This trial used CYF social workers within a simulated Contact Centre environment to assess the impact of the Background Risk Indicator on decision-making.

**The rest of this chapter sets out the design and implementation of the trial, and quantitative analysis of how the indicator influenced decision-making**

This chapter outlines the design of the Background Risk Indicator non-operational trial and sets out the quantitative results that were collected. The chapter describes the trial methodology, including how the trial was designed to answer core research questions, and an account of the trial day itself. The chapter then reports quantitative results from the trial, including information relating to current social worker decision-making, the impact of the Background Risk Indicator, and whether social workers used the Background Risk Indicator within their decision-making in a safe and expected manner. The following chapter describes social workers' views about using the Background Risk Indicator during the trial.

## Chapter 4 summary

- The primary objective of the trial was to understand whether social workers would apply the Background Risk Indicator within their decision-making in a safe and expected manner.
- The trial was designed to test the impact of the Background Risk Indicator across nine different scenarios.
- The trial involved simulating the intake decision-making process at the CYF National Contact Centre.
- Decision-making within the trial was measured both before and after being shown the Background Risk Indicator score.
- The trial shows a level of variation within current decision-making practices. The Background Risk Indicator did not appear to systematically reduce or increase this variation.
- The majority of social workers used the Background Risk Indicator within their decision-making at least once, although only a minority of social workers changed their decision for each case summary.
- Based on a definition of safety developed within the trial, social workers used the Background Risk Indicator within their decision-making in a safe manner.
- In instances where social workers used the indicator within their decision-making, this generally occurred in an expected manner.
- The overall impact of the Background Risk Indicator on decision-making was not

[24] Lower risk of harm is defined as any notification where a response is not required within 24 or 48 hours.

statistically significant across all scenarios.

- The impact of the indicator on referral decisions was generally larger when it suggested that a child or young person was at higher, rather than lower, risk.

## Trial design

**The trial was designed to simulate the National Contact Centre intake decision-making environment**

In order to assess whether social workers used the Background Risk Indicator in a safe and expected manner, the trial used current and past Contact Centre social workers, and was designed to simulate the regular intake decision-making environment at the Contact Centre. Under normal processes, social workers receive notifications from the public, community organisations, and other government departments regarding the potential abuse or neglect of children and young people. These notifications come in a number of forms, including via phone, email, fax, and letter. Social workers receive and assess each notification, and provide an initial triage service to determine the appropriate service response.

Significant effort was made to build a realistic non-operational environment. The trial was held at the Contact Centre itself, and used composite case summaries that were designed to closely replicate the form and content of notifications ordinarily received. The decision-making pathways available to participants also exactly replicated the Contact Centre's existing practices. However, despite these efforts, it was not possible to recreate all aspects of the Contact Centre context and decision-making processes. Elements that differed from actual practice included the case summaries, which were slightly less detailed than those normally received, the fact that social workers were not able to discuss cases with their colleagues, and the trial information system, which was reported to be easier to use than the existing CYRAS system.

**Social workers were asked to make intake decisions with and without the addition of the Background Risk Indicator**

During the trial, social workers were asked to assess and make intake decisions regarding 27 case summaries. After reading and assessing each case summary, all participants in the trial were initially asked to decide the appropriate service response using only their regular decision-making process. This initial decision was made independently of any reference to the Background Risk Indicator.

In some cases, after the social worker had made this initial intake decision, the notification was considered to be resolved. In other cases, after making their initial decision, social workers were then shown the Background Risk Indicator and asked whether they wished to change their decision. If the social worker elected to maintain their initial decision, they were asked to justify their response. If the social worker indicated that they wanted to change their decision, they were then asked to record it again and provide a brief summary of their rationale for doing so.

**The impact of the Background Risk Indicator was established by measuring changes in decision-making**

Decision-making by social workers within the trial was measured in two ways: by examining changes in the rate at which cases were referred for further action at a local CYF site; and by examining any changes in the criticality of the response assigned to each case. The process used to measure the impact of the Background Risk Indicator is described in greater detail within the results section of this chapter.

**Case summaries were designed to reflect different categories of presenting care and protection concern**

The case summaries used within the trial were designed to fit within three high-level categories of presenting care and protection concern:

- **Serious risk of harm.** The presenting information showed obvious care and protection concerns and an immediate response from a local CYF social worker was required.
- **Possible risk of harm.** The presenting information contained both risk and safety factors, leading to uncertainty regarding the appropriate service response.
- **Low risk of harm.** The presenting information suggested that the child or young person did not require further assessment or services from either CYF or another agency.

The case summaries were developed by members of the project team with social work experience, including experience at the Contact Centre. With two exceptions, the average decision made by social workers during the trial indicated that the case summary reflected its intended category. The results section within this chapter reports more information on the final distribution of intake decisions for cases within each of these categories.

**Case summaries were paired with high, medium, and low Background Risk Indicator scores**

Within the trial, it was important to understand how social workers might apply a range of Background Risk Indicator scores, and how these scores might interact with cases containing different levels of care and protection concern. In order to investigate this range of scenarios, case summaries from within each category of presenting care and protection concern were paired with either a high, medium, or low Background Risk Indicator score. By creating a range of combinations, it was possible to observe the impact of different Background Risk Indicator scores across a wide spectrum of cases.

As the case summaries used within the trial were a composite of de-identified historical cases, it was not possible to generate true Background Risk Indicator scores. Instead, indicator scores were allocated by developing a cut-down version of the statistical risk model. Through a moderation process, individual cases were allocated a realistic score, based on the specific characteristics of that notification.

**The use of the Background Risk Indicator within decision-making was tested across a range of different scenarios**

By creating all possible combinations of presenting care and protection concern (serious, possible, or low risk of harm) and Background Risk Indicator score (high, medium, or low), nine scenarios were developed where the impact of the Background Risk Indicator

could be assessed. Based on the two hypotheses of the trial, which related to whether social workers would use the indicator in a safe and expected manner, the Background Risk Indicator was expected to impact decision-making within each scenario differently.

Table 4.1 sets out the nine scenarios tested within the trial and the expected impact of the Background Risk Indicator in each case. Scenarios where minimal or no impact on intake decisions was expected were designed to test the safety of decisions (red scenarios). The remaining scenarios outline the expected impact of the Background Risk Indicator on decision-making (green scenarios).

**Table 4.1: Scenarios tested within the trial and expected impact on decision-making**

| | | Presenting care and protection concern | | |
|---|---|---|---|---|
| | | **Serious risk of harm** | **Possible risk of harm** | **Low risk of harm** |
| **Background Risk Indicator score** | **High (60-100%)** | Minimal or no impact | Increased referrals or criticality | Increased referrals or criticality |
| | **Medium (30-60%)** | Minimal or no impact | Increased referrals or criticality | Increased referrals or criticality |
| | **Low (0-30%)** | Minimal or no impact | Decreased referrals or criticality | Decreased referrals or criticality |

**The impact of the Background Risk Indicator within these scenarios was tested across multiple cases**

Using many elements drawn from actual cases, 27 composite case summaries were developed for use within the trial. Table 4.2 sets out the distribution of 24 of these cases across each of the nine scenarios detailed above. The allocation of case summaries with specific scores was designed to ensure that the impact of the Background Risk Indicator within each scenario was tested across multiple cases.

Pre-trial power calculations indicated that the higher variance in referral rates associated with cases within the 'possible risk of harm' category would make detecting small impacts challenging. To address this issue, a higher number of cases within the possible risk of harm category were included within the trial.

**Table 4.2: Distribution of cases within each scenario**

| | | Presenting care and protection concern | | |
|---|---|---|---|---|
| | | **Serious risk of harm** | **Possible risk of harm** | **Low risk of harm** |
| **Background Risk Indicator score** | **High (60-100%)** | 2 cases | 4 cases | 2 cases |
| | **Medium (30-60%)** | 2 cases | 4 cases | 2 cases |
| | **Low (0-30%)** | 2 cases | 4 cases | 2 cases |

In addition to these 24 cases, the trial also used three further cases designed to fit within the possible risk of harm category. These cases were used to create a measure of the 'intake disposition' of each social worker. Within other research, this is sometimes also referred to as a measure of each social worker's risk aversion (see Dorsey et al., 2007; Mumpower, 2010). More information on the development of this measure is included within the results section of this chapter.

**Social workers were randomised into two equal groups, with only one group receiving the Background Risk Indicator for each case**

Participants within the trial were randomised into two equally sized groups using a pre-tested spreadsheet-based tool (see Glennerster and Takavarasha, 2013). For each case summary, only one group was presented with the Background Risk Indicator and given the opportunity to incorporate it within their decision-making. The group that was presented with the indicator alternated, meaning that for each scenario, both of the groups made at least one decision with reference to the Background Risk Indicator information. Case summaries were presented in the same random order to both groups.

Using this approach, in total, each randomly selected group of social workers made 12 intake decisions with reference to the Background Risk Indicator score: three decisions within the serious risk of harm scenarios, six decisions within the possible risk of harm scenarios, and three decisions within the low risk of harm scenarios. A further 15 decisions (including the three designed to measure the intake disposition of each social worker) were made without any reference to the Background Risk Indicator.

# Trial implementation

**The trial was held at the National Contact Centre over two weekends and involved 54 participants**

The trial was held at the National Contact Centre on the following four weekend days: 11, 12, 18, and 19 June 2016. Holding the trial over four separate days introduced the possibility of participant contamination. However, this risk was deemed unavoidable due to resource constraints at the Contact Centre, the limited pool of participants available, and the need to reach a minimum number of participants. In order to mitigate the risk of contamination, participants were asked not to discuss the trial with their colleagues.

Participation in the trial was voluntary and effort was taken to ensure that social workers did not feel coerced to participate. Research participants were social workers currently employed at the Contact Centre, or current CYF social workers who have been employed at the Contact Centre within the past four years. Social workers seconded to the Children's Action Plan were also invited to participate. The only eligibility criterion for participation was that the social worker was no longer working with a coach[25].

A total of 54 social workers participated in the trial. This exceeded the minimum sample size of 40, which was deemed sufficient to detect modest sized impacts on decision-making in the pre-trial power calculations. Of the 54 total participants, all but 12 currently worked at the Contact Centre, representing just over half (51 percent) of all Contact Centre staff who could have participated in the trial.

Social workers were recruited to participate in the trial using a variety of methods. Current Contact Centre social workers were primarily recruited through the use of multi-media advertisements. Staff from the project team also visited the Contact Centre in order to increase awareness of the trial and encourage participation. Participants not currently employed at the Contact Centre were identified by Contact Centre staff on the project team and recruited directly.

Social workers were compensated for their participation on the weekend trial days with the payment of double-time wages. Other incentives for participation included providing catering on each trial day and an assurance that participation could count towards social worker continuing professional development. Potential participants were also encouraged to view the trial as an opportunity to contribute to future developments in social work practice.

**At the start of each trial day, participants attended a training session outlining how to interpret and apply the Background Risk Indicator within their decision-making**

All trial participants attended a training session prior to making any intake decisions. This training session outlined the intent of the trial, the development of the Background Risk Indicator, and guidelines for interpreting and applying the indicator within decision-making. Additional information regarding the training session is reported in Chapter 5 of this report.

[25] In the first two months that a new intake social worker is employed at the National Contact Centre, they are paired with a coach who listens in on all their calls, provides consults for all decisions, and signs off on all their work.

**Figure 4.1: Training session, day four**

As discussed in Chapter 3, within the training session, social workers were given guidance regarding how the background indicator could be applied in different situations. This guidance emphasised that social workers were expected to largely disregard the indicator in cases assessed to be very high risk, and set out how the Background Risk Indicator could influence decision-making in cases assessed to be lower risk.

The guidance given within the training session was that:

1. If your initial social work analysis suggests that the case is very high risk, then refer for a safety assessment (irrespective of the indicator). This guidance was intended to highlight that only minimal change was appropriate, with any shift from a critical or very urgent referral to beyond seven days considered unsafe.
2. If the presenting information does not suggest the child or young person is at very high risk, then have a look at the Background Risk Indicator. Consider these statements:
    - The Background Risk Indicator is **high.** You should seriously consider that some action by CYF or another agency is required
    - The Background Risk Indicator is **medium.** You should consider that some action by CYF or another agency is likely required
    - The Background Risk Indicator is **low.** You should consider that possibly no action is required.

### The case summaries used within the trial were presented in a number of forms

Each case summary was based on a single notification to the Contact Centre, and was presented in a way that resembled information a social worker might normally receive. The information available from an email, fax, or letter notification was exactly replicated. Information from a telephone notification was presented in a form designed to look like the notes taken by a social worker during a phone call. However, it was not possible to replicate the social worker asking further questions, as normally occurs during a phone call.

Some cases were also supplemented by information – in the form of a case history - that a social worker might usually be able to quickly obtain from the CYRAS database. These case histories were significantly abbreviated, as it was not possible to exactly replicate the full extent of information contained within the CYRAS database.

Figure 4.2 sets out example case summary information, including a notification and a supplementary CYRAS case history. The notification is designed to replicate the case notes taken by a social worker during a telephone notification. All case histories were presented in a standardised form, regardless of the method of notification. These examples are drawn from two separate case summaries.

**Figure 4.2: Example composite de-identified case summary information[26]**

### Notification

Contact Record

**Caller**

| Given Names | Surname | Role |
|---|---|---|
| Maria | Jennings | Other individual |

**Participants**

| Given Names | Surname | Age | Gender | Role | Address |
|---|---|---|---|---|---|
| Daniella | McAlister | 8 | F | Child / Young person | 3 Rosewood Place, Manukau |
| Travis | McAlister | 6 | M | Child / Young person | 3 Rosewood Place, Manukau |
| Benny | McAlister | | M | Other | 3 Rosewood Place, Manukau |
| Sonya | McAlister | | F | Other | 3 Rosewood Place, Manukau |
| Adrian | McAlister | | M | Other | 3 Rosewood Place, Manukau |

**CSR Comments**

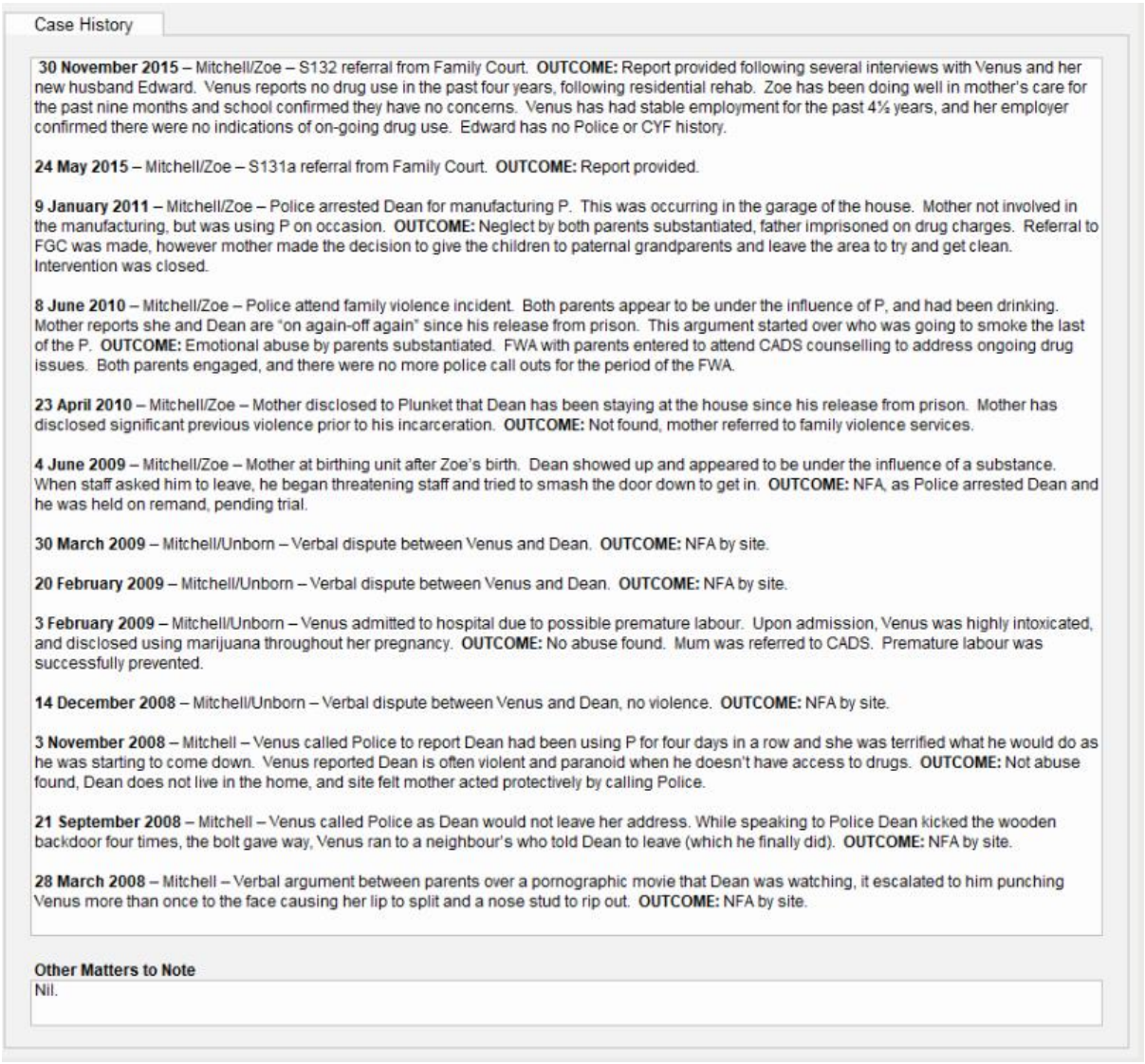
Child: Daniella McAlister, 8 years, worried about sexual abuse, told caller's daughter

**ISW Notes**

Daniella is friends with my daughter, in the same class at school.
Daniella here this afternoon. heard them talking.
Daniella told my daughter "Papa keeps touching my bits".
Daughter asked what she meant and Daniella said "you know, my naughty bits, where I wee".
Then she said "but you can't tell anyone, Papa told me it's our secret game".
Caller thinks those are the exact words she used. seemed fine, didn't seem upset.
My daughter promised not to tell . they started talking about something else. i didn't ask Daniella anything
Daniella lives at home with:
Mum Sonya
dad Adrian
grandfather Benny
brother travis, he is 6, same school. redwood north school.
Caller thinks "Papa" is grandfather, because Daniella calls her father "Dad".
no other concerns. until she heard this.
Daniella left to go home about half an hour ago.

[26] These composite case summaries have been de-identified and do not include personal information relating to any individual.

## Supplementary CYRAS case history



Case History

**30 November 2015** – Mitchell/Zoe – S132 referral from Family Court. **OUTCOME:** Report provided following several interviews with Venus and her new husband Edward. Venus reports no drug use in the past four years, following residential rehab. Zoe has been doing well in mother's care for the past nine months and school confirmed they have no concerns. Venus has had stable employment for the past 4½ years, and her employer confirmed there were no indications of on-going drug use. Edward has no Police or CYF history.

**24 May 2015** – Mitchell/Zoe – S131a referral from Family Court. **OUTCOME:** Report provided.

**9 January 2011** – Mitchell/Zoe – Police arrested Dean for manufacturing P. This was occurring in the garage of the house. Mother not involved in the manufacturing, but was using P on occasion. **OUTCOME:** Neglect by both parents substantiated, father imprisoned on drug charges. Referral to FGC was made, however mother made the decision to give the children to paternal grandparents and leave the area to try and get clean. Intervention was closed.

**8 June 2010** – Mitchell/Zoe – Police attend family violence incident. Both parents appear to be under the influence of P, and had been drinking. Mother reports she and Dean are "on again-off again" since his release from prison. This argument started over who was going to smoke the last of the P. **OUTCOME:** Emotional abuse by parents substantiated. FWA with parents entered to attend CADS counselling to address ongoing drug issues. Both parents engaged, and there were no more police call outs for the period of the FWA.

**23 April 2010** – Mitchell/Zoe – Mother disclosed to Plunket that Dean has been staying at the house since his release from prison. Mother has disclosed significant previous violence prior to his incarceration. **OUTCOME:** Not found, mother referred to family violence services.

**4 June 2009** – Mitchell/Zoe – Mother at birthing unit after Zoe's birth. Dean showed up and appeared to be under the influence of a substance. When staff asked him to leave, he began threatening staff and tried to smash the door down to get in. **OUTCOME:** NFA, as Police arrested Dean and he was held on remand, pending trial.

**30 March 2009** – Mitchell/Unborn – Verbal dispute between Venus and Dean. **OUTCOME:** NFA by site.

**20 February 2009** – Mitchell/Unborn – Verbal dispute between Venus and Dean. **OUTCOME:** NFA by site.

**3 February 2009** – Mitchell/Unborn – Venus admitted to hospital due to possible premature labour. Upon admission, Venus was highly intoxicated, and disclosed using marijuana throughout her pregnancy. **OUTCOME:** No abuse found. Mum was referred to CADS. Premature labour was successfully prevented.

**14 December 2008** – Mitchell/Unborn – Verbal dispute between Venus and Dean, no violence. **OUTCOME:** NFA by site.

**3 November 2008** – Mitchell – Venus called Police to report Dean had been using P for four days in a row and she was terrified what he would do as he was starting to come down. Venus reported Dean is often violent and paranoid when he doesn't have access to drugs. **OUTCOME:** Not abuse found, Dean does not live in the home, and site felt mother acted protectively by calling Police.

**21 September 2008** – Mitchell – Venus called Police as Dean would not leave her address. While speaking to Police Dean kicked the wooden backdoor four times, the bolt gave way, Venus ran to a neighbour's who told Dean to leave (which he finally did). **OUTCOME:** NFA by site.

**28 March 2008** – Mitchell – Verbal argument between parents over a pornographic movie that Dean was watching, it escalated to him punching Venus more than once to the face causing her lip to split and a nose stud to rip out. **OUTCOME:** NFA by site.

**Other Matters to Note**

Nil.

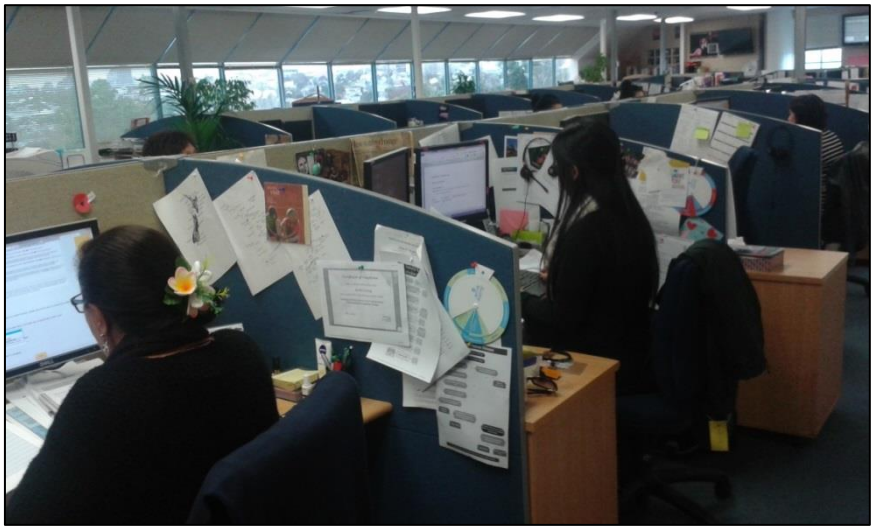
### Social workers were asked to make and record a number of intake decisions using an online tool

Social workers viewed all cases and recorded their intake decisions using a customised SurveyMonkey interface[27]. This interface was designed to replicate the CYRAS information system used by social workers. Over the course of two sessions, social workers were sent 27 emails containing a unique link to each case summary. The progress of each social worker was monitored to ensure that cases were completed in the correct order.

Appendix 2 sets out an example of the replica CYRAS database that was used within the trial.

[27] SurveyMonkey is an online survey platform. See www.surveymonkey.com for more information.

**Figure 4.3: Social workers making intake decisions during the trial**



To replicate the Contact Centre's existing practices, the SurveyMonkey interface included the full range of pathways and urgency response categories usually available to social workers making intake decisions. Table 4.3 sets out these categories.

**Table 4.3: Pathway and urgency response categories**

| Pathway | Urgency |
|---|---|
| **Intake (report-of-concern)** | |
| Investigation | 24 hour, 48 hour, 7 day |
| Child and Family Assessment (CFA) | 24 hour, 48 hour, 7 day, 20 day |
| Partnered Response (PRP) | No urgency required |
| **No intake (no further action)** | |
| Contact Record (CR) | - |

All of the data entered through SurveyMonkey was extracted in Excel worksheets and compiled to create a master dataset for quantitative analysis.

## Participant characteristics

### The two groups created by randomisation were broadly comparable

At the start of each trial day, participants were randomly allocated into two groups. Participants were not told prior to the decision-making sessions which group they were allocated to. Information on the characteristics of the 54 trial participants is set out in Table 4.4. This information shows that after randomisation the composition of each group was broadly comparable. Given the relatively small sample size, there was some inevitable variation in the demographic characteristics of each group.

As discussed, three of the case summaries used within the trial were designed to measure the intake disposition of each social worker. Despite the two groups being randomly selected, there was a slight difference between the estimated intake disposition of Group A and B.

The average referral rate and criticality index rating for each social worker (based on the remaining 24 cases) was also measured[28]. A slight variation in the average rates of each group was also noted, in line with the difference in estimated intake disposition.

**Table 4.4: Participant characteristics**

| | Group A | Group B | Total | Percentage |
|---|---|---|---|---|
| **Participants** | | | | |
| **Day 1** | 7 | 8 | 15 | 28% |
| **Day 2** | 6 | 6 | 12 | 22% |
| **Day 3** | 8 | 7 | 15 | 28% |
| **Day 4** | 6 | 6 | 12 | 22% |
| **Total** | 27 | 27 | 54 | 100% |
| **Gender** | | | | |
| **Female** | 27 | 26 | 53 | 98% |
| **Male** | 0 | 1 | 1 | 2% |
| **Age** | | | | |
| **20-29** | 3 | 3 | 6 | 11% |
| **30-39** | 10 | 6 | 16 | 30% |
| **40-49** | 6 | 6 | 12 | 22% |
| **50-59** | 4 | 6 | 10 | 19% |
| **60 +** | 2 | 4 | 6 | 11% |
| **Prefer not to say** | 2 | 2 | 4 | 7% |

[28] More information on the development of these measures is included in the results section of this chapter.

| | Group A | Group B | Total | Percentage |
|---|---|---|---|---|
| **Ethnicity** | | | | |
| **Māori** | 6 | 5 | 11 | 20% |
| **Pasifika** | 6 | 2 | 8 | 15% |
| **NZ European/ Pakeha/ European** | 8 | 15 | 23 | 43% |
| **New Zealander** | 1 | 0 | 1 | 2% |
| **Asian** | 6 | 4 | 10 | 19% |
| **Other** | 4 | 2 | 6 | 11% |
| **Prefer not to say** | 0 | 1 | 1 | 2% |
| **Length of time working at the National Contact Centre** | | | | |
| **Less than 1 year** | 3 | 1 | 4 | 7% |
| **Between 1 and 3 years** | 4 | 8 | 12 | 22% |
| **Between 3 and 5 years** | 2 | 4 | 6 | 11% |
| **More than 5 years** | 11 | 9 | 20 | 37% |
| **Not currently working at the Contact Centre** | 7 | 5 | 12 | 22% |
| **Role** | | | | |
| **Intake social worker** | 11 | 6 | 17 | 31% |
| **Senior Practitioner** | 5 | 14 | 19 | 35% |
| **Supervisor** | 4 | 2 | 6 | 11% |
| **Not currently working at the Contact Centre** | 7 | 5 | 12 | 22% |
| **Estimated intake disposition** | | | | |
| **Index rating (1-6)** | 2.7 | 2.9 | 2.8 | - |
| **Average referral and criticality rate** | | | | |
| **Average referral rate (%)** | 73.9 | 77.9 | 75.9 | - |
| **Average criticality (1-6)** | 3.1 | 3.3 | 3.2 | - |

# Results

## Outcomes and impacts measured

### The trial measured changes in decision-making in two ways

Changes in decision-making resulting from the provision of the Background Risk Indicator were measured in two ways:

- Rate of referral to site for further action (ie no intake/intake)
- The urgency response category assigned.

The rate of referral was calculated as the percentage of participants who referred a case to at least a Partnered Response pathway. The trial also used a more specific measure based on the urgency of the response recommended, which was developed from the pathway and urgency options described in Table 4.4. This 'criticality index' was designed to give a more detailed understanding of decision-making, particularly within the intake decision pathway.

Table 4.5 sets out the referral rate and criticality index, and the corresponding pathway or urgency category for each measure.

**Table 4.5: Measures of changes in decision-making**

| Referral rate | Criticality index | Corresponding pathway/urgency category |
|---|---|---|
| **No intake** | **1** | Contact Record |
| **Intake** | **2** | Partnered Response |
| | **3** | 20 day |
| | **4** | 7 day |
| | **5** | 48 hour |
| | **6** | 24 hour |

### The impact of the Background Risk Indicator was assessed by examining changes in decisions made with and without the score

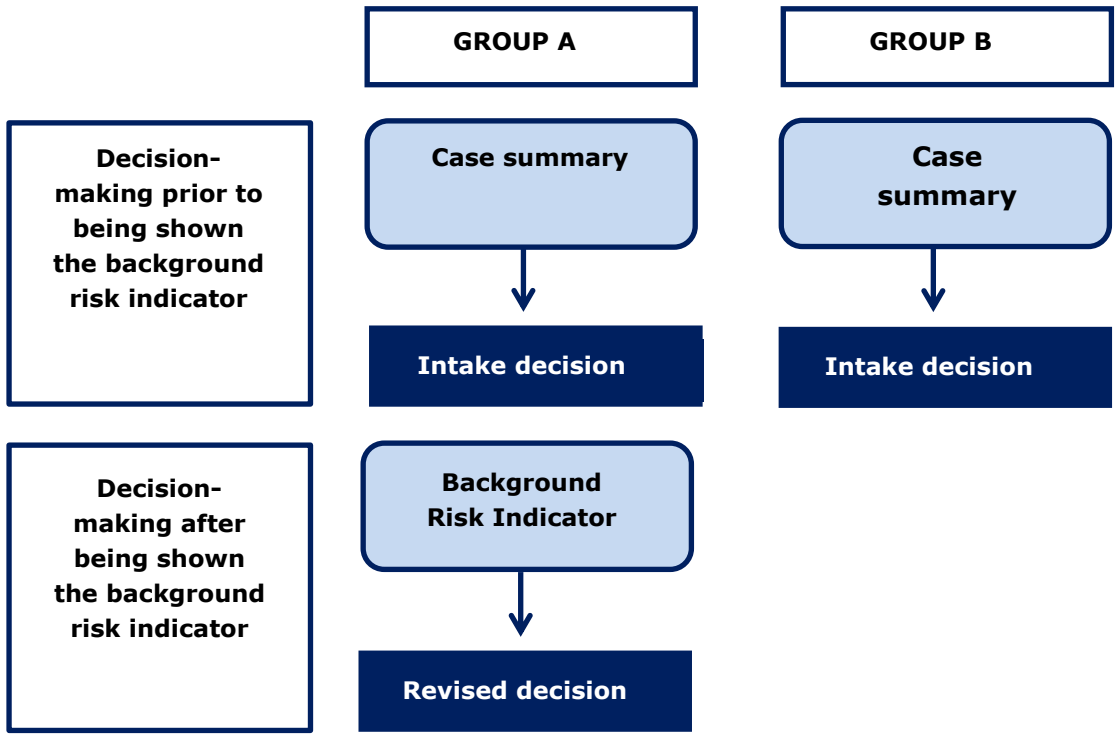
The trial involved giving social workers case summaries and asking them to make intake decisions. One of the randomly selected groups of social workers was then provided with the Background Risk Indicator, and given the opportunity to revise their decision in light of this information. This approach meant that for every case, the initial decision made by all social workers was collected, along with a subsequent decision made by the group of social workers who then received the Background Risk Indicator for that particular case.

The initial decision made by all social workers represents 'decision-making prior to being shown the Background Risk Indicator'. The subsequent decision made by the group of social workers who then received the indicator information represents 'decision-making after being shown the Background Risk Indicator'.

The overall impact of the Background Risk Indicator was assessed by examining the number of social workers who changed their decisions after being shown the indicator (within group differences). The average change in decision-making was also measured more formally by comparing the decisions made by those social workers who were shown the indicator, with the decisions made by the group who were not shown the indicator (between group differences).

Figure 4.4 sets out the two decision-making pathways used for each case, and how these relate to decision-making both prior to, and after, being shown the Background Risk Indicator. This Figure shows decision-making for one case only; as the group presented with the Background Risk Indicator alternated, Group B also experienced decision-making after being shown the Background Risk Indicator.

**Figure 4.4: Decision-making prior to and after being shown the Background Risk Indicator**



## Decision-making prior to being shown the Background Risk Indicator

### Decision-making broadly aligned with the intended high-level categories of care and protection concern

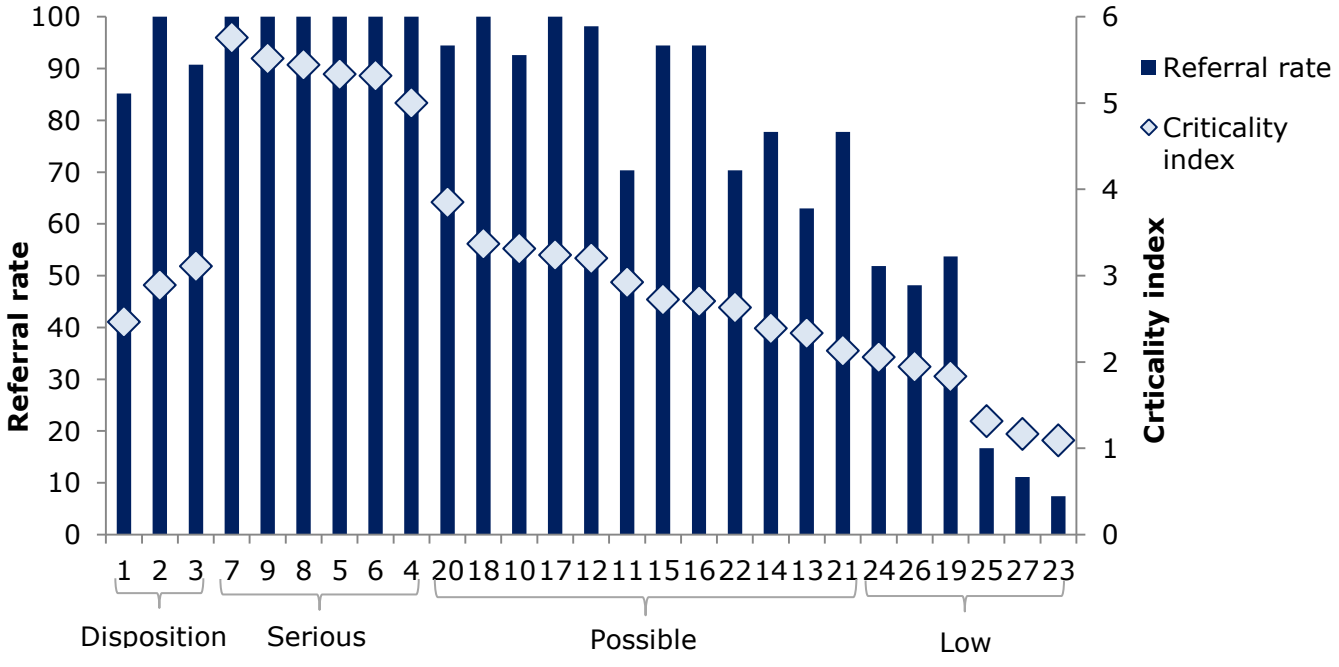
The case summaries used within the trial were developed to fit within one of three high-level categories of care and protection concern: serious risk of harm, possible risk of harm, and low risk of harm to the child or young person involved. Following the trial, decision-making was investigated to determine whether each case fit within its intended category.

To do this, case summaries were grouped by their average criticality index rating prior to any social worker being shown the Background Risk Indicator score. Cases with an index rating of five or above were said to represent a serious risk of harm, cases with a rating of between five and two a possible risk of harm, and cases with an average score of below two a low risk of harm.

The trial case summaries were generally aligned with their intended high-level category of care and protection concern. Two cases were the exception to this broad alignment: case 19, which was intended to represent a possible risk of harm, but swapped to the low risk category; and case 22, which was designed as low risk, but was reallocated to the medium risk of harm category.

Figure 4.5 sets out an overview of decision-making prior to seeing the Background Risk Indicator across the 27 cases used within the trial. Cases have been grouped based on the category of care and protection concern they represent (serious, possible, or low risk of harm), or whether they were used to develop the intake disposition measure. The average referral rate and criticality index rating of each case is also included. With the exception of the cases designed to measure intake disposition, cases are ordered by descending criticality index.

**Figure 4.5: Overview of decision-making prior to being shown the Background Risk Indicator**

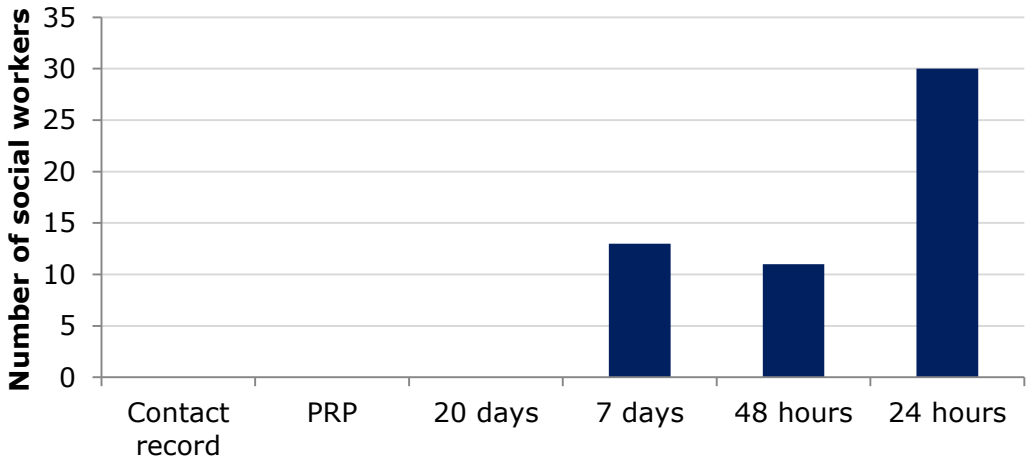


**Results from the trial show variation in decision-making across participants**

Results from the trial provide insight into existing decision-making practices at the Contact Centre. An important feature of this current practice is the existence of variation in the decisions made for each case. Decision-making on cases prior to seeing the Background Risk Indicator shows variation across both the type of intake pathway selected, and within the urgency response category assigned to individual cases.

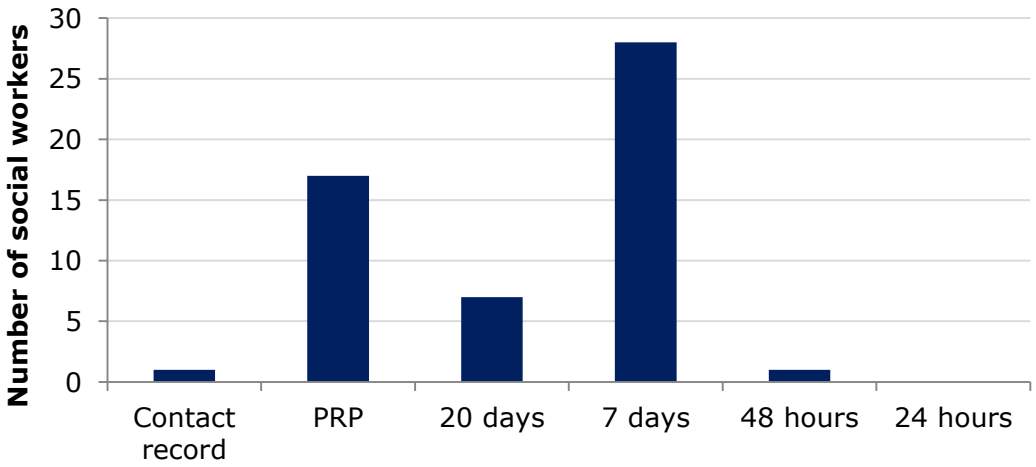
The extent of this variation is shown below in three illustrative examples from the serious, possible, and low risk of harm categories.

**Figure 4.6: Number of social workers making different intake decisions for Case 6 – Serious risk of harm category**



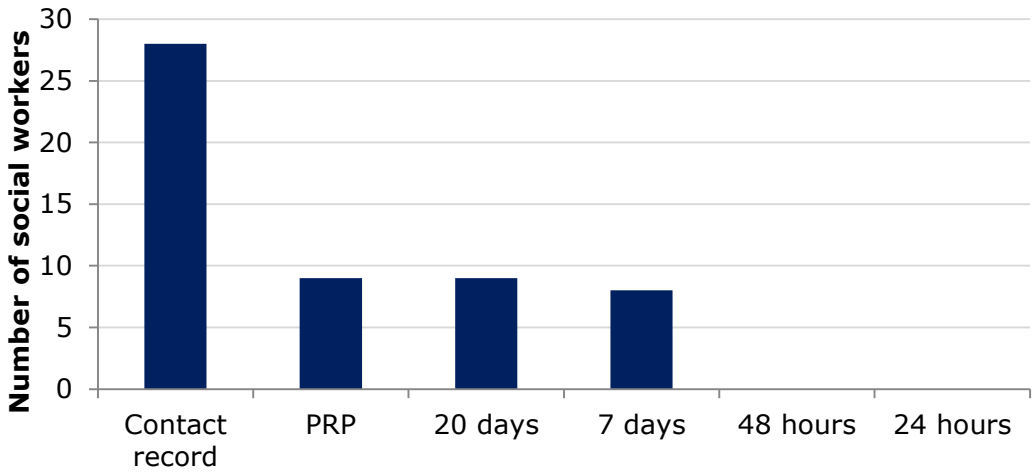

**Case summary:** *Case summary for a notification relating to the regular physical abuse of a child.* N = 54.

**Figure 4.7: Number of social workers making different intake decisions for Case 12 – Possible risk of harm category**




**Case summary:** *Case summary where the notifier is concerned that a parent is in jail and the other is not coping well with stress. While possible developmental delays for a child have been noted, this child is currently safe in the care of a protective family member away from the home.* N = 54.

**Figure 4.8: Number of social workers making different intake decisions for Case 26 – Low risk of harm category**




**Case summary:** *Case summary for a notification where an Aunt has not had contact with the family within the past year, but has heard rumours that a parent is not coping with stress, and that there may be alcohol and drug use within the home.* N = 54.

The extent to which this trial reflects variation within actual decision-making practices is unknown. Due to its artificial nature, it is likely that results from the trial may over- or under-represent the true extent of variation. Features that may have affected variation include a requirement that trial participants did not consult with their colleagues, the hypothetical nature of the trial and the cases used, the shortened length of time available to analyse cases, the amount of information available, and the nature of the SurveyMonkey interface compared to the information system used within day-to-day practice.

However, despite these caveats, results from the trial provide suggestive evidence of variability within current intake decision-making. This finding is consistent with existing research noting levels of variation within social worker decision-making (see Stewart, 1993; Benbenishty et al., 2015; Ross et al., 1996).

### Some variation in decision-making was due to systematic differences in the 'intake disposition' of each social worker

The trial also provided insight into the extent to which variation in decision-making resulted from systematic differences in the 'intake disposition' of individual social workers, compared to variation simply resulting from the inherent difficultly of making a triage decision. In order to investigate this distinction, an estimated intake disposition index was calculated for each participant. This was based on the average level of criticality assigned to three common 'individual fixed effect' cases.

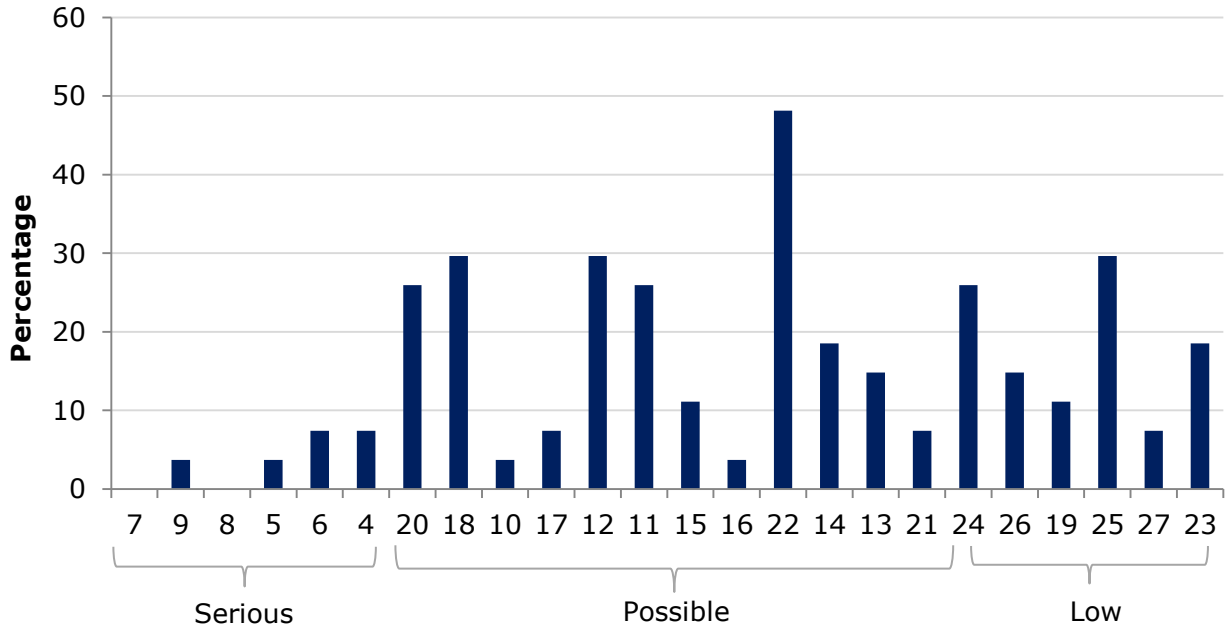
This index was then used as a covariate to explain the average of the remaining 24 decisions made by each social worker prior to seeing the Background Risk Indicator. The intake disposition was statistically significant, explaining 16 percent of the variation across the average referral rate of social workers and 23 percent of the variation in average criticality assigned across all cases. No other variables investigated were correlated with decision-making to the same extent.

## Decision-making after being shown the Background Risk Indicator: overview

### After being given the Background Risk Indicator, social worker decision-making changed in some cases

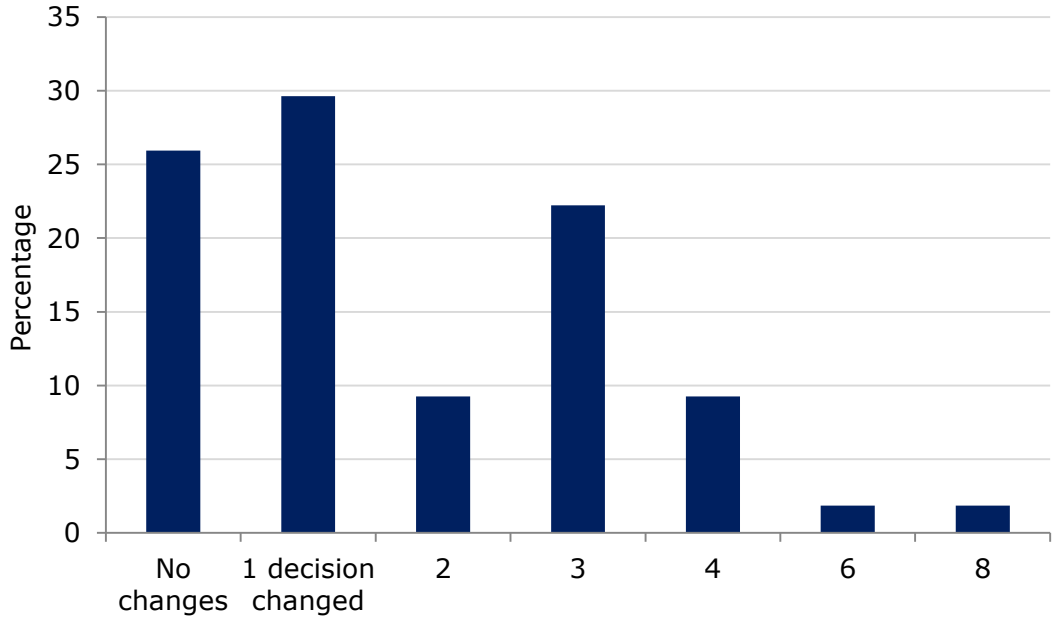
As mentioned, throughout the trial, each social worker was presented with the Background Risk Indicator and given the opportunity to incorporate it within their decision-making on 12 occasions. After seeing the Background Risk Indicator, a small and varying number of social workers were observed changing their decisions for each case. Figure 4.9 sets out the percentage of social workers who changed their decision for each case summary. On average, almost 15 percent of social workers changed their decision after seeing the Background Risk Indicator for each case.

**Figure 4.9: Percentage of social workers who changed their decisions after seeing the Background Risk Indicator by case summary**




Across all cases, overall, 74 percent of participants in the trial changed at least one intake decision in response to the Background Risk Indicator, while 26 percent of participants did not make any changes. Figure 4.10 sets out the percent of social workers who made changes to their decisions after seeing the Background Risk Indicator, and the number of changes that were made.

**Figure 4.10: Percentage of social workers who made changes to decisions over 12 cases**




### Several characteristics were associated with responsiveness to the Background Risk Indicator

The extent to which different demographic characteristics were associated with responsiveness to the Background Risk Indicator was investigated. To do this, the characteristics of social workers were associated with the number of changes made after seeing the Background Risk Indicator. This analysis showed that, on average, younger and Asian social workers made a statistically significant larger number of changes, while older social workers made significantly fewer changes. Table 4.6 sets out the average number of changes made by social workers across a variety of characteristics.

Within the follow-up survey relating to effectiveness of training, participants were also asked about their level of confidence in understanding the concept of a Background Risk Indicator. While some difference in the average number of changes made by social workers who were very confident was noted, this was not statistically significant. Further investigation of the relationship between intake disposition and the average number of changes made also found no significant difference in responsiveness.

**Table 4.6: Average numbers of changes by relevant characteristic**

| Characteristic | Average number of changes (across 12 cases) | p value |
|---|---|---|
| **Age** | | |
| **Under 40** | 2.5 | **<0.01**** |
| **40 and above** | 1.3 | **<0.01**** |
| **Position** | | |
| **Intake social worker** | 2.2 | 0.25 |
| **Senior practitioner or supervisor** | 1.4 | 0.09 |
| **Not current Contact Centre social worker** | 2.1 | 0.49 |
| **Current Contact Centre social worker** | 1.7 | 0.49 |
| **Ethnicity** | | |
| **Asian** | 2.8 | **0.03*** |
| **Pasifika** | 1.9 | 0.86 |
| **Other ethnicity** | 1.6 | 0.73 |
| **Māori** | 1.5 | 0.49 |
| **European/NZ** | 1.4 | 0.21 |
| **Confidence in understanding the Background Risk Indicator** | | |
| **Very confident** | 2.3 | 0.19 |
| **Less than 'very confident'** | 1.6 | 0.19 |
| **Intake disposition** | | |
| **Low (below average)** | 1.9 | 0.59 |
| **High (above average)** | 1.6 | 0.59 |

Note: *$p < 0.05$. **$p < 0.01$. Statistical significance calculated from OLS regression of average number of cases changed by each social worker for each separate covariate. N = 54.

### The Background Risk Indicator did not systematically reduce or increase the extent of variation in decision-making

As previously noted, prior to being shown the Background Risk Indicator, there was variation across the intake pathways and urgency response categories selected by participants. Results from the trial show no evidence that this variation (as measured by the standard deviation of the criticality index) changed systematically as a result of social workers using the Background Risk Indicator within their decision-making.

## Decision-making after being shown the Background Risk Indicator: detailed results

### The trial hypotheses relating to the impact of the Background Risk Indicator were investigated in greater detail

The trial was designed to test two hypotheses relating to whether social workers used the Background Risk Indicator within their decision-making in a safe and expected manner. These hypotheses were investigated across the nine scenarios used within the trial. The impact of the Background Risk Indicator on these aspects of social worker decision-making was assessed in two ways:

1. Descriptive statistics outlining decision-making before and after the indicator for the group of social workers who saw the Background Risk Indicator for each case. These results state the average proportion of social workers who changed their decision, as well as detailed analysis of whether the indicator was used in a safe and expected manner.
2. The randomised nature of the trial was then used to assess the overall size and statistical significance of the impact of the Background Risk Indicator on decision-making. Within this analysis, the decisions made by a control group who did not see the indicator were compared with the decisions made by the treatment group after they saw the indicator.

For both analyses, cases within each of the nine scenarios used within the trial were aggregated. The definitions of 'safe' and 'expected' used within the descriptive statistics are set out below.

### Decision-making was defined as 'unsafe' in any instances where a critical or very urgent response was significantly downgraded

In the training session, social workers were given guidance regarding those situations where the Background Risk Indicator should not influence their decision-making. This guidance was: If your initial social work analysis suggests that the case is very high risk, then refer for a safety assessment (irrespective of the indicator).

In line with current Contact Centre assessment practices, 'very high risk' covers any cases where an urgency response category of 24 or 48 hours is selected. A safety assessment includes any intake within the Investigation and Child and Family Assessment pathways.

Based on the guidance given during training, an 'unsafe' decision was defined as any instance where, after being provided with the Background Risk Indicator, a social worker downgraded a case initially assessed as requiring a 24 or 48 hour response to a 20-day response, a Partnered Response pathway, or a Contact Record.

### Decision-making was defined as 'expected' when changes were consistent with the direction suggested by the indicator

Subject to the safety constraint explained above, social workers were expected to use the Background Risk Indicator information within their decision-making in a manner consistent with the indicator score. This meant that high Background Risk Indicator scores were expected to result in increased referrals to site, or more urgent referrals, while low Background Risk Indicator scores were expected to result in reduced referrals to site, or less urgent referrals.

**Detailed results for all nine scenarios investigated during the trial are set out in Table 4.7**

Scenarios 1 to 3 used cases designed to fit within the serious risk of harm category. Table 4.7 shows that prior to seeing the Background Risk Indicator, the referral rate of social workers was 100 percent, and that a critical or very urgent response was recommended. These scenarios were explicitly designed to test the safety of decision-making, and accordingly, minimal change in decision-making was expected. In response to the Background Risk Indicator, very few social workers changed their decision, regardless of whether they were shown a high, medium, or low Background Risk Indicator score. All changes in decision-making resulting from the indicator were safe. Further, the very small number of changes made were consistent with the indicator, and occurred in the expected direction. Across these scenarios, results are assessed as being fully consistent with the trial hypotheses.

Scenarios 4 to 6 were intended to test the impact of the Background Risk Indicator on cases within the possible risk of harm category. Before seeing the indicator, the referral rate of social workers was between 79 and 92 percent, and an average urgency response of 20 days was recommended. Across each of these scenarios, changes in decision-making were broadly in line with the expected impact. A number of social workers changed their decision in response to the indicator, these changes were all safe, and with one exception, were consistent with the direction suggested by the indicator. In addition, not all impacts were statistically significant, and impacts appeared larger where the indicator suggested higher, rather than lower, risk. Across these scenarios, results are assessed as being fully consistent with the trial hypotheses only where there was a high Background Risk Indicator score.

Cases within the low risk of harm category were used within scenarios 7 to 9. This table shows that prior to seeing the Background Risk Indicator, the referral rate and criticality assigned to these decisions was substantially lower than in other scenarios. After seeing the Background Risk Indicator, a number of social workers made changes to their decisions, all of which were safe and, with one exception, occurred in the direction suggested by the indicator. The impact of the indicator was only significant on both the referral rate and criticality index when there was a high Background Risk Indicator score. Across these scenarios, results are assessed as being fully consistent with the trial hypotheses only where there was a high Background Risk Indicator score.

**Table 4.7: Detailed results for all scenarios investigated during the trial**

| Scenario | Care and protection category | Average referral rate before BRI | Average criticality index before BRI | BRI score | Expected impact on referrals and criticality | % changing decision | % point impact on referral rate | Impact on criticality index | All changed decisions safe? | All changes in the expected direction? | Consistent with expected impact? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **Serious** | 100% | 5.2 (48 hour) | High | Minimal | 6% | 0% | 0.20 | Yes | Yes | Yes |
| **2** | | 100% | 5.5 (24 hour) | Medium | Minimal | 4% | 0% | -0.11 | Yes | Yes | Yes |
| **3** | | 100% | 5.5 (24 hour) | Low | Minimal | 2% | 0% | 0.06 | Yes | Yes | Yes |
| **4** | **Possible** | 79% | 2.9 (20 day) | High | Increase | 24% | **13%**** | **0.34*** | Yes | Yes | Yes |
| **5** | | 92% | 2.8 (20 day) | Medium | Increase | 10% | 7% | 0.19 | Yes | **One exception** | **Unclear** |
| **6** | | 91% | 3.1 (20 day) | Low | Decrease | 21% | -7% | -0.40 | Yes | Yes | **Unclear** |
| **7** | **Low** | 7% | 1.1 (CR)[1] | High | Increase | 19% | **26%**** | **0.33**** | Yes | Yes | Yes |
| **8** | | 34% | 1.7 (PRP)[2] | Medium | Increase | 28% | **19%*** | 0.24 | Yes | Yes | **Unclear** |
| **9** | | 30% | 1.6 (PRP)[2] | Low | Decrease | 11% | -5% | -0.01 | Yes | **One exception** | **Unclear** |

**p* < 0.05. ***p* < 0.01. Impacts estimated as the difference in the decisions of the treatment group (after seeing the Background Risk Indicator) compared to the control group (without seeing the Background Risk Indicator). Estimates aggregated across decisions for all cases in each scenario. For each estimated impact N = 54. Detailed information on the estimates and p values for the impact of the Background Risk Indicator on the referral rate and criticality index are reported in Appendix 3. This Appendix also includes very similar estimates found after controlling for each social worker's intake disposition.

[1]Contact Record

[2]Partnered Response Pathway

## Detailed results: discussion

The primary objective of the trial was to understand whether social workers would apply the background risk indictor within their intake decision-making in a safe and expected manner. To achieve this objective, two hypotheses were developed and tested across nine different scenarios.

**In instances where social workers used the Background Risk Indicator within their decision-making, they did so in a safe and expected manner**

In this trial, an 'unsafe' decision was defined as any instance where, after being provided with the Background Risk Indicator, a social worker downgraded a case initially assessed as requiring a 24- or 48-hour response to a 20 day response, a Partnered Response pathway, or a Contact Record. Results from the trial demonstrate that based on this definition, social workers used the Background Risk Indicator within their decision-making in a safe manner.

Throughout the trial, there were a total of five instances where a social worker downgraded a case initially assessed as requiring a response within 24 or 48 hours. Of these changes, four cases initially assessed as requiring a 24-hour response were downgraded (two cases became a 48-hour response and two a seven-day response), while one case assessed as requiring a 48-hour response was downgraded to seven days. However, based on the criteria described above, none of these decisions are considered unsafe as a result of this change. Further, none of these changes resulted in decision-making that was inconsistent with other social workers.

**Changes in decisions were largely consistent with the direction suggested by the Background Risk Indicator**

With two exceptions, social workers' use of the Background Risk Indicator within their decision-making occurred in an expected manner. Results from the trial indicate that higher Background Risk Indicator scores tended to result in increased rates of referral, or more urgent referrals, while lower Background Risk Indicator scores led to decreased rates of referral, or less urgent referrals. These results provide suggestive evidence that social workers generally use the Background Risk Indicator in a manner that is consistent with the indicator score.

In two instances, decision-making did not occur in an expected manner. In one of these instances, a medium Background Risk Indicator score led to a social worker making a more urgent referral, while all other changes for that case resulted in a lower urgency response. In the other case, after seeing a low Background Risk Indicator score, the social worker revised their decision to a more urgent response. However, apart from these two exceptions (out of a possible 96 changes that were observed), the use of the Background Risk Indicator occurred in an expected manner.

**These results show that social workers made a modest number of changes, and that the impact of the Background Risk Indicator was significant in some cases**

Decision-making after being shown the Background Risk Indicator shows that a modest number of changes were made by social workers for each case. Overall, the provision of the Background Risk Indicator influenced both the referral rate and criticality index of some individual cases. However, these impacts were statistically significant within only two of the six scenarios where some change in decision-making was expected. The

results also show that the impact of a high Background Risk Indicator on referral rates was larger than the impact of a low score.

**A range of factors may have limited the number of statistically significant impacts identified within the trial**

While approximately 50 percent of the total National Contact Centre workforce was involved in the trial, this equated to a relatively small number of total participants (54). This restriction may have limited the number of statistically significant impacts able to be detected within the trial. However, given the large proportion of possible participants involved, it is likely that the trial results can be generalised to the total Contact Centre population with some confidence.

The limited instances where changes in decision-making were expected may also have restricted the number of significant effects identified. Across the nine scenarios tested within the trial, each social worker was presented with the Background Risk Indicator and given the opportunity to incorporate it within their decision-making on 12 occasions. As three of these cases were designed to test the safety of using the indicator, there were a total of only nine instances where some change in decision-making was expected. This small number may have resulted in a limited ability to detect significant impacts.

The pairing of case summaries with Background Risk Indicator scores may also have limited the number of significant impacts detected. To understand the impact of various Background Risk Indicator scores across a range of scenarios, the trial design involved matching cases from within each category of care and protection concern with a high, medium, and low indicator score. However, this design also meant that within several scenarios, the Background Risk Indicator score and level of risk evident within a case were in alignment. For example, for the case containing a low risk of harm that was paired with a low Background Risk Indicator score, there was a limited likelihood that significant changes to decision-making would occur, as the presenting information was effectively confirmed by the indicator score. Some instances of congruence would also occur within any operational use of the tool, as the Background Risk Indicator was developed using many variables already considered by social workers within their regular practice (e.g. the level of prior involvement a child or young person has with CYF).

This issue may also have been compounded by the broad guidance given to social workers regarding how to apply the Background Risk Indicator within their decision-making. To allow for social workers to apply their professional judgement, this guidance was designed to be non-prescriptive. For example, in cases with a medium Background Risk Indicator score, social workers were told to consider that some form of service response was likely required. However, this approach may also have meant that in many cases, the social worker's initial decision already satisfied this guidance, reducing the likelihood that significant changes in decision-making would occur.

The design of the trial, which involved all social workers making an initial decision prior to seeing the indicator, was intended to reflect a possible approach to introducing the indicator within an operational environment. However, this design may also have resulted in a 'confirmation bias' or an 'anchoring effect'. This refers to a tendency to privilege an existing decision, or information that was initially received, resulting in a reduced likelihood of any decision-making changes. Asking social workers to make an initial decision independently may have yielded different results to showing the indicator alongside the presenting information.

This trial was also the first occasion where social workers were exposed to the tool and asked to apply it within their decision-making. Within the current intake system, social workers primarily rely on their professional judgement about the presenting information associated with each case. Given that the Background Risk Indicator required changes to this existing practice, and acknowledging that only one training session was held introducing social workers to the tool, the limited number of significant effects detected within the trial is not unexpected. However, results showing that a majority of social workers changed their decision-making at least once suggest an initial receptiveness to using the tool.

# Chapter 5: Feedback from social workers regarding the Background Risk Indicator

## Introduction

This chapter sets out the findings from the qualitative research undertaken as part of the non-operational trial of the Background Risk Indicator. The aim of this part of the study was to address the question: **what were the views and perspectives of social workers given access to the Background Risk Indicator?** Key qualitative data sources included an online survey completed by participants and eight focus groups conducted after they had finished making decisions about the 27 cases. Two CYF Working Group advisors were also interviewed during the trial.

The first part of this chapter sets out the qualitative methodology in more detail. The rest of the chapter presents the qualitative research findings, including social workers' understanding and perceptions of the Background Risk Indicator; how they used (or did not use) the Background Risk Indicator information; their suggestions for improving the tool; and how the Background Risk Indicator fits within the current CYF context and social worker practice.

## Chapter 5 summary

- The training was effective in providing social workers with an understanding of the Background Risk Indicator concept. Future training and information should include more detail about the variables that underpin the model (what they are and why they were included).
- Social workers are receptive to adopting a new tool that can assist with keeping children and young people safe. This is evidenced by the high comfort level many social workers had in making changes to their initial decisions after considering the Background Risk Indicator.
- Many social workers report the Background Risk Indicator is a useful additional resource to use alongside the Intake Decision Response Tool, which is their primary resource.
- Some social workers are fundamentally opposed to a tool based on statistics and view it as a labelling device. They are also concerned the tool focuses on risk rather than protective factors.
- Social workers need assurance that the Background Risk Indicator is based on accurate information. It was noted that some information is not able to be put into the model even though it may include the most accurate information about a child or young person. In addition, some information is reported in the CYF database without being verified.
- The Background Risk Indicator tool may be more useful in decision-making if it

includes information about which variables are 'driving' a score.

- As suggested in the training, social workers disregarded the Background Risk Indicator in cases where the presenting information indicated a 'critical' response.
- Many social workers indicated the Background Risk Indicator is most useful in cases where they are less sure about the most appropriate response. In some cases it prompted social workers to reflect further on the presenting information, or acted as a 'warning' prompt.
- Currently social workers make intake decisions in an environment where thresholds focus on high-risk cases. Social workers perceive the tool to have a greater role in prevention work.
- The research findings highlight differences in social worker decision-making. Social workers regard these variations as acceptable and expected.

## Qualitative methods

This part of the trial was led by an independent researcher, with support from three MSD staff. The focus was on the extent to which the training for using the new tool was effective, as well as social workers' views of the tool.

**Participants completed a survey to capture information about the effectiveness of the training**

All 54 social workers completed an online survey once they had finished making decisions about the 27 cases. The survey was administered through Survey Monkey and aimed to capture high-level feedback about the training session in the morning. Using a five point likert scale, respondents were asked:

- Thinking about the introductory information and training that you received this morning, how well do you think this prepared you to use the 'Background Risk Indicator' information in your intake decision-making?
- How confident are you that you now understand the concept of a Background Risk Indicator information?

The survey then included an open-ended text box, inviting participants to provide comments about the information and training and/or suggestions for improvement[29]. The survey captured information about participants' comfort with making changes after seeing the Background Risk Indicator information. Participants were asked:

- Thinking about when you changed intake decisions after seeing the Background Risk Indicator information, overall how comfortable did you feel making these changes?

This question included a five-point likert scale as well as a 'not applicable' option for those who did not change any intake decisions. A final open-ended text box invited participants to provide additional comments about using the Background Risk Indicator.

[29] This question was kept deliberately open, so that participants could provide suggestions about the training, trial or the background risk indicator.

**At the end of each day, social workers participated in a focus group interview to share their views and experiences of the Background Risk Indicator**

In the final part of the trial, all 54 social workers participated in a focus group interview. A key purpose of the focus group was to gather contextual information to assist with the interpretation of the decision-making results of the trial. Social workers were asked to share their perspectives about the Background Risk Indicator and their experiences of using, or not using, the information in their decision-making.

A limitation of the focus group data is that it is not possible to quantify the number of participants who agree, or disagree, with a particular perspective. In this report the term 'some' refers to comments that were made at one or more (but not all) focus group interviews; and the term 'many' or 'most' refers to comments made in all the focus group interviews.

At the end of each focus group, participants were given the opportunity to provide any additional comments about the Background Risk Indicator that had not been brought up in the discussion. They were also invited to make contact with the independent researcher if they had additional information they wished to share. One email was received. This information was included as another source of data, while keeping the identify of the social worker confidential.

Two CYF Working Group advisors were interviewed to gather background and contextual information about current social worker practice. The advisors were interviewed by the independent evaluator on the second and fourth days of the trial. The interview was unstructured and provided the independent researcher with the ability to clarify information obtained from the focus group interviews.

The analysis of the qualitative results is thematic. For example, although there were no specific questions about how the Background Risk Indicator fits with current CYF practice, or suggestions for improving the Background Risk Indicator, these topics emerged as themes from the focus group data and have been included in the results reported in this chapter. More information about the qualitative elements of the trial design is included in Appendix 3.

# Qualitative results

## Social workers' understanding of the Background Risk Indicator

**Information about the model needs to be conveyed in language targeted to the audience**

The training was presented by a member of the research team and a CYF Working Group advisor. This shared facilitator approach ensured that information about the technical aspects of the model were followed up with case examples conveyed in language and terms familiar to social workers. As one participant commented:

> *The presenter [researcher] had good insight into the model. However, it was difficult to follow what the presenter was trying to portray ... [The CYF advisor] explained in two sentences what this model was and in a way that we understood… (Online survey)*

**The training session was effective in providing social workers with an understanding of the Background Risk Indicator concept**

In the survey, social workers were asked, "How confident are you that you now understand the concept of a Background Risk Indicator information?" The survey results indicate that social workers considered the training provided them with sufficient information about the trial and the Background Risk Indicator. As Figure 5.1 shows, 87 percent of respondents indicated they were confident or very confident they understood the concept of the Background Risk Indicator. One participant commented:

> *Information was very clear and made sense to me. I can see how this can be a useful additional tool in order to help Intake Social Worker(s) make decisions. (Online survey)*

Some social workers said they appreciated working through examples of using the Background Risk Indicator before they began the task of reviewing cases for the trial.

**Most participants said the training prepared them well for the decision-making tasks they had to undertake for the trial**

Social workers were asked how well the introductory information and training that they received prepared them to use the Background Risk Indicator information in their intake decision-making. The majority (91 percent) said it had prepared them well, or very well (Figure 5.2). Comments in the survey data indicate that participants had ample opportunity to ask questions and get clarification where required.

Respondents who indicated the training did not prepare them well for the decision-making tasks, or were neutral about the training, commented that they needed additional information about all the variables used within the model as well as those they considered obvious for inclusion (e.g. cultural identity) that were not included. This is an issue that was raised again, by many social workers, in the focus group interviews. This highlights the importance of providing adequate information about the Background Risk Indicator for social workers to trust the tool.

**Figure 5.1: Most participants (87%) indicated they were confident or very confident they understood the concept of the Background Risk Indicator**

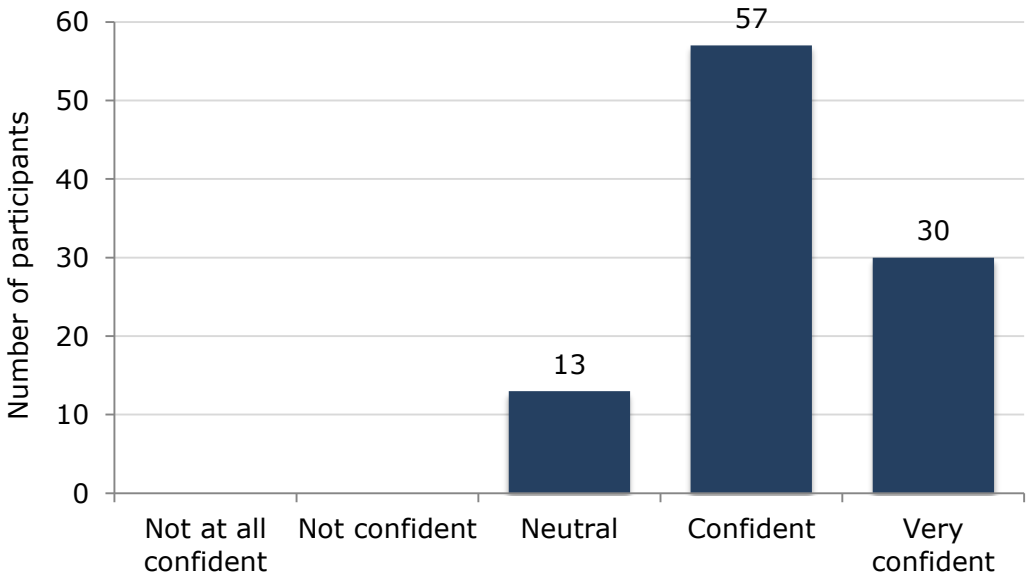
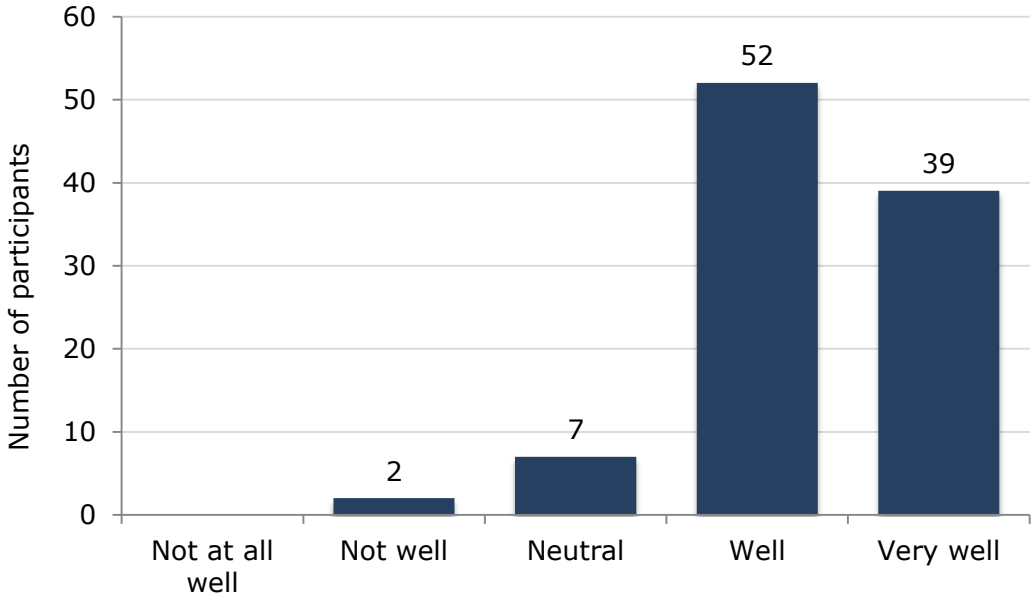


**Figure 5.2: Most participants (91%) said the training prepared them well or very well for using the Background Risk Indicator**




There was a small variation in survey responses over the four days of the trial. On the first day, all participants indicated they had been well or very well prepared for the task ahead. On the other three days of the trial there were a small number who indicated they were neutral or not well prepared for the task. The qualitative research team noted that the presentation stuck closely to the intended script on the first day, but additional information was provided on subsequent days. For example, the training script on the first two days of the trial did not mention that ethnicity was excluded as a factor in the model. After a question was raised on the second trial day, this information was included in subsequent training sessions. It is possible that the additional information provided on three of the trial days triggered some concerns for participants.

## Perceptions of the Background Risk Indicator

### The survey provides some indication of the diversity of social worker perceptions about the Background Risk Indicator

In total, 35 (65 percent) participants provided comments about using the Background Risk Indicator. Analysis of these comments indicates almost half (46 percent) were positive about the tool, while 37 percent were neutral and 17 percent had negative views. The types of survey comments about using the Background Risk Indicator are summarised in Table 5.1, along with the number of times the same point was made.

**Table 5.1: Summary of survey comments* about the Background Risk Indicator**

| Percent of participants | Types of comments (no of similar comments) | Number of similar comments** |
|---|---|---|
| Positive 46% | Helpful as it confirmed or aligned with my decision | 11 |
| | Useful, additional tool | 10 |
| | Helpful when not sure, sitting on the fence | 6 |
| | Helps me to reflect on presenting information; useful alert | 5 |
| Neutral 37% | Interesting, but it did not change my thinking | 7 |
| | Need additional information about risk factors to support rationale for decision | 6 |
| | Existing information over-rides the Background Risk Indicator | 5 |
| | Maybe more useful if it includes data from other agencies | 2 |
| | In practice I would consult with colleagues | 2 |
| Negative 17% | I have confidence in my own decision-making; do not need Background Risk Indicator | 4 |
| | Current tools work perfectly well | 2 |
| | Do not see the relevance of the Background Risk Indicator information | 1 |

* N=35 (all survey participants who commented on the Background Risk Indicator)
** Numbers do not add to 35 as some participants included more than one point in their response

There is strong congruence between the survey comments and those raised in the focus group discussions. The key themes are discussed in more detail in this chapter.

**Many social workers are receptive to new tools that can assist with keeping children and young people safe**

In the focus groups, positive perceptions of the tool centred on the idea that the wellbeing of children and young people is the primary priority, and any new tools that can assist with that purpose ought to be embraced. As one social worker commented:

> *It's good to have tools, new tools, come in [to] help us in our decisions and to keep our children and young people safe [and to] support the family. (Focus group)*

During the training session the researchers indicated that, in the future, additional information from other government agency databases could be included in the future model. Some social workers responded enthusiastically to the suggestion they would have a tool that could assist with building a broader understanding of wellbeing and risks for children and young people. As one respondent commented:

> *I'm quite excited about it. I like the idea that it's drawing on a whole lot of information that we have, you know, that the Ministry has access to, and, you know, through my studies, it's pretty clear to me that there's a lot of factors that make up wellbeing, so to have access to those general patterns and considering all*

*of those factors, those lifestyle factors, I think it's a worthwhile process going forward. (Focus group)*

**Acceptance of new tools requires evidence they are based on accurate information**

Social workers said they want to know that the tools they use will help them to better protect vulnerable children. They raised two issues with data quality that should be addressed to help improve social workers' confidence using the Background Risk Indicator.

The first relates to the types of information the modellers are able to extract from the CYF database. One example given was social workers recording an intake as an NFA (a case where 'No Further Action' is considered necessary) if it is already an existing case:

*Sometimes the outcomes don't actually really indicate what's happened…You maybe have to go into your Tuituia summary and have a look … but that information isn't easy to take out statistically ... (Focus group)*

This issue is relevant as qualitative information is not easily put into the model, even though it may include the most accurate information about a child or young person.

The second aspect of quality concerns the subjective nature of information provided to social workers that may be reported in the CYF database without being verified. As an example, a child may be reported as living with a sole parent based on the information a caller has provided:

*This is what Mum told me, that she's no longer in a relationship and he's at a different address. And then you rock up to the address and they're climbing out of bed, or whatever…He's living there because his work boots, and all his clothes [are there] … so that's not always 100 percent accurate either, just like our stuff [in the database] (Focus group)*

As this example indicates, information provided to social workers, and recorded in the CYF database, may differ to what is happening in reality.

**The Background Risk Indicator focuses on risk rather than protective factors**

In developing their decision responses, social workers assess safety and risk while drawing on a strengths-based approach:

*You ask a lot of questions about what's the support … for mum, so outside support … we're looking to the wider whānau and what strengths they bring to that. (Focus group)*

This approach is evident in the questions posed in the Intake Decision Response Tool. For example, when assessing safety, social workers are asked to consider: "Is there an adult willing and able to meet the immediate needs of children and young people? Are there other factors that help reduce the risk of neglect and abuse?"

Some social workers view the tool as a labelling device. As one social worker said:

*I don't like the idea of predicting people as high risk or labelling individuals/families because they are beneficiaries. (Online survey)*

While social workers understand the Background Risk Indicator is based on children or young people with similar characteristics and circumstances, some see the numbering aspect as dehumanising:

> *I think the thing that probably puts me off the most is that it's statistical. It's based on statistics, and … I'm going to be honest … just the fact that a lot of it's around labelling, for example … around people being on benefits, where they live, and yet there's a whole lot more to it than just that. (Focus group)*

**The Background Risk Indicator is not sensitive to changes occurring in a family**

When assessing the presenting information about a case, social workers are looking at a family's history and may note an increased capacity to change. One of the cases was designed specifically with this in mind. The Background Risk Indicator was high, but the detail in the history indicated significant change had occurred within the family. Many social workers downgraded this case because the tool could not see the change. As one participant commented:

> *I think [the Background Risk Indicator] almost labels a family as being always at that 80 percent even though there's been some change and they're heading towards a more positive future. (Focus group)*

**Some social workers are critical of a tool that does not take into account cultural differences**

Some social workers were told during the training session that ethnicity was not included as a factor in the model. This message had an unanticipated consequence, in that some social workers then viewed the Background Risk Indicator as a 'one size fits all' approach, potentially lacking the ability to take into account key differences between ethnic groups.

> *I like the information that you guys are delivering. However, would it really meet the needs of everybody with different backgrounds, different cultural backgrounds? (Focus group)*

With this in mind, one participant suggested the tool might be reliable only when used with Pakeha families. They were critical that other ethnic groups were "lumped in this one thing". Implicit in these comments is a perception that the methodology behind the tool comes from a western paradigm, and may not have a good fit with Māori or Pacific ways of viewing the world.

## How social workers used the Background Risk Indicator

This section reports on social workers' experiences of using the Background Risk Indicator, based on data gathered during the focus group interviews. As noted earlier, each participant was asked to assess 27 cases. After an initial assessment, 12 cases then included Background Risk Indicator information. After considering the Background Risk Indicator information, the participant was asked to consider changing their initial intake decision. If they decided to change their initial intake decision they could either decrease or increase the urgency of the decision. Alternatively, they could decide not to change their intake decision.

**Intake decisions are made primarily on the presenting information about a case**

During the training the tool was presented as being a possible input into professional decision-making, alongside the presenting information. A key theme emerging from the focus groups is that many social workers are not willing to accept the Background Risk Indicator when it does not align with the presenting information. Many social workers referred to 'presenting information' as evidence:

> *Because [the Background Risk Indicator] is based on that profile of similar children captured in our database [it] doesn't necessarily mean it's going to reflect on that child. So, as a practitioner, my assessment was based on the presenting concern, looking at the history. (Focus group)*

**A social worker's confidence, knowledge and experience may influence whether they respond to the Background Risk Indicator information**

Social workers may decide on the same initial response, but in some cases the Background Risk Indicator influences a social worker to change a decision while another decides to stay with their original assessment. The following exchange between two social workers in a focus group illustrates a case where a social worker (Speaker 2) was not prepared to downgrade a decision even though the Background Risk Indicator information suggested they do so.

> *Speaker 1: I think the one I might have gone down on is [the case] where it was the baby in the car on her own and Mum fell asleep on the couch, because I think I initially was thinking CFA and then the indicator came low, low reoccurrence, so I went to PRP*
>
> *Speaker 2: Oh, okay. That's interesting, whereas I left it at CFA, because I think I've just read too much … about people just leaving babies in cars that die… It's too risky. And even though she was upset, you know, when the police came and she realised, I mean, she was asleep, so she wouldn't have known. I thought … if the temperature had changed and it got really hot all of a sudden … it was just too many things we didn't know about, so I just upped it, left it there. Based on my knowledge, not what the model said, you see? (Focus group)*

The different ways that social workers respond to the Background Risk Indicator may require further investigation. It may be that less experienced social workers are more receptive to using the tool than other staff who have more confidence in their decision-making. It may also relate to some social workers trusting the tool less than others.

**Social workers did not use the Background Risk Indicator when the presenting information showed clear evidence of harm**

The training session provided clear guidance to social workers to disregard the Background Risk Indicator when the presenting information showed evidence of serious harm. The focus group data indicates that most social workers understood and followed this guidance. For example, one participant referred to a case they assessed as 'critical', and then the Background Risk Indicator indicated that for children or young people with similar characteristics and circumstances, there was a low risk of them going on to have an intervention or subsequent intake within two years. The participant said she understood why the Background Risk Indicator came up with 'low', but felt that in this instance, with this specific child, a critical response was required. In another case, a participant commented:

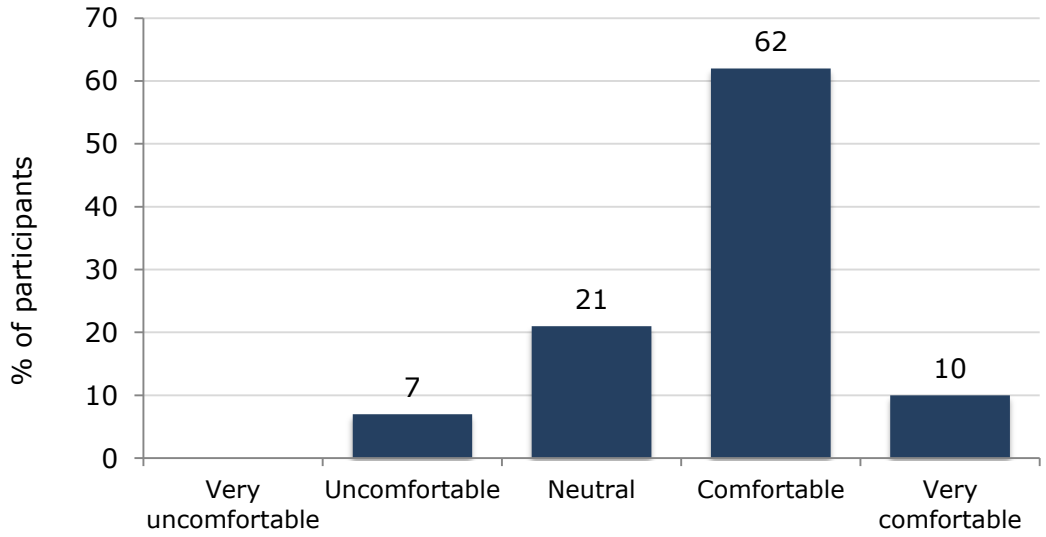
*… in the case of the young person saying they're going to suicide, that's clearly critical because they say they're going to go suicide and they don't want to return home. There's nowhere else for them to go. Clearly, it's a critical despite whatever the Background Risk Indicator's going to tell you. It doesn't matter at that point because we know that's our business. (Focus group)*

In such situations the case was clear-cut and social workers relied on current practice guidelines to make their decision.

**In most cases social workers did not change their decision, but when they did, they were predominantly comfortable doing so**

Overall, 74 percent of social workers made at least one change to a decision after seeing the Background Risk Indicator. Of this group, the majority indicated they felt comfortable or very comfortable changing their decision/s.

**Figure 5.3: Social workers* comfort with making changes after viewing the Background Risk Indicator information (%)**




* N=42 (all participants who indicated they made at least one change)

**The Background Risk Indicator is useful in cases where social workers are less sure about the most appropriate response**

In cases where social workers were unsure of what decision to make about a case, the Background Risk Indicator provided some guidance about how to proceed:

*You'd had this response, then that [Background Risk Indicator] carries quite a bit of weight, so I'm thinking, "Okay, I need to consider that" when I was sort of sitting of the fence perhaps. (Focus group)*

*When you are at the borderline where you have to refer it or not, then the Background Risk Indicator would be an additional tool which provides you with additional information, or it would strengthen your decision – yeah, I have done the right thing, I have referred because the Background Risk Indicator is high, or it is low so it was a NFA. (Focus group)*

One participant described assessing a case as NFA (No Further Action) because the Family Court was involved, suggesting that because it was a custody issue it was not CYF business. But when the Background Risk Indicator information showed a high risk the participant changed their assessment. The Background Risk Indicator provided the social worker with some justification for CYF involvement even though this was not backed up by the presenting information. This finding is an example of a social worker stepping beyond the current decision-making protocols set by CYF.

**The background information prompted some social workers to reflect further on the presenting information**

Another reason for making a change related to the Background Risk Indicator acting as a warning flag, prompting social workers to reflect further on a case and err on the side of caution. In this respect the Background Risk Indicator functions as an alert, similar to the trigger that appears in the CYF database when a social worker is working on a case with a vulnerable infant. Comments from social workers indicate that the Background Risk Indicator acted as a warning flag when their initial decision involved a low level response and the Background Risk Indicator came back with a high score. As one social worker said:

*The Background Risk Indicator came up, I thought, "Well, actually, that does change it because there are other factors that are all of a sudden there" and perhaps a referral to a PRP or something like that might be really useful for that family as a whole. (Focus group)*

Some social workers indicated that when the Background Risk Indicator came back with a high score, their response was to take a closer look at the presenting information.

*I'm going to have another look. Let's have another look. (Focus group)*

*When you're sitting here in the contact centre and if you're assessing day in, day out, you could arrive at an area of complacency or whatever, so a tool is always a handy thing just to think, "Oh, hello". You know, double-check. (Focus group)*

These responses provide further evidence that social workers could use the Background Risk Indicator within the context of current intake social worker decision-making guidelines.

Some social workers downgraded their initial decision after the Background Risk Indicator came back with a low score, on the basis that they had already decided on a low-level response and were therefore happy to downgrade even further. In such cases they also took into account the context at Site:

*I think I only changed one out of the 27 assessments. And that one I downgraded from 20 days to PRP or NFA, because … I can see a bit of risk there, so it could be good for them to go out and do CFA. But in reality there's a lack of resources and workers on Site, so I can see probably even as an intake social worker they can put down 20 day CFA on the side of cautious, but it's highly likely Site will NFA that.*

*And then with the tool telling me okay it's of low risk and I'm feeling more comfortable. (Focus group)*

In such cases the Background Risk Indicator both reinforced the social worker's decision and reassured them that the risk level was low.

**Decision changes tended to be subtle shifts in criticality**

One participant's comment about the Background Risk Indicator's influence was met with general agreement by the rest of the group and was also reflected in comments from social workers in other focus groups:

*I stuck to my own decision on most of [the cases]. It was influential slightly, minorly. (Focus group)*

**Social workers stayed with their initial decision when the Background Risk Indicator aligned with their judgment**

For around a third of the cases in the trial, the level of risk described by the Background Risk Indicator broadly aligned with the presenting information of the case. Most social workers reported that the Background Risk Indicator often aligned with their initial decision, thus providing them with confirmation that they had made the right decision. For example:

*What Background Risk Indicator did do for me was actually just cemented or confirmed where I was heading in terms of my assessments. (Focus group)*

## Suggested improvements to the Background Risk Indicator information

A key request from social workers is for more information about the variables used in the Background Risk Indicator.

**Information about the Background Risk Indicator should include a list of all the variables used within the model**

At the training session social workers were shown a PowerPoint slide with 15 variables. However, the research presenter indicated the list was much greater than that. Social workers would like to see a list with all the variables as well as an explanation of why these have been included. As one social worker commented:

*Perhaps briefly talk a bit more on what are the characteristics identified as risk indicators, e.g. why Work and Income unsupported child benefit is considered as a characteristic or possible risk indicator. (Online survey)*

Likewise, social workers want to know why some variables, such as cultural identity, are not part of the model. Providing this information may be important in helping social workers trust, and therefore use, the Background Risk Indicator.

**It would be helpful to know which variables in particular are responsible for a Background Risk Indicator score**

As noted earlier in this section, social workers develop decision responses based on the presenting information. Adding additional information about the variables that have influenced a rating for a particular child or young person may assist a social worker to probe further. As one social worker commented:

*There might be disabled children, you know. Another 80 percent could be driven because the mother has got extensive CYF history … [There might be] poverty in the local area… That is the sort of information you need to be provided with, not just this number. You need to know what's driving that number. (Focus group)*

Additional information to support the background risk information may help to support the rationale for their response decision, especially with Sites. Social workers commented favourably about incorporating data from other agencies as well, as this will help to provide a broader picture of a family's circumstances.

## How does the Background Risk Indicator fit with current CYF and social worker practice?

The qualitative data also provides insights into existing social worker practice, including how social workers make and rationalise intake decisions and how other parts of CYF respond to referrals from the National Contact Centre.

### The Background Risk Indicator does not align with the current Intake Decision Response tool

The primary tool used by social workers making making intake decisions is the Intake Decision Response tool. The tool aims to assist social workers to determine the appropriate response and timeframe (ranging from 'no further action' through to 'investigation'). Timeframes for responses range from 20 working days (low urgency) through to 24 hours (critical). The intake decision-making aims to assess safety and immediate risk (this is referred to as CYF 'core business').

The Background Risk Indicator provides no information about current safety or immediate risk. Rather, it provides information on the likely chance that there are safety concerns for a child or young person, that will manifest as either an intervention or another subseqent intake in the next 24 months. Because CYF social workers are required to assess a case based on the presenting information only, many social workers suggested the Background Risk Indicator would be useful for the Children's Team/hub, which they suggest has a greater focus on prevention.

### The Background Risk Indicator needs to be integrated with Site decision-making if it is to be an effective tool

While the Background Risk Indicator may indicate some action, such as a partnered response, several constraints mean these families will not be followed up at Site. The first reason a site may downgrade a response relates to lack of resource to deal with anything other than high risk cases. As one social worker who now works at Site commented:

*Yeah, and if a current intake isn't showing any clear current care and protection stuff like some of those were, we wouldn't be accepting it at Site. There's definitely no way that we would accept it at Site if the - even if a number was showing there's been a huge history with this family. If there's no current care and protection stuff we don't have time to ... it would be amazing if we could. It would be ideal if you could because you would be predicting that something else is going to come in. But we know when we're closing them that they're probably going to come back in. You know, you do know that but at the same time you just don't have the resources to ... (Focus group)*

Many social workers also expressed a frustration that their decisions are changed by Site:

> *We can only do what is right given the tools and the information that we've got at hand. And sometimes it can be quite despairing to open up a case that you have viewed and made a decision upon just to find it was closed straight away ... You believe there's on-going problems. Why aren't they doing anything? So that's probably the basis of some frustration around the whole, "Oh, Site have done something different", because we see and we believe quite firmly there's a problem, but we've got no control beyond it. (Focus group)*

A CYF site may also change a response because they have additional information that the National Contact Centre does not have access to. Participants commented that Site staff tend to have local knowledge and know the families.

Some social workers reflected back on previous CYF policy and speculated about the impact the Background Risk Indicator might have at Site in the current environment:

> *Thinking back to the good old days when if there was three reports that required an intervention regardless. There used to be that rule of three within a year. And that had some real merit, but obviously it got superseded by workloads. But seeing all those NFAs, I wonder if the Background Risk Indicator flagging up a little bit sooner might make both Site and the Contact Centre look at it a little bit differently a little bit sooner. (Focus group)*

**Many social workers view the variation in their decision-making as acceptable and expected**

The quantitative results of the trial showed significant variation in decision-making across participants. This was also a theme identified in the focus group data. Social workers noted that their values, experiences, and training, as well as CYF policies and practices, could influence their assessment:

> *In the end we have to distil it down through ourselves and our knowledge of what our thresholds are. (Focus group)*

As an example of the variation in decision-making, one social worker said they never use a '20 working days' response:

> *Don't ask me why, but I just don't. I just ignore that response and … we're never going to get, you know, consensus … but as long as we do for the … criticals … we need to have it for those. I'm not saying the other lower ones are less value, but … in a room full of social workers, honestly, there's such division. Because we're all coming from our learning and thinking and what we think is right… (Focus group)*

Social workers accept they have different worldviews and this influences the way they see the information in front of them. Some social workers indicated that this variation was acceptable as long as social workers provided a strong rationale for their assessment:

> *Now, I come to decisions which may not be the same as anyone else's. I might be different. But at that time I would've had a rationale and that would've focused on what I was presented with then. (Focus group)*

To some extent an individual social worker's decision may be moderated through consultation with colleagues. Social workers discuss cases and provide feedback to each other.

> *I can go to my colleague, to at least two of them, and then we have a…robust discussion…I work in a team where I've got tauiwi (non Māori ) and I've got PI (Pacific Island colleagues), so there are different world views…We've got a supervisor who's also a psychologist…And we feedback with one another. (Focus group)*

The artificial nature of the trial meant that trial participants were not able to consult with their colleagues. However, the qualitative findings provide evidence that variability within current intake decision-making occurs, and is to be expected and at some level is accepted.

Another example of variation in decision-making amongst social workers relates to the use of partnered response. Partnered response is a voluntary pathway and it does not require a statutory response and no assessment of safety occurs. The intention is that site social workers meet with a family and assist them to engage with community professionals by way of referrals to appropriate agencies. If the family refuses to engage, the case can come back for a safety assessment and ongoing monitoring. While social workers support the concept (because it is prevention focused), many expressed a concern that it does not work in practice. Rather, whānau often decline support, no referrals are made and the cases are closed at Site without assessment. Therefore, some social workers do not bother to refer to partnered response:

> *I [don't] get too bogged down in the technicalities of NFA, contact record and PRP because to me, a PRP is a NFA … And I get kind of annoyed if I read the information in an intake: "the parents didn't engage", because it's their choice not to engage. They can't be forced, so how can you hold that against them, you know? (Focus group)*

# Chapter 6: Conclusion

## Chapter 6 summary

**The overall objective of the Enhancing Intake Decision-Making Project was to assess whether care and protection intake decision-making could be improved by giving social workers access to a statistical risk tool**

Currently, CYF receives notifications regarding the alleged abuse or neglect of around 100,000 unique New Zealand children and young people annually. The CYF National Contact Centre and local FVIARS committees are the primary organisations responsible for an 'intake decision' regarding these notifications, which determines whether further assessment or services are warranted. These decisions have significant consequences for the children, young people, and whānau involved, but despite their importance, are made within a time-pressured environment, using information that is uncertain or incomplete. Previous international and New Zealand research has demonstrated the potential for these intake decisions to benefit from the use of statistical risk modelling tools.

To assess whether a statistical risk model could be incorporated into intake decision-making within the New Zealand care and protection system, the research project comprised three main phases of work:

1. Developing a statistical risk model specifically tailored to the New Zealand care and protection intake system.
2. Developing a means of putting this statistical risk model into operation within an intake decision-making environment.
3. Trialling the use of this information within a non-operational context at the National Contact Centre, and collecting feedback from social workers relating to their perceptions of this tool.

**Results from the project demonstrate that a statistical risk model has the potential to be effectively used within an intake environment**

The overall findings of the Enhancing Intake Decision-Making Project suggest that the incorporation of statistical risk model information, in the form of a Background Risk Indicator, has the potential to improve care and protection intake decision-making. Results from the trial highlight that when this information is successfully put into operation, social worker decision-making is influenced in a safe and expected manner. These results suggest that the potential for more effective decision-making provided by the model could be realised within an intake environment. While further development work is warranted, these results provide a clear platform for progressing towards an implementation phase.

## Development of a statistical risk model

**A statistical risk model can provide useful information for intake decision-makers**

An essential first step within the overall project was to identify whether statistical risk modelling could provide social workers with information that was useful for their intake decision-making. In order for this information to be deemed 'useful', it needed to provide intake decision-making that was more accurate than under the status quo. The overall approach taken to answer this key question involved building a number of statistical risk models, and comparing the accuracy of the best model to current intake decision-making.

This work initially involved creating a dataset from notification information, which, due to the underlying quality of CYF data, was not straightforward. In order to assess the accuracy of intake decisions, a measure of *estimated concern* was then developed. This measure used specific information about what happened to the child or young person after a referral decision (either an intervention with CYF, or a second intake decision within the following two years) to estimate if they experienced an underlying care and protection related concern. As outlined in the modelling chapter of this report, while this approach provides a reasonable measure, it has some limitations and will not be correct in all circumstances.

Using this measure of *estimated concern,* current intake decision-making was assessed as being accurate in around 60 percent of cases. Using historical data, the accuracy of the best model was then compared against this existing decision-making. Results from this testing demonstrate that a statistical risk model can perform better than current intake decision-making, at a rate of around 6 percentage points. The model was able to refer an increased proportion of children and young people where there was an *estimated concern*, as well as fewer children and young people where there was not an *estimated concern*.

These results suggested that model information could be useful for social workers making intake decisions, providing justification for advancing towards the next phase of the project: developing a 'Background Risk Indicator' and trialling the use of this tool within non-operational intake decision-making.

## Use of the Background Risk Indicator

**A majority of social workers were receptive to using the Background Risk Indicator within their decision-making**

Within the trial, the majority of social workers appeared willing to use the Background Risk Indicator within their decision-making, with 74 percent of participants making at least one change after seeing the tool. Survey results also highlight that a majority of these social workers stated that they felt comfortable or very comfortable making this change. This finding highlights that most social workers appear receptive to adopting a new tool that can be applied within their decision-making.

The qualitative information collected provides useful insight into specific instances where social workers applied the tool, along with broader factors influencing its application within decision-making. Focus group discussions during the trial highlighted that social workers found the tool particularly useful in cases where the presenting information left

them unsure as to the appropriate service response. Social workers also noted that the tool had a useful function as a 'warning flag', which prompted them to reassess the details of a case.

The high level of comfort experienced by most social workers may also be related to the effectiveness of the training programme developed for the trial. The qualitative information collected shows that a large majority of social workers felt that this training prepared them well or very well for using the Background Risk Indicator. A majority also reported that they were confident or very confident that they understood the concept of this tool. These results highlight the importance of a considered approach to putting the model into operation, and demonstrate that appropriate training may be associated with greater uptake of the tool.

**Some social workers appeared resistant to using the Background Risk Indicator within their decision-making**

Quantitative results from the Background Risk Indicator trial highlight that a number of social workers did not make any changes to their decision-making. Across a total of 54 participants, 14 social workers did not use the Background Risk Indicator on any occasion. The qualitative information that was collected throughout the trial also reflects the views of a group of social workers who were resistant to using the indicator. These social workers appeared to be 'fundamentally opposed' to using the tool, perceiving it to be narrowly focused on identifying risk, unsuited to a strengths-based approach to social work practice, and unable to account for cultural differences.

As highlighted in the introduction to this paper, the merit of using statistical risk tools within a range of sectors, including the care and protection system, has been widely debated. While the potential for these tools to improve the effectiveness of decision-making is noted, some literature also argues that the use of statistical risk modelling carries moral and ethical risk, may compromise an individual's right to privacy, and could undermine the critical reflexive practice of social workers. Given this level of contention, it is unsurprising that some social workers were unwilling to use the Background Risk Indicator within their decision-making. Future work may focus on overcoming these limitations, for example, by better recognising a range of cultural perspectives, or attempting to reframe the function of the tool in a more strengths-based manner. This work may also benefit from partnering with social workers, to ensure higher levels of engagement and support for the tool.

**Social workers did not make unsafe decisions using the Background Risk Indicator**

As discussed throughout the paper, to ensure that the wellbeing of children and young people was protected, a rule was developed that reflected a deliberate judgement regarding the threshold for safe use of the Background Risk Indicator considered appropriate. Social workers were told that if their initial analysis of a case suggested that it was very high risk, then it should be referred for a safety assessment (irrespective of the indicator). This guidance was intended to highlight that only minimal change within these cases was appropriate, with any shift from a critical or very urgent referral to beyond seven days considered unsafe.

Results collected throughout the trial demonstrate that social workers understood this guidance, and were able to readily apply it within their decision-making. The quantitative information collected shows that a majority of social workers did not downgrade any high

risk cases and that on the few occasions where this did occur, it did not result in unsafe decision-making. Focus group information also highlights that social workers clearly understood the guidance given, and felt comfortable following it. These findings provide indicative evidence that when given clear guidance, in cases of serious harm, social workers will disregard the Background Risk Indicator and instead rely on their professional assessment of the presenting information. While the guidance given was appropriate within a trial environment, this may require further refinement to support any operational use of the tool. This could involve giving social workers more specific safety guidance, or investigating the viability of an over-ride function to protect against unsafe decision-making.

**Social workers used the Background Risk Indicator within their decision-making in an expected manner**

The statistical risk model developed for the trial shows that the Background Risk Indicator provides information that could potentially enable social workers to make more accurate intake decisions. This 'accuracy' relates to decision-making that refers more children and young people with a care and protection related concern, and fewer of those children and young people who do not require formal care and protection services. Quantitative results from the trial demonstrate that for cases that were not very high risk, social workers generally used the 'Background Risk Indicator' in an expected manner, which was consistent with the direction suggested by the tool. For example, when given a high Background Risk Indicator score, social workers used this information to refer more children and young people, or to make more urgent referrals. These results suggest that the opportunity for enhanced decision-making provided by the tool can be leveraged in an appropriate manner, which may result in improved outcomes for children and young people.

While social workers used low Background Risk Indicator scores to refer fewer children and young people, or to make less urgent referrals, the quantitative results collected show that this downward shift occurred to a lesser extent than in higher risk cases. Social workers appeared to be more responsive to the indicator when it suggested that a child or young person was at higher, rather than lower, risk. This finding implies that any future use of the tool may result in a higher overall rate of referral, and that the opportunity for the tool to reduce 'false positive' referrals may not be fully realised. Reluctance by social workers to downgrade their decisions on the basis of the Background Risk Indicator may be related to a range of factors identified within the literature. For example, research on social worker decision-making notes that high levels of risk aversion and the existence of an organisational 'blame culture', may result in an inflated referral rate. Further work may be required to support social workers using the tool in a manner that reduces the rate of unnecessary intervention.

**Quantitative results from the trial demonstrate that the impact of the Background Risk Indicator was statistically significant in some cases**

The randomised nature of the trial was used to assess whether the Background Risk Indicator had a significant effect on decision-making. Quantitative results from the trial demonstrate that the Background Risk Indicator influenced both the referral rate and criticality index of some cases, and that the impact of the indicator was significant in some cases. Aggregated across the nine scenarios tested within the trial, the Background Risk Indicator has a significant impact on the referral rate of social workers in three cases, and on the criticality index assigned in two cases.

## Challenges and limitations

**Aspects of the trial design may have limited the extent to which social workers used the indicator within their decision-making**

While the impact of the Background Risk Indicator was significant in some cases, the number of social workers making changes, and the size of these changes, was relatively modest. The quantitative results highlight that only a minority of social workers changed their decision for each case summary, and that few social workers made more than three changes across the trial. The relatively small impact of the Background Risk Indicator is also reflected in the qualitative component of the trial, which noted that social workers primarily used the indicator to make subtle shifts in the criticality assigned to their intake decisions.

The relatively low uptake rates observed may partially have resulted from aspects of the trial design, along with its inherently artificial nature. As discussed within the quantitative chapter of this report, elements that may have limited the use of the tool, along with the ability to detect significant impacts, include: the relatively small number of total participants; the limited instances where changes in decision-making were expected; the alignment of Background Risk Indicator scores with the level of risk evident within a case; the broad guidance given regarding how to apply the Background Risk Indicator; and the possibility that the design of the trial introduced confirmation bias, or an anchoring effect. Many of these limitations could be resolved by undertaking targeted testing, development, and monitoring work, which would result in an improved understanding of the extent to which social workers may apply the tool.

**Social workers did not always trust the data used to generate the indicator, and wanted to understand more about the variables 'driving' the score**

Analysis of the qualitative data highlighted some limitations of the tool, along with other factors that restricted its application within decision-making. A primary issue that was raised related to a lack of confidence in the quality of the data used to generate the indicator score. Social workers stated that they had concerns regarding the accuracy of the CYRAS system, and noted that the subjective nature of some of this information will not always translate readily into a statistical risk score.

While this issue may have limited the application of the tool within this trial, social workers also offered suggested improvements to the indicator that may result in greater levels of uptake. Within the focus group discussions, trial participants requested that more information be provided regarding the variables used to generate the indicator score, and also stated that it would be helpful to understand the specific variables relevant to each child or young person notified. Incorporating this feedback may enhance the value of the model to social workers, and increase their trust in the tool.

**A primary issue affecting the use of the tool was a perceived disconnect with current intake decision-making practices**

As discussed throughout the report, when making intake decisions, social workers primarily rely on the presenting information contained within a notification. Social workers assess this information using the Intake Decision Response Tool, which is the principal decision-making aid used within the intake process. This tool outlines the criteria used to assess whether an intake is required, and the thresholds for response that govern this decision. Under current intake decision-making practices, if a social

worker cannot establish clear care and protection concerns, which are evidenced through specific examples of alleged abuse or neglect, the threshold for CYF involvement may not be met, and a notification cannot be justified.

Social workers within the trial noted that the purpose of the tool, which is to provide a broader consideration of underlying need, does not always align with current decision-making practices and thresholds, which primarily consider issues of immediate risk. The qualitative information collected highlighted that when operating within the decision-making context, social workers primarily focus on identifying issues relating to current safety or immediate risk. In contrast to this existing practice, the indicator is designed to provide insight into the 'background risk' a child or young person may experience, which may manifest as either an intervention or a further intake in the near future.

While this disconnect may have limited the use of the indicator within the trial, the quantitative results suggest an initial receptiveness to using the tool, along with a willingness by social workers to shift their highly embedded practice. Feedback collected throughout the trial also suggests that social workers support the more preventative approach that the tool promotes. As an intensive prevention and early intervention focus is a core component of the CYF modernisation programme currently underway, it is likely that the Background Risk Indicator will be better suited for use within this future context.

**The artificial nature of the non-operation trial meant that a range of scenarios could not be tested**

The quantitative and qualitative information collected throughout the trial provides useful insight into the impact of the indicator, along with an increased understanding of how social workers use this tool within their decision-making. However, given the artificial nature of this non-operational trial, it was not possible to test all aspects of decision-making using the indicator. Several potential scenarios were not investigated, for example, how social workers would respond if a notification with no CYRAS history received a relatively high indicator score. In order to more fully understand the impact of the Background Risk Indicator, further targeted testing work could be undertaken.

## Future work

**The statistical risk model would benefit from further development work prior to any operational use**

While the overall findings of the project provide suggestive evidence that a statistical risk tool could be successfully incorporated within an intake environment, further development work may be required prior to any operational use. Currently, the statistical risk model provides decision-making that is more accurate than the status quo, suggesting that the use of the model provides some scope for improvement within the intake system. However, a range of limitations affecting the performance and accuracy of the model also exist, which are primarily related to the inherent difficulty of using administrative data.

Further work to improve the effectiveness of the model could include a targeted focus on developing robust and consistent administrative data, and an investigation of the feasibility of integrating a wider range of data from other agencies. This work is likely to

enhance the accuracy of the statistical risk model, and may also resolve some of the data quality issues raised by social workers during the qualitative focus groups.

**The impact of the statistical risk model on the referral rate of Māori children and young people requires further investigation**

Currently, a large proportion of all children and young people notified to CYF are Māori. As discussed in the modeling chapter, while ethnicity was not included as a variable, the statistical risk model refers a higher number of Māori children and young people than under the status quo. During the focus groups, some social workers also indicated that they did not feel that the Background Risk Indicator could adequately assess risk for different cultural groups. This belief resulted from a perception that the Background Risk Indicator took a 'one size fits all' approach, which could not account for key differences between ethnic groups, for example, kaupapa Māori perspectives. Given these findings, implementation work is also likely to require early engagement and partnership with Māori academics, service providers, and other relevant stakeholders.

**Future work to reduce levels of variation within social worker decision-making could be explored**

The quantitative results collected throughout the trial show a level of variation in decision-making across participants, although the extent to which this variation may be over- or under-inflated by the trial methodology is unknown. This finding reflects existing research on social worker decision-making practices, and was also echoed within the focus groups. Feedback from trial participants included an acknowledgement that decision-making was likely to be inconsistent across individual social workers, and further, that this variation was considered acceptable and expected. Investigation of the impact of the Background Risk Indicator tool on decision-making showed no discernible reduction in levels of inconsistency. This finding suggests that the model is unlikely to improve the consistency of decision-making, and that further work to reduce variation could be explored.

**A range of implementation issues will require consideration prior to any operational use of the tool**

While a full consideration of these issues is outside the scope of this paper, it is worth noting that the introduction of the statistical risk model within an operational environment would require significant implementation work. Along with the range of issues already noted, further work would be required to better understand the impact of this tool on short and long term referral rates, and on the corresponding workloads of CYF and its partners. It is also likely that the implementation of the tool would require increased resourcing of preventative services, and this implication requires further investigation. Insights from this project highlight the importance of local FVIARS committees, the Vulnerable Children's Hub, and CYF sites within the intake system, and the implementation of the tool at these decision-making points may also warrant further consideration. Finally, the implementation of the tool would benefit from the input of front-line practitioners, and also requires significant IT infrastructure and an adequate monitoring and evaluation plan.

**Use of a statistical risk model within intake decision-making may contribute to improved outcomes for children and young people**

Despite the limitations of the trial and the need to address a range of implementation issues, overall, the results of the project suggest that the incorporation of a statistical risk model within intake decision-making may be warranted. The use of this tool has the potential to contribute to an on-going strategy focused on improving outcomes for those New Zealand children and young people who require care and protection services. A statistical risk model is also well-placed to support the current CYF modernisation programme, particularly efforts to enhance service delivery and shift towards a more preventative approach. As articulated by social workers within the trial, any tool that can assist with protecting and promoting the wellbeing of children and young people ought to be embraced.

# Glossary

| Term | Acronym | Description |
|---|---|---|
| administrative data | | Data collected incidentally as part of recording keeping, generally as part of providing a service. This data can include individual's names, demographic information, and the particular service provided. |
| anchoring | | A decision-making bias or short-cut where the first piece of information is over-weighted relative to subsequent pieces of information. |
| assessment | | Assessment seeks to gather information about a child or young person's circumstances, make sense of what may have happened to them, and understand the impact of this on their wellbeing. |
| Background Risk Indicator | BRI | The term used to describe the statistical risk model output, which indicates the likelihood of the child or young person having a subsequent report of concern, or a Family Group Conference/Family Whānau Agreement, or an investigation resulting in a finding of maltreatment, within two years of a notification. High risk indicates a 60-100% probability, medium indicates 30-60%, and low equates to 0-30%. |
| case history | | Information on a child or young person's previous contact with CYF and Work and Income, which is accessed through CYRAS, and can be supplemented by searching Work and Income records to identify relationships with other individuals whose CYRAS case history may be relevant. |
| case summary | | Each case summary was based on a single notification to the National Contact Centre, and was presented in a way that resembled information a social worker might normally receive. These summaries drew on de-identified historical cases, but were fictionalised to a large extent. Some cases were also supplemented by a case history that a social worker might usually be able to obtain from the CYRAS database. |
| case summary – serious, possible, or low risk of harm. | | Three theoretical groupings of the risk in a presenting care and protection concern.<br>• Serious: obvious care and protection concerns and an immediate response from a local CYF social worker is required.<br>• Possible: unclear whether the child or young person has been, or is likely to be, subject to abuse and neglect.<br>• Low: the child or young person does not require further assessment or services from CYF or another agency. |

| Term | Acronym | Description |
|---|---|---|
| Child, Youth and Family | CYF | The Ministry of Social Development service line responsible for working with the community, families, caregivers, to help protect and support children and young people. |
| Child, Youth, Residences and Adoption System | CYRAS | Case management database managed by the Ministry of Social Development and used by Child, Youth and Family (CYF). This is where CYF administrative data is pulled from for inclusion in the statistical risk tool. |
| Child and Family Assessment | CFA | The child or young person is assessed as being likely to be in need of care and protection and a statutory response is required. For example, a child may be experiencing (or is likely to experience) harm, neglect or abuse, which is having a significant impact on their development, safety, health or wellbeing. See also: assessment. |
| Child Protection Protocol | CPP | A protocol outlining the agreement between Child, Youth and Family and Police to work alongside each other in situations of serious child abuse. |
| consensus-based tool | | A decision-making aid or tool that is developed by experts who consider theory and practice knowledge. See also statistical risk tool. |
| Contact Record | CR | Under current practice, when the National Contact Centre receives a notification it is assessed to determine the pathway and urgency response time required. If a decision is made that an intake is not required, a Contact Record for the notification is created and saved in CYRAS. |
| *estimated concern* | | A measure of the accuracy of intake decisions based on the subsequent events recorded in the case file of the child or young person, within 24 months of the initial notification. The occurrence of at least one event was taken as an indication of *estimated concern*:<br>1. A site social worker forms recommended holding a Family Group Conference or creating a Family Whānau Agreement<br>2. The child or young person was subject to a further notification which was assessed as a report of concern (an intake)<br>3. An investigation resulting in a finding of maltreatment. |
| Expert Panel | | The Modernising Child, Youth and Family Expert Panel; sometimes referred to as the Expert Panel. |

| Term | Acronym | Description |
|---|---|---|
| expected influence on decision-making | | This relates to social workers using the information in a manner consistent with what was suggested by the indicator, in cases where the presenting information was less clear. For example, an increase in criticality or referral rate for a medium case when paired with a high score. |
| false positive/ negative | | Refers to the measure used to calculate the accuracy of decision-making and the performance of the statistical risk model. A 'false positive' is where a child or young person is referred to site and, within the subsequent 24-month period, there is no *estimated concern*. A 'false negative' is where a child or young person is not referred to site but an *estimated concern* does occur within the subsequent 24-month period. See also: *estimated concern*, true/false positive. |
| Family Group Conference | FGC | A meeting where CYF meets with a family and the child or young person(s) for whom there is care and protection concerns. They will talk about:<br>• why the social worker thinks the child is at risk, or in need of care and protection<br>• what's already been done to help the child and family<br>• what has worked so far and what hasn't.<br>The family also has some time to separately discuss these points. The outcome of an FGC is the generation of a plan for moving forward. |
| Family Whānau Agreement | FWA | The family/whānau agreement is between:<br>• The family and whānau<br>• Child, Youth and Family.<br>It is about how the concerns for their child or young person will be addressed, who will do what, and how CYF will support them. Other people, like counsellors in the community, might also be part of the plan. |
| Family Violence Inter-Agency Response System | FVIARS | This system is an interagency initiative designed to manage cases of family violence reported to the Police, and involves three core agencies: New Zealand Police, CYF, and the National Collective of Independent Women's Refuges (NCIWR). |
| heuristic | | Decision-making short-hand rules of thumb that are based on previous experience. See also: anchoring. |
| high risk score | | Refer to Background Risk Indicator. |

| Term | Acronym | Description |
|---|---|---|
| intake | | When the National Contact Centre receives a notification, it is assessed by a social worker who recommends a pathway and urgency/response time by a local CYF site. Notifications that are sent to site with recommendation for further action are considered intakes. Intake pathways include Investigation, a Child and Family Assessment, or Partnered Response. For no intake, see contact record or no further action. |
| intake – urgency/ response time | | Social workers recommend a response time to the local site. Further action required within 24 or 48 hours is selected when there is high risk and no immediate protection available to the child or young person, and within 7 or 20 working days for all other cases. |
| Intake Decision Response Tool | | Social workers and FVIARS committees use this tool as guidance when making care and protection decisions. This tool adheres to a predominantly strengths-based approach, and includes factors such as the vulnerability of the child or young person and whether protective factors are in place. |
| intake disposition | | The individual tendency of a social worker to refer a notification to intake. Within other research, this is sometimes also referred to as a measure of each social worker's risk aversion. |
| Intake Social Worker | ISW/ SW | Intake Social Worker, which refers to social workers employed at the National Contact Centre. |
| intervention | | Either a Family Group Conference or Family Whānau Agreement. |
| investigation | | Cases require an investigation following allegations of serious physical abuse, sexual abuse, serious neglect or cases where a child or young person witnesses serious family violence, and a joint response between CYF and Police is required. |
| KPI | | Key Performance Indicator, a performance measurement used by an organisation to evaluate achievement of key business objectives. |
| Likelihood of Long-Term Benefit Receipt | LLTBR | A statistical risk tool developed by Work and Income to identify clients at risk of long term benefit receipt, which is used as a screening measure to help target clients for work-related training or employment assistance. |
| low risk score | | Refer to Background Risk Indicator. |
| medium risk score | | Refer to Background Risk Indicator. |

| Term | Acronym | Description |
|---|---|---|
| Ministry of Social Development | MSD | The Ministry responsible for social services including care and protection of vulnerable children and young people, employment, income support and superannuation services, student allowances and loans, etc. |
| National Certificate of Educational Achievement | NCEA | The official secondary school qualification used in New Zealand. |
| National Contact Centre | | The National Contact Centre provides the initial point of contact for anyone in the community who has concerns about a child or young person's welfare. Notifications can come in the form of calls, emails, letters or faxes from a range of notifiers, including family members, members of the wider community, Health or other practitioners, schools, Police and courts. |
| No Further Action | NFA | When a social worker makes the decision that no agency response is required (as a case is below a statutory threshold), this is recorded as a contact record - no further action (NFA). However, due to the structure of the recording database NFA is also used to record a range of other outcomes, and does not always indicate that no response was required. |
| non-operational trial | | A trial of procedures in an offline setting, using example cases that are based on anonymised historical records. Decisions are hypothetical and do not impact any provision of services. |
| notification | | A contact from anyone in the community who has concerns about a child or young person's welfare. Notifications can come in the form of calls, emails or faxes from a range of notifiers, including family members, members of the wider community, Health or other practitioners, schools, Police and courts. |
| Office of the Chief Social Worker | OCSW | Part of the executive committee for Child, Youth and Family. This office provides social work practice leadership, sets practice standards, analyses current practice and initiates practice reviews and improvements. |
| Ontario Domestic Assault Risk Assessment tool | ODARA | An empirically developed risk assessment tool developed in Ontario to predict the likelihood of re-assault against a current or former partner, developed for Police to use in the field. |

| Term | Acronym | Description |
|---|---|---|
| Partnered Response Pathway | PRP/ PR | Also referred to as 'PR.' This is a way of providing an NGO, community-based service to families/whānau with low level issues who require services rather than a formal or statutory response, and as such is a voluntary pathway. For example, Family Start is an intensive early intervention home visitation programme for families with young children aged 0 - 12 months at the time of referral, who are at risk of poor life outcomes, and provides practical advice, support, and parenting education to ensure that their children have the best possible start in life. |
| POL 400 | | An obsolete incident report form that all Police officers were required to complete after attending any incident with family violence overtones. This requirement applied irrespective of whether an offence has been committed. It is now called a POL 1310. |
| POL 1310 | | The Family Violence Form Set (Pol 1310) records the outcome of Police attending a family violence incident. The three outcomes are 1) Family Violence, 2) Intimate Partner Violence, or 3) Intimate Partner ODARA Response where there is violence between intimate partners and it meets the ODARA threshold of physical and/or sexual violence and/or threat of harm with a weapon. |
| presenting information | | Any information present in the email, fax, letter or telephone conversation to/with the National Contact Centre. For example, a teacher's observation regarding visible facial bruising on a child or young person. |
| Privacy Act, Principle 10(e) 1993 | | This principle states that, an agency that holds personal information obtained for one purpose shall not use the information for any other purpose unless the agency believes, on reasonable grounds, that the purpose for which the information is used is directly related to the purpose for which it was collected. |
| referral | | A notification that has been triaged by a social worker and sent to site with a recommendation for further action by Child, Youth and Family. 'Referral' is synonymous with 'intake.' |
| Report of Concern | | The documentation used to record an intake decision to recommend a notification to site for further action. For pathway options, see: an Investigation; a Child and Family Assessment; or a Partnered Response. For no intake, see: contact record or no further action. |

| Term | Acronym | Description |
|---|---|---|
| Risk of Reconviction and Risk of Imprisonment | ROC<br>ROI | A statistical risk tool developed by The Department of Corrections to support the targeting of rehabilitative programmes. |
| safety assessment | | A safety assessment is completed in both the Investigation and Child and Family Assessment pathways, which include the 24 and 48 hour, and 7 and 20 day urgency categories. A safety assessment involves establishing whether any immediate safety concerns exist, and whether the report meets the statutory definition of child abuse or neglect. See also: assessment. |
| safe influence on decision-making | | An 'unsafe' decision was defined as any instance where, after being provided with the Background Risk Indicator, a social worker downgraded a case initially assessed as requiring a 24 or 48 hour response to a 20 day response, a Partnered Response pathway, or a Contact Record. |
| screening/ triage decision | | Where a concern has been raised regarding a child or young person, and a recommendation for a service response must be made, the triage decision relates to the decision to intake (recommend further action) or not (no further action required). |
| Section 15 | | Section 15 of the Children, Young Persons and Their Families Act (1989). Any person who believes that any child or young person has been, or is likely to be, harmed (whether physically, emotionally, or sexually), ill-treated, abused, neglected or deprived may report the matter to CYF or the Police. |
| Section 17 | | Under Section 17 of the Children, Young Persons and Their Families Act (1989), any social worker or constable is empowered to organise or complete an investigation into the allegations raised in a section 15 report of concern. |
| Section 19 | | Court ordered request for a mandatory investigation (a Family Group Conference [FGC]) by CYF. This is sent directly from Court to the local site FGC coordinator. |
| Section 131A | | Court ordered request for information from CYF, who must provide a report on a child or young person. This Section does not involve an intake decision. |
| Section 132 | | Notifications sent from courts to a local site for mandatory assessment. This historically also included a request for information from CYF. However, this second purpose has been replaced by 131A. |

| Term | Acronym | Description |
|---|---|---|
| sensitivity | | An accuracy measure which indicates the ability of a tool to correctly identify individuals with an outcome (e.g. an *estimated concern*). This is calculated by dividing the number of true positives by the sum of the true positives and false negatives: TP/(TP + FN). See also specificity. |
| service response | | Any service response from CYF including a safety assessment or partnered response (community provider). |
| site | | The CYF frontline offices, of which there are 58 nationwide. |
| Social Welfare Information for Tomorrow Today | SWIFTT | Work and Income administrative database, which can provide reports on the number of people on benefits by different categories, such as age, gender, duration on benefit, region and district. |
| social worker | SW | A social worker (SW) can be employed at either the National Contact Centre or at a local site office. |
| specificity | | An accuracy measure which indicates the ability of a tool to correctly identify without an outcome (e.g. no *estimated concern*). This is calculated by dividing the number of true negatives by the sum of the false positives and true negatives: TN/(FP + TN). See also sensitivity. |
| statistical risk model | | The use of statistics to identify the optimal combination of variables that predict an outcome of interest. A model can then be used to generate a score which indicates the likelihood that the outcome will occur. |
| Statistical Risk Tool | | The use of modelling or statistical techniques to identify variables that significantly predict an outcome of interest, e.g. the risk of abuse or neglect. |
| statutory response | | A service response (e.g. Family Group Conference) that is empowered by statute, such as the Children, Young Persons and Their Families Act (1989). See also Section 15, 17, 19, 131A, 132. |
| true positive/ negative | | Refers to the measure used to calculate the accuracy of decision-making and the performance of the statistical risk model. A 'true negative' is where a child or young person is not referred to site and, within the subsequent 24-month period, there is no *estimated concern*. A 'false negative' is where a child or young person is not referred to site but an *estimated concern* does occur within the subsequent 24-month period. See also: *estimated concern*, false positive/negative. |

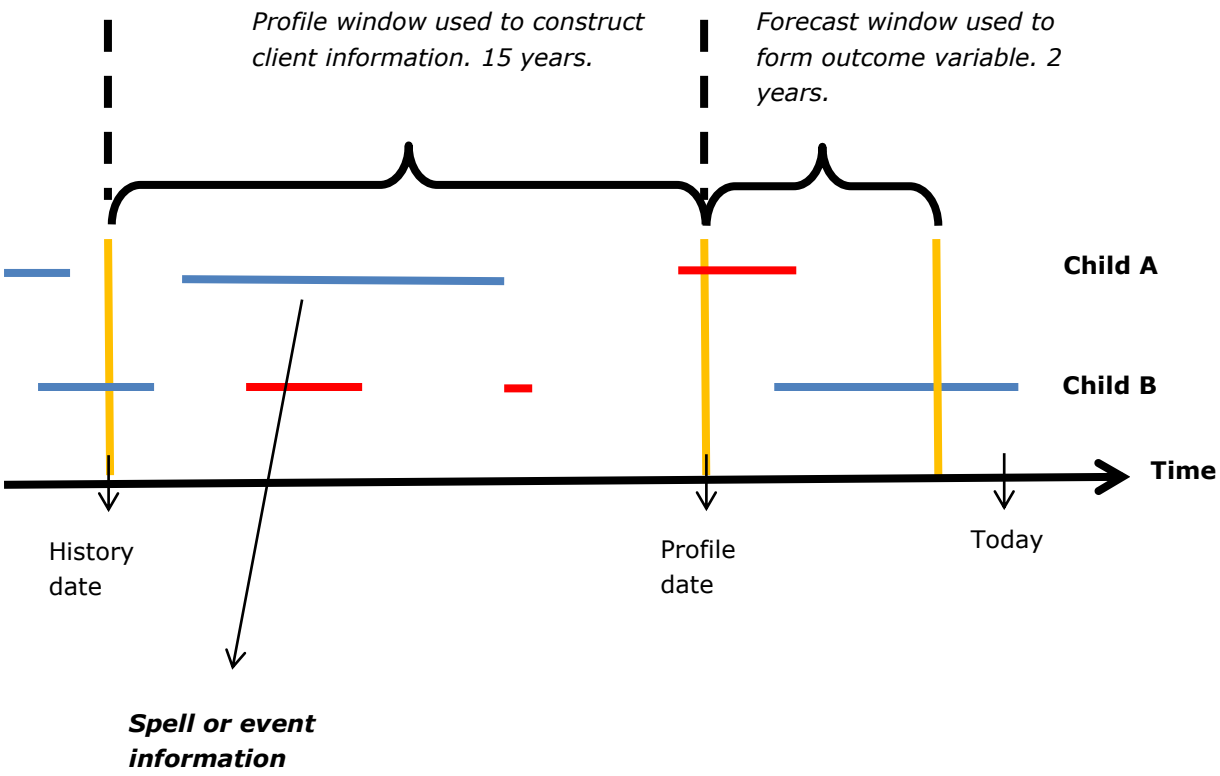
| Term | Acronym | Description |
|---|---|---|
| true/false negative | | Refers to the measure used to calculate the accuracy of decision-making and the performance of the statistical risk model. A 'true positive' is where a child or young person is referred to site and, within the subsequent 24 month period, there is an *estimated concern*. A 'true negative' where a child or young person is not referred to site and no *estimated concern* occurs within the subsequent 24 month period. See also: *estimated concern*, true/false negative. |
| Tuituia | | Assessment tool used by CYF to record the areas of need, strength and risk for a child or young person, their parents and/or caregivers. |
| unsafe influence on decision-making | | Refer to: safe influence on decision-making. |
| Work and Income | | The Ministry of Social Development service line responsible for providing employment services and financial assistance in New Zealand, e.g. benefit receipt, or Superannuation. |
| Youth Justice | YJ | Government response to crime committed by children and young people. This service line is managed by Child, Youth and Family and includes Youth Court, Family Group conferences, and secure residences. |
| Youth Offender Risk Screening Tool | YORST | A statistical risk tool developed by Police to predict youth offending. |

# Appendix 1: Modelling annex

## Creating a dataset for modelling

A model must be built on data that includes past information as well as the outcome that is being estimated. This requires a standardised window of data collection in the past and also the future for each individual (see Figure A1).

**Figure A1: Data used to create statistical risk models**




During this window, we create relevant historical and forward-looking variables for each child and young person.

The forward-looking period here is called the forecasting window. It is during this time period that we look for a return intake or FGC.

### Administrative data has limitations

Administrative data provides information on large proportions of the population, but there are some important limitations.

First, the way information is recorded in the database may influence how and what is recorded. For example, a social worker may need to select a field in CYRAS in order to progress to the next section of a form, even though it may not be applicable to the child or young person.

Second, as a result of the data capture error described above, changes to the way data is collected and stored may compromise data consistency and as a result reduce model performance.

Third, important information is sometimes missing. Reasons may include the fact that data is sometimes not captured at the frontline (e.g. when a notification is made by a member of the public the child or young person's age may not be known). Data is only available since the advent of electronic records, so left censoring[30] is a problem.

The dataset we have created uses both Work and Income and CYF data. There is no common identifier between these two agencies, so identity was needed to link the administrative data between the two systems. Identity matching here refers to the process of linking person identities, based on name and date of birth, across Work and Income and CYF systems. Two types of errors exist in identity matching:

- identities are linked incorrectly – these are called 'false positives'
- identities are not linked when they should be – these are called 'false negatives'.

Identity matching exists on a spectrum, ranging from conservative (i.e. exact match on name and date of birth) to less conservative (i.e. some error margin allowed, e.g. John Smith and Jon Smith born on the same date will be matched).

Information held by CYF regarding the identities of children and young people was matched to Work and Income data, first using a less conservative match and then a conservative match. Table A1 below shows at the conservative level 43 percent of children and young people were matched to their Work and Income information, this increased to 77 percent when less conservative matching criteria were used. Therefore, using less conservative matching criteria allows more children and young people to be matched to their Work and Income records.

**Table A1: Conservative and less conservative matching CYF and Work and Income data**

| Measure | Conservative identity match | Less conservative identity match |
|---|---|---|
| Children and young people matched to Work and Income record | 43.2% | 77.0% |

When less conservative matching criteria are used, the chances of false positive matches increases (matching a child or young person to a record that doesn't belong to them). Table A2 shows the number of estimated false positive matches increases only marginally from 0.04 percent when conservative matching criteria is used to 0.22 percent when less conservative matching criteria is used[31]. This finding is consistent with previous work completed by MSD.

[30] Left censoring is when a data point is below a certain value but it is unknown by how much (e.g. the year is unknown because it occurred before 2000 when electronic records were created).
[31] Note that these are the incorrectly matched clients that we know, from the data, are wrong. There are likely to be more incorrect matches but it is not possible to know the extent of the incorrectly matched clients without full manual checking.

**Table A2: The effect of matching criterion on false positive matches between CYF and Work and Income data**

| Measure | Conservative identity match | Less conservative identity match |
|---|---|---|
| Incorrect matched clients | 0.04% | 0.22% |

After considering previous feasibility work as well as exploration and analysis for the current project we decided to use a less conservative data match. This method ensured as much SWIFTT data as possible was included in the model with only a small number of false data matches.

**Table A3: Predictors included in the Logistic Regression model**[32]

| Child or young person predictors | Definition of predictors |
|---|---|
| Whether the child or young person has previously been the subject of a safety assessment. | A safety assessment involves establishing whether any immediate safety concerns exist, and whether the report meets the statutory definition of child abuse or neglect. |
| The number of previous care and protection notifications. | The number of previous care and protection notifications includes all previous intakes as well as contact records since 2010[33]. |
| Whether the child or young person was included on a main benefit at the time of the notification. | This measure seeks to determine whether the child or young person is included on a guardians' main benefit currently or has been in the past.<br>Here 'main benefit' refers to the following:<br>• Job Seekers<br>• Sole Parents<br>• Supported Living Payment<br>• Youth / Young Parent. |
| Days since the last Section 15 intake. | Time (in days) since the child or young person was the subject of a Section 15 intake (not including current notification). |

[32] There were 17 variables in the model, but only 16 listed here, because child or young person age was included as two separate variables in the model, see Footnote 35 for further explanation.
[33] Contact records have only been available since August 2010, so notifications referred to site before 2010 are not recorded in CYRAS.

| | |
|---|---|
| Age of the child or young person at the time of the notification. | The age of the child or young person at the time of the current notification, regardless of their age at first notification. Two variables were included[34]:<br>• age (in days) of the child or young person<br>• age group of the child or young person (one of the following: 0-newborn; 1-3; 4 or older). |
| Gender of the child or young person. | Male / Female / Unknown |
| Number of previous substantiated findings of maltreatment. | Total number of previous substantiated findings of maltreatment for the child or young person, including: emotional abuse, physical abuse, sexual abuse and neglect. |
| Whether the child or young person was already included in an open social worker phase. | Whether the child or young person is currently the subject of an open CYF case. The 'phase' of a CYF case refers to the point along the CYF continuum at which the open case currently sits. There are five CYF social worker phases:<br>• Intake<br>• Investigation<br>• Intervention<br>• Partnered Response<br>• Placement. |
| Whether the child or young person has had a prior custody or guardianship spell. | Whether or not the child or young person has previously had care and protection custody and/or guardianship to the CE of MSD or another service provider.<br>This does not include:<br>• Section 205 which is a temporary order to prevent removal of a child or young person from New Zealand; or<br>• Section 42 which allows a Police constable, who believes it is critically necessary to protect a child or young person from injury or death, to conduct a search and detain the child or young person without warrant. |
| Level of contact that the child or young person had with MSD. | Each child or young person is categorised into one of four groups:<br>• No previous Work and Income or CYF contact<br>• Previous CYF contact, no previous Work and Income contact<br>• Previous Work and Income contact, no previous CYF contact<br>• Previous Work and Income and CYF contact. |

[34] The reason two separate age-related variables provided sufficient predictive power to be included in the model remains unknown. On the surface it appears these variables provide the same information, but it is likely that in reality each variable conveys subtly different information.

| Caregiver[35] predictors | Definition of predictors |
|---|---|
| The highest level of previous CYF involvement of the caregiver. | The level of CYF involvement during the childhood of the current caregiver is recorded using the following categories:<br>• None (caregiver had no known involvement with CYF)<br>• Reported (caregiver had at least one intake as a child)<br>• Finding of abuse or neglect<br>• Placement<br>Note: that complete CYF history is only available for young caregivers, because CYF data is only available since 2000. |
| **Family predictors** | **Definition of predictors** |
| Number of siblings the child or young person had at the time of the notification. | Total number of siblings listed in CYRAS and SWIFT databases; this includes foster siblings, adopted siblings and step-siblings. |
| Number of contact records for siblings. | The total number of contact records for all siblings identified above. |
| Whether the mother of the child or young person could be determined at the time of the notification. | In many cases the mother of the child or young person cannot be determined from the data. These children and young people have significantly lower rates of *estimated concern* than those where the birth mother is known. In other words, children and young people whose mothers aren't known to CYF or Work and Income, or for whom an identity match cannot be found, are a lower risk. |
| **Neighbourhood predictor** | **Definition of predictors** |
| New Zealand deprivation index. | New Zealand deprivation Index, sometimes called neighbourhood deprivation index, is a measure of socio-economic status calculated for small geographic areas. The calculation uses a range of variables from the Census of Population and Dwellings. Further information can be found at: http://www.otago.ac.nz/wellington/otago069936.pdf<br>In the case where the child or young person's address is unknown, deprivation index is also unknown. In these cases other information about the child or young person is used to make a best estimate of the deprivation index. |

[35] In this context 'caregiver' refers to the person currently caring for the child, this is usually the birth mother. In cases where the caregiver is the birth mother some information regarding her is included as a *caregiver predictor* and as a *family predictor*.

| Other predictor | Definition of predictors |
|---|---|
| Notifier type. | When a notification is made to CYF the notifier 'type' is recorded. There are 37 notifier type categories, the following are the five most frequent:<br>• Police Family Violence<br>• Police<br>• Family<br>• Health<br>• School. |

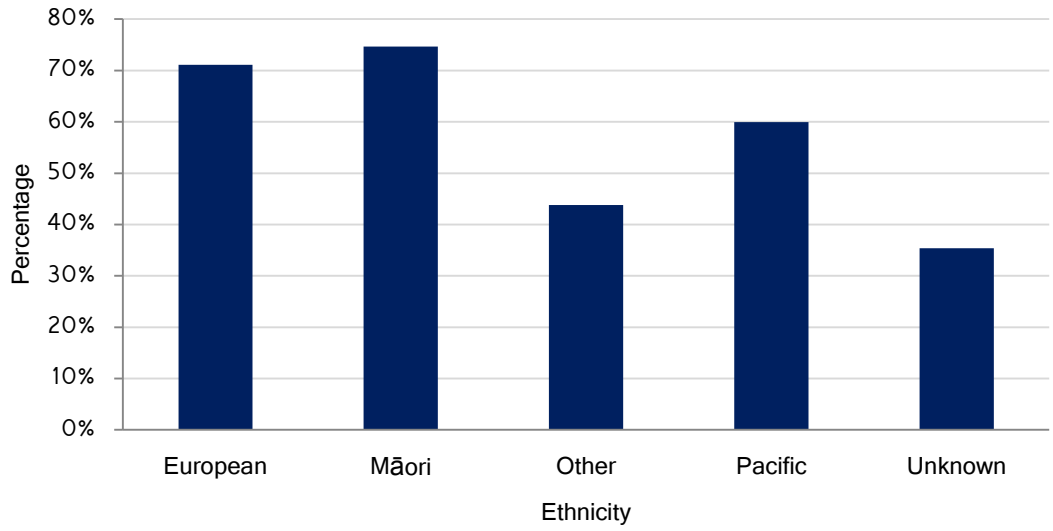
## Comparing expert variables with ethnicity

Here we look at a couple of variables that may help explain why the impact of including ethnicity in the model is not as big as one might expect.

### (i) Age of first benefit receipt

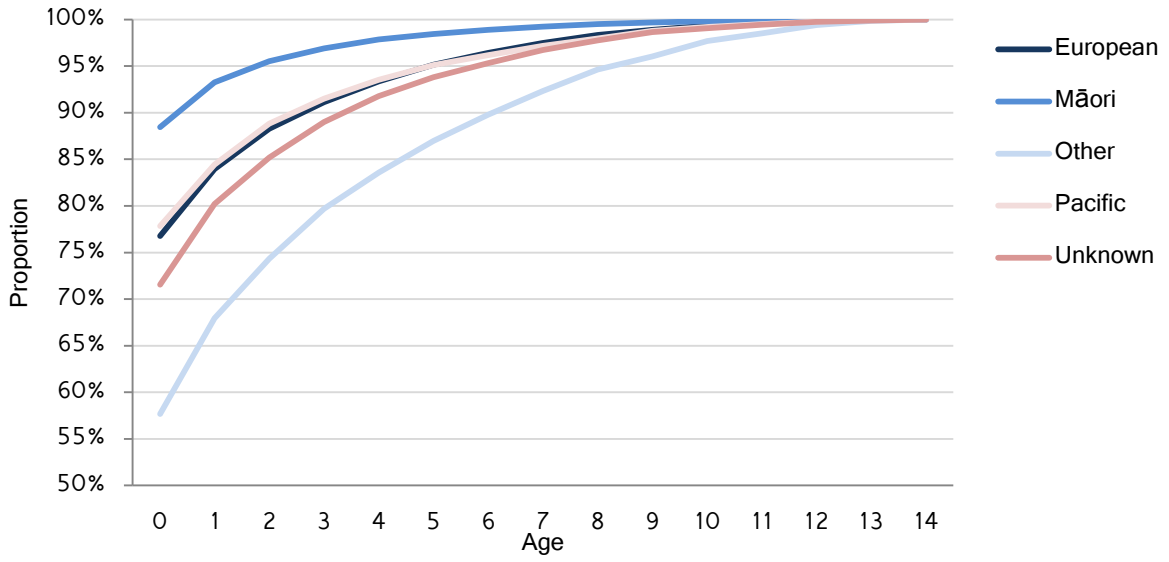
We first look at the age of the child or young person when they were included in a main benefit. First, we see that the percentages of children and young people who are included in a main benefit at some stage in their lives vary considerably between the ethnic groups:

**Figure A2: Percentage of children and young people included in a main benefit during their lifetime (data from 87,120 unique children and young people notified in 2013)**




We can look at the age of first benefit receipt of these children and young people by ethnic group. It is clear that Māori has a significantly higher proportion of younger children included on a benefit than the other ethnic groups.

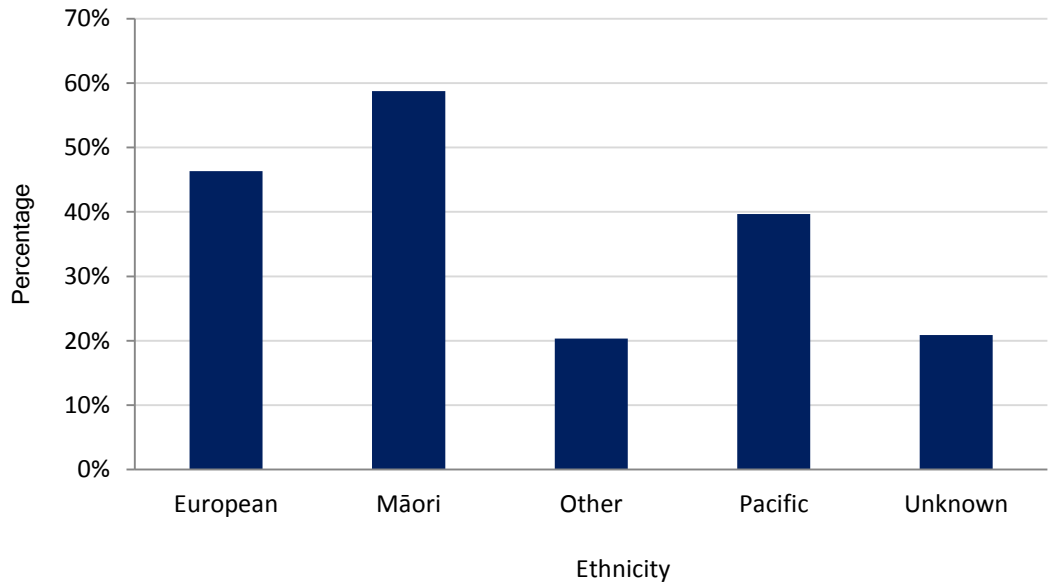
**Figure A3: Age of child or young person at first benefit receipt (data from 87,120 unique children and young people notified in 2013)**




### (ii) Born onto benefit

Here we look at the percentage of children and young people who were born to a caregiver on a main benefit. Again it is clear that the percentage for Māori is significantly bigger than those of other ethnic groups.

**Figure A4: Percentage of children and young people born to a caregiver on a main benefit (data from 87,120 unique children and young people notified in 2013)**



## Output from the Logistic Regression

The chart below gives the misclassification rate during the creation of the Logistic regression model, showing a typical exponential shape as the error rate stabilises with the addition of new predictors in the model.

**Figure A5: Misclassification rate during the creation of the logistic regression model**

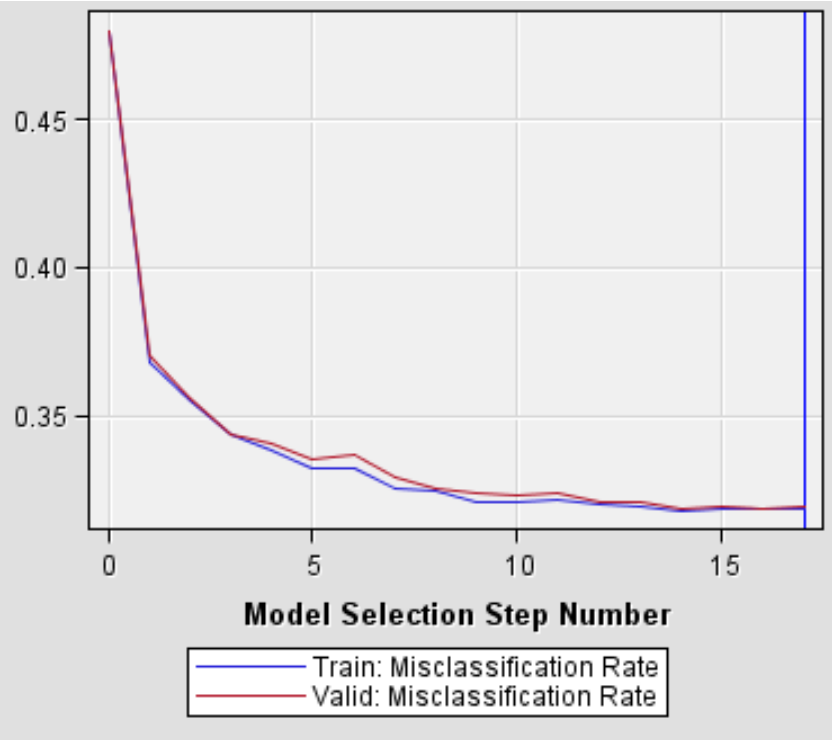



Table A4 shows the significance level of each of the predictors in the logistic regression model. *The stopping criteria for variables entering the model*: when, during the stepwise variable selection, no variable meets the entry criteria of $p < .05$ (i.e. given the model so far, the chance of spuriously entering a new variable is less than 5 percent).

**Table A4: The significance level of each of the predictors in the logistic regression model**

| Step | Entered | DF | Chi-Square | Pr > ChiSq |
|---|---|---|---|---|
| 1 | Number of previous care and protection notifications | 1 | 5579.8 | <.001 |
| 2 | Age of child or young person at time of notification, grouped | 2 | 1383.0 | <.001 |
| 3 | The notifier type | 2 | 1258.4 | <.001 |
| 4 | Whether child or young person was included in main benefit at time of notification | 2 | 992.5 | <.001 |
| 5 | Whether child or young person was already in an open phase | 1 | 574.2 | <.001 |
| 6 | Gender of child or young person | 2 | 389.1 | <.001 |
| 7 | Age of child or young person at time of notification | 1 | 480.6 | <.001 |
| 8 | Safety assessment history | 2 | 351.0 | <.001 |
| 9 | Sibling count of past contact records | 3 | 213.1 | <.001 |
| 10 | Previous custody flag | 1 | 192.1 | <.001 |
| 11 | Level of caregiver's CYF involvement | 4 | 191.9 | <.001 |
| 12 | Days since last Section 15 intake | 3 | 162.9 | <.001 |
| 13 | Whether mother is known at time of notification | 1 | 121.1 | <.001 |
| 14 | Level of MSD contact | 2 | 79.7 | <.001 |
| 15 | Number of previous substantiated findings | 3 | 34.1 | <.001 |
| 16 | Number of siblings | 1 | 18.9 | <.001 |
| 17 | Deprivation index | 9 | 28.9 | <.001 |

## Modelling algorithms used in this project

### Decision Trees

Decision trees are a class of supervised learning algorithms, i.e. a model is trained on the input data and the outcome (target) provided. The idea behind a decision tree is to group similar instances in the same 'bucket' and then assign the 'average target' of the bucket to each instance. At the start, all instances are in the starting node. All variables are then searched to see how well a split on them can group the appropriate instances together. The strength of a split is based on the 'purity' as well as the size of the children nodes (i.e. the nodes that resulted from the split). The best variable is then used to split the initial node into two (or more) nodes. For two splits, a numerical predictor would be split into two (less than or greater than / equal to); a categorical variable will be grouped in a way that provides an optimal two-way split. This procedure then continues for subsequent nodes until either one of the following happens:

- splitting does not improve the purity of the nodes
- the maximum specified tree depth is reached
- the minimum number of instances in a node is reached.

When no further splitting can occur, the growth of the tree stops. The terminal nodes are called leaf nodes. Every new instance scored will end up in one of these leaf nodes.

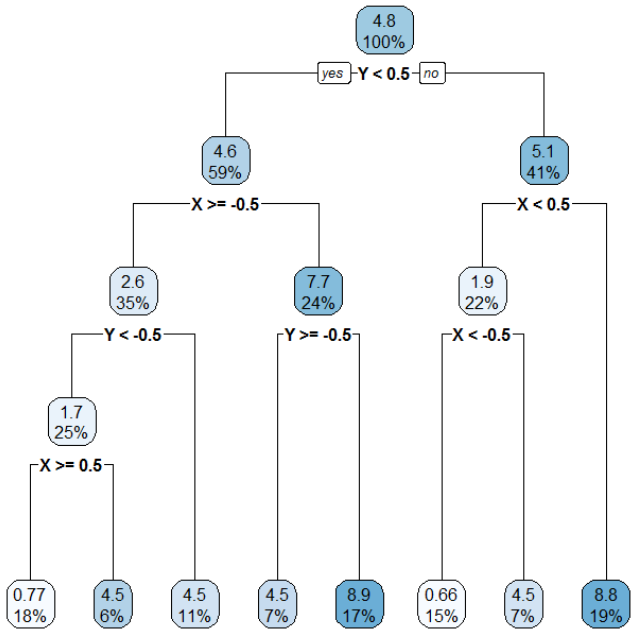
As is usually the case, a portion of the data is held out for validation and the prevention of over-fitting (this means that a model is over-trained, or gets too specific, on the data and then do not generalise well when applied to out of sample data).

Decision trees are one of the most commonly used data mining algorithms and have many desirable features:

- They can deal effectively with missing values, thus there is no need to impute them.
- There is no need for transforming the data, due to the way they split the input space.
- They can deal effectively with high-level categorical variables.
- They are robust with respect to outliers.
- They are easily explained to and interpreted by a non-technical audience.
- To a large extent, they can deal effectively with irrelevant variables.
- They can be grown very quickly and are computationally inexpensive.

Figure A6 below shows an example of a decision tree. The layout of a tree makes it easy to explain the path of a particular individual to an interested person.

**Figure A6: Example decision tree**




The biggest disadvantage of decision trees is that their predictive power is often inferior to that of other learning methods. Algorithms that make use of multiple decision trees in

order to boost predictive power also exist, and it is to these that we now turn. For more on decision trees see Tan, Steinbach and Kumar (2006).

### Gradient Boosting

This is a relatively recent algorithm developed by Jerome Friedman. The idea is to use small decision trees to incrementally approach the solution surface. After an initial approximation to the solution, the following happens during each iteration:

- Randomly select a sample of instances from the training data.
- Form a small decision tree (with specified depth and width) and approximate the target with the predictions from this tree (the approximation is called the step size).
- Shrink the step size by a specified amount; this is called the shrinkage factor (this gives a more stable model).
- Increment the solution function with this amount, update the residuals and start again.

These steps are done on the training data and the number of steps is pre-specified by the user – usually around 100 to 200, but sometimes up to 500 or more.

The Gradient Boosted Model (GBM) retains many of the desirable features of a single decision tree:

- They can deal effectively with missing values, thus there is no need to impute them;
- There is little or no need to transformation the variables;
- They can deal effectively with high-level categorical variables;
- They are robust with respect to outliers;
- They deal effectively with irrelevant variables (i.e. variables that have no relevance to the target), to a large extent.

The results are usually better than for that of a single tree. Indeed, GBMs are often amongst the best classifiers when compared to other ones. As with decision trees, variable importance, based on all the iterations, is one of the outputs of a GBM. This extends the use of a GBM as a tool for variable selection. Some software also produces partial dependence plots, showing how the variables are related to the target when the others are kept at their 'average' value. This allows for the transformation of variables prior to doing a simpler model like, say, a linear regression, and obtaining a better result than when using the untransformed variables.

A drawback of these models is that they are not easy to interpret. Simpler models (decision tree, for example) are often used to approximate them and show their inner workings. For more on these models, see Friedman, (2001).

### Random Forest

Random Forests is another method that makes use of multiple decision trees to make a prediction. It is an ensemble learning method that constructs multiple decision trees during training and outputs either the mean (numeric target) or mode (categorical target) of the class predicted.

The training algorithm will do the following over a series of iterations:

- randomly sample (with replacement) a pre-specified number of training examples from the training data
- train a decision tree on the data.

When done, use the mean or mode of the tree to make a prediction for new instances.

Random Forests will reduce the variance of decision trees without increasing the bias. This is because single decision trees can be rather sensitive to noise, while the average of many trees is not, provided that the trees are not correlated too much.

Similarly to Gradient Boosting, Random Forests retain many of the positive properties of decision trees whilst reducing their biggest weakness, their relatively weak performance. Again, the price paid for this is that they are difficult to interpret. For more on these models, see Hastie, Tibshirani and Friedman (2008).

**Logistic Regression**

Logistic regression was developed by the statistician David Cox in 1958. It predicts the probability of a binary outcome variable based on one or more predictor variables. It measures the relationship between the outcome and the set of independent variables by estimating probabilities using a logistic function.

An advantage of logistic regression is that it is easier to explain the contribution of each predictor to the estimated probability. These models give good, stable results that usually outperform single decision trees but are not quite as good as boosting / bagging methods without a lot of interactions in the model. For more on logistic regression see Hosmer and Lemeshow, (1989).

# Appendix 2: Impact estimates

**Table A5: Impact of Background Risk Indicator on social worker decisions (treatment versus control estimates)**

| Scenario | Cases | Referral rate | | | | Criticality index | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No other covariates | | Including intake disposition | | No other covariates | | Including intake disposition | |
| | | Estimate | p value | Estimate | p value | Estimate | p value | Estimate | p value |
| Scenario 1<br>serious case/high BRI | 4,5 | 0.0 | . | 0.0 | . | 0.20 | 0.27 | 0.20 | 0.27 |
| Scenario 2<br>serious case/medium BRI | 6,7 | 0.0 | . | 0.0 | . | -0.11 | 0.46 | -0.11 | 0.46 |
| Scenario 3<br>serious case/low BRI | 8,9 | 0.0 | . | 0.0 | . | 0.06 | 0.70 | 0.06 | 0.70 |
| Scenario 4<br>possible case/high BRI | 10,11,12,<br>13,22 | 13.3 | 0.00** | 13.6 | 0.00** | 0.34 | 0.02* | 0.36 | 0.01** |
| Scenario 5<br>possible case/medium BRI | 14,15,16,17 | 6.5 | 0.08 | 6.5 | 0.08 | 0.19 | 0.16 | 0.19 | 0.15 |
| Scenario 6<br>possible case/low BRI | 18,20,21 | -7.4 | 0.15 | -7.1 | 0.17 | -0.40 | 0.07 | -0.36 | 0.10 |
| Scenario 7<br>low case/high BRI | 23 | 25.9 | 0.01** | 25.8 | 0.01** | 0.33 | 0.01** | 0.33 | 0.01** |
| Scenario 8<br>low case/medium BRI | 24,25 | 18.5 | 0.05* | 18.5 | 0.05* | 0.24 | 0.27 | 0.24 | 0.27 |
| Scenario 9<br>low case/low BRI | 19,26,27 | -4.9 | 0.51 | -5.7 | 0.45 | -0.01 | 0.93 | -0.03 | 0.84 |

Note: Estimate of treatment impact is the difference between treatment and control groups using all the cases in each scenario, and was calculated using Ordinal Least Squares Estimation with and without inclusion of intake disposition measure for each social worker. White adjusted standard errors (also known as Eicker-Huber-White standard errors) were calculated for the referral rate (Glennerster & Takavarasha, 2013). *$p$ value <0.05. **$p$ value is <0.01.

# Appendix 3: Qualitative Methodology

A key purpose for gaining qualitative information from social workers was to provide contextual information to assist with interpretation of the decision-making results of the trial. This part of the research included two research questions: 1) how effective was the training provided to participants, and b) what is the value of the risk modelling information to social work intake decision-making?

Data for the first question was gathered primarily through an online survey (discussed below). Data for the second question was gathered via eight focus groups and interviews with two CYF staff. Focus groups were selected as an effective way to gather information immediately after social workers had completed their assessment of cases.

## Online survey

At the end of each trial day an hour was allotted to run focus groups with the social workers to gather qualitative data around how the they understood and used the Background Risk Indicator. Time was very limited so it was agreed that after the social workers had finished making intake decisions about all of the 27 cases they would be asked to complete a short survey to gain some initial feedback from them and to record their demographic data to support the analysis.

The feedback survey aimed to capture some quick high level feedback about the training session received in the morning and how well this prepared them for the task of using the Background Risk Indicator to support intake decision-making. Social workers were also asked about their level of comfort in using the Background Risk Indicator. The demographic information collected included their role and level of experience at the Contact Centre (or whether they were in fact now ex-Contact Centre staff). Table A6 provides a description of each question and the purpose for asking the questions. See Appendix 3.1 for the full content of the survey.

**Table A6: Rationale for questions included in the survey**

| No. | Question | Rationale |
|---|---|---|
| 1 | Thinking about the introductory information and training that you received this morning, how well do you think this prepared you to use the 'Background Risk Indicator' in your intake decision-making? | Provide an indication of how effective the training session was in preparing the participants to use the Background Risk Indicator. It can be used to assess how the training went each day and can be compared to decision results to check for any correlation; especially to check for situations of a poor rating of the training session and unexpected use of the Background Risk Indicator. |

| | | |
|---|---|---|
| 2 | If you have any comments about the information and training that you received this morning, or have suggestions for improvement, please provide these below. | Allow for additional qualitative information that may help when analysing the broader findings. Allow participants an opportunity to raise any issues with the training which may have affected their understanding, attitudes and behaviours and therefore impacted on their use of the Background Risk Indicator. |
| 3 | How confident are you that you now understand the concept of a Background Risk Indicator? | An indication of how well the participants understood the general concept of the Background Risk Indicator. It can be used to assess how confidence in using the Background Risk Indicator may have affected its use by participants. |
| 4 | Thinking about when you changed intake decisions after seeing the Background Risk Indicator information, overall how comfortable did you feel making these changes? | An indication of how comfortable participants were in making changes to their decisions based on the Background Risk Indicator information. It can be used to get an understanding of how open participants were to using the Background Risk Indicator and allowing it to influence their decisions. |
| 5 | If you have any comments about using the Background Risk Indicator, please provide these below. | Some people may have been more comfortable (or honest) providing feedback via a form rather than face to face. |
| 6 | Please select the age group to which you belong. | Demographic information collected to understand the make-up of the participants and to check for any influence on demographic factors on the use of the Background Risk Indicator. |
| 7 | What gender do you identify as? | Demographic information collected to understand the make-up of the participants and to check for any influence on demographic factors on the use of the Background Risk Indicator. |
| 8 | Which ethnic group (or groups) do you identify as? Please select all that apply. | Demographic information collected to understand the make-up of the participants and to check for any influence on demographic factors on the use of the Background Risk Indicator. |
| 9 | How long have you worked at the National Contact Centre? | Demographic information collected to understand the make-up of the participants and to check for any influence on demographic factors on the use of the Background Risk Indicator. Experience at the Contact Centre was thought to possibly influence behaviours and attitudes towards using the Background Risk Indicator. |

| | | |
|---|---|---|
| 10 | What is your current role at the National Contact Centre? | Demographic information collected to understand the make-up of the participants and to check for any influence on demographic factors on the use of the Background Risk Indicator. Role at the Contact Centre was thought to possibly influence behaviours and attitudes towards using the Background Risk Indicator. |

## Focus groups

Focus groups are a form of qualitative research in which participants are asked about their perceptions, opinions and experiences related to a specific topic. For the trial, focus groups were used as a follow-up research approach to gather information about participants' experiences of considering, and using, the Background Risk Indicator in their decision-making of cases.

The focus group questions and process were trialled in early June 2016 at the National Contact Centre, along with the training material and planned structure for the trial. Eight Contact Centre staff attended, including four social workers, two practice managers and two senior Contact Centre advisors who are also Working Group advisors. The aim of the pilot was to identify any stumbling blocks and make improvements before the trial went live. Minor changes were made to the focus group process as a result.

Over the four days of the trial, all 54 social workers participated in a focus group discussion. Eight focus groups were conducted, each including between six and eight social workers. The focus groups were led by two facilitators, each assisted by a note taker. The note takers rotated between facilitators to provide a level of quality assurance across the focus groups. The focus groups lasted between 1 and 1.5 hours.

Each focus group began with a general question: what was it like having the Background Risk Indicator as a decision-making tool? Participants were invited to select from a range of A4 photos to reflect on their experience. Called 'photo elicitation', the use of photos to trigger a response can be useful for breaking the ice, and bring out issues that are meaningful for individuals. The process of using visual images allowed participants time to reflect on the Background Risk Indicator and produced insightful information early on in the focus group. Examples of participants' comments during this exercise include:

> *"I chose this lady scratching her head, because I think my concept of the model was really good…but I'm actually thinking…I need to think of a nice way to put this. I didn't find it useful at all. I'm kind of wondering, thinking it's a bit of a waste of time to be honest."*
>
> *"I selected this picture of people surfing and some very big waves, lots of white spray happening around as well, on their journey. Looked a bit turbulent. And the spray, I suppose…was like the Background Risk Indicator, but it wasn't a surfboard, you know, in terms of navigating my decision-making, but it was certainly something I was aware of."*
>
> *"So I've chosen this (photo) for outlook to the lake and the mountains. And I feel…the idea of the model and the presentation before our survey was pretty clear and good directions...So after reading through the presenting information,*

*presenting concerns and the … history, I pretty much already know what the indicators will tell me and there was no surprise."*

During the second part of the focus group, participants were asked about times when they considered the Background Risk Indicator and made a change to their initial decision, or times when they considered the Background Risk Indicator and then decided to stay with their initial decision. During their decision-making, participants had been asked to keep notes for each of the 27 cases so they could refer to them during the focus group discussion. Despite this, participants found it hard to remember specific cases where they had changed, or not changed a decision.

For the last two days of the trial, a prompt sheet with key details about each case was made available, and additional information was provided to participants during the training, asking that they record notes about the Background Risk Indicator. Even with these instructions, some participants found it hard to remember how they had dealt with specific cases.

At the end of each focus group participants were invited to raise any additional issues related to the BRI. They are also given the opportunity to make contact with the independent researcher if they had additional information they wished to share. One email was received. This information was included as another source of data, while keeping the social worker's identity confidential.

After each focus group, the qualitative research team (two facilitators and two note takers) held a debrief meeting to reflect on key findings and the management of each focus group. This debrief helped to identify key differences between focus groups (for example, one focus group included primarily social workers who worked away from Contact Centre).

All the focus group interviews were digitally recorded and then transcribed. In the interests of confidentiality, numbers were used instead of participants' names in the transcriptions, e.g. speaker 1, speaker 2. Any names that were mentioned in the audio were replaced with '[name]' in the transcription.

## Key stakeholder interviews

Two unstructured face-to-face interviews were held with the CYF Working Group advisors. These interviews were held on the second and fourth days of the trial, and provided an opportunity to clarify information gathered by respondents in the focus group discussions, as well as contextual information about intake social worker practice and the national contact centre.

## Analysis

Coding of data was undertaken using Nvivo, and began with a coding framework that matched the research questions (training and use/non-use of the Background Risk Indicator). Members of the research team then read through a focus group transcript and coded using an inductive, generative approach. All the qualitative research team members participated in a high-level analysis workshop, using a framework developed by Williams (no date) to identify key generalisations, exceptions, and contradictions.

# Appendix 3.1: Copy of Online Survey


**Background Risk Indicator Trial - Initial Feedback - Group B**

Feedback

Thank you again for taking part in the Background Risk Indicator Trial! Your participation is greatly appreciated.

You only have one session left to complete (telling us what you thought in the focus group discussions), before that, we just want to ask you a few questions and get some details from you to help with our analysis of the trial results.

* 1. Thinking about the introductory information and training that you received this morning, how well do you think this prepared you to use the 'background risk indicator' in your intake decision making?

| Very well | Well | Neutral | Not well | Not at all well |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

2. If you have any comments about the information and training that you received this morning, or have suggestions for improvement, please provide these below.

* 3. How confident are you that you now understand the concept of a background risk indicator?

| Very confident | Confident | Neutral | Not confident | Not at all confident |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

* 4. Thinking about when you changed intake decisions after seeing the background risk indicator information, overall how comfortable did you feel making these changes?

| Very comfortable | Comfortable | Neutral | Uncomfortable | Very uncomfortable | Not applicable - I didn't change any intake decisions |
|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ |

5. If you have any comments about using the background risk indicator, please provide these below.

Next


## Background Risk Indicator Trial - Initial Feedback - Group B

### About You

Finally we would like to know a bit more about you. Nothing you choose to share will used to identify you.

6. Please select the age-group to which you belong.

- ○ 20 - 29
- ○ 30 - 39
- ○ 40 - 49
- ○ 50 - 59
- ○ 60+
- ○ Prefer not to say

7. What gender do you identify as?

- ○ Female
- ○ Male
- ○ Gender diverse
- ○ Prefer not to say

8. Which ethnic group (or groups) do you identify as? Please select all that apply.

- ☐ NZ European/Pakeha/European
- ☐ New Zealander
- ☐ Maori
- ☐ Pasifika
- ☐ Asian
- ☐ Prefer not to say
- ☐ Other (please specify)

9. How long have you worked at the National Contact Centre?

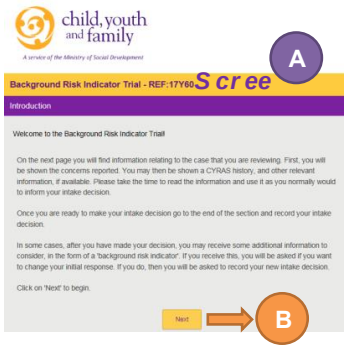
- ○ Less than 1 year
- ○ Between 1 and 3 years
- ○ Between 3 and 5 years
- ○ More than 5 years
- ○ Not currently working at the National Contact Centre

10. What is your current role at the National Contact Centre?

- ○ Intake Social Worker
- ○ Senior Practitioner
- ○ Supervisor
- ○ Not currently working at the National Contact Centre

Thank you for providing some initial feedback.

# Appendix 3.2: Example of 'CYRAS Monkey'



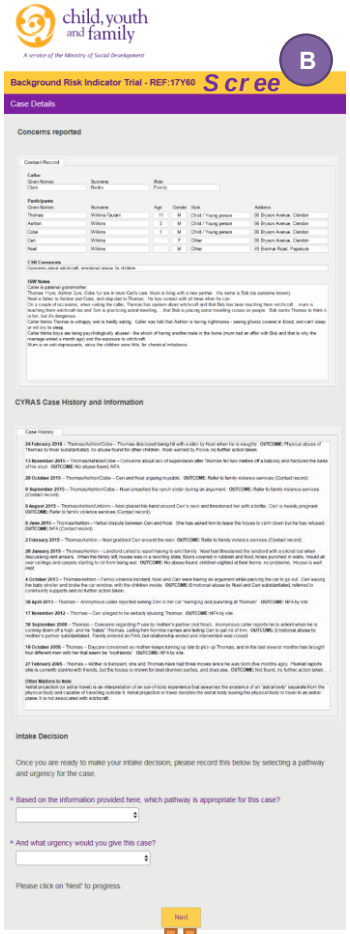

**Answer options for the 'Pathway' and 'Urgency' decision choices:**

**Pathway options:**

- Investigation
- Child Family Assessment
- Partnered Response pathway
- Contact Record / No Further Action

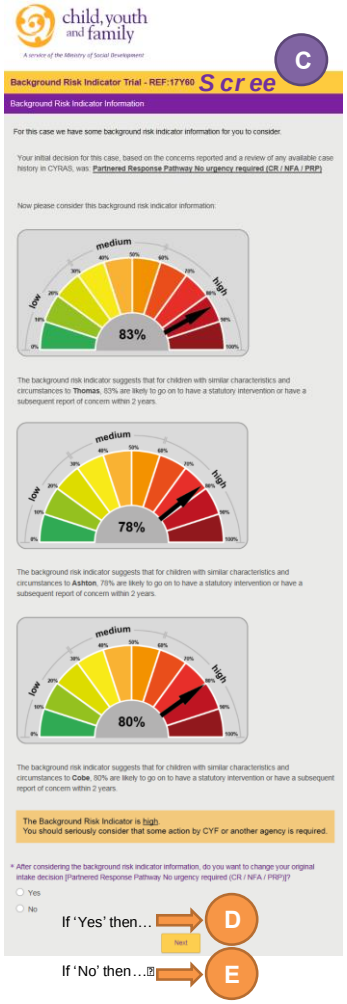
**Urgency options:**

- 24 Hours - Critical
- 48 hours – Very Urgent
- 7 Working Days - Urgent
- 20 Working Days – Low Urgency
- No urgency required (CR / NFA / PRP)



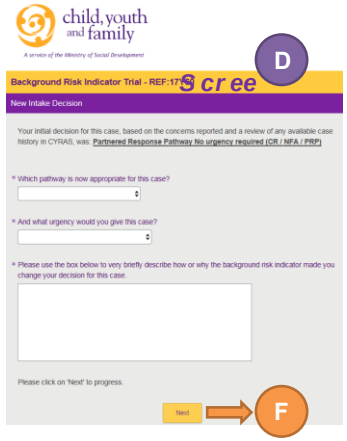

50% of the time the group get the **control** case with no BRI info

50% of the time the group get the **treatment** case with BRI info




If 'Yes' then… D

If 'No' then… E





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