NRSPP
NATIONAL ROAD SAFETY
PARTNERSHIP
PROGRAM

Emerging Technologies Driver Monitoring Project: Eyes On Fatigue

Dr Darren Wishart

Griffith UNIVERSITY
Queensland, Australia

A partnership between:
MONASH University
NRSPP NATIONAL ROAD SAFETY PARTNERSHIP PROGRAM

Todays moderator

Jerome Carslake

Director of NRSPP

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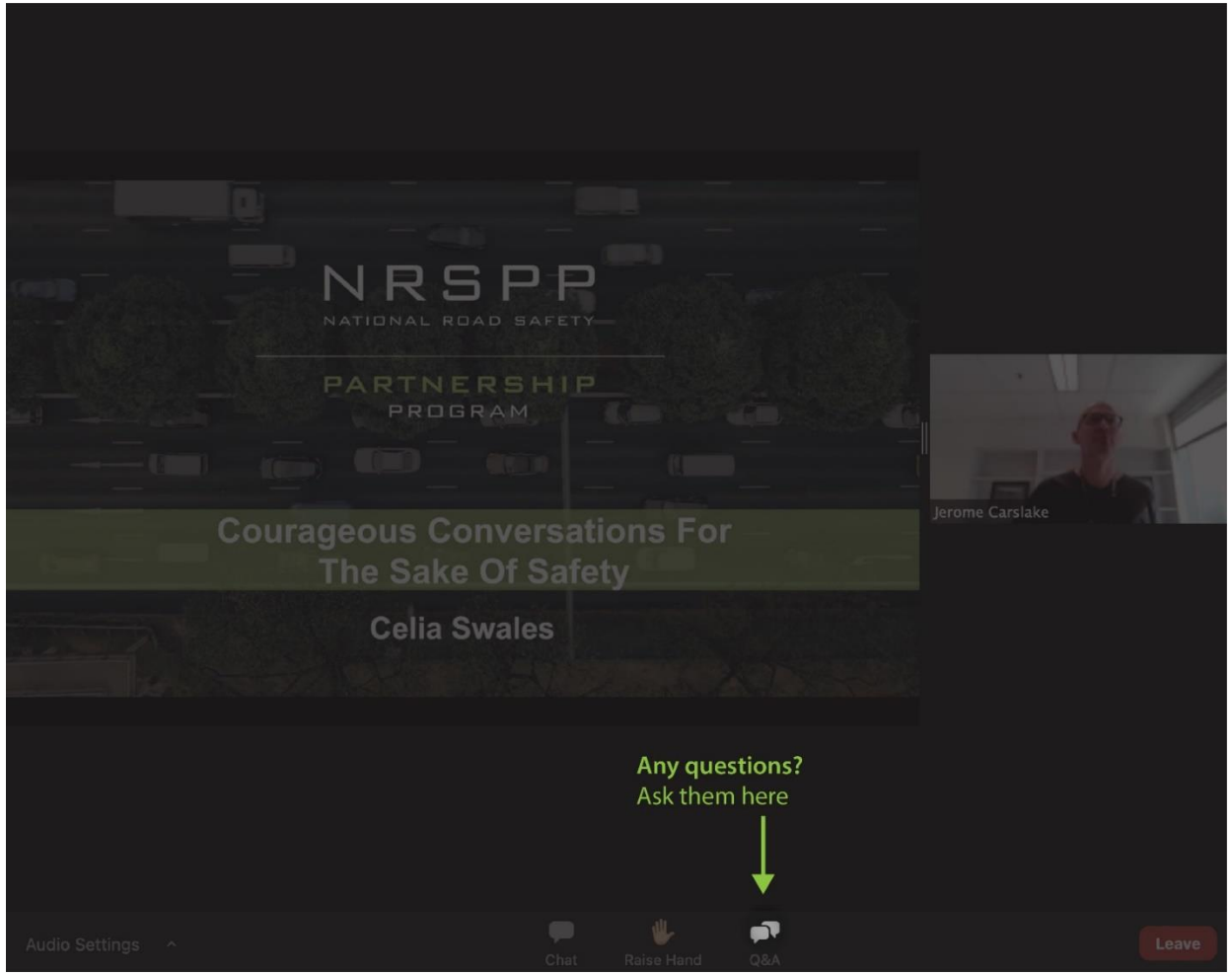
Housekeeping

Webinar is = 40 mins

Question time = 20 mins

Zoom Webinar Functions



Today's presenter

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CRICOS No. 00233E

Emerging Technologies Pilot Project
“Eyes on Fatigue”

NRSPP –Presentation 31 March 2022

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Report Availability

https://experts.griffith.edu.au/7927-darren-wishart/publications

Cite Report as:

Wishart & Barrett (2021). Emerging Technologies Driver Monitoring Pilot: Eyes on Fatigue. MAIC Report, Griffith University

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Acknowledgement

- Motor Accident Insurance Commission (MAIC)
- Queensland Trucking Association (QTA)
- 2 x In-cabin Technology Providers
- 11 Organisations that participated along with drivers and other key personnel

Study Aim

- The aim of this research was to undertake a pilot study to provide insight into and determine the effectiveness of in-cabin technology to reduce driver distraction, inattention, and fatigue in a number of participating real world heavy vehicle transport operations.

Methodology & Process

- Transport industry recruitment and participation
- Installation of technology and on boarding process
- Collection of in vehicle technology data (8 Months) as provided to GU by technology agents
- Before and after heavy vehicle safety survey and stakeholder interviews
- Brief organisational driving safety systems analysis
- Participation and involvement in QTA stakeholder working group monthly and bi-monthly meetings
- Participation in the “yarn in the yard’ initiative

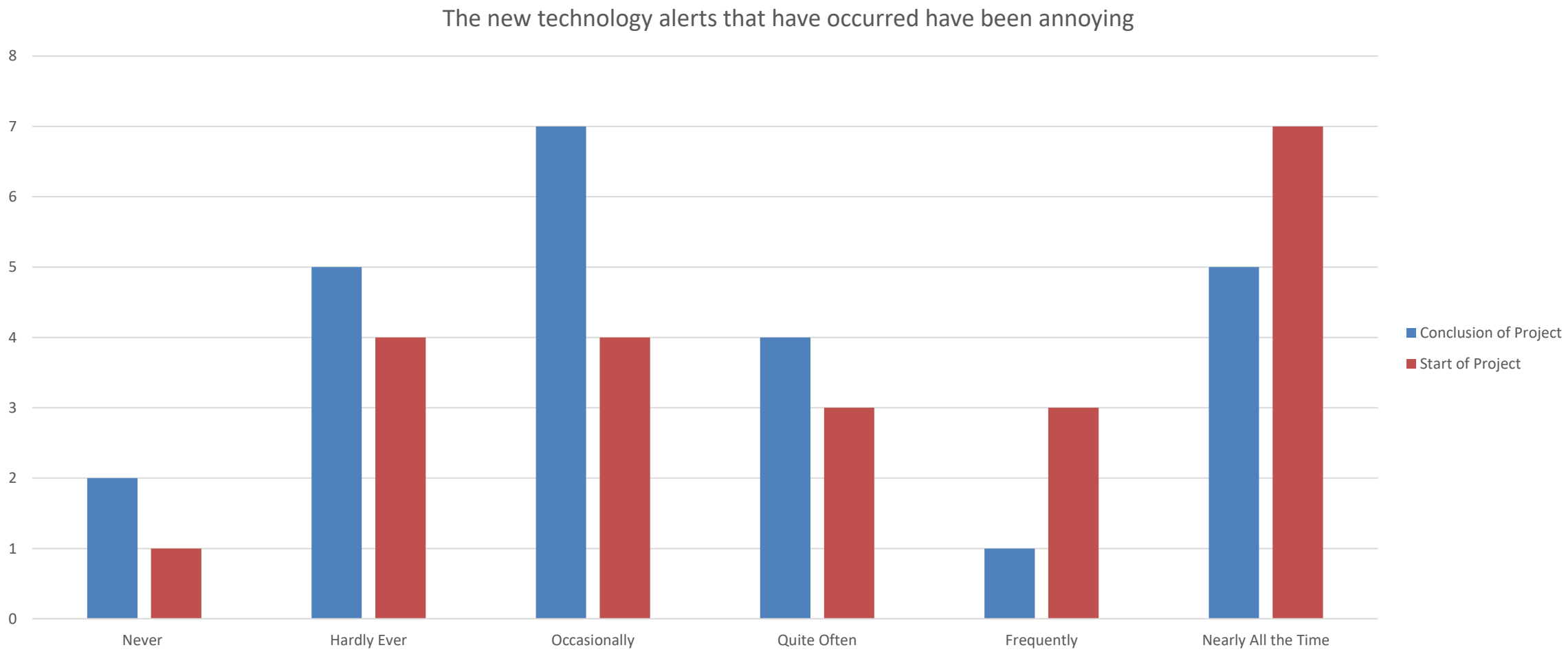
Technology & Process

1. The in-cab sensors tracking the driver's face, eyes, and head movements determine level of eyelid closure, blink rate, and head position.
2. These sensors measure head movements and/or eyelid closure that exceed the pre-determined safety levels.
3. These safety level breaches are determined to be either a fatigue or distraction event. Accordingly, an audio alarm sounds and/or seat vibrations occur.
4. Data from the event is immediately sent to the 24/7 operations centre for the secondary verification process. The event is reviewed and categorised. This categorisation includes determining if the event was real (verified) or a false positive, and for real events, placing them into a sub-class, if applicable. For events that are confirmed to be fatigue related, the organisation is contacted directly.

Type of Events

- **Distraction events:** When the driver's head position is not facing forward for a period of 4 seconds while the vehicle is travelling at 40km/h or faster. This results in an audio alert.
- **Fatigue events:** When the driver's eyes close for a period of 1.5 seconds while the vehicle is travelling 10km/h or faster. This results in an audio alert and vibration.
- **Manual recording events:** When the driver presses the button on the in-cab sensor then 30 seconds of footage is recorded (15 seconds before and 15 seconds after the press of the button).
- **Field of view exception:** When the in-cab system is unable to detect the facial features of the driver for a period of 10 minutes or longer while the vehicle is travelling at 10km/h or faster. The in-cab sensor being out of focus or covered are possible causes, in addition to the driver being in a position that is not in view of the sensors, or the driver's facial features are covered.

Before & After Survey



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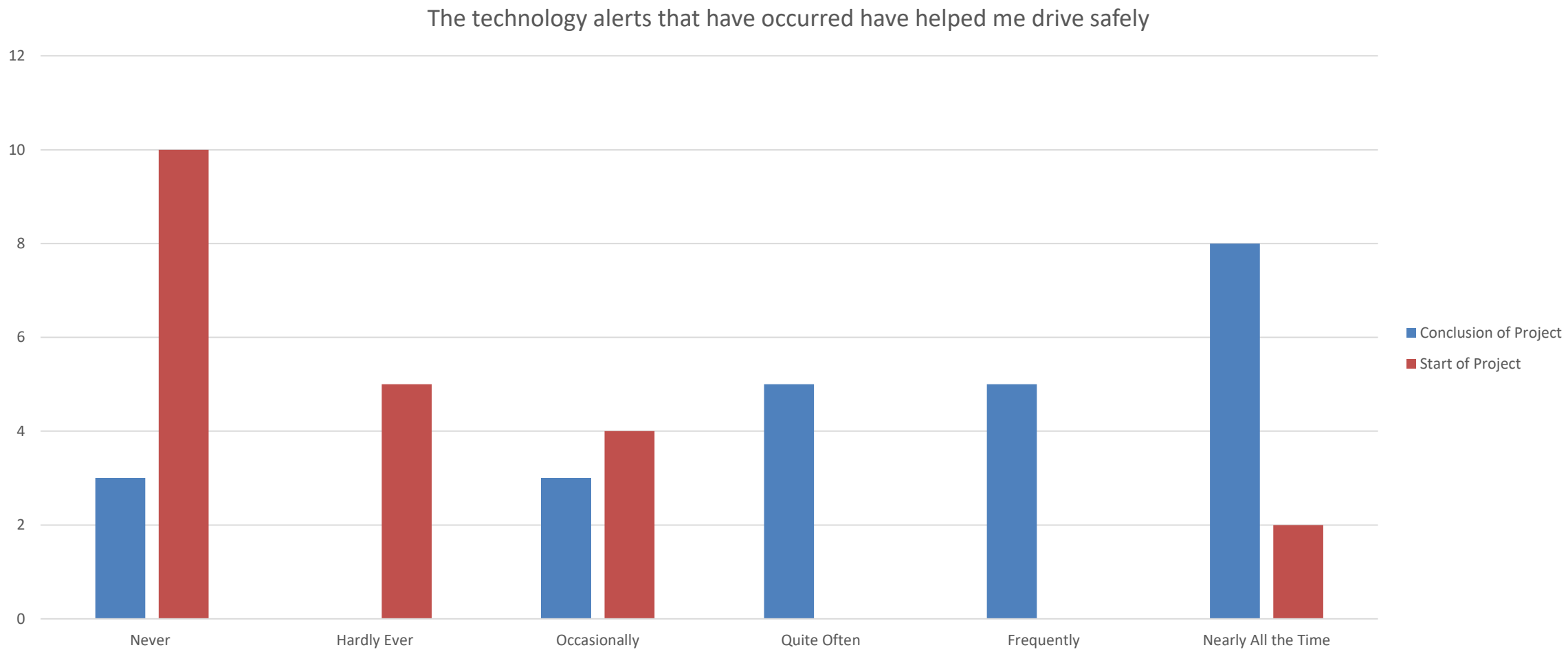
Before & After



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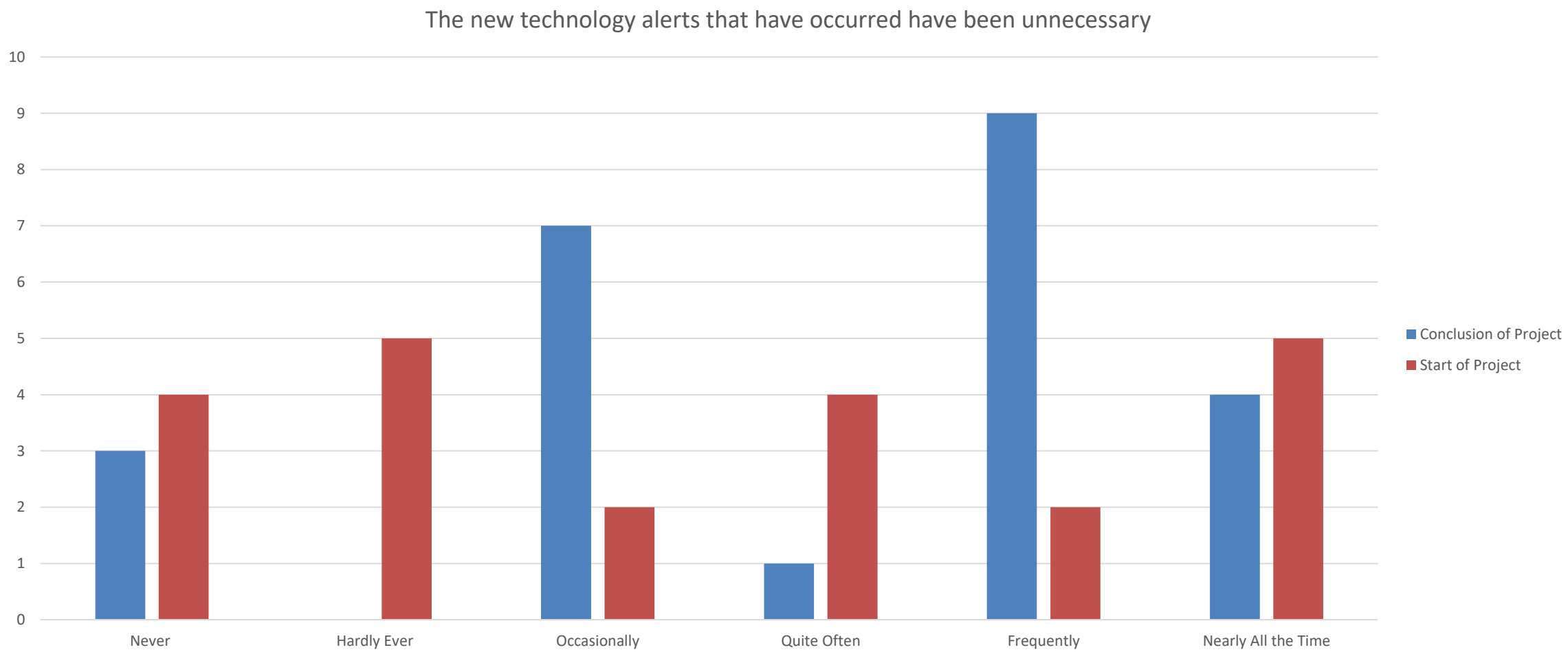
Before & After Survey



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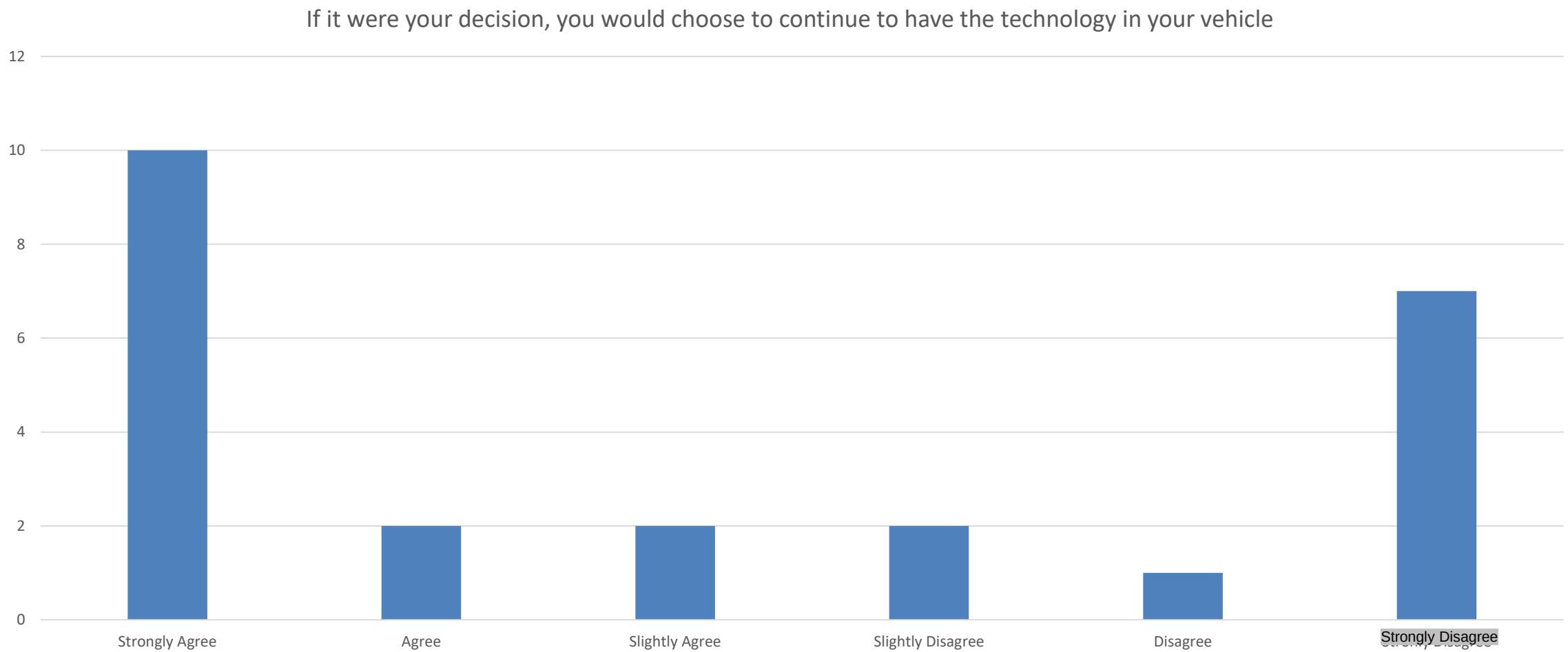
Before & After



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Questions?

Stakeholder Interviews

Benefits and challenges associated with the technology included key themes such as;

- **Onboarding and installation of the technology,**
- Use of the technology,
- **Alerts provided by the technology,**
- Policies and procedures associated with managing the alerts,
- Changes in driver behaviour and other associated processes

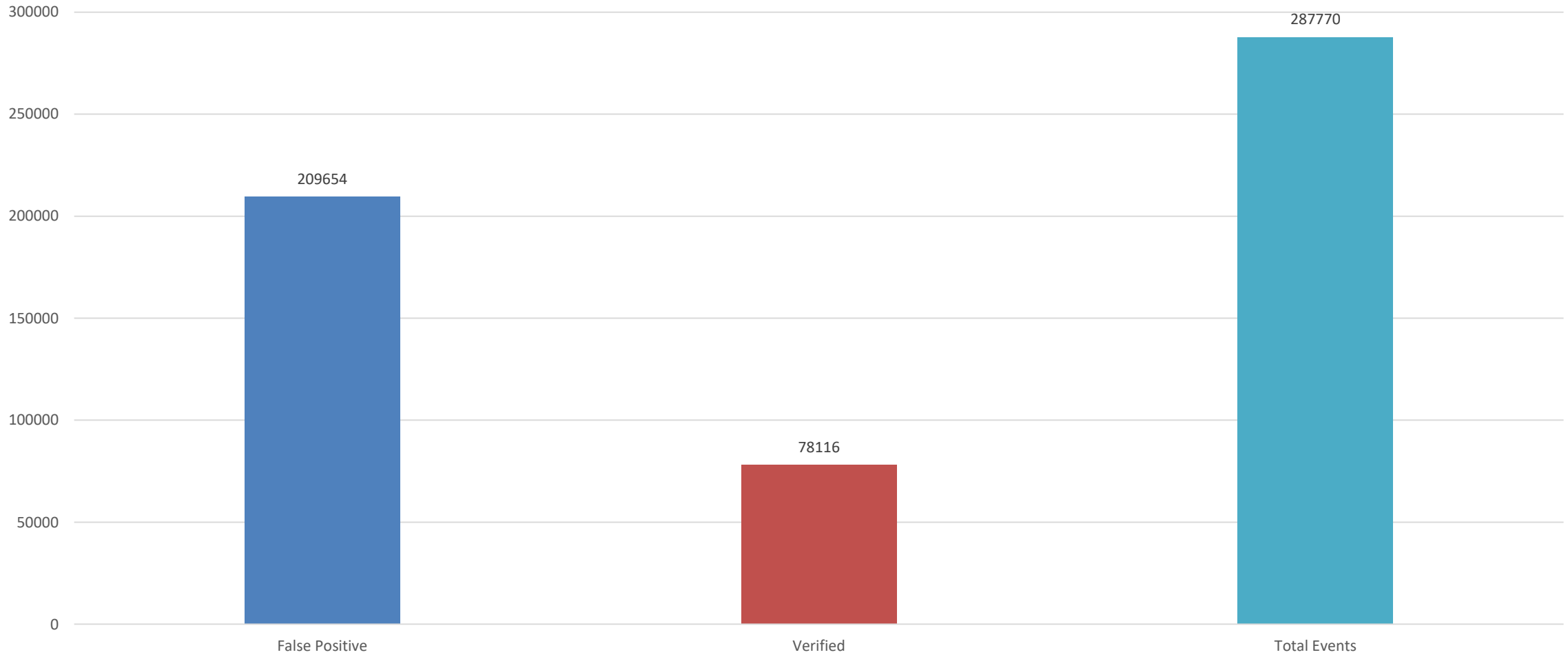
Key Advantages

- The capacity to demonstrate the potential for fatigue and distraction events to customers has been ***helpful in shifting customer delivery expectations,*** as they understand the need to mitigate insurance claims.
- Directly communicating to customers when a fatigue event has occurred ***appears to make customers understanding of delays occurring,*** as such delays are present to ensure road safety.
- Advertising the presence of the technology in vehicles has been ***a selling point*** for some customers.
- ***Organisations see the value of recording*** fatigue and distraction events.
- Organisations recognise not only the benefits of the technology directly influencing driver behaviour in the vehicle cab, but also in the manner in which the ***in-cab data can be used in conversations*** with the driver to pre-emptively and permanently change their behaviour.
- Broadly, there was a ***lot of positivity*** directed towards the technology by many organisations, however, some organisations expressed that in terms of ***cost benefit, the challenges that the technology presents are not necessarily worth having the technology.***

Key Challenges

- The ***high rate of false positives*** and technology anomalies reported by the technology was distracting and frustrating for drivers.
- ***Behaviour changed – But*** ……False positives appeared to reduce as drivers started changing their behaviour. It was suggested that this behaviour change was not necessarily the result of drivers being less distracted, but simply learning the thresholds at which distraction alerts were being triggered.
- **Driver pushback**, big brother
- Across organisations, there were ***multiple instances of drivers resigning*** over the implementation of the technology. While this may suggest that the implementation of technology may result in unsafe drivers resigning, no evidence indicates that this is actually the case.
- ***Delays in returning emails/phone calls after an event occurred.***
- ***Technology malfunction***
- ***Fatigue versus distraction focus?***
- ***Lack of transparency and clarification*** about the manner and criteria regarding decisions made during the ***secondary verification processes***
- ***After sales service***

Summary Analysis of Technology Data



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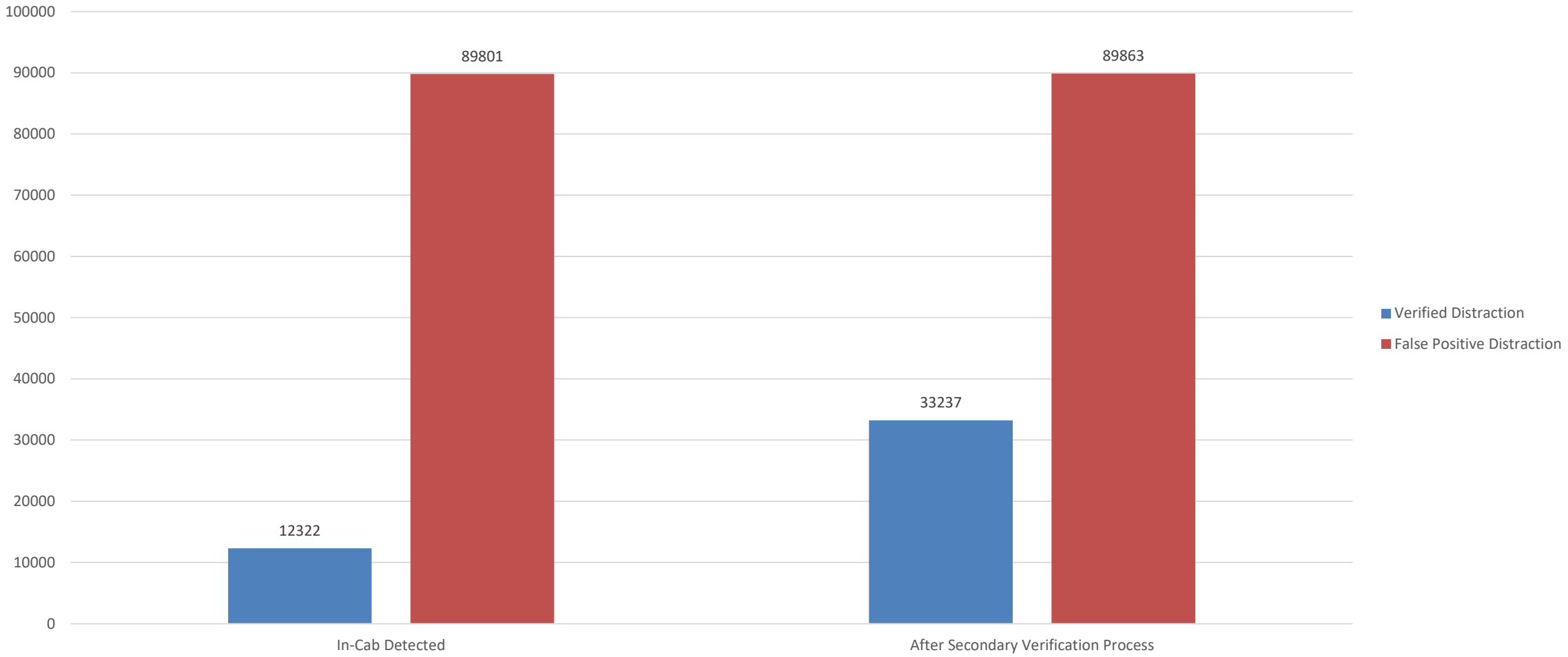
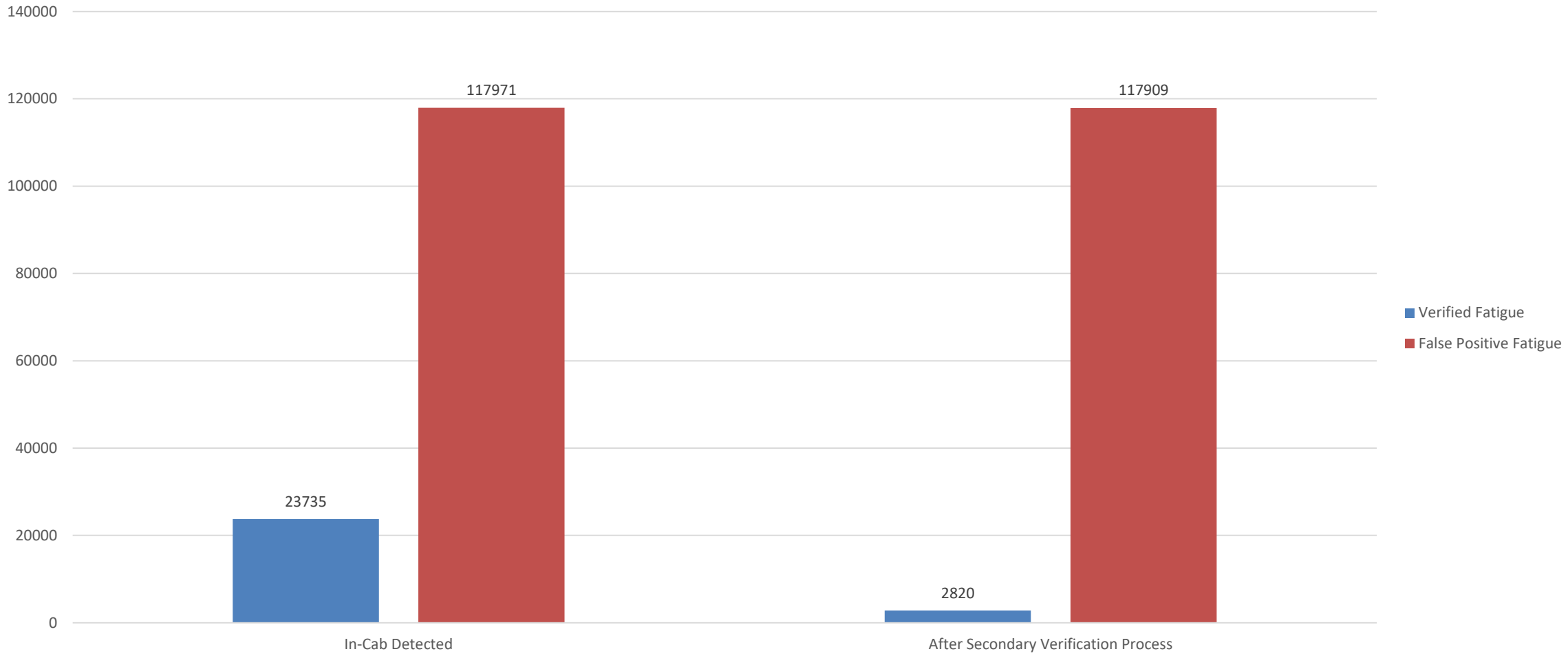
Distraction



Fatigue


140000
120000
100000
80000
60000
40000
20000
0
117971
117909
23735
2820
In-Cab Detected
After Secondary Verification Process
Verified Fatigue
False Positive Fatigue

Other Key Outcomes

- Speed alert thresholds – large frequency of exceptions
- Frequency of alerts increased over the course of the project
- Large number of recategorization of fatigue alerts to distraction across organisations
- Challenges associated with policy, resourcing and risk management

Future Activities

- Final Report publicly available

https://experts.griffith.edu.au/7927-darren-wishart/publications

- Road Safety Innovation Fund- Grant Success

THANK YOU

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Questions?

Thank You

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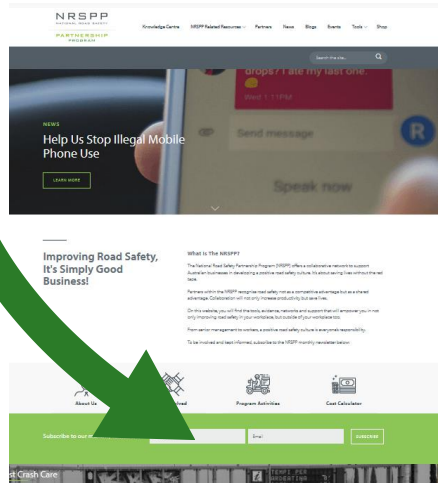

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