Public attitudes on vaccine distribution

ANU Centre for Social Research and Methods

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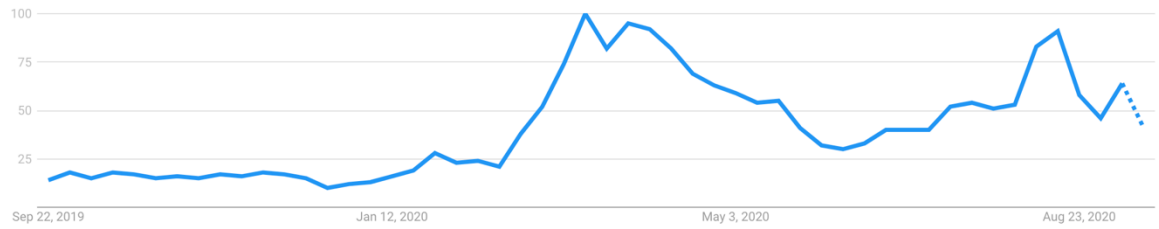
Abstract

If and when a safe and effective vaccine that prevents the spread of COVID-19 becomes available, consideration will need to be given to a distribution method not only maximises its effectiveness, but also has support from the general population. The aim of this paper is to summarise the results from a survey experiment on a probability-based, representative sample of the Australian population during mid-August 2020 that tested explicitly the relative weight that Australians put on different characteristics of individuals in terms of who should receive a vaccine ahead of others. Demographic characteristics of priority vaccine recipients only had a small effect, with age more important than sex, and ethnicity having no effect. A person's employment status did have a large effect though, with essential health workers far and away the highest priority as identified by Australians, and paramedics being the specific occupation who Australians feel should receive the vaccine first. In addition, Australians preferred those with a health condition over those without, those in a high COVID-19 area over those in areas with low infections, and those with caring responsibility over those without (in that order). For the most part, preferences were relatively stable across the Australian population, though people tended to preference those who had different characteristics to themselves to receive the vaccine first. The data from this experiment is available through the Australian Data Archive for further interrogation.

1 Introduction and overview

Many Australians, like people across the world, are hoping for a vaccine to SARS-COV-2 and the associated disease (COVID-19) which would allow for travel restrictions and physical distancing measures to be substantially relaxed or dispensed with entirely. One indicator of the interest in vaccines is the use of the term in internet searches, which show a dramatic increase in Australia since the start of 2020, with peaks that coincide with increases in the Australian infection rate (Figure 1).

Figure 1 **Relative frequency for search term 'vaccine' in Google Searches – Australia, September 2019 to September 2020**



Notes: Numbers represent search interest relative to the highest point on the chart for Australia for the period September 2019 to September 2020. The value of 100 is the peak popularity for the term and a value of 50 means that the term is half as popular. The dotted line represents incomplete data for the period and is indicative only.

Source: trends.google.com

If and when a vaccine or vaccines have been developed, the vaccine(s) will be a need to be manufactured and distributed in sufficient quantities to allow widespread vaccination of the population. While plans are being put in place to ensure that any safe and effective vaccines can be deployed as quickly possible in Australia (Australian Government 2020), it is likely that it will take some time for the full number of required vaccinations to become available, especially if people need to be vaccinated more than once for full effectiveness. If there are initial shortages of a vaccine in Australia, then decisions will need to be made as to which Australians receive the vaccine first.

The standard market approach of using price to determine access to a scarce good or service will almost certainly not produce a social optimal allocation in the face of the COVID-19 pandemic and is also likely to be politically untenable. Using waiting times as a way to ration (Barzel 1974; Globus-Harris 2020) is also not likely to be feasible, given the necessity to vaccinate as many people as possible in as short a period of time. Rather than price or time, the medical ethics literature outlines a different set of criteria. Cookson and Dolan (2000) discuss three principles:

- Need principles – distribute in proportion to immediate threat or capacity to benefits;
- Maximising principles – maximise health or wellbeing over a population; and
- Egalitarian principles – equalise lifetime health expectancy.

Persad et al. (2009: 423) on the other hand, argues that 'no single principle is sufficient to incorporate all morally relevant considerations and therefore individual principles must be

combined into multiprinciple allocation systems.' They argue for eight allocation principles, that can be categorised into four categories: 'treating people equally, favouring the worst-off, maximising total benefits, and promoting and rewarding social usefulness.' An alternative framing of principles is given by Pathak (2020) as follows:

> '… equity, which is fair distribution of benefits and burdens; utilitarianism, which involves maximizing welfare; reciprocity, which is respecting contributions others have made in the past; instrumental valuation, which is respecting contributions others could make in the future; solidarity, which is fellowship with other members of society; non-discrimination, which is requiring that certain individual characteristics such as gender, race, and age play no role allocation'

The Australian Government, implicitly through the strategy introduced above (Australian Government 2020), is also advocating for a 'targeted and responsive' approach, receiving advice from the Australian Technical Advisory Group on Immunisation (ATAGI).[1] In this paper, we aim to inform such deliberations by documenting the views of a representative sample of adult Australians on who should be prioritised to receive a vaccine. As far as the authors are aware, this is the first evidence on such public opinion explicitly with regards to a COVID-19 vaccine using a large, probability-based sample from the August 2020 ANUPoll, that also takes into account the respondent's own vaccine behaviour.

The survey also asked respondents whether they would get a COVID-19 vaccine, if a safe and effective one were to be developed. While it is estimated that over half of Australian adults (58.5 per cent) would definitely get the vaccine and only a minority would definitely not get the vaccine (5.5 per cent) or probably would not get the vaccine (7.2 per cent), about one-quarter of Australians said they would probably, but not definitely get the vaccine (28.7 per cent). A forthcoming paper uses the August 2020 ANUpoll data to report in detail on Australian's responses about the likelihood of them getting the vaccine and the individual-level factors associated with the reported likelihood of getting a COVID-19 vaccine, should it become available (Edwards et al. 2020)

The remainder of this paper is as follows. In the next section, we outline the data used in the study, including the structure of the questions asked. In Section 3 we provide national level results on views towards prioritisation, with Section 4 looking at how views vary by characteristics of the respondents. The final section provides some concluding comments.

2 Data

2.1 August 2020 COVID-19 tracking survey

The primary source of data for this paper is the August 2020 COVID-19 tracking survey (ANUpoll), which collected data from 3,061 Australians aged 18 years and over across all eight States/Territories in Australia, and weighted to have a similar distribution to the Australian population across key demographic and geographic variables. Data for the vast majority of respondents was collected online (94.1 per cent), with the remainder enumerated over the phone. A limited number of telephone respondents (17 individuals) completed the survey on the first day of data collection. A little under half of respondents (1,222) completed the survey on the 11th or 12th of August (largely online).

The contact methodology for offline Life in Australia™ members was an initial SMS (where available), followed by an extended call-cycle over a two-week period. A reminder SMS was also sent in the second week of fieldwork. The overall completion rate for the survey (those in

the panel who completed the particular wave) was 78.7 per cent. However, taking into account recruitment to the panel, the cumulative response rate for the most recent survey is 7.8 per cent, a slight decline from previous waves of data collection in 2020.

Unless otherwise stated, data in the paper is weighted to population benchmarks. For Life in Australia™, the approach for deriving weights generally consists of the following steps:

- Compute a base weight for each respondent as the product of two weights:
    - Their enrolment weight, accounting for the initial chances of selection and subsequent post-stratification to key demographic benchmarks
    - Their response propensity weight, estimated from enrolment information available for both respondents and non-respondents to the present wave.
- Adjust the base weights so that they satisfy the latest population benchmarks for several demographic characteristics.

We make use of a limited amount of longitudinal data in this paper. Of those who completed the August 2020 wave of data collection, 2,916 individuals (95.3 per cent) also completed the May 2020 ANUpoll, 2,833 individuals (92.6 per cent) also completed the April 2020 ANUpoll, 2,828 individuals (92.4 per cent) also completed the February 2020 Life in Australia™ survey[2], and finally, 2,790 individuals (91.1 per cent) also completed the January 2020 ANUpoll (during the height of the Black Summer Bushfire crisis).

The ethical aspects of the ANUpolls have been approved by the ANU Human Research Ethics Committee (2014/241). Data is available through the Australian Data Archive.[3]

2.2 Survey questions

The August 2020 ANUpoll included questions about a potential COVID-19 vaccine, as well as respondent's views about priority of access to COVID-19 vaccine if it becomes available and needs to be rationed. This second set of information is obtained using a choice experiment (Mutz 2011; Mullinix 2015).

The introduction to the questions on views about who should have priority access to a COVID-19 vaccine was:

> *Once a safe and effective vaccine for COVID-19 has been developed there may be a delay in having vaccines available for everyone in Australia. We would like to know who you think should receive the vaccine first. In order to understand this, we would like you to consider two hypothetical individuals and tell us which one you think should receive the vaccine first.*

Respondents are then asked to make five choices in sequence as to which of two hypothetical individuals should receive the vaccine first. The choice is presented using the following format:

> *<name>, is a <age> year old. <pronoun> is <employment status> in <occupation>. <name> lives in an area with <rate> rates of COVID-19 and <caring/no caring responsibility for a child>. <pronoun> <has/does not have> a health condition that would make <pronoun2> susceptible to COVID-19.*

The list of names which were randomly selected from are classified into four groups: Anglo-Celtic; Middle-Eastern; Asian; and Southern European.[4] Gender was indicated using gender pronouns, but was also aligned with the hypothetical individual's name. Ages were randomly assigned within the range of 18 to 85 years, thereby limiting our choice experiment to priority provision of the vaccine across adults.

The hypothetical individuals are randomly allocated to three labour force states (employed, not-employed but not retired, and retired) as follows:

- If aged 18 to 54 years: 80% employed and 20% not employed;
- If aged 55 to 74 years: 50% employed, 25% not employed and 25% retired; and
- If aged 75 to 85 years: 100% retired.

This allocation approximately reflects the Australian average for each age group.

Employed hypothetical individuals are classified into three occupation categories: essential health services; other essential worker; and non-essential services. One-third of the employed hypothetical individuals are assigned to each occupation category and for each occupation category the hypothetical individual was randomly assigned one of a set of actual occupations (Table 1). The respondent is not provided with information on which occupational category the randomly assigned occupation falls.

Table 1 Hypothetical occupations – By (unrevealed) classification

Essential health worker	Other essential worker	Non-essential worker
Registered Nurse	Retail Manager	Sales Assistant
Aged and Disabled Carer	Truck Driver	Clerk
Pharmacist	Primary School Teacher	Receptionist
Nursing Support Worker	Secondary School Teacher	Accountant
General practitioner	Commercial Cleaner	Electrician
Paramedic	Checkout Operator	Office Manager
	Child Care Worker	Project Administrator
	Bus driver	Storeperson
	Preschool Teacher	Advertising and Public Relations Manager
	Police Officer	Carpenter
	Packer	Waiter
		Kitchenhand
		Metal Fitter
		Bookkeeper
		Motor Mechanic
		Farmer
		Construction Manager
		Barista
		Bar Attendant
		Plumber
		Welder
		Real Estate Sales Agent
		Secretary
		Programmer
		Chef
		Bank Worker
		Human Resource Professional
		Hairdresser
		Gardener
		Welfare Support Worker
		Personal Assistant
		Architect
		Solicitor

Finally, we used a 50/50 random allocation of whether or not the hypothetical individual did or did not live in an area with a high rate of COVID-19; did or did not have caring responsibility for children; and did or did not have a pre-existing health condition. Apart from name and gender pronoun, as well as employment status and occupation, there was no relationship between the allocation of characteristics within one category and characteristics within another category. For example, older Australians were as likely to be said to have caring

responsibility as young Australians, and males were as likely to be in particular occupations as females.

3 Prioritisation in allocation of vaccines across Australia

This section reports the analysis of the choice experiment data, highlighting what characteristics the general population thinks should be prioritised for a COVID-19 vaccine, at least initially.

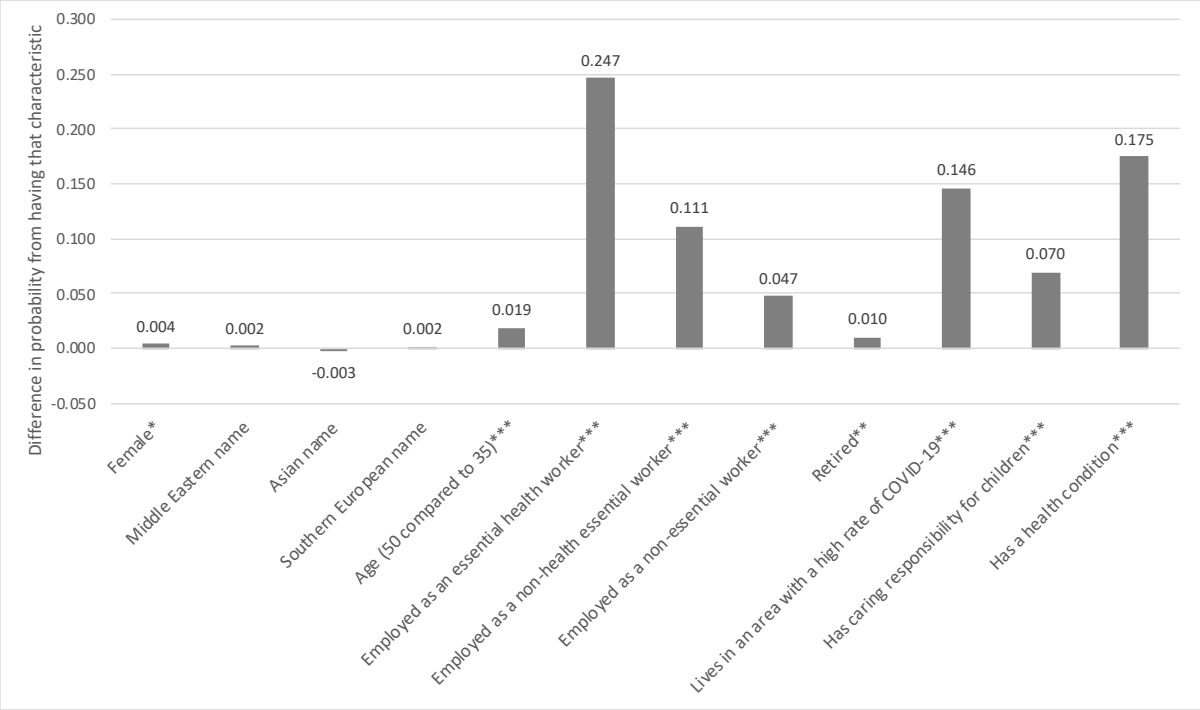
3.1 Relationship between individual characteristics and Australians' views about who should have priority access to a vaccine

Figure 2 shows the change in the average predicted probability of a respondent choosing a hypothetical individual with a particular characteristic over the alternative hypothetical individual without the characteristic. Statistical significance is indicated at the end of the variable name, as described under the table.

The total number of observations is 28,404. That is, we create a separate observation for each of the 10 different hypothetical individuals per respondent in our sample (five choices, with two individuals in each choice set). The dependent variable then equals zero if the respondent chose the other hypothetical individual when deciding who should receive the vaccine, and one if they chose that particular individual. We then model how the characteristics of the hypothetical individual influenced the probability of that individual being preferred over the alternative. The Pseudo R-Squared, which is a proxy or how much of the variation in the data is explained by the model and varied from 0 to 1, is 0.1521 for the estimation for the total sample. Coefficient estimates are given in Appendix Table 1.

It should also be noted that in our model we control for whether or not that particular individual was presented first or second to respondents, with respondents being slightly more likely to say that the individual presented second should be given the vaccine first (0.6 percentage points higher, with a p-value of 0.015).

Figure 2 Relationship between characteristics of hypothetical individual and probability of vaccine priority



Source: ANUpoll, August 2020.

Notes: The base case individual is male; with an Anglo-Celtic name; aged 35; not employed; lives in an area with a low rate of COVID-19; does not have caring responsibility for children; and does not have a health condition. Coefficients that are statistically significant at the 1 per cent level of significance are labelled ***; those significant at the 5 per cent level of significance are labelled **, and those significant at the 10 per cent level of significance are labelled *.

There are only very small any differences in the extent to which Australians would give priority access to a vaccine to individuals with particular demographic characteristics over those with other demographic characteristics (the first five bars in Figure 2). Females are very slightly preferred over males (p-value = 0.076) and older Australians are slightly preferred over younger Australians.[5] We present the marginal effect as the difference in the predicted probability of someone aged 50 being preferred to receive the vaccine first compared to someone aged 35 (estimated to be 0.019). Across the full range of possible ages, that is comparing someone aged 85 to someone aged 18 but holding other characteristics of the hypothetical individual constant, the difference increases to 0.086. This relatively small effect of age on vaccine priority is somewhat surprising given the clear evidence that the risk of becoming seriously ill or dying from COVID-19 is much higher for the elderly.

There is no statistically significant relationship between the ethnicity of the individual (as signalled by their name) and whether or not Australians think the individual should receive the vaccine first, and the estimated difference is very small. This finding is important because it suggests that the indications of at least some increase in anti-Asian views dues to the origins COVID-19 being China[6] has not translated into an implicit view that people with an Asian name should be given lower priority in access to a COVID-19 vaccine.

Australians are very slightly more likely to say those who are retired (holding constant

differences in age and having a pre-existing health condition) should be given the vaccine before those are not employed but who are not retired (p-value = 0.017). The difference is very small (1.0 percentage point).

Australian's are much more likely to say that people working in occupations which are classified as essential health workers should be given the vaccine ahead of those who are not employed (24.7 percentage points). They are also likely to say that non-health essential workers should be given the vaccine before those who are not employed (11.1 percentage points more likely). And while Australian's are more likely to think that those who are employed but who are non-essential workers should get a vaccine before people who are not employed, the difference is relatively small (4.7 percentage points). Given that we did not specify to the respondent whether we regarded an occupation as being an essential health worker, a non-health essential worker or a non-essential worker), and that they were asked to rank only two hypothetical individuals a time (and hence the probabilities will average 50 per cent across all choices), the difference between essential health workers and the not employed is large.

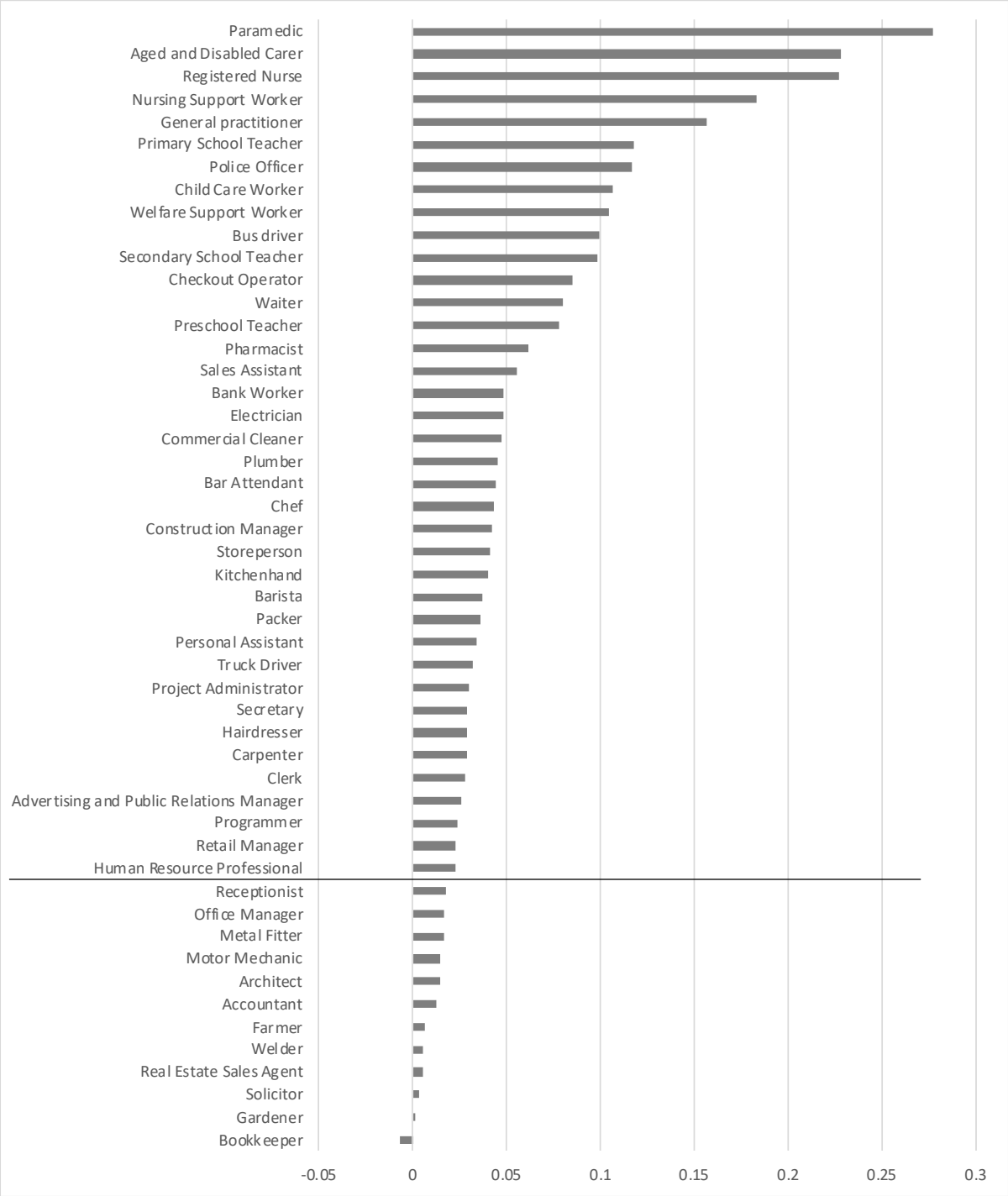
Of the other characteristics of the individual, having a health condition had the largest marginal effect (17.5 percentage points). This is consistent with the idea that those for whom COVID-19 is more likely to be serious or fatal should be given priority access (corresponding to the need principle articulated by Cookson and Dolan (2000)). Respondents also thought that those who lived in an area with a high rate of COVID-19 should receive the vaccine over those who live in a low COVID-19 area (marginal effect of 14.6 percentage points) as should those who had caring responsibility for a child (marginal effect of 7.0 percentage points)

3.2 Ranking of individual occupations

As described in Section 2.2, respondents were asked to choose between individual occupations without any indication as to whether the occupation was an essential or non-essential occupation which we had allocated to categories *a priori*. Figure 3 shows the estimated differences in the probability that Australians report that a particular occupation should be given access to the vaccine first, compared to being not employed. While the there is less statistical confidence around the estimates for the individual occupations than there is for the broad occupation categories, the occupations which Australians are most likely to think should be given a vaccine first are all essential health workers, who are also very likely to be exposed to COVID-19 if there is an outbreak, followed, by other essential workers.

The occupation which Australians were most likely to think should be given priority access to a vaccine are paramedic, followed by aged and disabled carer, registered nurse, nursing support worker, general practitioner, primary school teacher and police officer. There are twelve occupations below the horizontal line which Australians think people working in should not be given priority access to as compared to the not employed (Receptionist; Office Manager; Metal Fitter; Motor Mechanic; Architect; Accountant; Farmer; Welder; Real Estate Sales Agent; Solicitor; Gardener; and Bookkeeper). That is, the coefficients for these occupations are not significantly different from zero.

Figure 3 Relationship between occupation of hypothetical individual and probability of vaccine priority



Source: ANUpoll, August 2020.

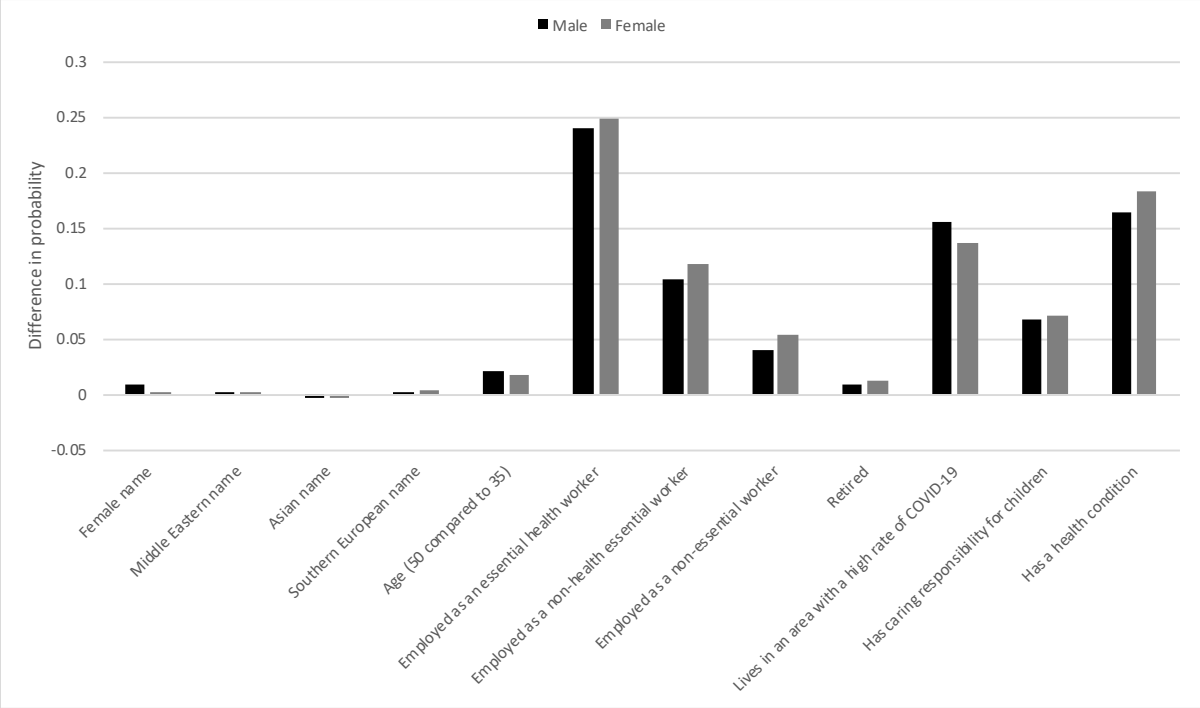
Notes: The base case individual is male; with an Anglo-Celtic name; aged 35; not employed; lives in an area with a low rate of COVID-19; does not have caring responsibility for children; and does not have a health condition.

4 Characteristics of respondents that predict prioritisation of vaccines

For Australia as a whole, there is clear prioritisation in terms of who should receive a vaccine if a choice does need to be made between different "types" of individuals. In this section, we consider whether that ranking is consistent based on the characteristics of the respondent completing the vaccine priority choice experiment.

One of the interesting differences is that males are significantly more likely to prioritise a vaccine for females compared to males, whereas there is no difference for females (Figure 4). Males also place slightly greater weight on the area in which a person lives. Females, on the other hand, place greater weight than males on the employment status and the occupation of the hypothetical individual, as well as whether the hypothetical individual had a pre-existing health condition.

Figure 4 Relationship between characteristics of hypothetical individual and probability of vaccine priority

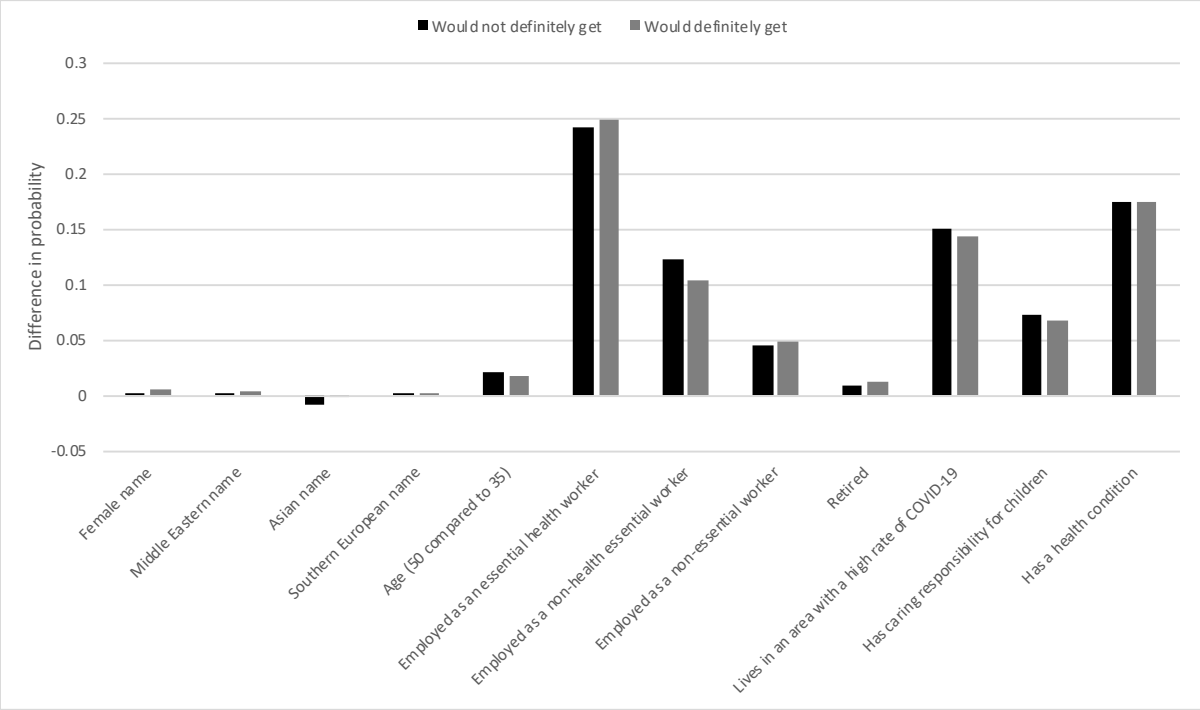


Source: ANUpoll, August 2020.

Notes: The base case individual is male; with an Anglo-Celtic name; aged 35; not employed; lives in an area with a low rate of COVID-19; does not have caring responsibility for children; and does not have a health condition.

There were no major differences in prioritisation based on whether or not the individual said that they would definitely get vaccinated if a safe and effective vaccine were to be made available. A small exception to this is the effect of the hypothetical individual being a non-health essential worker, which had a slightly larger effect for those who said they would not get a vaccine compared to those that would.

Figure 5 Relationship between characteristics of hypothetical individual and probability of vaccine priority

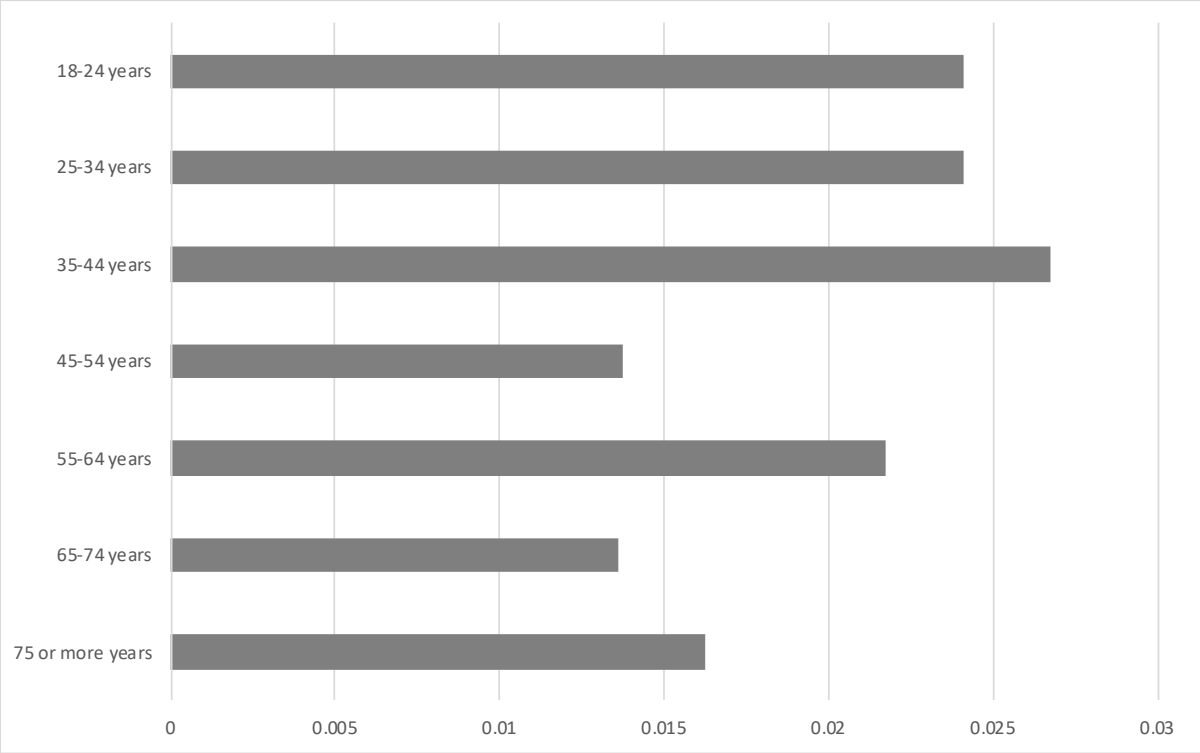


Source: ANUpoll, August 2020.

Notes: The base case individual is male; with an Anglo-Celtic name; aged 35; not employed; lives in an area with a low rate of COVID-19; does not have caring responsibility for children; and does not have a health condition.

When we look at the effect of age on prioritisation (Figure 5), we find that younger Australians tend to be more likely to say that greater priority should be given to older Australians. Specifically, for the three age groups under the age of 45, we predict that increasing the age of the hypothetical individual from 35 to 50 increases the probability of prioritising that individual by roughly 2.5 percentage points. For those respondents aged 45 years and over, however, the effect of the same increase in age is around half of that.

Figure 6 Relationship between age of hypothetical individual and probability of vaccine priority, by age of respondent



Source: ANUpoll, August 2020.

Notes: The base case individual is male; with an Anglo-Celtic name; aged 35; not employed; lives in an area with a low rate of COVID-19; does not have caring responsibility for children; and does not have a health condition.

In general, we find that there is a small negative correlation between the characteristics of the respondent and the types of individual that they think should receive the vaccine. We have seen that males are more likely to prioritise females, and young Australians are more likely to prioritise the elderly. However, in the detailed results presented in Appendix 1, we can also see that those who are not employed themselves are more likely to prioritise the vaccine going to those who are employed; those who live in Victoria were less likely to prioritise the vaccine going to those who live in high infection areas, and those who are parents of someone aged under 20 in the household are less likely to prioritise the vaccine going to someone who has caring responsibility.

5 Concluding comments and future work

The world is hoping that at some stage soon, a safe and effective vaccine will be developed for COVID-19. If and when it does become available, and ideally before then, a decision will need to be made and communicated by each country as to how such a vaccine will be distributed and what criteria will be used to identify who receives the vaccine first. Such a decision will inevitably take into account the health and economic benefits of some groups within a country receiving it ahead of others. This will involve careful use of evidence and biostatistical/economic modelling. To support such a decision though, public opinion is likely to be a factor.

The aim of this paper was to summarise the results from a survey experiment on a probability-

based, representative sample of the Australian population during mid-August 2020 that tested explicitly the relative weight that Australians put on different characteristics of individuals.

Demographic characteristics only had a small effect, with age more important than sex, and ethnicity having no effect. To a certain extent, this upholds Pathak et al. (2020) non-discrimination principle, though it should be noted that the relatively small effect of the hypothetical individuals age runs somewhat counter to the greater disease burden of COVID-19 on the elderly.

A person's employment status did have a large effect though, with essential health workers far and away the highest priority as identified by Australians. This in many ways reflects the instrumental valuation ethical principle in Pathak et al. (2020) ('respecting contributions others could make in the future') and Persad et al. (2009: 423) who argued for 'promoting and rewarding social usefulness.' In addition, Australians preferred those with a health condition over those without to receive the vaccine first, those in a high COVID-19 area over those in areas with low infections, and those with caring responsibility over those without (in that order).

For the most part, preferences were relatively stable across the Australian population. One of the interesting findings from our analysis though was that on the margins people tended to preference those who had different characteristics to themselves to receive the vaccine first. Males preferred females receive the vaccine first, the young preferred the old receive it, those not employed preferred those who are employed, and people without children preferred those with. We make clear in our question that the vaccine is safe and effective, so this probably implies a degree of altruism amongst the population.

The data from this survey experiment is publicly available through the Australian Data Archive, and there is a rich set of additional analysis that could be undertaken on it. We have not considered any interaction effects between the categories (for example, do people consider age differently for potential female recipients compared to male recipients?), nor have we considered whether the characteristics of the individual being compared against effects how characteristics are weighted (for example, do people preference different occupations more when it is being compared against an employed person compared to one not employed?). Perhaps most fruitfully, there is a far richer set of information about the individual making the choice than has been explored in this paper.

Ultimately, Australians appear to be advocating for a balance between vaccines being available for those who would help the community the most (through their occupation or caring responsibilities) and those who are most at risk of COVID-19 (through their age, location, or health status). Governments should take this on board when making what will be one of the more consequential decisions they will make.

Appendix 1 Model estimates

Appendix Table 1 Relationship between characteristics of hypothetical individual and probability of vaccine priority – Full sample, by age, and by employment status

Explanatory variables	All		Male		Female		Not employed		Employed	
	Coeffic	P-value	Coeffic	P-value	Coeffic	P-value	Coeffic	P-value	Coeffic	P-value
Female name	0.028	0.076	0.058	0.014	0.002	0.910	0.022	0.364	0.033	0.118
Middle Eastern name	0.015	0.502	0.016	0.626	0.013	0.660	0.010	0.780	0.018	0.543
Asian name	-0.023	0.301	-0.017	0.604	-0.025	0.415	-0.005	0.892	-0.035	0.249
Southern European name	0.012	0.580	0.003	0.931	0.023	0.457	0.007	0.841	0.016	0.587
Age	0.008	0.000	0.008	0.000	0.008	0.000	0.008	0.000	0.008	0.000
Employed as an essential health worker	0.976	0.000	0.926	0.000	1.019	0.000	1.004	0.000	0.954	0.000
Employed as a non-health essential worker	0.548	0.000	0.494	0.000	0.596	0.000	0.601	0.000	0.509	0.000
Employed as a non-essential worker	0.276	0.000	0.221	0.000	0.326	0.000	0.329	0.000	0.234	0.000
Retired	0.070	0.017	0.055	0.203	0.085	0.033	0.120	0.006	0.034	0.379
Lives in an area with a high rate of COVID-19	0.671	0.000	0.672	0.000	0.671	0.000	0.641	0.000	0.694	0.000
Has caring responsibility for children	0.380	0.000	0.348	0.000	0.408	0.000	0.412	0.000	0.355	0.000
Has a health condition	0.763	0.000	0.701	0.000	0.822	0.000	0.736	0.000	0.784	0.000
Second-listed option in choice experiment	0.039	0.015	0.055	0.021	0.027	0.204	0.056	0.020	0.026	0.228
Constant	-1.723	0.000	-1.669	0.000	-1.777	0.000	-1.739	0.000	-1.707	0.000
Sample size	28,404		12,706		15,614		12,326		15,978	
Pseudo R-Squared	0.1521		0.1421		0.1617		0.1483		0.1553	

Source: Life in Australia™ February 2020, and ANUpoll, August 2020

Notes: Probit Regression Model. The base case individual is male; with an Anglo-Celtic name; aged 35; not employed; lives in an area with a low rate of COVID-19; does not have caring responsibility for children; and does not have a health condition.

Appendix Table 2 Relationship between characteristics of hypothetical individual and probability of vaccine priority – By parenting status, own vaccination preference, and health status

Explanatory variables	Not a parent		Parent		Not definitely vaccinate		Definitely vaccinate		Excellent health		Not excellent health	
	Coeffic	P-value	Coeffic	P-value	Coeffic	P-value	Coeffic	P-value	Coeffic	P-value	Coeffic	P-value
Female name	0.041	0.028	0.026	0.448	0.016	0.553	0.037	0.069	0.066	0.072	0.030	0.101
Middle Eastern name	0.013	0.616	0.052	0.287	0.002	0.954	0.021	0.451	0.017	0.750	0.025	0.336
Asian name	-0.022	0.406	0.006	0.896	-0.056	0.131	-0.004	0.875	-0.042	0.420	-0.008	0.764
Southern European name	-0.008	0.750	0.111	0.024	0.011	0.771	0.014	0.629	0.016	0.763	0.021	0.427
Age	0.008	0.000	0.010	0.000	0.008	0.000	0.008	0.000	0.007	0.000	0.008	0.000
Employed as an essential health worker	0.966	0.000	0.989	0.000	0.915	0.000	1.014	0.000	0.945	0.000	0.978	0.000
Employed as a non-health essential worker	0.532	0.000	0.593	0.000	0.551	0.000	0.545	0.000	0.450	0.000	0.573	0.000
Employed as a non-essential worker	0.278	0.000	0.288	0.000	0.243	0.000	0.296	0.000	0.245	0.000	0.290	0.000
Retired	0.071	0.040	0.054	0.400	0.051	0.292	0.083	0.023	0.048	0.476	0.072	0.035
Lives in an area with a high rate of COVID-19	0.653	0.000	0.712	0.000	0.642	0.000	0.693	0.000	0.670	0.000	0.664	0.000
Has caring responsibility for children	0.371	0.000	0.424	0.000	0.362	0.000	0.392	0.000	0.392	0.000	0.380	0.000
Has a health condition	0.761	0.000	0.788	0.000	0.718	0.000	0.794	0.000	0.754	0.000	0.771	0.000
Second-listed option in choice experiment	0.022	0.233	0.067	0.054	0.053	0.043	0.029	0.144	0.001	0.982	0.040	0.032
Constant	-1.669	0.000	-1.943	0.000	-1.634	0.000	-1.778	0.000	-1.642	0.000	-1.757	0.000
Sample size	20,270		6,138		10,420		17,900		5,364		21,034	
Pseudo R-Squared	0.1480		0.1655		0.1426		0.1587		0.1493		0.1524	

Source: Life in Australia™ February 2020, and ANUpoll, August 2020

Notes: Probit Regression Model. The base case individual is male; with an Anglo-Celtic name; aged 35; not employed; lives in an area with a low rate of COVID-19; does not have caring responsibility for children; and does not have a health condition.

Appendix Table 3 Relationship between characteristics of hypothetical individual and probability of vaccine priority – By location and age (up to age 44)

Explanatory variables	Rest of Australia		Victoria		Aged 18 to 24		Aged 25 to 34		Aged 35 to 44	
	Coeffic	P-value	Coeffic	P-value	Coeffic	P-value	Coeffic	P-value	Coeffic	P-value
Female name	0.022	0.240	0.045	0.149	-0.055	0.511	0.035	0.419	0.037	0.350
Middle Eastern name	0.001	0.965	0.052	0.240	0.195	0.103	0.083	0.176	-0.022	0.695
Asian name	-0.008	0.747	-0.065	0.138	0.005	0.964	0.041	0.496	-0.031	0.575
Southern European name	0.015	0.569	0.006	0.882	0.097	0.412	0.004	0.949	0.054	0.328
Age	0.008	0.000	0.010	0.000	0.007	0.011	0.009	0.000	0.011	0.000
Employed as an essential health worker	1.017	0.000	0.862	0.000	0.717	0.000	1.092	0.000	0.892	0.000
Employed as a non-health essential worker	0.556	0.000	0.520	0.000	0.524	0.000	0.517	0.000	0.584	0.000
Employed as a non-essential worker	0.303	0.000	0.195	0.000	0.193	0.179	0.356	0.000	0.303	0.000
Retired	0.105	0.002	-0.030	0.600	-0.250	0.118	0.089	0.264	0.040	0.576
Lives in an area with a high rate of COVID-19	0.697	0.000	0.598	0.000	0.644	0.000	0.719	0.000	0.631	0.000
Has caring responsibility for children	0.365	0.000	0.416	0.000	0.349	0.000	0.288	0.000	0.345	0.000
Has a health condition	0.774	0.000	0.738	0.000	0.781	0.000	0.812	0.000	0.760	0.000
Second-listed option in choice experiment	0.058	0.002	-0.014	0.642	-0.216	0.011	0.090	0.038	-0.037	0.345
Constant	-1.737	0.000	-1.679	0.000	-1.422	0.000	-1.863	0.000	-1.779	0.000
Sample size	21,010		7,394		1,020		3,918		4,660	
Pseudo R-Squared	0.1581		0.1379		0.1558		0.1646		0.1440	

Source: Life in Australia™ February 2020, and ANUpoll, August 2020

Notes: Probit Regression Model. The base case individual is male; with an Anglo-Celtic name; aged 35; not employed; lives in an area with a low rate of COVID-19; does not have caring responsibility for children; and does not have a health condition.

Appendix Table 4 Relationship between characteristics of hypothetical individual and probability of vaccine priority – By age (aged 45 years and over)

Explanatory variables	Aged 45 to 54		Aged 55 to 64		Aged 65 to 74		Aged 75 plus	
	Coeffic	P-value	Coeffic	P-value	Coeffic	P-value	Coeffic	P-value
Female name	-0.045	0.258	0.043	0.218	0.061	0.089	0.094	0.089
Middle Eastern name	-0.055	0.320	-0.018	0.714	0.059	0.246	-0.005	0.946
Asian name	-0.064	0.246	-0.044	0.369	-0.010	0.844	-0.045	0.559
Southern European name	-0.067	0.231	0.027	0.585	-0.004	0.942	0.043	0.577
Age	0.006	0.000	0.009	0.000	0.006	0.000	0.009	0.000
Employed as an essential health worker	1.029	0.000	0.986	0.000	0.915	0.000	1.078	0.000
Employed as a non-health essential worker	0.602	0.000	0.512	0.000	0.572	0.000	0.476	0.000
Employed as a non-essential worker	0.231	0.000	0.252	0.000	0.234	0.000	0.341	0.000
Retired	0.159	0.027	0.049	0.449	0.086	0.189	0.034	0.733
Lives in an area with a high rate of COVID-19	0.714	0.000	0.662	0.000	0.686	0.000	0.603	0.000
Has caring responsibility for children	0.353	0.000	0.339	0.000	0.445	0.000	0.631	0.000
Has a health condition	0.772	0.000	0.801	0.000	0.710	0.000	0.751	0.000
Second-listed option in choice experiment	0.088	0.025	0.044	0.213	0.051	0.155	0.105	0.057
Constant	-1.579	0.000	-1.763	0.000	-1.652	0.000	-1.910	0.000
Sample size	4,700		5,872		5,556		2,408	
Pseudo R-Squared	0.1592		0.1561		0.1497		0.1636	

Source: Life in Australia™ February 2020, and ANUpoll, August 2020

Notes: Probit Regression Model. The base case individual is male; with an Anglo-Celtic name; aged 35; not employed; lives in an area with a low rate of COVID-19; does not have caring responsibility for children; and does not have a health condition.

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Endnotes

1 https://www.health.gov.au/committees-and-groups/australian-technical-advisory-group-on-immunisation-atagi

2 The February wave of data collection was conducted as Australian social Survey, in parallel with the European social Survey

3 https://dataverse.ada.edu.au/dataset.xhtml?persistentId=doi%3A10.26193%2FZFGFNE

4 The names are those used by Booth et al. (2012) in their study of ethnic discrimination in the labour market.

5 A non-linear age effect was estimated but was not statistically significant.

6 https://www.abc.net.au/news/2020-06-28/racism-asian-australians-coronavirus-pandemic-solutions/12385908