Received: 2 April 2023 | Revised: 25 May 2023 | Accepted: 26 May 2023

DOI: 10.1111/trf.17474

BLOOD DONORS AND BLOOD COLLECTION

TRANSFUSION

Prevalence of blood donation eligibility in Australia: A population survey

Yasmin Mowat[1] | **Veronica Hoad**[2] | **Bridget Haire**[1] | **Barbara Masser**[2,3] | **John Kaldor**[1] | **Anita Heywood**[4] | **Rachel Thorpe**[2] | **Hamish McManus**[1] | **Skye McGregor**[1]

[1]The Kirby Institute, University of New South Wales, Sydney, Australia

[2]Australian Red Cross Lifeblood, Melbourne, Australia

[3]School of Psychology, The University of Queensland, Brisbane, Australia

[4]School of Population Health, University of New South Wales, Sydney, Australia

Correspondence
Yasmin Mowat, The Kirby Institute, University of New South Wales, Sydney, Australia.
Email: ymowat@kirby.unsw.edu.au

Funding information
National Health and Medical Research Council (Australia), Grant/Award Number: APP1151959; Australian Red Cross Lifeblood

Abstract

Background: Reliable estimates of the population proportion eligible to donate blood are needed by blood collection agencies to model the likely impact of changes in eligibility criteria and inform targeted population-level education, recruitment, and retention strategies. In Australia, the sole estimate was calculated 10+ years ago. With several subsequent changes to the eligibility criteria, an updated estimate is required.

Study Design and Methods: We conducted a cross-sectional national population survey to estimate eligibility for blood donation. Respondents were aged 18+ and resident in Australia. Results were weighted to obtain a representative sample of the population.

Results: Estimated population prevalence of blood donation eligibility for those aged 18–74 was 57.3% (95% CI 55.3–59.3). The remaining 42.7% (95% CI 40.7–44.7) were either temporarily (25.3%, 95% CI 23.5–27.2) or permanently ineligible (17.4%, 95% CI 16.1–18.9). Of those eligible at the time of the survey, that is, with the UK geographic deferral for variant Creutzfeldt-Jakob disease included, (52.9%, 95% CI 50.8–54.9), 14.2% (95% CI 12.3–16.3) reported donating blood within the previous 2 years. Eligibility was higher among men (62.6%, 95% CI 59.6–65.6) than women (52.8%, 95% CI 50.1–55.6). The most common exclusion factor was iron deficiency/anemia within the last 6 months; 3.8% (95% CI 3.2–4.6) of the sample were ineligible due to this factor alone.

Discussion: We estimate that approximately 10.5 million people (57.3% of 18–74-year-olds) are eligible to donate blood in Australia. Only 14.2% of those eligible at the time of survey reported donating blood within the previous 2 years, indicating a large untapped pool of potentially eligible blood donors.

KEYWORDS

blood, blood donation, deferral criteria, eligibility, perceptions, prevalence, transfusion medicine, vCJD

1 | INTRODUCTION

Maintaining a safe and sufficient supply of blood and blood products is vital for health systems. With increasing demand for blood,[1] especially plasma, changing demographics, and the recent COVID-19 pandemic, shortfalls in the blood supply are occurring or predicted in many regions of the world.[2–8] Although in Australia, there has been an upward trend in the number of blood donations, this is mostly due to more frequent donation by repeat donors, who account for more than 90% of all donations, while the number of first-time donors has been relatively stable.[9]

The goal of ensuring the availability of blood must be balanced with the need to protect the safety of both blood donors and recipients. Donor safety primarily involves identifying and excluding people with health-related conditions that may be adversely affected by either the donation procedure or blood volume loss. A major concern for recipient safety is the risk of transfusion transmissible infections (TTIs),[10] which is addressed by both deferring donors with characteristics associated with increased risks of infections, and screening donations for the presence of TTIs. Eligibility criteria for blood donation require regular review to ensure they are evidence-based to promote safety, while encouraging inclusivity to avoid unnecessary deferrals and exclusion of population groups without compelling scientific rationale.[11] In Australia, an updated risk estimate of variant Creutzfeldt-Jakob disease (vCJD) transmission led to the removal of the donor deferral for anyone who had lived in, or visited, the United Kingdom for a cumulative period of more than 6 months between 1980 and 1996. This change was made in July 2022. Modeling predicted that removing the deferral would result in virtually no increased risk of vCJD transfusion transmission, yet resulted in a potential increase of 17,000 donors and 57,000 donations annually.[12]

Estimates of the proportion of the population ineligible to donate blood, and the relevant exclusion factors, are essential for predicting the likely impact of changes in eligibility criteria. Estimates have been calculated for the United States, Canada and Australia using a range of methods,[13–15] but the sole estimate for Australia was made in 2012. It estimated that 62% of the age-eligible population were eligible,[15] yet only 3.2% of the age-eligible population donated blood that year.[16]

In 2021, we conducted Australia's first national survey of factors related to blood donation eligibility and attitudes to donation. Drawing upon survey findings and other sources of data, we calculated updated estimates of the prevalence of blood donation eligibility based on eligibility criteria in January 2023.

2 | MATERIALS AND METHODS

We conducted a nationally representative cross-sectional survey in November 2021, via the Life in Australia™ probability-based panel, described in more detail in Data S1.[17] To be eligible to participate in the survey, respondents had to be resident in Australia and aged 18 years or over.

Ethics approval was granted by the University of New South Wales Human Research Ethics Committee (HC210431), the University of Queensland Human Research Ethics Committee (2021/HE001768), and Australian Red Cross Lifeblood Ethics Committee (2021#08). Informed consent was provided online or verbally, depending on the method of survey completion.

2.1 | Eligibility assignment

The survey included questions to assess respondents' eligibility based on Australian Red Cross Lifeblood's (Lifeblood) Donor Questionnaire (DQ), which must be completed prior to every blood donation attempt. Some DQ items on specific conditions that were covered under more general questions in the survey were omitted. Exclusion factors that lead to a deferral of 4 weeks or less (e.g., common cold symptoms) were omitted from the survey. In the context of blood donation, the DQ is generally followed by an interview, during which further information may be sought to determine eligibility. As we were not conducting supplementary interviews, survey questions related to eligibility were individually assessed as to whether specific answers would always result in a deferral. If a response to a question in the survey would require further discussion in an interview in a real-life context, internal Lifeblood deferrals data, and published literature were used to estimate the proportion eligible. For exclusion risk factors where a respondent refused to answer, selected "do not know" or where that exclusion risk factor does not always result in exclusion, a probabilistic re-allocation of eligibility based on a priori input was made (probabilistic estimate). A minimum and maximum estimate (where all "uncertain responses" were deemed ineligible or eligible) were also calculated. Eligibility assignment for every exclusion factor assessed is documented in Table A3, Data S1.

We considered respondents eligible if they were eligible to donate any blood product (i.e., whole blood, plasma or platelets). Eligibility was categorized as temporary or permanent deferral according to criteria current at the time of analysis, unless specified otherwise. Donor status was categorized according to lifeblood's definitions.

In Australia, the maximum age for blood donation is 75 years (i.e., until their 76th birthday) unless the individual has previously donated blood. Because the panel categorized respondents ages into 10-year subgroups and the oldest two age groups were 65–74 years old and 75 years and over, anyone past their 75th birthday was considered permanently ineligible unless they had donated blood previously.

2.2 | Weighting

Survey responses were calibrated to population benchmarks using general regression calibration estimation,[18] estimated residential population strata and National Health Survey estimates strata for age group, educational attainment, sex; household composition, language spoken at home, remoteness, and state or territory of residence. Further details on weighting methods are described in Data S1.

3 | RESULTS

A total of 5178 respondents completed the survey, most online (96.5%), and 3.5% via phone. Demographic characteristics of the respondents are displayed in Table 1. The blood donor-eligible population demographics are summarized in Table 2. Just over half the participants (55.8%, $n = 2889$) reported previously attempting to donate blood, with 8.5% ($n = 439$) having done so overseas, and 51.4% ($n = 2660$) in Australia. By "attempting" we mean presenting to donate blood, thus this figure includes both those who successfully donated and those who were deferred. Current donors (those who had donated blood within the last 2 years) formed 9.1% of the sample ($n = 469$), 35.9% ($n = 1861$) were lapsed donors (donated blood in Australia but over 2 years prior), and 54.3% ($n = 2811$) were non donors (never donated blood in Australia). A further 0.7% had indeterminate donor status.

Of the 25 respondents who said "yes" to having ever tested positive to HIV, 19 also said "yes" to having tested positive to hepatitis B and C. Given the implausibility of co-infection at this rate,[19] but the potential that they might have tested positive to at least one, these respondents were included in the total ineligibility estimate, but excluded from individual exclusion factor prevalence estimates.

Based on weighted prevalence estimates, 57.3% (95% CI 55.3–59.3) of the sample aged 18–74 years were eligible to donate blood. The remaining 42.7% (95% CI 40.7–44.7) were either temporarily (25.3%, 95% CI 23.5–27.2) or permanently ineligible (17.4%, 95% CI 16.1–18.9). Eligibility was higher among men (62.6%, 95% CI 59.6–65.6) than women (52.8%, 95% CI 50.1–55.6). When eligibility was assessed using "yes" and "no" responses only and excluding the "do not know" and refusals to answer, eligibility was 60.2% (95% CI 58.1–62.3). Applying the probabilistic assessment code, eligibility was 57.2% (95% CI 55.1–59.2). The minimum estimate was 57.0% (95% CI 54.9–59.0), and the maximum was 65.0% (95% CI 63.1–66.9).

Exclusion factor rates within 18–74-year-olds are shown in Table 3. The most common reason for exclusion was a diagnosis of anemia or iron deficiency within the last 6 months (9.9%, 95% CI 8.8–11.2), a history more common among women (16.4% [95% CI 14.4–18.7]) than men (2.1% [95% CI 1.6–2.9]).

When applying the survey results to deferral criteria at the time the survey was conducted, prior to the removal of the UK residence exclusion due to vCJD risk,

TABLE 1 Respondent demographics.

	n	% ($n = 5178$)
Country of birth grouping		
Not stated/unknown	14	0.27
Australian born	3659	70.66
Overseas, mainly non-English speaking background	846	16.34
Overseas, mainly English-speaking background	659	12.73
Sex		
Male	2222	42.91
Female	2928	56.55
Non-binary	23	0.44
Use a different term	3	0.06
Donor status		
Current donor	469	9.06
Lapsed donor	1861	35.94
Non-donor	2811	52.29
Indeterminate	37	0.71
Age group		
Refused to answer	3	0.06
18–24	256	4.94
25–34	649	12.53
35–44	798	15.41
45–54	810	15.64
55–64	1032	19.93
65–74	1087	20.99
75+	543	10.49

TABLE 2 Demographics of the blood donation-eligible population.

Pre-25th July 2022, before the vCJD risk deferral was removed	Blood donation-eligible population, weighted (95% CI), %
All ages	49.19 (47.26–51.11)
18–74 years age group	52.87 (50.8–54.9)
Country of birth grouping	
Not stated/unknown	0.26 (0.1–0.66)
Australian born	72.9 (70.39–75.27)
Overseas, mainly non-English speaking background	20.02 (17.9–22.31)
Overseas, mainly English-speaking background	6.82 (5.63–8.25)
Post 25th July 2022, after the vCJD risk deferral was removed	
All ages	53.32 (51.41–55.22)
18–74 years age group	57.31 (55.27–59.32)
Country of birth grouping	
Not stated/unknown	0.24 (0.1–0.61)
Australian born	70.83 (68.43–73.13)
Overseas, mainly non-English speaking background	19.03 (17.06–21.17)
Overseas, mainly English-speaking background	9.89 (8.58–11.39)
Sex	
Male	50.72 (48.89–52.54)
Female	48.96 (47.14–50.78)
Non-binary	0.32 (0.15–0.67)
Use a different term	0.00 (0–0)
Donor status	
Current donor	13.6 (11.81–15.62)
Lapsed donor	29.14 (26.94–31.44)
Non-donor	56.58 (53.98–59.16)
Indeterminate	0.67 (0.32–1.41)
Age group	
Refused to answer	0.00 (0–0)
18–24	10.62 (9.4–11.99)
25–34	22.59 (20.97–24.29)
35–44	19.43 (18.09–20.85)
45–54	18.77 (17.49–20.12)
55–64	15.41 (14.33–16.56)
65–74	12.92 (11.82–14.1)
75+	0.26 (0.13–0.5)

52.9% (95% CI 50.8–54.9) of respondents aged 18–74 years old were eligible. Of those eligible based that criteria, 14.2% (95% CI, 12.3%–16.3%) were current donors, 29.4% (95% CI 27.1–31.7) were lapsed donors, and more than half (55.8%, 95% CI 53.1–58.5) were non-donors. Most of those eligible at the time of survey completion (74.2%, 95% CI 71.6–76.7) correctly perceived themselves as so. However, 12.4% (95% CI 10.7–14.5) incorrectly believed they were ineligible and 13.3% (95% CI 11.5–15.4) did not know whether they were eligible. Of those classified by the survey responses as ineligible, 43.5% (95% CI 40.7–46.4) correctly stated their status, 36.6% (95% CI 33.7–39.5) incorrectly believed they were eligible and 19.2% (95% CI 16.9–21.8) did not know, with 0.6% (95% CI 0.2–2.3) of respondents refusing to answer this question.

4 | DISCUSSION

To our knowledge, this is the first survey in Australia to provide a direct estimate of the size of the eligible donor population. The only previous published estimate was calculated using multiple, disparate data sources.[15] We found that 57.3% of the 18- to 74-year-old population is eligible to donate blood in Australia. Given the small variation between the estimation methods using the survey data, the main estimate is unlikely to be dissimilar were the respondents' eligibility assessed as per the pre-donation screening in a blood donation center. The 2021 Census counted approximately 17.9 million Australians within the 18–74 age range,[20] so our survey estimates that 10,256,700 people are likely to be eligible to donate blood.

Although a non-donor can donate blood up until their 76th birthday, we could only assess eligibility up to their 75th birthday. This one-year difference should make very little impact on the rate of eligibility, as few people become new blood donors within their 75th year. Internal Lifeblood data indicates that in 2021, only 79 of 117,557 new donors (0.067%) were aged 75 years old.

The eligible estimate of this study is lower than that reported in 2012 (62%).[15] This is despite the earlier estimate counting only those eligible for whole blood donation and excluding those eligible only for plasma donation, and the three factors estimated to be the most frequent reasons for deferral (vCJD travel, cardiovascular disease, and intravenous drug use) are no longer permanent deferrals.

There are possible explanations for the apparent decrease in eligibility. In our survey we were unable to clarify the answers given, unlike the process of establishing eligibility when donating blood. Plausibility checks in our survey indicate the "yes" answers are very likely to

TABLE 3 Exclusion factor rates within 18–74-year-olds (see Table A4 in Data S1 for both raw and weighted prevalence).

Deferral duration	Exclusion factor	Population prevalence (%), weighted (95% CI)
Permanent	Ever experienced a serious autoimmune disease	5.9 (5.0–6.9)
	Ever had chronic lung disease	3.0 (2.4–3.7)
	Ever experienced stroke	2.1 (1.6–2.7)
	Ever experienced significant damage to heart	2.0 (1.6–2.7)
	Significant kidney damage diagnosis	1.9 (1.4–2.5)
	Ever experienced heart failure	1.8 (1.3–2.4)
	Diabetes with secondary problems with eyes or kidneys	1.4 (1.0–2.0)
	Ever tested positive to hepatitis B*	1.3 (0.9–1.8)
	Ever had thalassemia or hemophilia diagnosis	1.2 (0.9–1.7)
	Ever tested positive to hepatitis C	1.0 (0.7–1.4)
	Aware of prion disease in immediate family	0.8 (0.5–1.2)
	Blood cancer, last 5 years	0.5 (0.3–0.8)
	Ever tested positive to HIV	0.2 (0.1–0.4)
	Ever tested positive to HTLV	0.1 (0.1–0.3)
Temporary	Anemia/iron deficiency in last 6 months	9.9 (8.8–11.1)
	Recent surgery	8.6 (7.6–9.8)
	Weigh <50 kg**	4.1 (3.3–5.1)
	Currently pregnant, or pregnant in last 9 months (female at birth respondents only)	3.2 (2.6–3.9)
	Immunosuppressive, last 12 months	3.0 (2.4–3.9)
	High blood pressure that is not well controlled	1.9 (1.3–2.6)
	Sex in last 3 months with someone who has ever injected, or been injected with, drugs not prescribed by a doctor or dentist	1.7 (1.2–2.4)
	Had male-to-male sex (men only)	1.7 (1.3–2.2)
	Tattoo in unlicensed venue or overseas in last 4 months	1.5 (1.1–2.2)
	Diabetes, not well controlled	1.3 (0.9–1.9)
	Finasteride, last 12 months	1.1 (0.7–1.8)
	Any clinical trial medication, last 12 months	1.2 (0.8–1.7)
	Denosumab, last 12 months	1.3 (1.0–1.7)
	Injected drugs not prescribed by a doctor or dentist within last 5 years	1.1 (0.7–1.7)
	Engaged in sexual activity with a sex worker in last 3 months (men only)	1.1 (0.7–1.6)
	Sex in last 3 months with someone who has tested positive for hepatitis B, hepatitis C, HIV or HTLV	1.0 (0.6–1.7)
	Dutasteride, last 12 months	1.0 (0.7–1.4)
	Other cancer, last 5 years	1.0 (0.7–1.3)
	Seizure due to epilepsy in last 3 years	0.9 (0.6–1.3)
	Sex in last 3 months with a man who may have had oral or anal sex with another man (women only)	0.6 (0.3–1.2)
	HIV PrEP, last 12 months	0.7 (0.5–1.1)
	Isotretinoin, last 12 months	0.7 (0.5–1)
	Colon and/or rectal cancer, last 5 years	0.5 (0.2–1)
	Breast cancer, last 5 years	0.5 (0.3–0.8)
	Invasive melanoma, last 5 years	0.4 (0.2–0.8)

(Continues)

TABLE 3 (Continued)

Deferral duration	Exclusion factor	Population prevalence (%), weighted (95% CI)
	Prostate cancer, last 5 years	0.5 (0.3–0.7)
	Lung cancer, last 5 years	0.2 (0.1–0.5)
	Received payment for sex in money, gifts, or drugs in last 3 months (males only)	0.2 (0.1–0.4)
	Sex in last 3 months with someone who could have HIV	0.2 (0.1–0.3)
	Received payment for sex in money, gifts, or drugs in last 3 months (females only)	0.2 (0.1–0.4)
	Had sex with a man or transgender partner in last 3 months (non-binary or "different term" only)	0.1 (0–0.3)
	Syphilis in last 12 months	0.1 (0–0.3)
	Engaged in sexual activity with a sex worker in last 3 months (females only)	0.1 (0–0.3)
	Engaged in sexual activity with a sex worker in last 3 months (non-binary or "different term" only)	0.0 (0.0–0.0)
	New sexual partner within last 12 months, living, or previously lived in	
	i) Papua New Guinea	0.0 (0.0–0.0)
	ii) Cambodia, Myanmar, or Thailand	0.2 (0.1–0.9)
	iii) Africa	0.0 (0.0–0.1)
	iv) Bahamas, Barbados, Dominican Republic, Haiti, Belize, or Panama	0.0 (0.0–0.3)
	v) Latvia, Russia, or Ukraine	0.0 (0.0–0.3)

*Categorized as a permanent deferral, but would be temporary if infection was acute.
**Categorized as a temporary deferral, but in some cases may be permanent.

have overestimated ineligibility. For example with 0.1% of respondents indicating a diagnosis of syphilis in the last 12 months, this equates to over 20,000 Australians aged 18–74 diagnosed with syphilis in a 12 month period, whereas in the year prior to the survey, there were 8131 syphilis infections reported in Australia.[21] Additionally, the previous estimate used epidemiological data to adjust for overlapping exclusion factors, which increased eligibility from 33% to 62% and may have overcompensated. Furthermore, some of the 2012 estimates are assumed based on point-in-time estimates. For example, the estimate for anemia was 0.77% and iron deficiency was not included, whereas our estimate was based on a diagnosis of iron deficiency or anemia in the last 6 months as per blood donation criteria, which was 9.9%. Also, 2.9% of the sample were deemed not eligible to donate due to "do not know" or refusals to answer. Some of these respondents might have been deemed eligible upon further questioning in a pre-donation interview. Therefore, our estimate is likely a conservative underestimate of true eligibility.

These findings indicate that within Australia there is a large pool of people who are eligible to donate but are not currently doing so. While over half of those sampled (55.8%) reported having attempted to donate blood, only 14.2% of those eligible reported having done so within the previous 2 years. The number of blood donations each year in Australia has generally increased in recent years, but the number of donors has not increased proportionally. In 2021 donors formed only 2.7% of the total age-eligible population.[9] An individual's perception of their eligibility may be a substantial barrier to blood donation. The prominence of misperceptions of eligibility among survey respondents demonstrates the need for education on donation criteria, alongside broad public health campaigns to encourage donation. Community-level education that increases knowledge of eligibility may increase presentation by eligible donors and decrease presentation by those who will be deferred. Deferrals are known to negatively impact on donor return rates, reducing the chances a donor, especially a new donor, will return once they become eligible.[22–27] However, the larger issue for recruitment and retention of blood donors is people believing they are ineligible, and consequently not presenting to donate blood. Targeting recruitment and education campaigns might be effective. For example, older age groups who are more likely to donate more frequently,[28] and people nearing their 76th birthday may be encouraged to extend their potential blood donor career beyond this age.

Whole blood donation can exacerbate iron deficiency and is increasingly considered an important risk both to donor health and to the blood supply.[29–33] Anemia and/or iron deficiency diagnosis was the most prevalent exclusion factor within the survey sample, with 3.8% of the sample ineligible to donate due to this factor alone. The significantly higher proportion of women ineligible can mostly be accounted for by anemia and/or iron deficiency. Donation for plasmapheresis has a significantly lower risk of exacerbating anemia and iron deficiency, particularly when procedures to minimize blood loss are in place.[34] Therefore, options to donate plasmapheresis for those at risk of or with iron deficiency without anemia may increase donor eligibility without the risk of iron loss that occurs with whole blood donation. If iron deficiency were no longer a deferral for plasma donations, our survey estimates a further 0.5% of the male population and 6.7% of the female population would become eligible.

Our findings suggest that removal of the UK geographical restriction, due to vCJD, resulted in an additional 4.4% of the population being eligible to donate blood. This substantial increase emphasizes the value of reviewing eligibility frequently as new evidence emerges, to expand the blood donation pool while still protecting the safety of the blood supply.

There are some limitations to this study. From March 2020 until just before the survey was conducted in November 2021, Australia was seriously affected by COVID-19 restrictions. The restrictions imposed may have led to changes in behavioral factors related to deferral. For example, there was reduced sexual contact among gay and bisexual men during lockdowns.[35] Blood donors are generally more likely than non-donors to agree to participate in surveys if invited,[36] and in our survey 9.1% were current donors—a substantially higher proportion than in the population as a whole, which may result in some bias.

This survey has several advantages over previous estimates of donor eligibility prevalence in Australia and overseas. It includes behavioral characteristics which are unavailable from other sources, and accounts for overlapping factors which impact on eligibility. Furthermore, the survey provides demographic data. Knowledge of eligibility rates, especially stratified by demographics such as age and sex, allow blood collection agencies to develop and implement more cost-effective, targeted donor recruitment strategies. Future research is required to explore misperceptions of eligibility criteria. The survey included questions on why the respondents believed themselves to be ineligible, and questions to assess knowledge of the eligibility criteria. These data will provide insight into what misperceptions are most common and in which populations, and how to correct these misperceptions through public health education.

This study demonstrates that there is a large untapped pool of blood donors in Australia, and an improved understanding of the misperceptions of the criteria will help inform public health education and could help to encourage people to donate blood.

ACKNOWLEDGMENTS

We would like to thank the Australian government for funding Australian Red Cross Lifeblood, and the Australian National Health and Medical Research Council for funding this project.

We would also like to thank the respondents who participated in the study for their time. Open access publishing facilitated by University of New South Wales, as part of the Wiley - University of New South Wales agreement via the Council of Australian University Librarians.

FUNDING INFORMATION

This work was majority funded under a Partnership Project grant from the Australian National Health and Medical Research Council (NHMRC APP1151959). Australian governments fund Australian Red Cross Lifeblood to provide blood, blood products and services to the Australian community.

CONFLICT OF INTEREST STATEMENT

The authors declare they have no conflicts of interest relevant to the manuscript submitted to TRANSFUSION.

DATA AVAILABILITY STATEMENT

The code used for the primary analyses is provided as the Supporting Information. Additional code associated with variable creation and sensitivity analysis is available on request to the corresponding author

ORCID

Yasmin Mowat https://orcid.org/0000-0002-3451-9164
Veronica Hoad https://orcid.org/0000-0002-7827-3661
Bridget Haire https://orcid.org/0000-0002-0657-9610
Barbara Masser https://orcid.org/0000-0001-9385-6497
Anita Heywood https://orcid.org/0000-0003-4400-7960
Rachel Thorpe https://orcid.org/0000-0003-4415-9438
Hamish McManus https://orcid.org/0000-0002-7264-8848
Skye McGregor https://orcid.org/0000-0002-8116-4319

REFERENCES

1. Seifried E, Klueter H, Weidmann C, Staudenmaier T, Schrezenmeier H, Henschler R, et al. How much blood is needed? Vox Sang. 2011;100(1):10–21.
2. Greinacher A, Fendrich K, Hoffmann W. Demographic changes: the impact for safe blood supply. Transfus Med Hemother. 2010;37(3):141–8.

3. Carter MC, Wilson J, Redpath GS, Hayes P, Mitchell C. Donor recruitment in the 21st century: challenges and lessons learned in the first decade. Transfus Apher Sci. 2011; 45(1):31–43.
4. Al-Riyami AZ, Burnouf T, Wood EM, Devine DV, Oreh A, Apelseth TO, et al. International Society of Blood Transfusion survey of experiences of blood banks and transfusion services during the COVID-19 pandemic. Vox Sang. 2022; 117(6):822–30.
5. Akita T, Tanaka J, Ohisa M, Sugiyama A, Nishida K, Inoue S, et al. Predicting future blood supply and demand in Japan with a Markov model: application to the sex- and age-specific probability of blood donation. Transfusion (Paris). 2016; 56(11):2750–9.
6. Drackley A, Newbold KB, Paez A, Heddle N. Forecasting Ontario's blood supply and demand. Transfusion (Paris). 2012; 52(2):366–74.
7. Ali A, Auvinen MK, Rautonen J. Blood donors and blood collection: the aging population poses a global challenge for blood services. Transfusion (Paris). 2010;50(3):584–8.
8. World Health Organization. Guidance on maintaining a safe and adequate blood supply during the coronavirus disease 2019 (COVID-19) pandemic and on the collection of COVID-19 convalescent plasma: interim guidance, 10 July 2020 [Internet]. 2020 [cited 2022 Jul 4]. Report No: WHO/2019-nCoV/BloodSupply/2020.2. Available from: https://apps.who.int/iris/handle/10665/333182
9. Kirby Institute. Transfusion-transmissible infections in Australia: surveillance report 2022. 2022 [cited 2023 Jan 4]. Available from: https://kirby.unsw.edu.au/report/transfusion-transmissible-infections-australia-surveillance-report-2022
10. Lifeblood. Classification and incidence of adverse events. 2023 Available from: https://www.lifeblood.com.au/health-professionals/clinical-practice/adverse-events/classification-incidence
11. Brailsford SR, Kelly D, Kohli H, Slowther A, Watkins NA. Blood donor selection steering group of the advisory committee for the safety of blood, tissues, organs. Who should donate blood? Policy decisions on donor deferral criteria should protect recipients and be fair to donors. Transfus Med Oxf Engl. 2015 Aug;25(4):234–8.
12. McManus H, Seed CR, Hoad VC, Kiely P, Kaldor JM, Styles CE, et al. Risk of variant Creutzfeldt–Jakob disease transmission by blood transfusion in Australia. Vox Sang. 2022;117(8): 1016-26. https://doi.org/10.1111/vox.13290
13. To L, Dunnington T, Thomas C, Love K, McCullough J, Riley W. The United States potential blood donor pool: updating the prevalence of donor-exclusion factors on the pool of potential donors. Transfusion (Paris). 2020;60(1): 206–15.
14. Fan W, Yi QL, Xi G, Goldman M, Germain M, O'Brien S, et al. The impact of increasing the upper age limit of donation on the eligible blood donor population in Canada. Transfus Med. 2012;22(6):395–403.
15. Lucky TT, Keller AJ, Seed CR, Lee J, Styles C, Pink J, et al. A refined method for estimating the size of the potential blood donor pool in Australia. Transfusion (Paris). 2014;54(10): 2445–55.
16. Transfusion-transmissible infections in Australia 2013 Surveillance Report. 2013.
17. Kaczmirek L, Phillips B, Pennay D, Lavrakas P, Neiger D. Building a probability-based online panel: Life in Australia™. (2):54.
18. Deville J-C, Särndal C-E, Sautory O. Generalized raking procedures in survey sampling. Journal of the American Statistical Association. 1993;88(423):1013-20. https://doi.org/10.1080/01621459.1993.10476369
19. Valerio H, Alavi M, Law M, Tillakeratne S, Amin J, Janjua NZ, et al. High hepatitis C treatment uptake among people with recent drug dependence in New South Wales. Australia J Hepatol. 2021;74(2):293–302.
20. ABS. Regional population by age and sex, 2021. Australian Bureau of Statistics [Internet]. 2022 [cited 2023 Feb 14]. Available from: https://www.abs.gov.au/statistics/people/population/regional-population-age-and-sex/latest-release
21. NINDSS. Dashboard. NINDSS Portal [Internet]. [cited 2023 Jan 4]. Available from: https://nindss.health.gov.au/pbi-dashboard/
22. Halperin D, Baetens J, Newman B. The effect of short-term, temporary deferral on future blood donation. Transfusion (Paris). 1998;38(2):181–3.
23. Custer B, Schlumpf KS, Wright D, Simon TL, Wilkinson S, Ness PM. Donor return after temporary deferral. Transfusion (Paris). 2011;51(6):1188–96.
24. Shah R, Tulsiani S, Harimoorthy V, Mathur A, Choudhury N. Analysis of efforts to maintain safe donor in main donor pool after completion of temporary deferral period. Asian J Transfus Sci. 2013;7(1):63–7.
25. Piliavin JA. Temporary deferral and donor return. Transfusion (Paris). 1987;27(2):199–200.
26. Hillgrove T, Moore V, Doherty K, Ryan P. The impact of temporary deferral due to low hemoglobin: future return, time to return, and frequency of subsequent donation. Transfusion (Paris). 2011;51(3):539–47.
27. Clement M, Shehu E, Chandler T. The impact of temporary deferrals on future blood donation behavior across the donor life cycle. Transfusion. 2021;61(6):1799–808. https://doi.org/10.1111/trf.16387
28. Priyono A, Masser BM, Dyda A, Davison TE, Irving DO, Karki S. Long-term return and donation pattern of those who begin donating at different ages: a retrospective cohort analysis of blood donors in Australia. Transfusion (Paris). 2021;61(3): 799–810.
29. Davey RJ. Recruiting blood donors: challenges and opportunities. Transfusion (Paris). 2004;44(4):597–600.
30. Newman B. Iron depletion by whole-blood donation harms menstruating females: the current whole-blood-collection paradigm needs to be changed. Transfusion (Paris). 2006;46(10): 1667–81.
31. Milman N, Byg KE, Ovesen L. Iron status in Danes 1994. II: prevalence of iron deficiency and iron overload in 1319 Danish women aged 40-70 years. Influence of blood donation, alcohol intake and iron supplementation. Ann Hematol. 2000;79(11): 612–21.
32. Pittori C, Buser A, Gasser UE, Sigle J, Job S, Rüesch M, et al. A pilot iron substitution Programme in female blood donors with iron deficiency without anaemia. Vox Sang. 2011;100(3): 303–11.
33. Spencer B. Blood donor iron status: are we bleeding them dry? Curr Opin Hematol. 2013;20(6):533–9.

34. Hoad V, Pink J. Chapter 6: frequent plasmapheresis donation safety considerations. Blood donor health and safety. 2nd ed. Bethesda, MD: AABB Press; 2022.
35. Hammoud MA, Maher L, Holt M, Degenhardt L, Jin F, Murphy D, et al. Physical distancing due to COVID-19 disrupts sexual behaviors among gay and bisexual men in Australia: implications for trends in HIV and other sexually transmissible infections. J Acquir Immune Defic Syndr. 2020;85(3):309–15.
36. Brodersen T, Rostgaard K, Lau CJ, Juel K, Erikstrup C, Nielsen KR, et al. The healthy donor effect and survey participation, becoming a donor and donor career. Transfusion (Paris). 2022;63:143–55.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Mowat Y, Hoad V, Haire B, Masser B, Kaldor J, Heywood A, et al. Prevalence of blood donation eligibility in Australia: A population survey. Transfusion. 2023; 63(8):1519–27. https://doi.org/10.1111/trf.17474