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The TAC's Longitudinal Client Outcome Study

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Abstract

The Transport Accident Commission (TAC) is Victoria's state-owned, monopoly Compulsory Third Party insurer. The TAC receives claims from individuals with a broad range of injuries and needs; early identification of clients with complex needs who are more likely to have protracted recovery journeys is important.

The TAC's goals have evolved over time from a sole focus on Financial Sustainability to understanding and monitoring performance in relation to the Client Experience, to a broader focus on understanding and measuring Client Outcomes. A comprehensive internal program of research has been developed to inform continuous improvement against Client Experience, and to support the TAC's understanding of Client Outcomes. The most recent development in this program was a longitudinal study. It was hoped that a longitudinal study would give the TAC greater insight into the drivers of different service and recovery outcomes and pathways, and would help the TAC to further understand and improve client outcomes.

The longitudinal study developed and implemented by the TAC was a multi-cohort longitudinal study that tracked the experience and outcomes of clients as they returned to health (and work, where relevant) following a transport accident. Clients were interviewed four times over a two-year period at approximately 3, 6, 12 and 24 months post-accident. The questionnaires used in the study covered a diverse range of content from pre-accident health and vocational status to accident circumstances and injury characteristics to post-accident health, vocational status, psycho-social factors and environmental considerations.

Early insight derived from the study can be summarised as follows:

- Clients have varying degrees of pre-accident health (physical, mental, disability and pain) and for some there is a negative compound effect.
- Some clients need help when dealing with the TAC, and some seek assistance from solicitors early in the life of claim. Clients with certain vulnerabilities reported higher levels of early solicitor engagement.
- Mental health vulnerability can be identified by two simple questions related to cognition and resilience.
- The TAC's Life Back on Track measure provides a coherent summary across multiple individual client outcomes.
- 12 broad domains of complexity have been identified from information in the study; complexity can complicate a client's post-accident recovery.

This study has given the TAC a rich dataset contributing to a deeper understanding of its clients. Insight from the study could be used to develop a predictive approach to identifying clients who may benefit from more pro-active claims management, and generally encourages a more holistic understanding of the difficulties some clients face when trying to get life back on track following a transport accident.

Keywords:

Health outcomes, mental health, persistent pain, vulnerability, longitudinal study, predictive approach, early intervention.

Context – Transport Accident Commission

The Transport Accident Commission (TAC) is Victoria's state-owned, monopoly Compulsory Third Party insurer. The TAC provides no-fault benefits (i.e. treatment and support as well as compensation for loss of earnings and impairment) to those injured in transport accidents as well as common law damages to those claimants not at fault in their accident and who are able to demonstrate that they have incurred a "serious Injury" in accordance with the TAC's legislation.

The TAC commenced on 1 January 1987 and currently receives approximately 16,000 claims per year, spending more than $1 billion each year on claims costs, comprising:

- Approximately $450 million in health and disability services (covering medical, allied health, rehabilitation and disability services)

- Approximately $550 million in compensation (covering common law damages for economic loss and pain and suffering, impairment lump sums, loss of earnings benefits and death benefits for dependent spouses and children of those killed in transport accidents, and

- Approximately $100 million in other expenses including legal costs, medical reports and investigation costs.

Compensation schemes such as the TAC receive claims from individuals with a broad range of injuries and needs. To effectively manage a scheme such as the TAC it is important to be able to identify as early as possible which claimants (also referred to as "clients") are likely to recover quickly and need relatively few services, and which clients are likely to have a more protracted recovery and receive a relatively larger volume of services.

The TAC's overarching approach to claims segmentation

For nearly twenty years the TAC has segmented its clients into two broad organisational groups:

1. Those clients with severe physical injuries who are likely to require care and support from the TAC for the remainder of their lives. The majority (between 85% and 90%) of these clients have an acquired brain injury whilst the remainder (between 10% and 15%) have a spinal injury (paraplegia or quadriplegia).

   These clients represent approximately 1% of one year's accidents. The TAC refers to this group of clients as "Independence" clients (as the goal for these clients is to assist them to maximize their Independence following their transport accident). Within the population of Independence clients the majority receive significant levels of care and support and the Independence clients are therefore relatively homogeneous in terms of their service usage.

2. Those clients with less severe physical injuries. These clients represent the remaining 99% of one year's accidents. The TAC refers to this group of clients as "Recovery" clients (as the goal for these clients is to assist them to recover from their transport accident as efficiently as possible). Within the population of Recovery clients there is a broad spectrum – some clients receive only a small number of services (for example GP or Physiotherapy) and cost less than $1,000, whilst some clients receive services for several years and cost hundreds of thousands of dollars. The Recovery population in aggregate is therefore far more heterogeneous than the Independence population.

Identification of the TAC's Independence clients is relatively straightforward as they can be identified via their injury soon after their accident.

By contrast segmentation within the TAC's Recovery population is more challenging and has evolved over time with the most recent evolution of this segmentation occurring in 2010, referred to as the "Recovery model" (*Pocock et al (2011)* and *Poel and Pocock (2013)).*

The remainder of this paper relates predominantly to the TAC's Recovery population

Evolution of TAC's client focus

The TAC's goals and focus on its clients has evolved over its history. There have been three broad phases in this evolution:

1. At the inception of the scheme in 1987, the organisation was solely focused on **Financial Sustainability** (with the main lever used to ensure Financial Sustainability being liability management). This focus resulted directly from the environment within which the scheme was created – the two predecessor organisations to the TAC (namely the State Insurance Office and the Motor Accident Board) both suffered significant financial challenges. It was therefore to be expected that the focus of the TAC in the early stages of its existence was financial.

2. In 2001, after successfully managing the scheme's financial position for nearly fifteen years, the organization added a second corporate goal, namely **Client Experience** (also referred to as "client satisfaction")**.** This represented a distinct shift in the organisation's focus – by having both Financial Sustainability and Client Experience as corporate goals the TAC could genuinely claim to be taking a "balanced scorecard" approach to measuring itself. The introduction of Client Experience was also the first attempt by the TAC to understand client expectations and needs.

3. In 2009, after achieving positive Financial Sustainability and Client Experience results (and in fact after successfully achieving *both* goals most years between 2001 and 2008) the TAC introduced a third corporate goal, referred to as **Client Outcomes.** Whereas Client Experience is a measure of the client's view of the service provided by the TAC and their experience of dealing with the TAC, Client Outcomes represent a broader client focus. In the TAC context client outcomes represent the extent to which those injured in a transport accident have been able to return to health, work and independence.

Client Experience history

As discussed above Client Experience has been one of the TAC's headline goals since 2001. To measure progress relating to Client Experience and to inform continuous improvement in service excellence, the TAC has conducted comprehensive quantitative Client Experience surveys since February 2000 complemented by a program of in-depth qualitative research. Specifically, the Client Experience Survey measures client perceptions of interactions with the TAC and helps to guide improvements in work practices and service delivery. The survey is conducted three times each year; the mean satisfaction score from the June benchmark survey is reported to Government and is published in the TAC Annual Report.

The TAC has worked consistently over a 15 year period to embed a service culture that has been largely driven by thinking and talking about client service. In more recent years the TAC has had a very strong focus on understanding the personal and individual experiences of clients, with the objective of ensuring staff have a deep understanding of each and every client they interact with, and that those interactions are truly empathic. There has also been considerable effort focused on understanding different client segments, understanding the interplay between outcomes, service expectations and perceptions, understanding the impact of problematic processes for clients (claim lodgement, return to work, impairment, common law), and the influence of third parties (with particular reference to legal engagement).

Over this period the TAC's overall client satisfaction has increased from 6.79 to 7.65, with the result achieved in June 2015 being the highest ever achieved.

Figure 1 History of TAC Client Satisfaction Scores

The strong results achieved over a number of years were one factor which allowed the TAC to add a further client goal, namely Client Outcomes, as its third corporate objective.

Client Outcomes

Client Outcomes was introduced as a corporate goal in 2009 as a component of the TAC 2015 Strategy with the objective of assisting TAC clients to get their lives back on track and return to health, work and independence as effectively as possible.

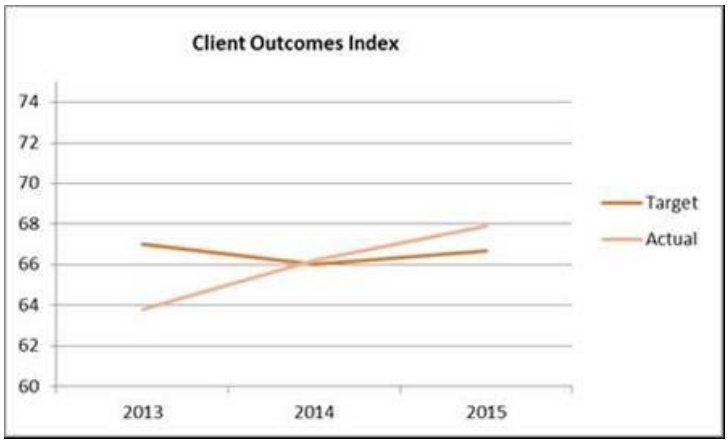
In 2012-13 the TAC introduced the Client Outcomes Index (COI) as a means of measuring progress towards the attainment of Client Outcomes. The COI is based around the International Classification of Functioning (ICF) framework, embracing the biopsychosocial approach to understand health and well-being. The COI enables the TAC to report one score from a number of underlying components, combining both client self-reported and claims management process oriented measures.

For the first three years the Client Outcomes Index was reported, it comprised a weighted average of six sub-measures. One relates to Independence clients and the other five to Recovery clients:

1. Life area goal achievement for Independence clients, measuring the percentage of open goals achieved over the course of a year;
2. Self-assessed mental health for Recovery clients measured using the Short Form 12 (SF-12) instrument;
3. Self-assessed physical health for Recovery clients measured using the Short Form 12 (SF-12) instrument;
4. Return to Work Outcomes as reported by TAC Recovery clients;
5. Income Durations 12 months post-accident for Recovery clients (i.e. the proportion of clients receiving income payments who have ceased receiving payments 12 months post their accident; and
6. Scheme Participation 12 months post-accident for Recovery clients (i.e. the proportion of clients receiving treatment sand payments who have ceased receiving payments 12 months post their accident.

The TAC exceeded its Client Outcomes Index target in two of the three years that it has been measured as shown in Figure 2.

Figure 2 History of TAC Client Outcomes Index results



In addition, the TAC's Executive Leadership Team made a commitment to raising the profile of Client Outcomes throughout the organisation, and a number of new outcome measures were identified for potential inclusion within the COI at an appropriate time following a detailed review of the evidence base.

The strong performance in all three Corporate Goals, including Client Outcomes, has provided the platform for the TAC to embark on the next phase of measuring and achieving Client Outcomes.

The TAC Longitudinal Research Study: Getting Life Back on Track. Study Overview.

Whilst the TAC had, and continues to have, a very strong history in client satisfaction measurement and service improvement initiatives, and had built up a solid understanding of the health and vocational status of Recovery Branch clients, it only had a very limited understanding of the drivers of different service and recovery outcomes and pathways. Developing a longitudinal study represented the next logical step in the evolution of TAC client research, and would help the TAC work towards understanding and improving client outcomes.

When proposing to undertake a longitudinal study, the TAC was conscious that many respected organisations in both Academia and the broader compensation industry were undertaking similar studies for example, the ACC in New Zealand via the Prospective Outcomes of Injury Study (POIS) and the MAA in Australia (New South Wales) via the New South Wales motor accident longitudinal cohort study.

Internationally acclaimed data registries were also in existence such as the Victorian Orthopaedic Trauma Outcomes Registry (VOTOR) and the Victorian State Trauma Registry (VSTR). These data registries are important sources of longitudinal data relating to injury, treatment techniques, hospital data, administration data and extensive patient reported outcomes data for both compensable and non-compensable patients, and are increasingly being used to inform initiatives and strategies at the TAC. However, the data were somewhat limited in application due to large portions of the TAC client base not being represented (specifically clients with musculoskeletal injuries and clients who were not admitted to hospital). Also, at the time the TAC longitudinal study was proposed the existing registries did not contain any measure of the TAC client experience, and data collection ended at 12 months post-accident in the case of VOTOR.

By conducting a longitudinal study, the TAC hoped to derive practical recommendations and tangible actions they could take to improve client outcomes, understand the effectiveness of interventions, and more deeply understand the experience of clients as they journeyed to recovery.

The overarching objective of the TAC longitudinal study (the study) was to develop and implement a multi-cohort longitudinal research program that tracked the experience and outcomes of clients as they journeyed through the TAC scheme on their return to health (and work, were relevant) following a transport accident. The research objectives can be summarised in the following way:

- To measure primary outcomes of TAC clients across health, vocational and client experience at the acute, rehabilitation, adaptation and stability phases of recovery from injury

- To identify predictors of outcomes following injury, and how these predictors impact the recovery trajectories of TAC clients, and

- To determine the extent to which the TAC can influence outcomes across health, vocational and client experience, and identify factors that the TAC may be able to utilise in claims management to improve clients' outcomes.

The study aimed to represent the complete spectrum of Recovery Branch clients. Clients were deemed eligible for the study based on the following criteria:

- if they had a non-catastrophic injury from a transport accident accepted by the TAC

- if they were aged 16-88 years at the time of the baseline interview (Time 1 – approximately 3 months post-accident), and

- their claim was not more than 90 days old at the Time 1 interview date.

Several categories of claim were excluded from the study:

- "Emergency expense only" claims (clients who only receive ambulance transport and/or emergency department admission and therefore have no substantive interaction with the TAC)

- Interstate Common Law only claims, and

- "Mental injury only" claims (clients who suffer the traumatic consequences of a transport accident involving a family member but who do not themselves receive physical injuries arising from a transport accident).

The study also involved an in-depth qualitative video series which complemented the quantitative data collected during the telephone surveys. A small number of study participants were selected to take part in these interviews, representing a good cross-section of Recovery clients. These clients were interviewed in person shortly after completing their telephone interview at each time point in the formal part of the study. Footage has been extensively used at the TAC to illustrate key study findings, to help bring the statistics to life and to help staff connect with clients.

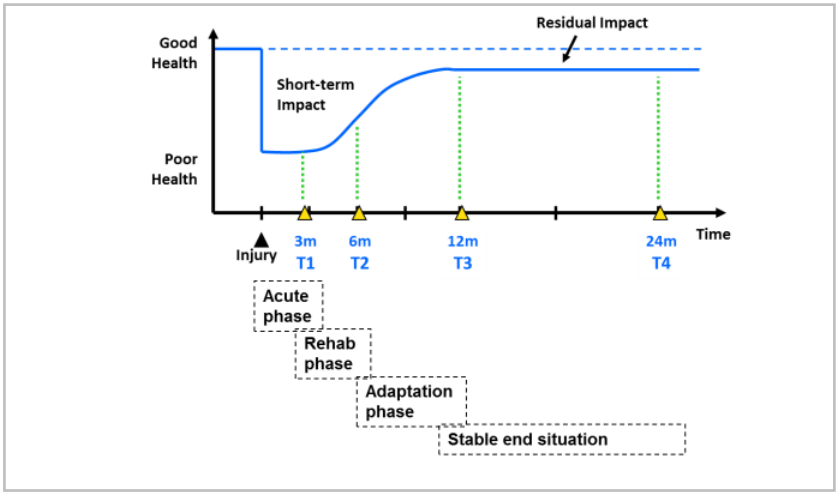
Study design and content

There is only room in this paper for a brief synopsis of study design and content, a considerable topic in itself. Further detail can be sought from the authors.

The study utilised a prospective cohort design with participants being interviewed four times post-injury, over the course of a two-year period. Fieldwork occurred across many months, including a pilot cohort and five subsequent intake cohorts to establish the base sample for the study. The time-points chosen related to key stages of rehabilitation following recovery post-injury and were designed to increase comparability to similar studies. The diagram overleaf is a simplified representation of the recovery process, including key recovery stages. Interviews with clients were timed to occur as close as possible to "baseline", during the acute phase – approximately 3 months post-accident, the second interview was at the 6-month mark, the third interview was at the 12-month mark and the fourth and final interview was at the 24-month mark.

The timeframes for data collection were generally consistent with recent systematic reviews and international working group recommendations for studies investigating injury outcomes (1, 2). The timeframes also aligned with the Victorian Trauma Registries (3, 4).

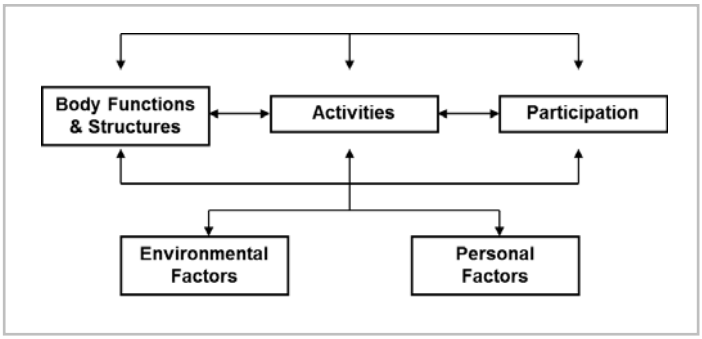
Figure 3 A Simplified Representation of the Recovery Process Post Transport Accident



Another key conceptual driver of study design was the International Classification of Functioning, Disability and Health (ICF) framework. The ICF was published by the World Health Organisation in 2001 (5). The ICF offers a coherent scientific framework, based upon the biopsychosocial model for understanding human functioning and disability, with application in clinical, research, policy development and other public health uses. As a model that integrates medical and social models of health and functioning, including the impact of environmental and personal factors, the framework was extremely useful for guiding study design.

The Clinical Framework designed to inform the delivery of health services for the TAC and WorkSafe Victoria by the Health and Disability Strategy Group (HDSG) also strongly references the ICF (6), and the ICF was also used to inform the development of the TAC's Client Outcomes Index.

Figure 4 The International Classification of Functioning, Disability and Health (ICF) Framework



Other key considerations that strongly guided study design included:

- The inclusion of repeated measures: the study was designed to facilitate a repeated measures approach to facilitate the analysis of change over time, whereby essentially the same content was covered across all four waves of the study. Some content was only asked at certain time-points, for example accident circumstances were only covered in the Time 1 interviews; and some content was only asked of certain clients, for example clients no longer actively engaged with the TAC were not asked extensive questions about interacting with the TAC

- Lessons learnt from the comprehensive program of existing internal client research. This included a specifically designed exploratory project following-up a relevant cohort of clients who had been involved in an existing cross-sectional study: this enabled the TAC to test proposed study design and specific questionnaire content

- Extensive stakeholder consultation with key internal business owners and subject matter experts, and key research partners including the contracted research supplier who would deliver the primary data collection, and relevant academic partners including the Institute of Safety Compensation and Recovery Research (ISCRR)

- The need to maximise initial and ongoing participation in the study balanced alongside concerns for the potential burden and sensitivities of participating clients, including interview length

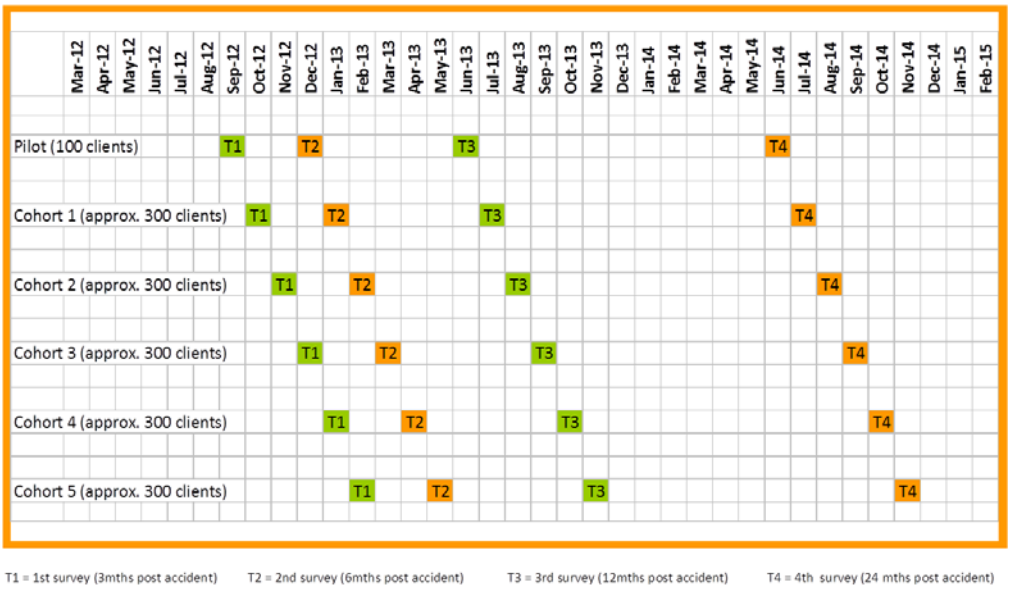
- The use of standardised scales, where appropriate

- A pragmatic focus on business relevance and research translation, for example only collecting information that wasn't already available via internal claims administrative data and thinking about the type of information that could be subsequently translated into claims management practice

- A desire to compare against other relevant studies, where appropriate
- Relevant academic and industry specific literature such as the importance of measuring health-related quality of life (HRQoL) and the use of patient-reported outcome measures (PROMs), and understanding the potential impact of pre-existing mental and physical health conditions on recovery outcomes following injury.

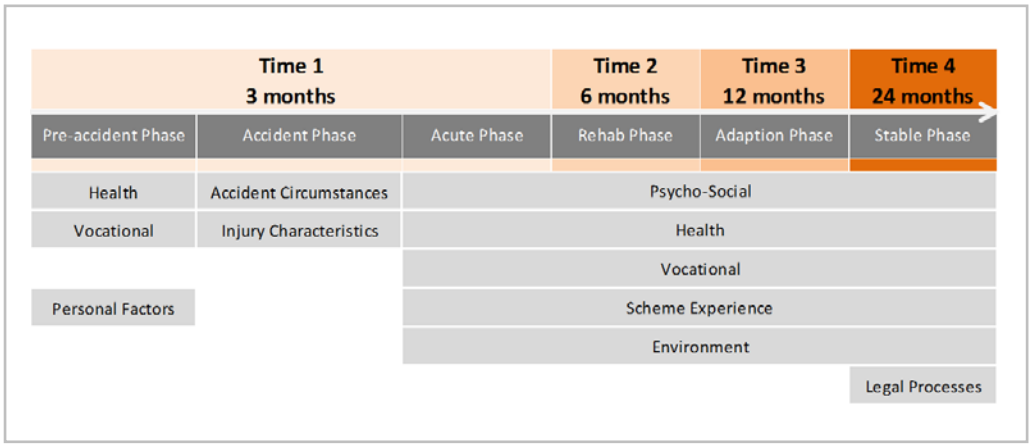
The diagram below provides a comprehensive overview of the final study design.

Figure 5 Overview of the TAC's Longitudinal Study Design



The questionnaires used in the longitudinal study covered a diverse range of content, as shown in the table below. The following section provides a summary of questionnaire content by key domains, noting that certain questions fall into multiple domains. As noted above there is insufficient scope within this paper to fully itemise questionnaire content, and reference all contributory papers, academic literature and relevant sources of background information which were influential in designing the study: rather this section provides an overview of final study content.

Figure 6 Overview of Questionnaire Content and Timing for the Study



Personal factors

- Socio-demographic factors included: age, gender, height and weight, household composition, country of birth, main language spoken at home
- Socio-economic factors included: education, income and financial status on an annual basis, pre-tax across total paid employment, relative financial difficulty experienced pre and post-accident, occupation (see below)
- Underlying traits: optimism, general self-efficacy.

Pre-accident health and disability

- Pre-accident global health, disability, chronic illness.

Pre-accident vocational status

- A short module designed to ascertain vocational status pre-accident including whether the client was working in a paid job at the time of accident, main activity, occupation, nature of role, working for wages or self-employed, hours worked, tenure, size of employer, income, work satisfaction, and whether the client took time off work as a result of the accident.

Accident-circumstances

- A short module only asked at Time 1 covering accident role, the number of vehicles involved, and perception of accident responsibility.

Injury

- The study included a question designed to obtain the client's perspective of injury severity which could be supplemented/compared to internal measures of injury severity.

Psychosocial factors

- Recovery expectations (extent and anticipated timeframe)
- Recovery responsibility and expected role of the TAC in that recovery
- Ability to cope
- The risk of persistent pain, pain avoidance and pain catastrophising beliefs
- Support networks
- Anger
- Resilience.

Health

- Global health: using the widely used self-rated health item from the SF-36 family of HRQoL instruments ("the SF1")
- Health Related Quality of life: using the EQ-5D which incorporates five separate domains of health (mobility, self-care, usual activities, pain/discomfort, anxiety/depression) - the TAC also included a question designed to assess cognitive issues using the same framing as the EQ-5D
- Pain: pain persistence and pain intensity using a numerical rating scale
- Depression: using the seven items from the DASS depression sub-scale
- PTSD: collected at Time 2 onwards, using the four-item Primary Care PTSD (PC-PTSD) screen
- Fright
- Travel anxiety.

Post-Accident Vocational Status

- A tailored module designed to collect information on return to work pathways, including whether the client had done any paid work since the accident, whether the client was currently working, longevity in current role / first RTW, how many jobs the client had since the accident, whether a job had been left for an accident related reason, how long it took to get back to work initially following the accident, nature of the role the client first returned to, if the client had not returned to work what intentions did the client have.

Scheme Experience

- A tailored module designed to collect information about client perceptions of interacting with the TAC including meeting expectations, stress dealing with the TAC, reasonableness of the time taken to do certain claim related activities, various aspects of service, striving for outcomes, resolving issues, demonstrating empathy, overall satisfaction
- To minimise burden, clients who were no longer substantially involved with the TAC at the time of interview were asked a smaller sub-set of questions about their perceptions of service, whilst clients with an ongoing and active relationship were asked a more comprehensive set of questions.

Environment and legal involvement

- A tailored module designed to collect information about the wider environment or system in which TAC clients find themselves: clients were asked about the healthcare practitioners they were involved with post-hospital, whether they had trouble getting access to necessary medical treatment or services, the nature of these troubles, whether the TAC had contributed to difficulties accessing treatment, and overall level of satisfaction with healthcare received
- Clients were asked if they had sought assistance from anyone to deal with the TAC and then specifically prompted about engaging a lawyer to assist them. Information was also collected about the reasons for engaging a solicitor at each time point
- Clients were also asked (at the Time 4 interview) whether they were involved in or contemplating impairment benefit and/or common law processes. Questions were designed to understand expectations and the early experiences of clients for whom the questions were relevant.

Life Back on Track (LBoT)

- A tailored measure developed by the TAC called the Life Back on Track or "LBoT" measure designed to capture a client's appraisal of recovery.

Early analysis

This section of the paper provides a brief overview of early exploratory analyses.

Bias analysis

The initial round of analysis related to understanding sample representative. The purpose of this analysis was to ascertain whether clients recruited into the study, and those who remained at follow-up, were typical and representative of the broader population of clients eligible to participate in the study.

It is worth noting that the study was carefully designed with the purpose of maximising recruitment and minimising bias. Examples of specific initiatives designed to reduce bias included:

- sensitive and transparent recruitment protocols
- a comprehensive explanation of the study via the primary approach letter and introductory questionnaire scripting
- the practice of maintaining multiple contact details and alternative contacts
- the timing of fieldwork and associated call protocols
- partnering with a research supplier who was highly experienced in conducting longitudinal studies with a professional and fully trained telephone interviewing staff
- conducting a full pilot to test and refine all aspects of the project at each interview time point
- including careful and sensitive introductions to potentially controversial or sensitive subject matter within the questionnaire
- reducing burden wherever possible throughout the questionnaire, and
- implementing an engagement strategy designed to maintain connection with study participants between survey waves.

Comprehensive bias analysis was conducted primarily using internal administrative data (available for participants and non-participants), survey derived variables, and other auxiliary variables from sources such as the ABS (specifically socio-economic indexes for areas - SEIFA) and the research company (including call records and timing of call attempts). Initial recruitment into the study was explored first, with subsequent examination of retention and impact on sample representativeness at each time point. A small degree of bias was evident in the sample (related to ability to contact clients and slightly "lighter touch" clients); however, the bias was negligible and efforts to correct the bias did not significantly impact any of the primary outcome variables in the study. Therefore, all subsequent analyses proceeded on the basis of unweighted data.

Early Insight

After establishing the representativeness of the study sample, initial data analysis focused on profiling study participants and describing outcomes early in the life of claim. Some interesting preliminary findings included the following:

- Average client satisfaction with the TAC was initially very high and remained high at the 6 month time point
- Self-assessed health showed improvement at 6 months but remained less positive than Victorian population norms
- Some change in pain levels occurred across time on average, with the majority of participants experiencing at least some pain at 3 months post-accident which lessened at 6 months post-accident, and
- Work status showed considerable improvement at 6 months compared to 3 months post-accident.

Early analysis also explored the different factors that predict or influence recovery trajectories in the early phase. Some of the key findings included:

1. Clients have varying degrees of pre-accident health (physical, mental, disability and pain) and for some there is a negative compound effect
2. Some clients need help when dealing with the TAC, and some seek assistance from solicitors early in the life of claim. Clients with certain vulnerabilities reported higher levels of early solicitor engagement.
3. The Life Back on Track (LBoT) measure provides a coherent summary across multiple individual client outcomes/domains, and
4. Mental health vulnerability can be identified by two simple questions - cognition and resilience.

These key findings are explored in further detail below.

<u>Pre-Existing Health</u>

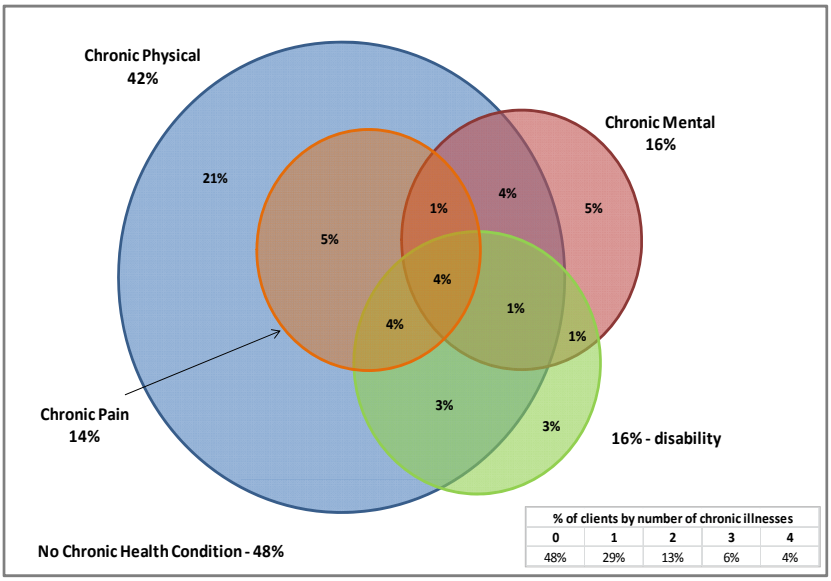
Whilst it was appreciated that not all clients begin their post-accident recovery journey from the same point, understanding pre-existing health and its impact on subsequent recovery had never been systematically explored by the TAC through its internal research program. The study provided a unique opportunity to ask clients about:

- Pre-accident disability. Clients were asked whether they had a health problem or condition (lasting 6 months or more) which caused them difficulty or stopped them doing everyday activities, communicating or socialising with others, or doing any other activity people their age usually did

- Pre-existing chronic conditions. Clients were also asked whether they had any long term health conditions confirmed by a doctor or nurse at the time of the accident that had lasted or was expected to last 6 months or more, for example asthma, arthritis, stroke, chronic back pain, other chronic pain, diabetes, high blood pressure or hypertension, some other heart condition, cancer, depression, anxiety or any other long term condition.

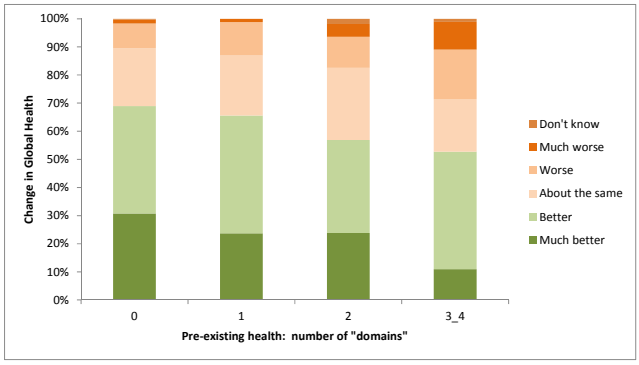
Answers to these questions were collapsed into four broad categories – chronic physical conditions, chronic pain (as a subset of chronic physical), chronic mental health, and disability. Results were quite revelatory with just over half of the study population presenting with some sort of pre-existing health condition. As is shown in the chart below, some clients (almost a quarter) reported pre-existing health issues in more than one "domain".

Figure 7 Pre-Accident Health



Early analysis suggested that clients with pre-existing and often compounded pre-accident ill-health would experience more protracted recovery journeys. The chart below shows clients with pre-existing health complications tended to be less positive about improvement in their health post-accident at the six month time point.

Figure 8 Pre-Accident Health and Global Change in Health (T1 to T2)



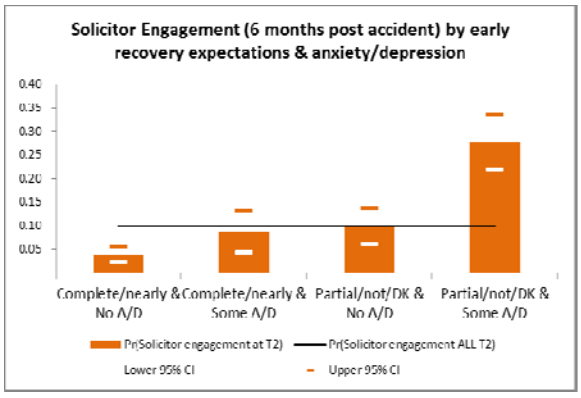
Seeking Assistance from a Solicitor

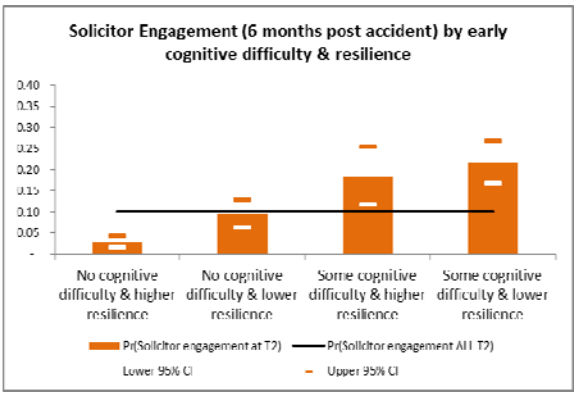
The TAC was interested in understanding whether clients needed help to deal with the TAC, and who provided that assistance. Clients were asked to nominate any sources of assistance they had used, and then specifically asked whether they had used the services of a lawyer or solicitor to help with their claim. Clients who had used a solicitor were asked why they chose to use a solicitor. These questions were asked at each time point in the study so the TAC could understand the level of solicitor engagement as the life of claim progressed and the reasons given, including being able to identify if those reasons changed over time.

Many clients did not seek assistance (40% at the Time 1 interview). Among those clients who did need assistance, the main sources included partners, parents or other family members, and healthcare practitioners. For some clients, solicitor engagement occurred very early: at 3 months post-accident 6.4% of clients had already engaged a solicitor, and by 6 months post-accident this had increased to 10.1%. The main reasons clients engaged a solicitor at these early points in time were related to being in unfamiliar territory and needing additional help or guidance, and that somebody else (a family, friend, medical person) had advised them to.

Analysis showed that solicitor engagement was strongly correlated with recovery expectations and the presence of anxiety/depression. Clients who expected a poor recovery and reported having anxiety/depression at 3 months post-accident had over 7 times the uptake of solicitors than those clients who expected a complete (or nearly complete) recovery coupled with no reported anxiety/depression. Higher levels of solicitor engagement were also apparent for clients who were not at fault in the accident, for clients who were extremely frightened at the time of the accident, for clients who had poor cognitive functioning (thinking, memory, concentration), and for clients reporting lower levels of resilience.

Figure 9 Solicitor Engagement





Life Back on Track

As previously mentioned, the TAC had conceptualised an over-arching summary measure of recovery in the "life back on track" or LBoT measure. This measure was included in the longitudinal study after being successfully trialled in the TAC's Client Experience Survey. Below is the specific wording of the LBoT measure:

> *"Clients often talk about trying to 'get their life back on track' following a transport accident. This can mean different things to different people. Thinking about your own circumstances right now (today), how would you rate the extent to which you have been able to 'get your life back on track', on a scale of 1 to 10 where 1 means 'not at all', and 10 means 'completely back on track'?"*

A follow-up question was also introduced enabling clients to provide context and meaning to their LBoT rating, at the Time 3 and Time 4 interviews.

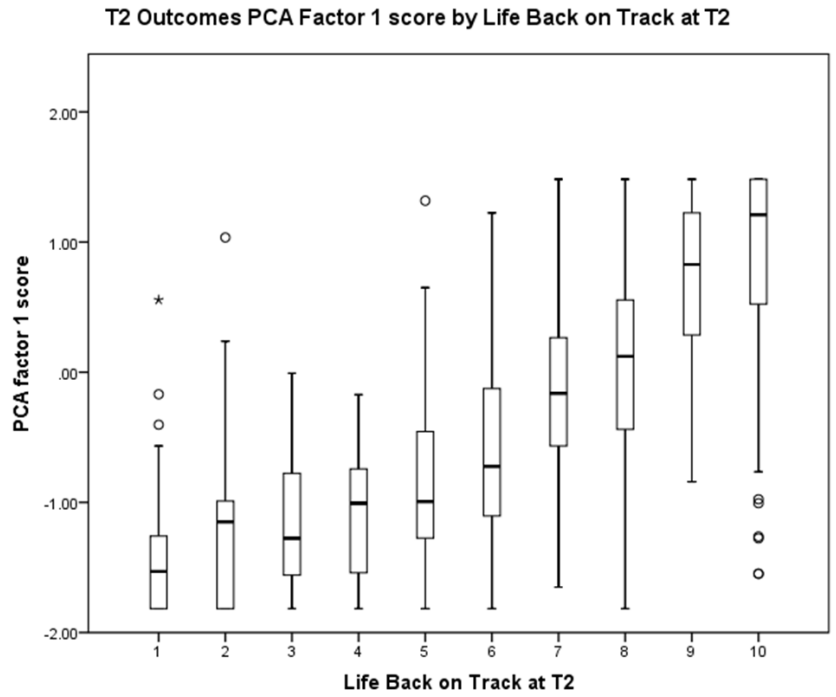
Early analysis focused on exploring whether the LBoT measure worked well as a summary measure, synthesising information across the diverse range of outcome measures contained in the study. This was explored using principal components analysis. The PCA produced two distinct components:

- The first component was essentially an index or summary of good outcomes across a range of multi-dimensional and complex individual outcome measures. This component explained approximately 50% of the variance across all of these measures and can be thought of as a general outcome factor. In general, if a client reported good physical health, they also reported good mental health; conversely, if a client reported poor physical health, they also tended to have poor mental health. This component appeared to be acting like a grand average across all the individual outcome measures included in the analysis.

- After controlling for the variability captured in the first component, a second component was apparent which explained approximately 10% of the variance. This second component appeared to provide a contrasting view between physical and mental health outcomes: some individual outcome measures were loaded / weighted positively to this component whilst others were negative, and some didn't load at all. This indicates that some clients were reporting poor physical but good mental health, whilst some were reporting good physical but poor mental health.

The graph below shows the correlation or relationship between the first component from the PCA (using the resulting factors scores) and LBoT ratings taking from the Time 2 interview. As shown, there is a very high degree of correlation: LBoT is doing an excellent job of accurately summarising a vast amount of information via one very simple question.

Figure 10 Life Back on Track at T2 by PCA Component 1 Factor Scores



Mental Health Vulnerability

The TAC began investigating study findings, initially using Time 1 and Time 2 data, with the objective of understanding more about the mental health challenges experienced by some clients. The TAC closely examined the work of Associate Professor Meaghan L. O'Donnell *(et al)* who had developed a predictive screening index for posttraumatic stress disorder (PTSD) and depression following traumatic injury (7). The screening index contained 10 items covering five constructs and was extremely useful as a triage instrument for screening out the majority of patients (prior to hospital discharge) who were unlikely to need attention for PTSD or depression. The TAC considered that a similar approach could be developed for use in its own environment.

The analysis started by mapping the factors identified by O'Donnell *(et al)* to comparable content contained in the longitudinal study. The TAC was interested in identifying clients with specific risk vulnerabilities early in the life of claim: the profiling variables used were taken from the Time 1 interview at approximately 3-months life of claim. The table below shows the five factors taken from the work of O'Donnell *(et al)* mapped against similar content available for examination from the study.

Figure 11 Comparing the Posttraumatic Adjustment Scale (PAS) to Content in the TAC's Longitudinal Study

			Final items in PAS:	TAC Longitudinal Study:
Pre-trauma	Factor2	Prior Social Support	*In the past I was able to talk about my thoughts and feelings with my family members or friends.*	*Thinking now about SUPPORT AVAILABLE FROM OTHER PEOPLE …Firstly, can you get help from family members if you need it?*
			In the past I was satisfied with the support that I had from my friends and family.	*Can you get help from neighbours if you need it?*
				Can you get help from friends if you need it?
	Factor3	Prior Psychiatric/Trauma History	*I have needed professional help to deal with emotional problems in the past.*	*Long term health conditions at the time of the accident confirmed by a doctor or nurse, that has lasted for 6 months or longer:* *Depression* *Anxiety* *Pre-accident chronic mental*
			Previously traumatic events have impacted negatively on my life in the past.	
Peri-trauma	Factor5	Perceived Threat	*At the time of the event, I felt terrified, helpless, or horrified.*	*Now thinking about the accident itself, how frightened were you at the time of the accident using a scale of 1 to 10 - where 1 is 'not at all frightened' and 10 is ' very frightened'*
			During the event, I thought I was about to die.	
Post-trauma	Factor1	Acute Stress Response	*I have felt irritable or angry since the event.*	*I am angry that this has happened to me*
			I have found it difficult to concentrate on what I was doing or things going on around me since the event.	*The next statement relates to intellectual activities such as remembering, concentrating, thinking and solving day to day problems. Would you say you have no problems, moderate problems or extreme problems with remembering/concentrating/thinking?*
	Factor4	Self Efficacy	*I am confident that I can deal with the financial stressors that may arise as a consequence of being injured*	*And to what extent do you agree or disagree with the following statements...* *a) I can solve most problems if I invest the necessary effort* *b) When I am confronted with a problem, I can usually find several solutions* *c) If I am in trouble, I can usually think of a solution* *d) I can usually handle whatever comes my way*
			I can accept what happened to me.	*I am finding it hard to bounce back from the accident*
				How would you rate your ability to COPE with the injury?

A combined "outcome" or "higher risk" variable was then developed incorporating both depression and PTSD symptomology at Time 2 (6 months post-accident). Depressive symptomology results came from the depression sub-scale (7-item tool) from the DASS-21 (8), and PTSD symptomology was taken from the Primary Care PTSD 4-item tool (9). It should be noted that the TAC was not attempting to diagnose mental health conditions, rather identify clients who may be at risk, from the non-clinical information available via the study.

As shown below, the "higher risk" outcome variable was constructed by cross-tabulating results for depression by PTSD at Time 2, with an appropriate threshold being identified for either (or both) to denote higher risk (highlighted in orange). The table shows that under these criteria, 17% of the study population (who gave valid responses at these questions) exhibited higher risk.

Figure 12 Combined Depression and PTSD Symptomology – Study Results

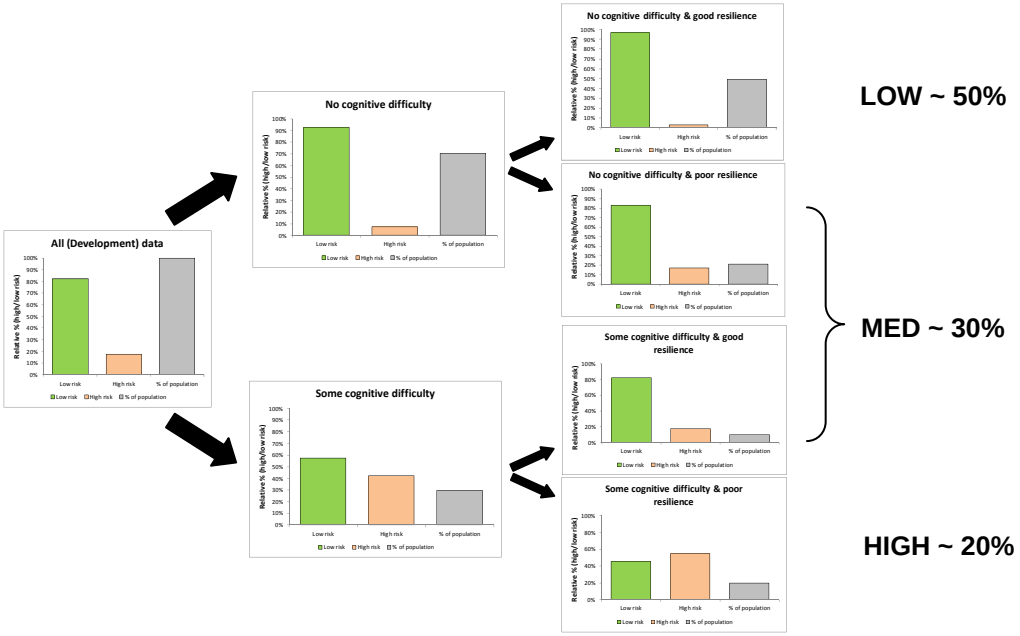
Mental Health Flag

	PC PTSD Score T2						
	-99	0	1	2	3	4	
DASS Depression Score T2 (Grouped)							
N/A	1.6%	1.7%	1.3%	0.7%	1.1%	1.6%	8.0%
Normal	1.5%	30.7%	13.5%	10.8%	9.6%	2.6%	68.7%
Mild	0.4%	0.4%	0.6%	1.3%	1.5%	1.8%	6.0%
Moderate	0.4%	0.6%	1.1%	1.0%	3.1%	3.6%	9.7%
Severe	0.2%	0.2%	0.1%	0.6%	0.6%	1.1%	2.8%
Extremely Severe	0.3%	0.1%	0.4%	0.2%	0.9%	2.9%	4.8%
	4.5%	**33.8%**	**17.0%**	**14.6%**	**16.6%**	**13.6%**	**100.0%**

Mental Health Flag	
low risk	81.2%
high risk	17.2%
	98.4%

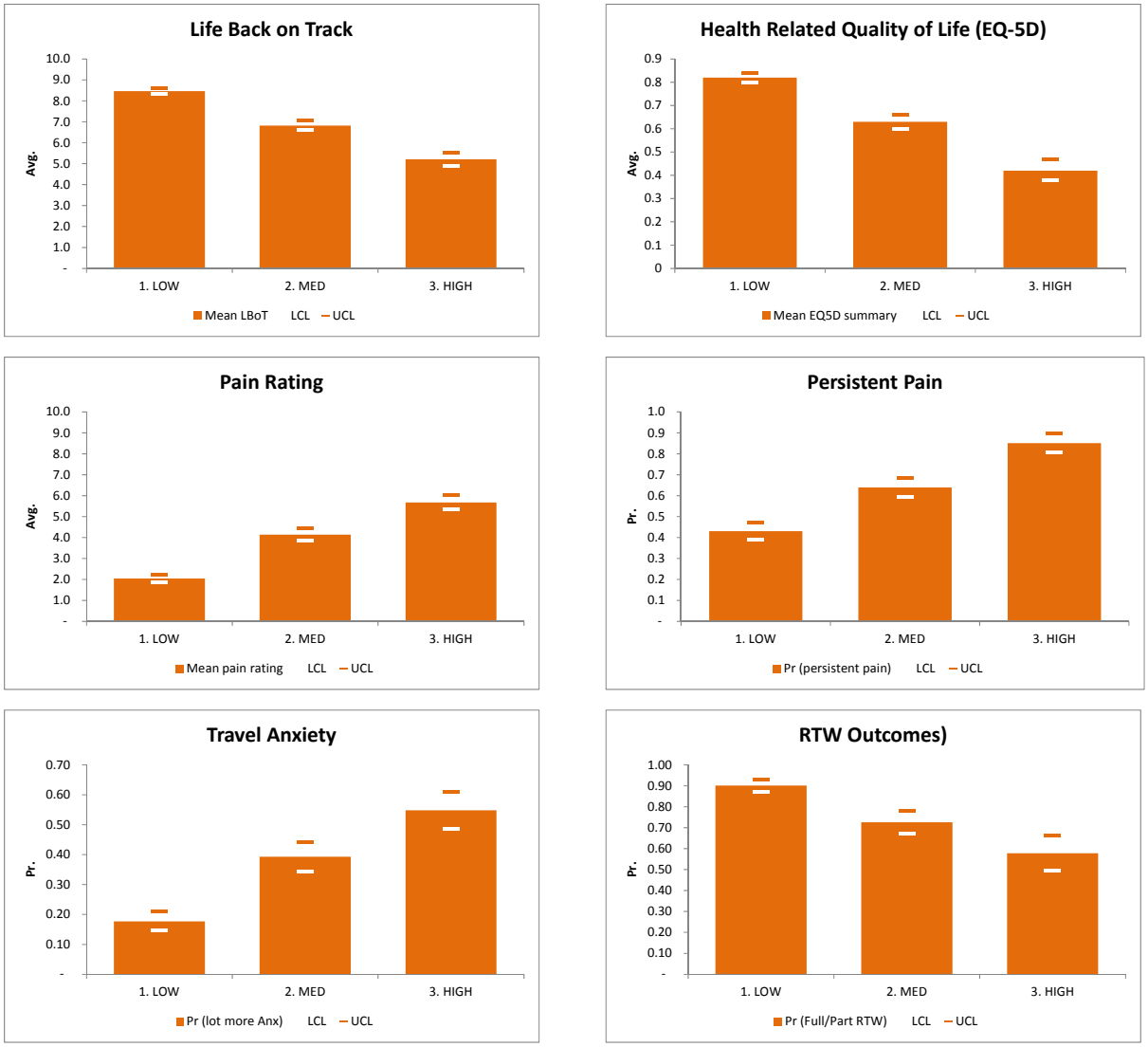
Following a similar statistical approach as used by O'Donnell *(et al)*, analysis was then conducted to understand the factor structure in the study data and to determine which items were most predictive of the "higher risk" outcome variable under consideration. Two key items were most predictive of the combined depression / PTSD "higher risk" outcome variable: they were **cognition** (falling into the acute stress, post-trauma factor) and **resilience** (falling into the self-efficacy, post-trauma factor). Using cognition and resilience results from the study, the TAC could broadly categorise study participants into three groups: those with no or low risk vulnerability (approximately 50%), those with moderate risk vulnerability (approximately 30%), and those with high risk vulnerability (approximately 20%).

Figure 13 Cognition and Resilience: Decision Tree Analysis – Study Results



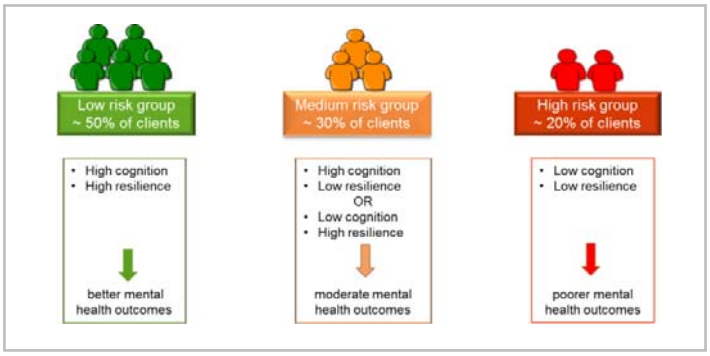
This risk vulnerability categorisation was then used to analyse a range of different variables in the study to identify if there were significant differences between the groups: for nearly every variable examined, the three broad groups showed remarkably different results. A diverse range of variables were examined including health-related quality of life, pain intensity, return to work, recovery expectations, solicitor involvement, stress and experience of the claims management process, and difficulty getting access to medical treatment. Internal administrative data was also examined by the three broad groups and once again, stark differences were apparent.

Figure 14 Selection of Key Outcome Measures by Mental Health Risk Vulnerability



The cohort of clients in the "high" category potentially at high risk of mental health vulnerability appeared to be uncertain about their recovery prospects, in need of more intensive contact with the TAC, had comparatively low coping resources, higher attention to pain, were starting from a more compromised pre-accident position with regards their health and financial status, and were potentially at risk of protracted and less positive recovery outcomes.

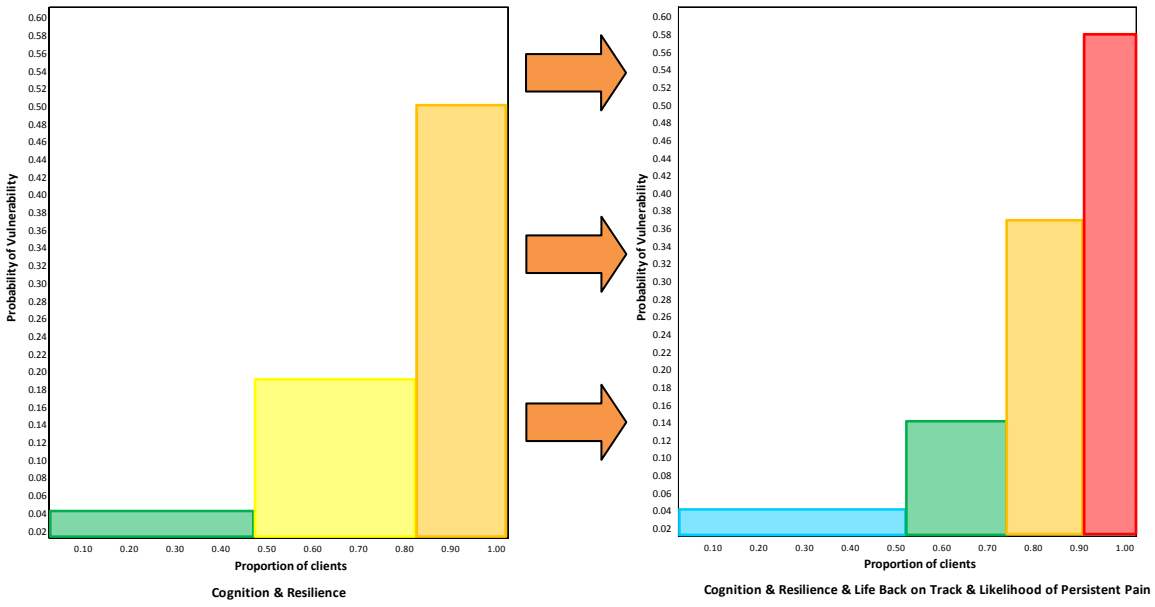
Figure 15 Understanding TAC Clients through Cognition and Resilience



The next stage of analysis explored additional items to further predict potential mental health vulnerability, using both longitudinal study data and internal administrative claims data. Whilst a wide range of internal data was considered, nothing was found to be as predictive as the items asked directly of clients. Incorporating the likelihood of pain persistence and ability to get life back on track (LBoT) into the analysis enabled a more refined level of risk vulnerability categorisation.

This level of analysis split study participants into four groups (not three): low, medium, high and severe vulnerability. This more granular level of categorisation helped "triage out" a greater volume of clients where vulnerability was assessed as very low (approximately 50%) or moderately low (approximately 22%), whilst focusing attention on a higher risk group of approximately 16%, and a very high risk group of approximately 12%.

Figure 16 Refining our Understanding of TAC Clients through Cognition, Resilience, Pain Persistence and LBoT

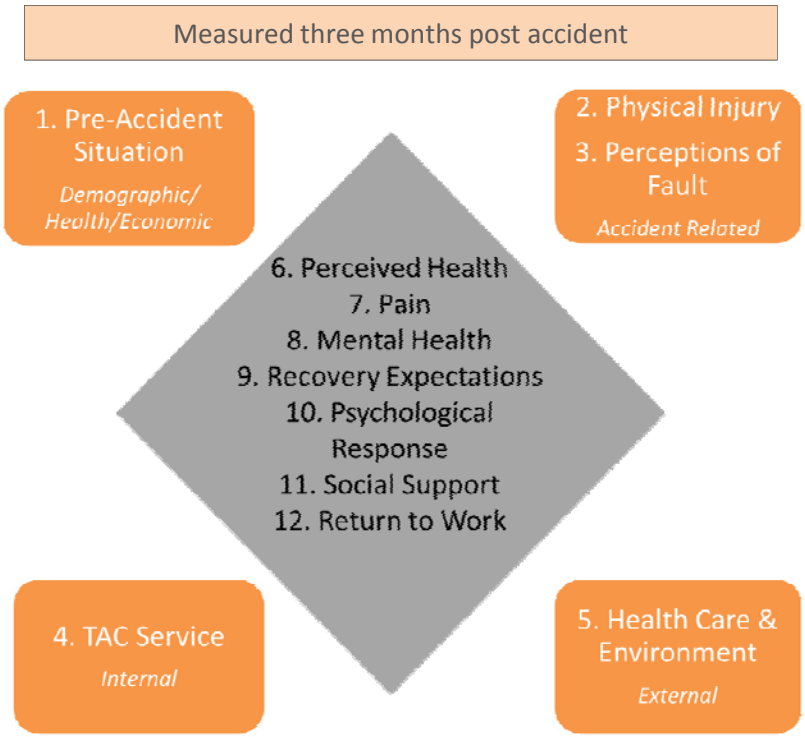


When examining key outcome measures by the updated categorisation (four risk groups), similarly striking results were apparent with clients in the high and very high risk groups demonstrating materially worse outcomes across a diverse range of measures. There was also an association between risk vulnerability and claims management intensity, and also total claim cost.

Recent Analysis: Understanding Complexity

In more recent times, the TAC has been using longitudinal study findings to more deeply understand recovery trajectories and the complexities some clients face when attempting to get life back on track following a transport accident. The study contains a vast amount of information that can be harnessed to understand "complexity". At the time of publication, the TAC had identified 12 broad domains of complexity, as shown below.

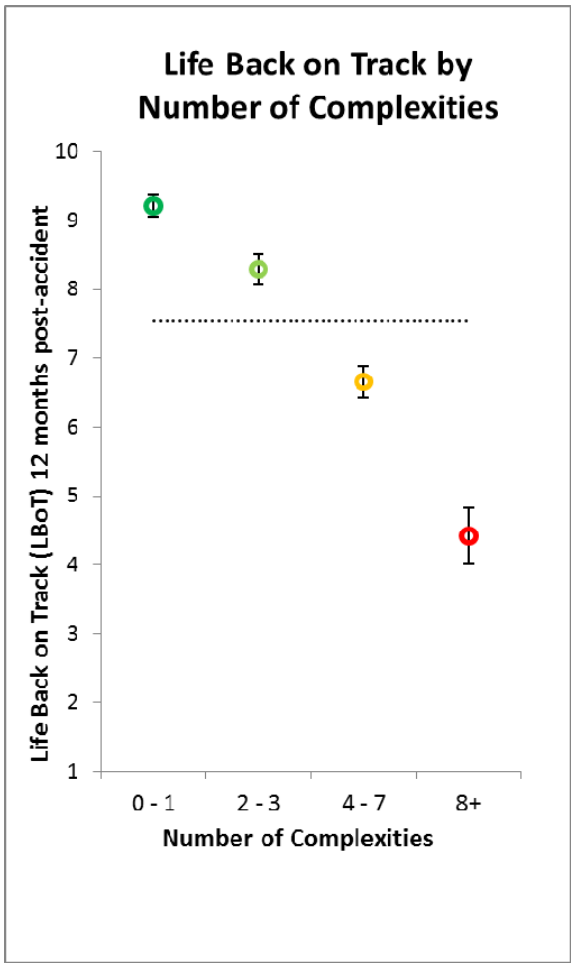
Figure 17 Understanding Complexity



These "domains" represent a diverse range of individual measures contained in the study of which they are indicative. The TAC is currently analysing the underlying structure of the data, and eventually hopes to build a statistical model to help clarify the different relationships and inter-dependencies between these domains, and the multivariate impact on key outcomes measures, with particular reference to getting life back on track.

Early analysis shows a very strong correlation between complexity and LBoT, as shown in the graph below.

Figure 18 Complexity and LBoT



It is hoped that insight from the study will inform a more holistic understanding of TAC clients, and therefore enable the TAC to tailor appropriate service and claims management models in response to individual client need, where possible. It is also hoped that early identification of clients at risk, coupled with early and appropriate intervention, will have a positive impact on the recovery trajectories of vulnerable clients, and may also have a positive impact on liability management.

Intended Usage

Whilst the TAC has not yet fully implemented the insight gained from its research, it has commenced consideration of how the research could possibly be translated to a claims management setting.

A potential predictive approach developed by the TAC could consist of two parts:

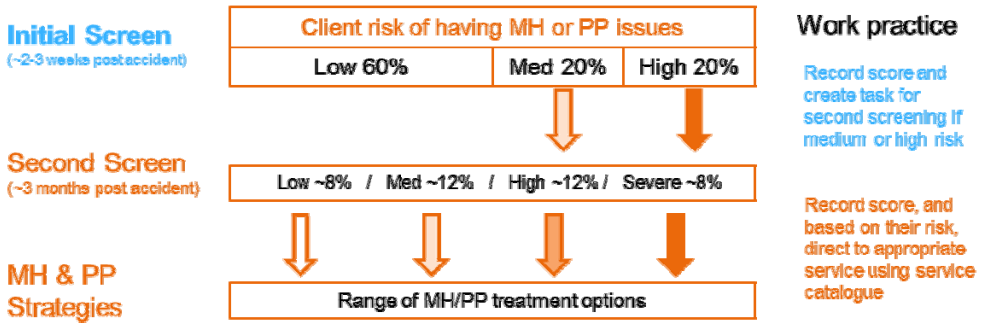
- An initial screen (screen 1) proposed to be administered very early in the life of claim, with four questions being asked (cognition, resilience, level of social support, and pre-existing mental health), and

- A secondary screen (screen 2) for clients not "triaged-out" via the initial screen (cognition, resilience, persistent pain, and ability to get life back on track).

The graphic below illustrates how the screen could work. The initial screen will identify clients most likely to be in need of mental health and/or persistent pain assistance in the future, and would screen out about 60% of clients. The initial screen would consist of four questions related to cognitive function (memory, thinking, and concentration), resilience (ability to bounce back), pre-existing mental health issues and social support (family and friends). Responses across all four questions would then be summed with a possible score range of 0 to 4. A score of two or more would result in a follow-up with the second screen at an appropriate time.

The second screen would validate the first screen for the remaining 40% of clients and provide further detail so that the client could be offered appropriate mental health and/or persistent pain supports. The second screen would consist of four questions; once again cognitive function and resilience, with the addition of two new questions related to pain and ability to get life back on track. Once again, responses would be summed across all four questions with the range of possible scores being from 0 to 4: 0-1 is categorised as low risk vulnerability, 2 is medium, 3 is high and 4 is severe. These risk vulnerability scores could then relate to different service offerings appropriate to the resulting potential vulnerability.

Figure 19 A Potential Predictive Approach for Identify Mental Health and/or Persistent Pain Risk Vulnerability



The questions used in the proposed screen are adapted from the questions used in the longitudinal study, essentially being simplified to make them more conversational. Claims staff were consulted when developing the questions: during this process it was discovered that many staff were already discussing the broad topic areas included in the proposed screen. Introducing a screening tool would enable the TAC to adopt a consistent approach, and a standardised way of recording information.

Conclusion

As the TAC's strategic focus has shifted over the years, from being solely focused on Financial Sustainability, to Client Experience and most recently to Client Outcomes, the importance of research such as the TAC's Longitudinal Client Outcome Study cannot be understated. The authors are confident that in time, the insight gained from this research will continue to result in clients' needs being better met thanks to a deeper understanding of client needs, at both aggregate and individual levels. It is hoped that, via the research set out in this paper, that organisations such as the TAC are able to continue to improve their ability to support those unfortunate enough to be injured in transport or workplace accidents.

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- TAC clients who participated in the study. These clients willingly gave their time to participate in a study that spanned two years with no direct incentive to do so. Clients generously shared their experiences, and recovery stories enabling the TAC to derive invaluable insight from study findings.

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NB: spelling, grammatical errors and any inadequately formed assertions or opinions are the sole responsibility of the authors.

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