

Supplementary material

Sample Representativeness

Although the 14,868 employees participating in the survey was a large sample size, the response rate was a modest 22%. While this is common in online voluntary surveys, it was important to assess the possibility of response bias in the survey. Response bias can impact the results of a survey if there are systematic differences between respondents and non-respondents.

The possibility of response bias in *Answering the Call* has been investigated in several ways. Firstly, demographic characteristics of the sample were compared with the known demographic characteristics of the entire population of employees in the sector, including comparisons with data from the 2016 Australian Census of Population and Housing, and information about the demographic composition of the workforce as provided by each participating agency. These comparisons identified some modest differences in the profile of respondents in the survey. Respondents were slightly more likely to be female, older or be in non-operational roles. No differences were found in terms of other characteristics, such as country of birth, educational status, marital status or number of children. The weighting strategy adjusts for these observed differences.

Secondly, characteristics of participants in the survey were modelled to test for evidence of possible non-response bias. As noted by Brick (2013), for any population survey, some respondents are going to be more likely to respond than others. Using data from those who did participate to examine possible differences between those who readily participated in the study, and those who required more effort to enrol in the study may be informative about possible differences among those who would have required more effort to enrol in the study than was feasible. In this case, *Answering the Call* was branded as a national survey of mental health and wellbeing. As such, it may have attracted participation from employees with mental health issues they wanted to discuss in the survey. If this occurred systematically, this could result in the prevalence of mental health conditions being overstated. To test for evidence of this type of bias, we compared outcomes between agencies with differing response rates. We also tested for possible differences between employees who participated in the survey when it was first released in each agency and those who required one or more reminders to participate.

Demographic characteristics of the sample compared with census data

Supplementary Table 6 compares the distribution of the sample of employees, with demographic characteristics obtained from the census, based on Industry classification. Note that the 2016 Census does not separately identify employees of State Emergency Services organisations. The comparisons suggest that the sample is comparable to the census distribution by Indigenous status, by marital status, and country of birth. However, the sample has a slightly higher proportion of females compared with males in each of the three sectors, and there is a general trend for the sample to have a slightly older age distribution than the workforce in general. It is a common experience in surveys that younger people, particularly young males, have lower response rates. Weighting was used to account for these

small differences in gender and age group between the composition of the survey data and the available comparative data.

Supplementary Table 6: Selected demographic characteristics of employees in the police and emergency services sector, comparison with 2016 Census data

	Ambulance		Fire and rescue		Police	
	Survey (%)	Census (%)	Survey (%)	Census (%)	Survey (%)	Census (%)
Indigenous status—						
Aboriginal and/or Torres Strait Islander	1.7	1.9	2.2	1.9	2.4	2.0
Marital status—						
Married	57.4	54.3	64.5	63.1	60.3	59.0
Divorced	5.8	8.9	6.5	9.4	6.7	9.2
Separated	3.4	3.3	3.9	3.9	4.2	3.9
Widowed	0.5	0.7	0.7	0.7	0.5	0.6
Age—	4.4	6.4	2.0	3.1	2.2	4.1
15-24						
25-34	22.8	27.3	13.2	18.5	17.6	26.1
35-34	25.9	25.9	23.6	27.4	29.3	31.6
45-54	30.3	25.0	37.4	30.7	35.8	27.4
55-64	15.6	13.5	22.1	18.4	14.3	9.9
65 or more	1.0	1.8	1.8	1.9	0.7	1.2
Sex—	52.1	56.4	68.8	79.8	61.1	65.4
Male						
Female	47.9	43.6	31.2	20.2	38.9	34.6
Education—						
Bachelor's degree or above	56.3	56.5	27.7	26.2	32.3	32.3
Country of birth—						
Australia	84.5	82.2	87.8	84.8	81.1	81.9

Rate of mental health conditions and negative workers' compensation experiences by time since launch of study

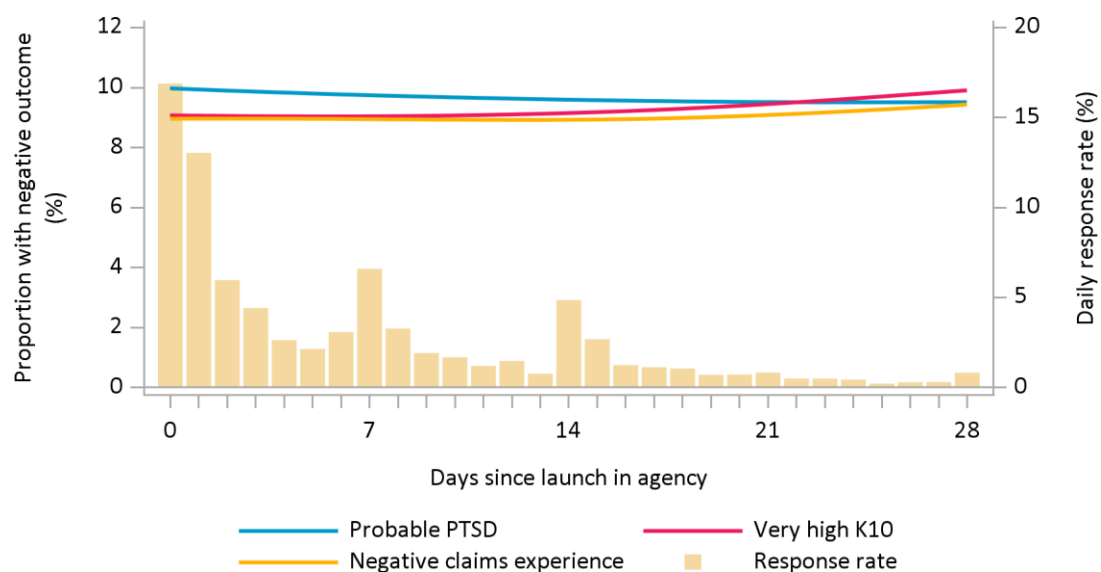
If there was a response bias operating such that people with a lived experience of a mental health condition or a negative experience relating to mental health at work, then it would also be reasonable to expect that employees who participated in the survey at the first opportunity would be more likely to have had negative experiences than employees who required multiple reminders before participating.

To investigate this, in each agency respondents were ordered by the number of days since the launch of the study in that agency. The rates of adverse outcomes were calculated by time since launch of study. These times were calculated separately for each agency, as launch of the study was staggered across agencies. In general, response rates were highest in the first few days after launch, with modest increases when the reminders were sent at one, two and three weeks after launch. Outcomes examined included prevalence of probable PTSD, very high level of psychological distress as measured using the K10, or having had a negative experience of the workers' compensation system as a result of a claim relating to

psychological trauma, stress or a mental health condition. There was no significant change in the rate of any of these outcomes by length of time since launch of the survey, suggesting there was little evidence of any response bias in the survey relating to the experience of mental health difficulties.

Supplementary Figure 1 shows the relationship between selected negative outcomes and number of days since launch of the study. There was no significant change in the rate of any of these outcomes by length of time since launch of the survey. This suggests that those employees who took the earliest opportunity to participate in the survey and those who delayed completing the survey, and those who required several reminders to participate in the survey did not differ meaningfully in level of mental health issues or distress. Logistic regression analysis also found no significant association between any of these adverse outcomes and time since launch of the study.

Supplementary Figure 1: Proportion of employees with probable PTSD, very high psychological distress or who have had a negative experience with workers' compensation associated with an emotional or mental health issues by length of time since study was launched



A second means of investigating if there is a relationship between participating in the survey and outcomes measured in the survey was to investigate whether outcomes differed between agencies that had higher and lower response rates.

Graphs of outcome rates by agency level response rates showed little sign of any systematic pattern. To protect the confidentiality of individual agencies participating in the study, these graphs are not shown. Logistic regression models were fitted to test for any relationship between agency level response rate and negative health outcomes, and these found no significant associations. For probable PTSD the regression co-efficient was -0.00061 [-0.0016-0.0004], $p = 0.27$. For very high psychological distress the regression co-efficient was

-0.00038 [-0.0011-0.0004], $p=0.33$, and for having had a negative experience of the workers' compensation system the regression coefficient was -0.00063 [-0.0024-0.0012], $p=0.49$.

These analyses did not support the hypothesis that personnel who were harder to recruit to the study may have had differing levels of mental health conditions or different rates of negative experiences.

Sample weights

The survey data was weighted to reflect observed differences between the characteristics of the sample and the population. The weighting strategy used was an extension of the two step procedure proposed by Haziza and Lesage (2016). Their two-step approach includes nonresponse propensity weighting followed by calibration. For *Answering the Call*, the calibration step was separated into two stages. The sample was calibrated first to the demographic profile of the employees in each agency using data on workforce demographics provided by each agency, and subsequently calibrated to reflect the census distribution of the population of employees.

Separate weights were developed for the employee sample and the volunteer sample. Only the employee sample is reported in this paper. The weighting strategy proceeded as follows:

- design weights were calculated from the inverse of the selection probability within each stratum within each agency
- the distribution of each agency's sample was compared with the reported demographic composition of their workforce, and adjustments were made to account for the response rate in each agency
- the distribution of the sample within each sector was compared with the census distribution for key demographic variables and a model based approach was used to adjust weights so that the demographic profile of the weighted sample matched the census distribution.

References

- Brick, J.M. (2013) Unit nonresponse and weighting adjustments: a critical review. *Journal of Official Statistics*. 29: 329-353.
- Haziza, D., Lesage, E. (2016). A discussion of weighting procedures for unit nonresponse. *Journal of Official Statistics*. 32: 129-145