

What motivates men to donate blood? A systematic review of the evidence

Alison Carver^{a,b}, Kathleen Chell^{b,c}, Tanya E. Davison^b, Barbara M. Masser^{b,d}

^a *Mary MacKillop Institute for Health Research, Australian Catholic University, Melbourne, Victoria 3000, Australia*

^b *Australian Red Cross Blood Service, 417 St Kilda Rd, Melbourne, Victoria 3004, Australia*

^c *Queensland University of Technology, Brisbane, Queensland 4000, Australia*

^d *The University of Queensland, St Lucia, Queensland 4072, Australia*

Corresponding author:

Dr Tanya Davison
National Donor Research Manager
Australian Red Cross Blood Service
417 St Kilda Rd, Melbourne, VIC,
Australia
email: tdavison@redcrossblood.org.au
Tel: +61 3 9863 2887
Fax: +61 3 9863 1601

Short running title as running head: What motivates men to donate blood?

Abstract

Background and objectives

Effective recruitment and retention of male donors is vital for the ongoing provision of blood products. Compared with females, male donors are less likely to be medically deferred or experience vasovagal reactions and are typically preferred for plasmapheresis donation in voluntary non-remunerated settings. However, females outnumber males among donors aged under 40 years. This systematic review aimed to synthesise evidence and identify key motivators for blood donation among males to inform targeted recruitment/retention campaigns.

Materials and methods

Databases (e.g., EBSCOhost, Web of Science) were searched using terms (dona* OR dono*) AND (blood OR aphaeresis OR apheresis OR plasma* OR platelet* OR platlet*) in title AND (male OR gender OR sex OR female) AND (motivat* OR intention OR attitude OR behavi* OR predictor OR barrier OR deter*) NOT (organ OR sperm OR tissue OR autologous OR oocyte) in text. Two researchers independently systematically scanned quantitative, full-text, English-language, peer-reviewed publications from 1990-2015 that examined males/females separately with outcomes of blood donation or self-reported intention. Two additional researchers resolved discrepancies.

Results

Among 28 identified articles, the most frequently-cited motivators for male blood product donation were: altruism; positive attitude towards incentives; health check(s); subjective norms. Altruism was less pronounced among males compared with females and was combined with 'warm glow' in novice males (impure altruism). Perceived health benefits and incentives (e.g. coffee mugs) were stronger motivators of males than females.

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3 **Conclusion** Marketing campaigns for recruitment/retention of male donors should focus on identified
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5 motivators rather than take a 'one-size-fits-all' approach.
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11 **KEYWORDS**
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14 Blood; plasma; blood donation; review; motivation; gender.
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For Peer Review

Introduction

The recruitment and retention of male blood donors is of increasing importance to blood collection agencies (BCAs) in ensuring the provision of whole blood and plasma products. Male donors are less likely than female donors to be temporarily deferred on medical grounds, such as low haemoglobin levels [1] or low body weight (<50kg) [2], and only female donors are deferred due to pregnancy and breast-feeding [3]. Further, male donors are statistically less likely to experience an adverse event while donating [4]. For example, Newman et al. [2] found that women were more likely than men to report experiencing vasovagal reactions (9% vs 4.5%), fatigue (11.1% vs 4.0%) and arm discomfort (12.5% vs 6.9%) after donating. The comparatively lower risk of deferral and of experiencing adverse events increases these donors' likelihood of returning to make future blood donations [5-7]. Gender is also associated with vein issues, with women more likely to have unsuitable veins for blood donation than men, thus reducing their overall success rate of completing blood donations [8,9]. **The relative robustness of male donors is recognised in the Netherlands [10] where they may donate whole blood five times per year, compared with female donors who may do so three times per year. Similarly, in England the inter-donation deferral period is shorter for male donors (12 weeks) compared with female donors (16 weeks) [11].**

Males may also be preferred plasmapheresis donors; an important consideration given increased demand in Australia and globally for plasma-derived products including intravenous immunoglobulin (IVIg) [12,13]. Plasma derived from male donors is also most needed for the development of clinical plasma products (i.e. Fresh Frozen Plasma, Cryoprecipitate and Cryo-depleted plasma). Whilst women can donate plasma for fractionation, their plasma is not desirable for clinical plasma products due to the risk of Transfusion Related Acquired Lung Infection (TRALI) if they have ever been pregnant [14].

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Despite their desirability as blood product donors, comparatively little is known about what motivates men to become and remain donors. An examination of the demographic characteristics of whole blood donors in Australia from July 2015 to June 2016 (drawing on internal data from the Australian Red Cross Blood Service) suggests that young men are comparatively under-represented within the blood donor population. **For example, male donors aged under 40 years comprise only 21.5% of the whole blood donor panel, compared to female donors in this age group, who comprise 26.9% of the panel. Similar gender disparities have been observed in England, Wales [15], USA [16] and the Netherlands [6].**

Targeting younger males (e.g. those aged under 40) could represent a fruitful marketing activity – not only are these donors comparatively robust to the demands of phlebotomy, recruitment at this younger age offers the potential of retaining these donors for a long donation career.

Given the lower comparative donation rates of younger men, this suggests that the current ‘one-strategy-fits-all’ marketing or motivational approach used by BCAs does not resonate with this group. It is possible that, instead, tailored recruitment campaigns are required to recruit and retain young men. However, in order to design these and to capitalise on the opportunity to recruit young men to become blood donors, BCAs require a thorough understanding of what motivates men to donate. Existing reviews of blood donor motivation [17-20] have considered blood donors in general without an exploration of gender specific motivations. Therefore, the aim of this systematic literature review is to synthesise previous findings and understand motivators of blood donation specific to adult males (and where possible identify age-specific factors). This will then facilitate the development of tailored interventions for the recruitment and retention of male donors.

Materials and methods

A systematic search strategy using multiple reviewers was undertaken, with the study flow as depicted in Figure 1. Databases (CINAHL, MEDLINE complete, PsychInfo, Health Business Elite and Web of Science) were searched using terms: (dona* OR dono*) AND (blood OR aphaeresis OR apheresis OR plasma* OR platelet* OR platlet*) in the article title AND (male OR gender OR sex OR female) AND (motivat* OR intention OR attitude OR behavi* OR predictor OR barrier OR deter*) NOT (organ OR sperm OR tissue OR autologous OR oocyte) in the full text. In total, **1733** references were identified, with **the final search conducted on November 30, 2015**. Two independent researchers scanned titles, then abstracts and ultimately full-text articles to determine their suitability for inclusion. The following inclusion and exclusion criteria were applied: selected articles had to be full-text, scholarly peer-reviewed journal articles published in the English language between January 1990 and August 2015. The articles had to describe quantitative studies that examined males separately from females and include at least one of the following outcome measures: actual blood donation (objective data or self-report) or self-reported intention to donate blood. Studies were excluded if they were conducted in settings where blood donation was remunerated. All selected full-text studies were checked for quality using the standard quality assessment criteria defined by Kmet et al. [21]. **For each study, 14 items (Table S1, available as supporting information with the online version of this paper) were scored based on meeting particular criteria (0, “no”; 1, “partial”; 2, “yes”) or marked “n/a” if not applicable to the study design. An overall score was computed for each paper by summing the scores for all applicable items and dividing by the maximum possible score (i.e. 2 x number of applicable items) [21].**

The initial search was undertaken by one author (AC). All identified titles were screened independently by two authors (AC, KC) who subsequently reviewed all abstracts considered to be potentially eligible for

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3 inclusion. All full-text articles were reviewed (by AC and KC) with input from two further authors (TD,
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5 BM) to resolve queries or discrepancies.
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15 **Results**

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17 The search terms allowed the initial extraction of papers on a wide variety of topics related to blood
18 donation (e.g. prevalence of particular antibodies and viruses among blood donors and samples; blood
19 cord donation; iron studies) that were not relevant to the current review. In total, only 28 articles met
20 the criteria for inclusion and these are described in Table 1. Among these studies, a lack of consistency
21 in the measurement of predictors and of outcome variables, **as well as sample composition (e.g. five**
22 **studies included data on donor and non-donors)**, was observed and this, therefore, precluded
23 conducting a meta-analysis of findings from these independent studies. The standard quality
24 assessment score [21] for each article ranged from 0.78-0.96 (possible range is 0 to 1) so none were
25 excluded for low quality. Several key themes regarding what motivates men to donate blood were
26 identified. These were classified, where possible, according to the cross-validated taxonomy of blood
27 donation motivators generated by Bednall and Bove [19]. This taxonomy describes the following as
28 (categories of) motivators for blood donation: prosocial motivation; personal values; perceived need for
29 blood; indirect reciprocity; marketing communications; incentives; social norms; intrinsic motivation;
30 convenience of collection site; and reputation of collection agency. The identified motivators of male
31 donors all lay within these categories, with the exclusion of intrinsic motivation, convenience of
32 collection site, and reputation of collection agency (see Table 2). Within this taxonomy, the category of
33 'personal values' was expanded to 'personal values and attitudes' to capture attitudes towards blood
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5 Some studies [23, 24, 37, 39] reported on men only while others sampled both men and women.

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7 However, it should be noted that throughout the description of results, the comparison standard varies
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9 between analyses. In most cases a particular motivator is reported as being stronger than other
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11 motivators among men, and in other cases (where indicated) the strength of a motivator among men is
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13 compared with its strength among women.
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17 -----Insert Table1 followed by Table 2 about here-----
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19 20 21 22 **Prosocial Motivation**

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24 Altruism, that is the desire to help and improve the health of others without reciprocity, was referenced
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26 as a driver of male donors in six studies [22-24, 28, 37, 39], while collectivism (regarding family members
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28 and friends) was cited in three studies [23, 24, 37]. Although altruism has been identified frequently as a
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30 general motivator of blood donation behaviour [19, 22], the nature and strength of altruism as a
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32 motivator of men to donate blood has been questioned [47]. For example, Ferguson et al. [28] identified
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34 particular forms of altruism as more pervasive among male donors compared with female donors. In
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36 their analysis, new male donors compared with all other male and female donors were found to be
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38 more strongly motivated by impure altruism, which is characterized by the combination of altruism with
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40 a 'warm glow' (i.e. feeling better about oneself after donating) [28]. Given the positive feelings
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42 experienced by donors in this case, impure altruism is classified by Bednall and Bove [19] as a form of
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44 'indirect reciprocity', rather than a 'prosocial motivation'. In addition, Ferguson et al. [28] identified a
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46 further sub-category of altruism, namely 'reluctant altruism' among men early in their donation career.
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48 This is characterized by a desire to donate blood that is motivated by the inaction or 'free-riding' of
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50 others [28].
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3 Collectivism with reference to family and friends who were in need of blood was identified as a key
4 motivator of male donors in Saudi Arabia [23, 24] and in Turkey [37] where replacement blood donation
5 for family and friends occurs (accounting for 40% and 34% of all donations, respectively [50]). Whilst
6 replacement blood donation is not permitted in many developed nations such as Australia that rely on
7 voluntary blood donation, the World Health Organisation reports that over half of the blood supply in 72
8 countries with varying income levels (11 high; 45 middle; 16 low) comes from replacement donors as
9 well as paid donors [50].
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21 ***Personal values and attitudes***

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23 Within this category, the most widely cited motivator (described in five studies) of male donors was
24 'personal moral norms' (i.e. where blood donors act on their sense of duty or moral obligation) [26, 30,
25 34, 37, 47]. A positive attitude towards blood donation was identified as important for male donors in
26 two studies [22, 29]. In particular, with their application of the Theory of Planned Behaviour [51],
27 France et al. [29] demonstrated that the path between attitude and intention to donate blood was more
28 strongly weighted for men compared with women (unstandardized [and standardized] path coefficients
29 were 0.51 [0.52] and 0.31 [0.33], respectively). Religious or spiritual motivation was cited as a further
30 motivation among personal values for male donors in Saudi Arabia [24].
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44 ***Perceived need for blood donation***

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46 Whilst awareness of the everyday need for blood may motivate some men to donate blood, albeit to a
47 lesser extent than women (men, 25%; women, 43%) [30], natural disasters or emergency situations can
48 be important triggers for beginning to donate for men [35, 41]. Evidence suggests, however, that the
49 impact of this on ongoing blood supplies may be short-lived. For example, a study in China reported
50 that, in response to an earthquake, a higher proportion of men (59%) donated blood for the first-time
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3 compared with women (41%) [35], but in spite of this men were less likely than women to sustain their
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5 donation behaviour (OR=0.83 (95% CI 0.71-0.96)) [35].
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10 ***Indirect reciprocity***

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12 In addition to being motivated by impure altruism, male donors were identified in two Brazilian studies
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14 as being further motivated by an aspect of indirect reciprocity -- namely 'downstream reciprocity' [32,
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16 33]. Interestingly, the first of these studies [32] reported that the possibility of requiring a blood
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18 transfusion in the future motivated men to begin to donate, while the second more recent study
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20 identified this as a motivator for male donor retention [33]. In support of this, existing male donors in a
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22 Saudi Arabian study desired formal recognition of their donation(s) in the form of 'credit' should they,
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24 themselves; require blood in future [23].
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30 ***Marketing communications***

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32 Communications including 'blood drives' by BCAs were not widely reported as strong motivators to give
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34 blood. For example, in a study in the USA only 15% of men and women were recruited via a blood drive
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36 organiser or recruiter. However, once recruited, men were significantly less likely than women to
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38 respond to reminders from blood collection agencies via telephone (OR=0.71 (95% CI 0.68-0.75)), email
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40 (OR=0.80 (95% CI 0.77-0.83)), TV, radio or print media (OR=0.62 (95% CI 0.58-0.65)) [30]. In a Turkish
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42 study [37] less than 5% of male donors listed suggestions by BCA staff and less than 5% listed media
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44 campaigns as influences on their decision to donate blood.
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50 ***Non-monetary incentives***

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52 The perception that donating blood is good for one's health was identified by several studies as
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54 motivating men to donate blood [30, 37, 41, 42, 46]. However, one of the most widely cited incentives
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3 for blood donation identified by men was the associated health check or screening [25, 32, 33, 37, 42,
4 49]. Similarly, some men viewed blood donation as an opportunity to be screened for infectious diseases
5 such as Human Immunodeficiency Virus (HIV) [30, 32, 37, 48].
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11 Men reported favourable views of incentives to donate blood or blood products in several studies [23,
12 24, 30, 32, 39, 49]. For example, in Saudi Arabia, Baig et al. [24] reported that 30% of men (donors and
13 non-donors) sampled considered the receipt of a gift to be acceptable, while a study of blood donors
14 (95% male) in Iran found that 25% of donors were in favour of a receipt of a gift [39]. There is also some
15 evidence that men are more likely than women to be motivated to donate blood by the offer of an
16 incentive [30, 49]. For example a study in USA [30] found that compared with female donors, male
17 donors had increased odds (OR=1.16 (95% CI 1.05-1.28)) of donating because they desired an item or
18 gift. Another study [49] based at a university campus in USA reported that a higher proportion of male
19 donors (77%) compared with female donors (70%) were motivated by incentives. Items identified as
20 attractive incentives for male donors included t-shirts and mugs [30], as well as the opportunity to win
21 tickets to sports or entertainment events and memorabilia autographed by celebrities [49]. In three
22 studies men cited time off work as an incentive to donate blood [23, 32, 39]. However, a further study
23 from Italy, where a whole day's leave is offered for blood donation, reported that few donors (<3%)
24 identified this as their key motivator [25].
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45 Official recognition of frequent blood donation was reported as an incentive by male donors in two
46 studies [23, 49]. Framed certificates or having donors' names engraved on a wall at the donor centre
47 were examples of this [49]. In addition, as described previously as a form of 'downstream reciprocity',
48 certificates/cards that offered credit for future blood transfusions were identified by men in Saudi
49 Arabia as incentives to donate blood [23].
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Social norms

Only one study identified 'descriptive norms' as motivating men to donate blood. Bani and Strepparava [25] reported that the example set by significant others who were themselves blood donors prompted some men to become donors. Six studies [23, 25, 30, 34, 37, 49] cited 'subjective norms' as motivating men to donate blood. In this context, subjective norms are perceptions of social pressure or direct requests from family members, friends or colleagues to donate blood [19]. Bani and Strepparava [25] found that men, compared with women, were significantly more likely ($\chi^2 = 83.7$, $df 1$, $p < 0.004$) to report being influenced by friends to donate blood. Findings from a study conducted in the USA concurred with this [30], while Yuan et al. [49] found that almost equal proportions of women (39%) and men (37%) reported being encouraged in this way. Overall, it appears that friends and/or relatives may play an important role in influencing men to donate blood. Adding to this, a study of male donors in Saudi Arabia [23] found that among voluntary donors, most men (68%) considered friends or relatives to be their main motivation. Likewise, over a third (35%) of men in a Turkish study reported becoming donors after learning about the need for blood from their social environment [37]. Guiddi et al. [34] reported that direct requests and/or pressure from significant others to donate blood were more commonly described as motivators by men who were loyal or regular donors (i.e. those who had made five or more donations) than by novice donors. Among novice donors, females reported being more strongly motivated by these subjective norms than male novice donors. However this gender difference was not apparent with loyal and regular donors [34].

Discussion

This systematic review highlights that the four most commonly identified motivators of male blood donors in non-remunerated settings are: subjective norms (in particular, perceived/actual pressure from

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3 family or friends to donate blood); a positive attitude towards incentives (e.g. gifts, chance to win event
4 tickets or sporting memorabilia); the opportunity for a health check; and (variants of) altruism.

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7 However, this review demonstrates that our understanding of what motivates men to become and
8 remain blood product donors **from the peer-reviewed published literature** is still at an early stage. For
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10 example, there has been little in-depth study of motivators to donate for men (or for women) stratified
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12 by age-group, stage of donation career, or frequency of donation. There has also been little
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14 consideration of deterrents to blood donation, in comparison to motivators, so how these weigh into
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16 the decision making of young men is not well understood. **Further, most published studies to date have**
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18 **been cross-sectional meaning that causality cannot be inferred, and have been conducted in a limited**
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20 **number of cultural settings.** Inconsistent measurement of predictors and of outcome variables across
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22 studies precluded the conduct of meta-analysis of findings which is a limitation of this review. **A further**
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24 **limitation is that our search terms may not have been exhaustive and our focus on the peer reviewed**
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26 **published literature may have overlooked research which has not (yet) been published.**
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34 Considering the role that subjective norms play in motivating men to donate blood it may be
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36 advantageous to design marketing campaigns that ask *existing* donors to recruit their significant others
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38 and friends. Interestingly, marketing campaigns and direct solicitation by BCAs were not widely
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40 identified as attracting male donors. However, a change of focus from direct appeals may show promise
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42 given that a Dutch study [52] found that most donors (57%) were willing to encourage their relatives and
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44 friends to become blood donors. Further, considering the apparent appetite for incentives among
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46 potential and existing male donors [23, 24, 30, 32, 39, 49], it may be worthwhile offering **small**
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48 **incentives (that do not constitute payment as defined by the US Food and Drug Administration [53] or**
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50 **the World Health Organization [54])** to those who recruit a relative or friend to donate blood, thus
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54 combining several motivators identified in this review.
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5 Research is required to investigate the effectiveness of a health check as an incentive as studies have
6 identified free cholesterol testing as being associated with intention to donate [55] but not actual
7 donation [31]. The mismatch between factors that men self-report as motivating them to become and
8 remain donors [55] and those demonstrated (not) to have efficacy in field experiments highlights a
9 further issue with our current knowledge of what motivates men to become donors. In short, it remains
10 possible that men (and women) may be unable to accurately identify what motivates them to donate
11 with their responses to surveys affected by a range of common affective and cognitive biases [56]. As
12 evidenced by Goette et al. [31] behavioural trials in the form of field experiments or randomized
13 controlled trials are required to determine those factors that truly motivate men to donate.
14 Furthermore, the offer of potential health checks for men needs to be balanced with broader knowledge
15 that many men avoid health tests due to fear of discovering any health-related problems [57].
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33 Caution is required regarding perceived opportunities to be screened for infectious diseases such as HIV.
34 Glynn et al. [30] proposed that blood banks should emphasise during initial communications with
35 potential donors the inappropriateness of using their resources for testing for infectious diseases and
36 should provide details of alternative testing services. In developed countries such as Australia, the pre-
37 donation screening process includes a questionnaire that discourages those at risk of HIV from donating
38 blood [58]. However, it is reported that in developing countries such as Brazil some donors view blood
39 collection agencies as testing services for HIV and other infectious diseases [32, 48]. This may be
40 because they are either unaware of dedicated HIV testing clinics or have had unsatisfactory experiences
41 when using such services [48]. To further combat this misuse of facilities at blood collection agencies,
42 there needs to be improvement in customer service (regarding time to process results, confidentiality
43 and accuracy of results) at HIV testing clinics [48].
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5 Altruism has been identified as a universal motivation for blood donation [22-24, 28, 37, 39]. However,
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7 this review suggests that general appeals for blood donation that focus on altruism are unlikely to be
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9 particularly successful in attracting male donors. In order to better understand altruism, Ferguson et al.
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11 [28] identified sub-categories of altruism: pure altruism (where one wishes to help others in the absence
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13 of a reward); impure altruism (where pure altruism is combined with a 'warm glow', e.g. feeling better
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15 about oneself after donating blood); and reluctant altruism (where one donates when they see that
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17 other people are not doing so). Ferguson et al. [28] reported that new male donors, in particular, tend to
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19 be motivated by impure altruism and reluctant altruism. These sub-categories of altruism may be
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21 important considerations when designing campaigns to attract male donors, in particular. Ferguson et
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23 al. [28] highlighted that as well as considering gender there is a potential need for segmented targeting
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25 of new and existing donors according the stage of their donor career. Further research is required to
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27 examine the motivation to donate blood among men according to the stage of their donor career and
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29 also according to their age-group as few studies have done so. As noted previously, blood donation in
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31 Australia is more prevalent among men aged 40-60 years compared with men aged below 40 years, and
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33 therefore, research with a particular focus on this younger age-group is warranted.
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41 Ferguson [59] suggests the application of Costly Signalling Theory [60] when designing interventions to
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43 recruit and retain this demographic who are of child-bearing age. The origins of this theory lie in
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45 evolutionary psychology and are related primarily to attracting a mate [60, 61]. For a behaviour to count
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47 as a 'costly signal' it needs to: (1) benefit others; (2) be observable by others; (3) cost the 'signaller' and
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49 be non-reciprocal; (4) indicate the strength, fitness or virility of the 'signaller' [60]. As a basic behaviour,
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51 blood donation meets all these requirements except being observable once the donor has left the donor
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53 centre [60]. However, paraphernalia (e.g., sticking plasters or bandages) or low value incentives that
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3 denote the blood donor status of the wearer or recipient (e.g., t-shirts, mugs) [30] may provide this
4 signalling function in everyday life. These items may prompt incidental conversations about blood
5 donation that may motivate others to begin donating and promote retention of existing donors.
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7 Ferguson [59] suggests that men are more likely to communicate their donor status during their fertile
8 years and when childless. Therefore application of Costly Signalling Theory to marketing campaigns
9 conducted by BCAs may show promise with recruiting and retaining men at this particular life stage.
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11 However, to date there is no published literature on the efficacy of interventions based on this method
12 of subtly signaling donor status among men to encourage young men to donate blood.
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23 In conclusion, while the extant literature on what motivates young men to donate is relatively limited,
24 this review has identified several promising approaches to motivating men to donate blood. For
25 example, it may be worthwhile to leverage existing donors by offering incentives (e.g. entry into prize
26 draws) to recruit male friends and relatives, and also to design campaigns that focus on impure and/or
27 reluctant altruism. In addition, randomised controlled trials are needed to test the provision of
28 particular health tests as motivators of actual blood donation (rather than intention to donate). Further
29 research that applies Costly Signalling Theory to blood donation is also warranted due to its potential
30 relevance to young men prior to fatherhood. Interventions and marketing campaigns that incorporate
31 these approaches should be evaluated using rigorous research methods so that effective ways of
32 recruiting and retaining younger male blood donors can be identified. This will play a crucial role in
33 ensuring that voluntary whole blood and plasma supplies are sustained in the future.
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50 **Acknowledgement**

51
52 Australian governments fund the Australian Red Cross Blood Service for the provision of blood, blood
53 products and services to the Australian community.
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Figure and Table Legends

Figure 1. Study flow diagram

Table 1. Details of papers included in review

Table 2. Male blood donor motivators and definitions

Table S1. Standard quality assessment results

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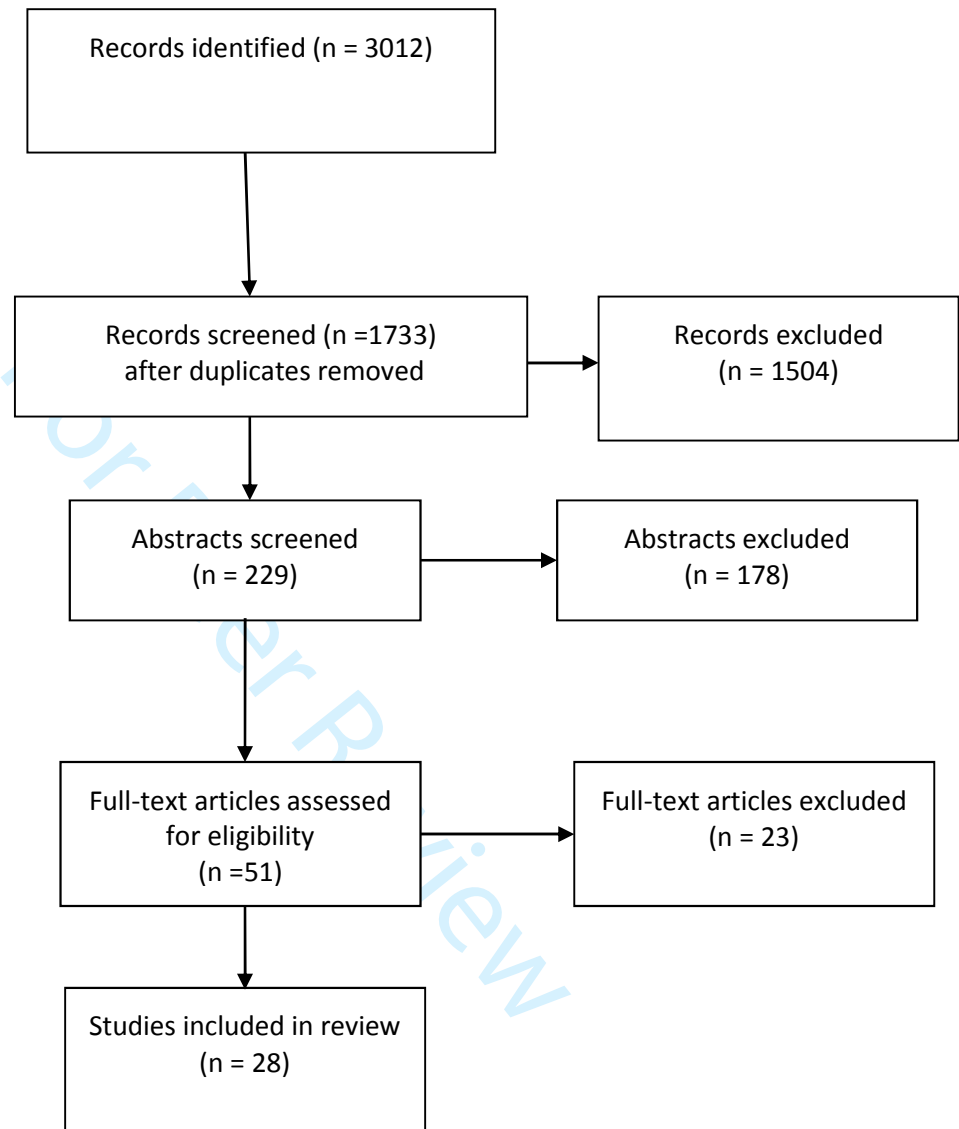


Figure 1. Study flow diagram

Table 1. Details of papers included in review

Ref no.	Author(s)	Country	Donor Type	Design	Outcome measure(s)	Main findings	Quality Score
[22]	Abolfotouh et al., 2014	Saudi Arabia	Non-donors & donors (n=469; 75.9% male)	Cross-sectional survey measures knowledge about donation (score) and attitudes towards donation (score).	Whether person had donated or not; frequency of donations.	Most participants (96%) considered blood donation to be altruistic. There were no significant differences by sex in blood donation knowledge, but men had more positive attitudes towards donation than women.	0.95
[23]	Alam & Masalmeh, 2004.	Saudi Arabia	Non-donors and donors; 500 males	Cross-sectional survey measured knowledge about donation; reasons for donating or not; frequency of donation; motivation for blood donation; incentives and attitudes towards donation.	Frequency of donation; motivation for blood donation	Most donors (64%) were replacement donors; 36% were voluntary. Almost half (43%) of non-donors reported they had never been asked to donate blood. Most voluntary donors (77%) donated blood to serve humanity. Friends/relatives were key sources of motivation. Overall, most donors (65%) cited certificates as possible incentives and 30% desired a blood credit card in case they needed blood in future.	0.78
[24]	Baig et al., 2013	Saudi Arabia	Non-donors and donors (n=326) male students (18-28 years).	Cross-sectional survey measured knowledge about blood donation and motivations to donate.	Donor or not	19% of (male) respondents were donors. Motivators were helping family/friends (30%), saving lives (28%) and religious reasons (20%). The key reason for non-donation was never having been asked (45%). Overall 30% of donors and non-donors were in favour of incentives (a gift or money).	0.78
[25]	Bani & Strepparava 2011.	Italy	Donors (n=895 donors; 80% male)	Cross-sectional survey about reasons for becoming a donor, who influenced this and commitment to donating	Total number of WB donations; annual number of WB donations	Overall motivations for becoming a donor were: were to help others, influence of family or friends and social/moral obligation. Men, compared with women, reported the influence of friends ($p<0.004$) and cited a health check more often.	0.90
[26]	Bani, et al., 2014	Italy	Lapsed Donors (n=121; 62% male).	Cross-sectional survey on motivations for beginning to donate, frequency of donation, reasons for discontinuation.	Differences by sex in motivation, donation frequency and reasons for discontinuation.	There were no significant differences by sex in reported motivations for becoming a donor or reasons for lapse (other than pregnancy).	0.95
[27]	Duboz & Cuneo, 2010	France	Lapsed donors (n=567) and non-donors (n=619); 47% male	Cross-sectional survey (by telephone) to identify barriers to blood donation and to compare their occurrence between lapsed and non-donors.	Donor status: regular donor (excluded from analyses), lapsed or non-donor	Barriers to donation were medical reasons (32%), lack of time (15%), fear (12%), negligence (10%), lack of information (7%), no reason (7%), not being asked to donate (6%), lack of opportunity (5%) and prior deferral (4%). Men had higher odds of reporting 'no particular reason', while women had higher odds of reporting 'medical reasons'.	0.91
[28]	Ferguson et al., 2012	Netherlands	WB donors (n=12,580; 47% male)	Cross-sectional survey measured intentions, cognitive and affective attitudes, role merger, pure altruism, trust, self-efficacy, subjective and oral norms, and habit formation. Used principal components analysis and confirmatory factor analysis.	Intention to donate	Principal components analysis and confirmatory factor analysis identified a cognition-behavior (CB) factor that included intentions and was common to all donor groups. Among first-time male donors impure altruism was associated with this. Among men and women reluctant altruism was associated with the CB factor for novice donors and warm glow and pure altruism for experienced donors.	0.95

1	[29]	France et al., 2008	USA	Return Donors (n=464; 29% male)	Cross-sectional lab-based survey using Theory of Planned Behavior (TPB). Measured: attitude, subjective norm, personal moral norm, self-efficacy, behavioral intention, vasovagal reactions, satisfaction	Intention to donate	When examining TPB constructs the path from 'attitude' to 'intention to donate' had greater weighting for men, compared with women. The path between self-efficacy and intention had greater weighting for women compared with men.	0.95
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7	[30]	Glynn et al., 2002	USA	Return (n=38,884) & new (n=6,704) WB donors; % of males not reported	Cross-sectional field survey of demographic variables, reasons for donating, influences and projected response to different types of reminder.	Correlations between demographic groupings and: reasons for donating, influences and response to different reminder types.	For men and women altruism was most cited (>75%) motivation. Compared with women, men had higher odds of reporting the following as motivations to donate blood: perceived health benefits (1.99, 95% CI 1.85-2.14); small gifts (1.16, 95% CI 1.05-1.28); being encouraged by someone close (1.20, 95% CI 1.07-1.34) and testing for infectious disease (1.53, 95% CI 1.33-1.75).	0.91
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16	[31]	Goette et al., 2009	Switzerland	Study 1: Non-donors n=2825; 51.3% male) Study 2: Donors (n=8269; 61.2% male)	Field experiments to recruit/retain donors with test conditions: solicitation letter, letter & appeal; or letter, appeal and offer of free cholesterol test. Follow-up was at 3 weeks (appointment date was in letter).	Making a donation.	No significant differences by sex. Study 1: Slightly lower probability of coming to donate if offered a cholesterol test than if sent invitation alone. Study 2: Offer of cholesterol test does not increase the donation rate relative to standard invitation.	0.96
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23	[32]	Gonzalez et al., 2008	Brazil	Donor candidates (n=1600; 52% male)	Cross-sectional survey on blood donation, HIV test-seeking and knowledge, social capital, and donor motivations, donor status (e.g. first-time, repeat, lapsed).	Altruism, self-interest, direct appeal, test-seeking behaviour were examined according to demographic variables and donor status.	Altruism was associated with being female, repeat/lapsed donors status, and test-seeking. Self-interest was associated with being male, novice donor status, test-seeking, age<21 years and less than high school education. Response to a direct appeal was associated with being female, repeat/lapsed donor status and age 21–40 years.	0.91
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31	[33]	Gonzalez et al., 2013	Brazil	Donor candidates (n=7365; 64% male)	Cross-sectional survey on blood donation, HIV test-seeking and knowledge, social capital, and donor motivations, donor status (e.g. first-time, repeat, lapsed).	Altruism, self-interest, direct appeal, test-seeking behaviour were examined by demographics, donor status and social capital.	Men had higher levels of self-interest regarding blood donation. Women reported higher levels of altruism and greater response to direct appeals.	0.91
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39	[34]	Guidi et al., 2015	Italy	New donors, regular donors (n=237; 65% male)	Cross-sectional survey included socio-demographic variables and Omoto and Snyder's Motivations for Volunteerism Scale adapted to blood	Total donations: donors were categorised as: new (1-4 donations) loyal	Women report higher levels of social motivations compared to men but gender differences lessen with total donations. Women reported higher levels of ego-protection motivations.	0.91
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4	[35]	Guo et al., 2012	China	Post- earthquake first-time donors (n=5147, 59.3% male); first-time donors (n=3176 53.6% male)	Observational; natural experiment. Return pattern (at 12 months) of post-earthquake first-time donors was compared with that of first-time donors in a comparable period.	First donation directly post- earthquake (13- 19 May, 2008); return donation within 12 months.	Men were more likely to become donors following earthquake but were less likely than women to return to donate within a year.	0.95
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11	[36]	Kalargirou et al., 2014	Greece	Randomly selected Greek citizens (n=800; 38.2% male)	Cross-sectional anonymous survey on demographics, number of donations, reasons for (not) donating, motivators, barriers, knowledge and attitudes re blood donation, perceived risk, fears.	Correlations between demographics and each of the other variables gathered.	Proportionally more men than women donated for personal benefit (10% vs. 1%), while proportionally more women donated due to the need for blood (80% vs. 74%).	0.83
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17	[37]	Karacan et al., 2013	Turkey	Male donors (n=189)	Cross-sectional survey on empathetic concern, altruism, social responsibility and blood donation motivation.	Motivation to donate	Social responsibility was a motivator of blood donation, independent of age, income, and education (sample was male). Blood donation motivation also related to altruism, as well as self-regarding motives.	0.90
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21	[38]	Kasraian, 2010	Iran	Lapsed donors (n=850; 80% male) - had not donated for at least 3 years	Cross-sectional survey on donor motivations and reasons for not returning to donate.	Lapsing from donation	Overall among the sample (80% male), the greatest motivation for donation was altruism. Donors lapsed due to lack of time and self- deferral for medical reasons. Female donors reported more frequently (p<0.05) lapsing due to fear of needles, concern about contracting disease or being ineligible to donate.	0.94
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26	[39]	Kasraian & Maghsudlu, 2012	Iran	Donors (n=421; 95% male).	Cross-sectional survey on donor status (first-time or regular); motivations to donate; attitudes re incentives.	Desire for incentives was examined by marital status, education, donor status, motivation and regularity of donation	(Sample was 95% male.) Altruism was most popular motivator (86%) and 25% thought that incentives should be provided.	0.91
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34	[40]	Lacetera & Macis, 2010	Italy	Donors (n=467; male 74%)	Cross-sectional survey on donor habits; attitudes towards different types of incentives	Future donation frequency	Donors are happy to receive vouchers. However 11% of men and 21% of women reported they would no longer donate if offered cash.	0.95
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37	[41]	Liu, J., et al., 2010	China	WB and apheresis donors (first- time & repeat; n=1836; 40.7% male)	Observational; natural experiment. Donations from 5 centres collected within 1 week post- earthquake were compared with those collected during the rest of year. Regional differences, demographics, first-time/repeat donor status, infectious disease screening	No. of donations (WB & apheresis)	Men showed a greater response post-earthquake than women did (74% vs 59% increase in donation rates).	0.95
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				markers were compared by earthquake status.			
[42]	Maghsudlu & Nasizadeh, 2011	Iran	People (n=16,955; 85.1% male) who presented at donor centres	Cross-sectional survey of donation history, and reasons for donating classified as internal (altruistic; religious belief) or external (health screening; health reasons; curiosity; social pressure).	Intention to donate (inferred by presentation at a donor centre)	Men tended to have external motivations (e.g. health screening) for donating blood, while women tended to have internal motivations (e.g. altruism, religious reasons).	0.95
[43]	Masser et al., 2013	Australia	First time WB donors (n=1015; 36% men)	Cross-sectional survey	Intention to donate	Among males who experienced a reaction, 'lack of motivation' and the normative referent of 'family' were predictors of intention to donate and accounted for 30% of the variance in this. For males who had no reaction, the belief of 'improving your own health' coupled with 'increasing blood stocks' accounted for 34% of variance in donors' intentions to return. Among female donors who had a reaction, the beliefs of having a pleasant experience and of 'health status/ medical reasons' and the referent of health/volunteer organisations accounted for 34% of the variance in their intention to donate blood. For female who did not experience a reaction to donation, the referent of 'work colleagues' contributed to 28% of the variance in their intention to donate blood.	0.95
[44]	Misje, Bosnes, & Heier, 2010	Norway	Donors (n=17,812); prospective donors who were deferred (n=484); Deferred or lapsed donors (n=1029)	Mixed methods; observational data and survey data from longitudinal study on donation behaviour. Follow-up was at 6 to 6.5 years.	Various: presentation at a donation centre to give blood; donation history including deferral.	Lapsed male donors reported more frequently to have been deferred due to prescribed medication and claiming not to have been called for donation. They key differences in donation patterns between male and female donors were due to pregnancy and breast-feeding.	0.91
[45]	Nilsson Sojka & Sojka, 2003	Sweden	WB donors (n=528; 60% male)	Cross-sectional survey with open-ended question asking whether blood donation had any impact on donor.	Asking donors how they felt after donating blood.	Most effects of blood donation reported by donors were positive (satisfaction, greater alertness, increased wellbeing, etc.). Male donors were less likely than female donors (p< 0.001) to report negative effects (e.g. dizziness).	0.86
[46]	Nilsson Sojka & Sojka, 2008	Sweden	WB donors (n=528; 60% male)	Cross-sectional survey on motivations and barriers.	Blood donation	There were no significant differences between male and female donors concerning general motivations for donating, except that more males (n=10) than females (n=1) considered it was good for their health - n.b. small numbers.	0.86
[47]	Steele et al., 2008	USA	Current and lapsed donors (n=12064; 43.4% male)	Cross-sectional survey on altruism, empathetic concern, and social responsibility motivation.	Number of donations in five years prior	Men and younger donors scored lower for prosocial motivation. Women scored higher for social responsibility and empathetic concern.	0.95
[48]	Truong et al, 2015	Brazil	People (n=11,867; 54.2% male)	Cross-sectional survey on blood donation history, test-seeking	Presentation at a donation centre to	Most blood donors were unaware of the availability of free, confidential HIV testing services. Men were more dissatisfied with alternative testing and the association between dissatisfaction and	0.91

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			presenting for donation	motivations, and prior HIV testing.	give blood.	test-seeking through blood donation was stronger for men compared with women.	
[49]	Yuan et al., 2011	USA	People (n=479; 30.6% male) who presented at donor centre.	Cross-sectional anonymous survey on motivators and deterrents re blood donation and preferred method of contact.	Previous presentation at blood donation centre.	Altruism was the most important motivator overall, but men were motivated more than women by prize draws for sports/concert tickets and certificates.	0.85

Note: WB = whole blood

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Table 2. Male blood donor motivators and definitions

Motivators	Definition ^[19]
Prosocial Motivation	'The desire to have a positive impact on other people or social collectives through blood donation.'
Altruism ^{[22-24],[28],[37],[39]}	'Motivation to increase the welfare of others, or serve humanity, through blood donation without expectation of personal rewards.'
Collectivism (friends and family) ^{[23],[24],[37]}	Motivation to increase the welfare of friends and family through blood donation.
Personal Values and Attitudes	'Set of personal ideals and beliefs that deem blood donation as worthwhile and encourage donation behaviour.'
Religiosity ^[24]	'Motivation arising from personal religious affiliation or spiritual commitment.'
Personal moral norms ^{[26],[30],[34],[37],[47]}	'Feelings of moral obligation or duty to perform specific helping behaviours such as blood donation.'
Attitudes towards donating blood ^{[22],[29]}	A positive or negative evaluation of blood donation behaviour
Perceived need for blood donation	'An awareness that blood donation is necessary for helping people.'
After catastrophic events ^{[35],[41]}	'An awareness of the need for blood in the aftermath of a disaster.'
Everyday ^[30]	'An awareness of the ongoing need for blood.'
Indirect reciprocity	'Engaging in blood donation, in response to or in anticipation of an act in kind by a third party.'
Impure altruism ^[28]	People help others because it is personally rewarding, where individuals derive positive feelings of affective states from donating blood.
Downstream reciprocity ^{[32],[33]}	'A belief that if a person helps, he/she has a greater chance of receiving help in the future if needed.'
Marketing Communication	'The use of promotional tools such as advertising, public relations, personal selling, sales promotion, and direct and online marketing to recruit and/or retain donors.'
Direct marketing ^[30]	'Nonpersonal and personal communications aimed at gaining a direct response, such as blood donation'
Advertising ^{[30],[37]}	'Any paid form of nonpersonal presentation and promotion of blood donation by an identified sponsor.'
Incentives	'Events or objects that increase or induce drives or determination to donate blood.'
Perceived health benefits ^{[30],[37],[41],[42],[46]}	'A belief that donating blood will provide positive health effects.'

1 2 3 4 5 6	Attitude toward incentives [23],[24],[30],[32],[39],[49]	A positive or negative evaluation of receiving incentives to encourage or reward blood donation behaviour
7 8 9	Health check [25], [32],[33],[37], [42],[49]	‘A health screening that is provided as part of the donation process.’
10 11 12	Time off work or school [23],[32],[39]	‘Release from work, school or other commitments for donating blood.’
13 14 15 16	Gift item [24], [30], [39], [49]	‘Receipt of items in exchange for donating, such as t-shirts, key rings, coffee mugs, etc.’
17 18 19 20	Infectious disease screening [30], [32], [37], [48]	‘Tests performed on donated blood to screen for infectious diseases, such as AIDS or hepatitis.’
21 22 23	Recognition [23],[49]	‘Formal acknowledgement of contribution from the collection agency.’
24 25 26	Social norms	‘Expectations, obligations, and sanctions currently anchored in social groups’
27 28 29	Descriptive norms [25]	‘Perceptions of how significant others typically behave in a given situation.’
30 31 32 33	Subjective norms [23],[25], [30],[34],[37],[49]	‘A perceived social pressure or direct solicitation to perform a behaviour from socially significant others.’
