

Blood Donors and Factors Impacting the Blood Donation Decision

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The aging of the US population and the evidence that only about 5% of individuals in the United States donate blood each year raise concerns about the assurance of an adequate, safe supply of blood in the future. Blood donation decision making has been investigated worldwide for decades to understand the process better to increase donation efficiency, safety, retention, collection numbers, and diversity of the donor pool. This review focuses on the characteristics of allogeneic blood donors, the motivational sources in donor decision making, and the research concepts and techniques used to examine these factors. Some historic studies considered pivotal, as well as more recent surveys, may not be pertinent to or representative of the current national donor pool. Interpretation of data related to donor characteristics should examine whether demographics mir-

ror the donor pool to assist in targeted recruitment or if targeted recruitment actually leads to the reported demographics. Few recent studies of donor motivation have been published. Modern sources of positive and negative motivation are worth exploring through scientifically sound investigations involving representative cohorts using multifactorial approaches. Strategies that focus on retaining return donors and transforming first-time donors into repeaters would be beneficial. Investigations are needed also to assess research questions and to develop well-designed interventions to test hypotheses and to produce generalizable findings applicable to future donor decision making.

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UNIQUE AMONG the armamentarium of widespread medical interventions, the availability of blood transfusion depends totally on a volunteer donor base. With the aging of the US population and the predicted doubling of the proportion that is over age 65 by the year 2030, the assurance of an adequate, safe supply of blood in the future is an area of considerable concern.^{1,2} Although close to half of the general population has reported giving blood at some time, only about 5% of individuals in the United States donate blood each year.³ Donor trends have fluctuated over the past 30 years,⁴ with a notable decline of 9.3% in the rates of blood collection from 1989 to 1994.⁵ Unpublished data (M. Sullivan, oral communication, August 2001) suggests that this trend may not be continuing. Still, the number of first-time donors in some regions of the country has diminished significantly,⁶ with overall reductions reported as close to 7% in the 1990s. Reduced collection rates, in part representing the aging donor pool and a decrease in the number of eligible donors because of enhanced screening for transfusion-transmitted diseases, have resulted in an estimated loss of approximately one-half million donors per year.⁷ With recent data reporting fewer collections concomitantly with greater blood use, significant deficits in the blood supply are projected for the near future.⁸ Furthermore, required or voluntary restrictions on donors that relate to potential or known emerging infectious agents (eg,

babesia, trypanosomes, or prions) will have an additive effect on donor loss, with new restrictions for variant Creutzfeldt-Jacob disease (as of September 2001) decreasing the available blood donors by an estimated 7% to 11%.

Thus, although data differ as to whether a supply-utilization disequilibrium exists whether supply has driven demand, or whether a significant increase in supply would lead to further changes in use, allogeneic blood donation has been investigated worldwide for decades. The intention of these studies has been to understand the process better to increase donation efficiency, safety, retention, and diversity of the donor pool, as well as the number of new and total donations collected. It is known that efforts at recruitment of an expanded, consistent donor pool have not been widely successful, and many centers have reported declines in new donors despite significant growth in program funding for recruiting such donors.⁹ Finally, it ap-

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pears that in general the vast majority of donors are repeat donors who represent a small but committed group of individuals responsible for donating most of the blood in the United States and other countries. This review will focus on characteristics pertinent to allogeneic blood donors, motivational sources in donor decision making, and research concepts and techniques used to examine these factors.

CHARACTERISTICS OF ALLOGENEIC BLOOD DONORS

General Demographic and Personal Characteristics

Theoretically, if donors can be profiled in terms of their personal characteristics, then potentially their behavior can be predicted and individuals selected who are more likely to become or remain as donors.¹⁰ A variety of donor characteristics reported in the literature are compiled in Table 1.

A comprehensive study investigating blood do-

nors and their decision making was conducted by Drake and colleagues¹¹ as part of a 5-year, National Institute of Health-funded project of blood banking in the United States.¹¹ These data from the 1970s revealed that the average donor was a middle-aged white man, the most preferred site to give blood was a local hospital, and the majority of individuals surveyed opposed paid donations. Oswald's 1977 review¹² of the blood donor literature described the "typical" donor as a white man representing an organized group who tended to be a repeat donor and who gave at a mobile unit in the community in which he resided. More recent data profile donors as married¹³ with 1 or more children and who often have a "rarer" blood type than nondonors.^{14,15}

Gender

Although most donors were reported as being men in the 1970s and 1980s,^{12,16} increases in the number of women donors were described in the

Table 1. Donor Characteristics

Donor Characteristics	Reference (% Cited, Specifics of Variable)
General	18 (40%-50% general population at 1 point) 3 (4%-6% US population/yr, 8%-9% of eligible population) 14 (male, married, have children, higher education, rarer blood type)
Gender	13 (80% men) 12 (majority men) 50 (47%-64% women, mean = 54%, increase trend in 1990s) 15 (increased drop out among women after 4-8 donations)
Age	13 (28%, ages 20-29; 29%, ages 30-39; 25%, ages 40-49; 17%, ages 50-59) 18, 17 (mean = 33-38) 26 (mean = 38)
Race	13 (10% nonwhite) 19 (74% white, first-time donor)
Married	13 (57%) 30 (62%)
Educational level	19 (41% ≤ high school, 28% graduated college, 28% ≥ college)
First-time donors	13 (19% total) 19 (52% men, 74% white, age: 28% ≤ 19 yr, 27% = 20-29 yr, 22% = 30-39 yr, 14% = 40-49 yr, 8% ≥ 50 yr) 50 (58% women) 6 (64% < 35 yr, 52% men, 88% US born, 32% ≥ college education) 24 (dropout rate: 89% women, 63% men)
Repeat donors	15 (78%-91% of all current donors, women have major dropout rate after 4-8 donations) 31 (81%) 19 (43% = Rh negative, 43% return rate if > 50 yr) 9 (become repeater if return within 2 yr of first time, % return increases with age, and no. of previous donations) 19 (highest repeat rate if return ≤ 6 mos after first donation)
Multigallon donors	26 (mean age = 52 yr, mainly white, male, college grad) 50 (30% women)
Elderly donors	23 (mean age = 68 yr, 91.4% white, 6% Hispanic, most married, well educated with higher education)

1990s. In 1 study, women comprised 47% to 64% of all donors, representing an average of 54%. A recent evaluation of over 900,000 first-time donors showed that women constituted 47.6% of this cohort,⁶ a substantial increase in proportion of the donor base from 2 or 3 decades earlier.

Age

Trends in donor age vary with the populations assessed and the types of donors represented. In 1965, 47% of all donors were 20 to 39 years old;¹³ in 1975, the average age was 33 to 38 years.^{17,18} This age range remained consistent through the 1990s, with 63.6% of all first-time donors for the period of 1991 to 1996 reported as being less than 35 years old.⁶

Race and Place of Birth

Although only 10% of the donor pool was reported as nonwhite in 1965,¹³ that number had grown to 26% for the period of 1991 to 1995.¹⁹ Results of a 1991 to 1996 survey of 5 major donor centers participating in the Retrovirus Epidemiology Donor Study (REDS) indicated significant changes in the race and ethnicity of first-time donors, with decreases in the number of white donors in all regions and increases in minority donors, particularly Hispanic.⁶ Wu and colleagues⁶ predicted that by 2005 Hispanics will outnumber other ethnic groups as the largest minority donor constituency in the country. In their study, the percent of non-US-born donors overall was 12%, reflecting an increase in this group in several regions of the country.

Education and Socioeconomic Status

Recent data showed that approximately one third of first-time donors had a college or graduate degree,⁶ with 45% of repeat donors having at least a college education.¹⁹ Higher educational status correlated with income level of donors, which was reported by a survey of 15 blood centers to be about 30% higher than the average income of nondonors.²⁰

Similar characteristics have been identified for donors in countries other than the United States.²¹ In a 1994 study of over 800 randomly selected donors in Greece between 18 and 65 years of age, stepwise multiple regression analysis revealed that blood donation correlated with gender, occupation, and knowledge level. The "standard" donor in this

setting was a man, either a student or member of the military, and had higher levels of knowledge about blood donation and needs for blood.²²

Elderly Donors

In anticipating the aging of the US population, Simon and associates²³ conducted a randomized, controlled trial of routine blood donation in elderly people over 63 years of age. A description of the 244 elderly donors characterized them as being well educated, married, white, and "somewhat affluent." These older individuals, although they showed greater incidence of comorbidities and chronic ailments than younger donors, experienced no higher rates of negative reactions to blood donation. Although the health histories of elderly volunteers might have been a source of initial concern, the investigators advised that "if thoroughly reviewed, the previous and current medical conditions of the elderly will be found not to disqualify them for blood donation."²³ Donation by the elderly in this study was concluded as being both safe and practical and may represent an untapped resource for recruitment or retention.

First-Time Donors

The need for recruitment of new donors to replace other donors who have become ineligible or dropped out of the donor pool, as well as to build the blood supply to prevent shortfalls, represents an important focus of blood centers. About 19% of the donor base are those giving for the first time,¹³ with the overall dropout rate cited as 89% for women and 63% for men.²⁴ Wu and others from the national REDS group⁶ described first-time donors during 1991 to 1996 as mostly white, and US born; 52% were men. In this cohort, 77% were less than 39 years old, including 28% who were 19 years or less, reflecting targeted first-time donors from high school and college populations. The total number of first-time donors was reported at the 5 REDS centers as being decreased by 6.7% during this time period, which raised the question of national apathy toward blood donation. However, specific regions (eg, Southern California and Oklahoma) experienced a significant increase (60%) in new donors. Such descriptive data do not clarify the underlying reasons for these statistics, although certain centers had explicitly targeted minority recruitment as part of their donor campaigns.

Return Donors

Repeat donors comprise the majority of the donor pool, representing a range of 78% to 91% of all donors.^{13,15} This proportion of the donor pool has changed little over time because the blood supply has been "heavily dependent upon a core of committed, regular donors"¹⁵ for the past 30 years or more. Review of the literature indicates that although characteristics and motivation of first-time donors are important for guiding recruitment strategies, their high drop-out rates underscore the need to address factors related to return donors. Recruitment and retention of repeat donors lead to a safer blood supply with lower incidence of transfusion-transmitted viral diseases, create a donor pool that tends to be more responsive to donation requests, and facilitate ongoing recruitment of new and lapsed donors.^{25,26}

The importance of return donors was underscored in a quantitative analysis of donations in Australia.⁹ The effect on total donations caused by a slight decrease in overall return rates from 88% to 85% at 2 years was shown as correctable either by maintaining the return rate at 88.5% or by increasing the recruitment of new donors by 33%. Clearly, retention appears to be a far more efficient strategy in this population. Thus, defining the optimal method for retaining donors who later return and give blood on multiple occasions represents a worthwhile goal with long-term advantages and has been the subject of intensive study.²⁷

Certain factors have been reported to have significance in predicting the return behavior of donors. James and Matthews^{28,29} analyzed blood donor return behavior by using survival curves. The time from the initial donation until subsequent donation was termed the *donation cycle* to develop a framework to measure and analyze return behavior as interval data. Relative risks were shown to be time dependent, with the likelihood of a second attempt at donation diminishing over time since the initial donation. Similar donation patterns were reported by Whyte and colleagues⁹ in Australia, where 8.9% of the population (1.6 million people) gave 2.4 million donations over a period of 34 months. In this study, return behavior within 2 years predicted future patterns of donation and was highly related to age and the number of earlier donations: for donors 45 to 69 years old, over 90% returned within 2 years to donate again; with

smaller proportions reported for donors 30 to 44 years old (80% return) and 15 to 29 years old (70% return rate). Return behavior correlated directly with the number of previous donations, ranging from a 95.7% return rate for 30 or more prior donations to 57% return rate if the individual had given only 1 previous donation.

Piliavin¹⁵ classified return donors into 2 categories: (1) those who had given 1 to 3 times and those who had donated 4 or more times. Facilitating the transition of repeat donors to the latter classification was found to be critical in generating long-term repeat donors. Thus, interventions designed to encourage donors to continue through the fourth donation could have a significant effect on maintaining the overall donor pool.

In studies performed by using the REDS data, Ownby and colleagues¹⁹ evaluated 879,816 first-time donors from 1991 to 1995 for return behavior. Factors predicting a higher likelihood of repeat blood donation included (1) shorter time interval (6 months or less) between the first and second donation attempt ($P < .0001$); (2) increased age, with those 50 years or older showing a 43.3% return rate, whereas those less than 20 years old associated with only a 33.3% return rate ($P < .0001$); (3) higher levels of education, with college or graduate degrees associated with a 45% return rate compared with those with some college (39%) and a high school education or less (34%) ($P < .0001$); and (4) Rh-negative status, with a 43% return rate versus Rh-positive donors who showed a 37% return rate ($P < .0001$). By using multiple regression analysis, age was found to be a strong predictor of early return and higher frequency of donation. However, the investigators acknowledged that the youngest age group was likely more mobile and may actually have repeated donations at other blood centers, but their study was unable to capture such data. Importantly, the average time from the initial donation to the return attempt was the most significant factor in predicting later returns, with the number of donations inversely related to the length of time between the first and second donations. The highest number of donations was observed when 6 months or less elapsed between the initial donation and subsequent attempts.

Return Behavior of "Safe" Donors

Thomson et al³⁰ surveyed over 50,000 randomly selected blood donors considered "safe" after test-

ing of donated units to determine these donors' intent to donate again during the next 12 months. In evaluating their intentions about future donations, only 3.4% of this cohort stated they would be unlikely to donate again in the next year. Donors indicating a reduced intent toward repeat donations tended to be first-time donors of minority or ethnic background, with lower levels of education, who had a poor assessment of their treatment by the collection center, and/or had a negative reaction or "bad experience" during the donation process. Although intention is central to decision making, statements of intent do not always accurately predict behavior. Although this study examined anonymous survey results of intention to return, no authentic return behavior was recorded; however, a 97% actual return rate would be highly unlikely based on other studies in the literature. These responses also highlight the bias encountered in evaluating donor questionnaires because respondents may exhibit a tendency to provide answers they think they are expected to give or believe the investigators wish to receive rather than supplying a more realistic perspective.

Multigallon Donors

Among the group of return donors, most coveted are those individuals who have given repeated donations equal to 1 or more gallons. Royse and Doochin²⁶ surveyed by mail 500 multigallon donors who had given at least 5 gallons of blood (median donation, 64 units) and compared their responses to those from another 500 random donors who had not donated blood as frequently (median donation, 9.5 units). The multigallon donors were characterized as white male college graduates who had higher levels of awareness of the need for blood donation. The mean age of these donors was significantly older at 52 years compared with the 38 years of the random donors. No significant differences between the groups were reported for having had close friends or family members who were also donors or who had previously been transfusion recipients or for overall attention to their own health habits and practices. However, multigallon donors tended to indicate a deeper, more long-term psychological commitment toward blood donation compared with the random donor group, with a stronger desire to give blood until they were very old (86% vs 66%, $P < .001$). Although the multigallon donors more often

viewed their long-term donation as a proud accomplishment (51% vs 32%, $P < .001$), few donors in either group reported feeling that they had received support or recognition for their contributions. About 20% of these large-volume donors had a prior "bad experience" donating blood but persisted in giving blood on a continued basis, showing their ability to overcome obstacles commonly encountered in the blood donation process. No significant differences were noted in the stated reasons why multigallon donors gave blood compared with the random donors except that the multigallon donors reported a greater tendency to participate in humanitarian volunteer efforts compared with other groups (35% vs 24%; $P < .05$). However, in analyzing the study's findings, the low response rate (21%) to the mail survey by the random donor group should be noted because it raises the question of the representative nature of the sample.

Despite the myriad studies and intensive efforts over time to profile donor characteristics, the exact usefulness of demographic data should be interpreted cautiously. Demographics likely are not data causally related to donation. Most surveys of demographic characteristics draw from limited, nonrandom sampling often using flawed study design and/or instruments. The theoretic basis for many donor studies remains vague or undeveloped. Centers may target certain groups with campaigns directed toward specific characteristics (eg, Rh-negative blood type), or study samples may mirror recruitment techniques and sites. The success of cold calls to potential donors and subsequent donor recruitment may be based on demographic-targeted calling in that "demographic differences between donors and nondonors may be perpetuated through a self-fulfilling prophecy."¹⁵ Donor characteristics may also simply be a reflection of the more practical aspects of blood donation. For example, the greater return rates for individuals with higher education may actually relate to increased socioeconomic status and the concept that these donors may have more time available to give blood.

POSITIVE MOTIVATORS

Altruism

Oswalt's¹² and Piliavin's and Callero's^{15,18} reviews of 3 decades of literature on motivation and

recruitment of donors and nondonors reported that primary motivation to donate blood consistently had been determined to be altruism, defined as "prosocial behavior that has no obvious benefit for the respondent but is beneficial to the recipient."³¹ Individual studies have also attributed donor behavior primarily to altruistic motives.^{13,32,33}

The exact role of altruism in the blood donation decision-making process, however, has been questioned.^{14,34} In some cases, altruism and social responsibility were among the least significant motivations identified as reasons for blood donation.³⁵ Behavioral catalysts other than altruism have been proposed in that (1) donors may actually derive direct benefit from giving blood, including a boost to their self-esteem^{14,33,36,37}; (2) individual donors are likely motivated by multiple factors simultaneously;³¹ (3) decision making and behavior encompass cognitive, affective, and psychological components on many levels;¹¹ (4) altruism itself is a complex, multidimensional concept for which the empirical basis for studying behavior is difficult to establish;³¹ and (5) donors questioned about their motivation may be unaware, unable, or unwilling to express their underlying reasons with great accuracy.³⁸ In many reported studies, important differences likely exist between what the subjects stated and what their actual reasons were for giving blood, raising the question of the overall validity of these studies. As for demographic data, one must be careful not to automatically interpret the stated motivators as having a causal relationship with the behavioral outcomes. Many reasons cited as motivational sources may simply be a means of rationalization, and such concepts are generally multifactorial in nature.

Incentives

The role of incentives has been investigated as a potential key component of donor motivation.³⁹ Earlier studies of blood donors revealed that 50% of donors were motivated by the assurance of guaranteed blood replacement for family members, and 10% gave blood to cover their own potential needs in the future.¹³ In a 1995 mail survey of over 7400 blood donors in the REDS cohort,⁴⁰ subjects were asked about their attraction to different incentives as sources of motivation to continue giving blood. Of this group, 58% indicated they would return if offered blood credits, whereas 46% stated they

would be motivated to repeat donation if medical testing was a benefit. The elimination of assurance and credit programs at most centers has modified this reason as a source of general motivation.¹⁵

Receipt of items of small or limited value for blood donation was identified as a positive motivator to 20% of those surveyed by Sanchez and colleagues.⁴⁰ Incentives had a greater effect on first-time donors and those in younger age groups. Although incentives of limited value were viewed as both safe and potentially effective, the offering of cash was found to entice donors who were 60% more likely to be at risk for donation of transfusion-transmitted infectious diseases ($P = .03$).⁴⁰ Donors who were motivated by free tickets to events as a result of their donation were also more likely to represent an increased risk (odds ratio, [OR], 1.5) of transfusion-related infection, as were respondents who favored extra time off work as an incentive (OR, 1.2). In an earlier study comparing the motivations of donors with nondonors, 80% of donors indicated money would not serve as an incentive to them.⁴¹

Countries outside the United States have modified their voluntary donor system and implemented methods whereby donors are paid. Zeiler and Kretschmer⁴² questioned over 1100 German blood donors about their views toward reimbursement for donation: 77% responded they would no longer want to donate blood if reimbursement ceased entirely, although 78% were willing to accept a bank transfer rather than immediate cash payment as remuneration. Alternative payments to cash, such as in-kind tickets or coupons, met with the approval of only 27% of this cohort, but 37% indicated they would still be willing to donate blood if the in-kind payments were the only reimbursement received. Greek subjects specified 3 types of incentives that most influenced their decision to give blood: (1) health incentives for the donor; (2) structural and organizational factors, including donor education and management of blood center facilities; and (3) social or economic incentives.²² Incentives may actually serve to impede the blood donor decision. In 1 study, high incentives were associated with decreased number of donations, whereas high levels of positive intrinsic motivation coupled with low rewards were found to result in the highest number of donations overall.⁴³

Pressure

Sources of external pressure used to motivate individuals to give blood may take numerous forms including role models; personal requests; and contacts with others who may exert pressure in the form of phone calls, letters, or face-to-face communication.⁴⁴ One theory contends that blood donors actually have a lower sense of self-esteem and give blood in an attempt to raise their self-concept. If correct, this could mean that donors are naturally more vulnerable to pressure to comply with others' stated requests.¹⁵ Osborne and Bradley³³ reported that over half (56%) of all donors gave blood only because of personal pressure from others. In Drake et al's study¹¹ conducted in the 1970s, only 19% of eligible nondonors reported having been directly asked to donate compared with 38% of first-time donors and 54% of those repeating blood donation. The primary reason identified as to why nondonors did not give was "no one asked me personally."

Personal contact by recruiters and other donors can be very powerful motivators, with face-to-face contact reported as 4 times more effective than a phone call, especially for those considering donating for the first time.^{15,45,46} Friends and relatives who are already donors were cited by 75% of new donors as positive motivational factors in London and Hemphill's review,¹³ whereas contact with or modeling by other donors was identified as the primary reason for giving blood by 45% of Australian first-time donors. In a high social pressure situation designated as "intense collection environment", in which potential donors are heavily recruited, donor yield can be impressive.¹¹ These recruitment efforts forced individuals to state their decision as to whether they will donate blood or not, with the majority submitting to the pressure and agreeing to give. Those who resist the recruitment pressure must do so proactively: in an intense collection environment, 74% of nondonors consciously make the decision not to give blood, whereas in the general population only 20% of those who do not donate ever make such a deliberate decision.

Even cold contacts can be useful in recruitment. When Hayes et al⁴⁷ contacted individuals to ask them for permission to be put on a list of potential donors to call for future blood drives, 85% of

current donors, 71% of lapsed donors, and 40% of nondonors agreed. Cold calls targeted to nondonor households that fit a precise demographic profile of potential donors yielded a 20% agreement rate among individuals contacted, but only 14% of those who agreed actually showed up to donate. Because many of these nondonors also brought in 1 or more individuals to give at the same time, the true response rate to the contacts was closer to 30%.⁴⁸ A review of positive motivators is included in Table 2.

NEGATIVE MOTIVATORS

Fear and Anxiety

Various fears have been described by both nondonors and donors as having a negative influence on the decision to donate blood, including fear of needles, sight of blood, pain or discomfort, and being told they are not eligible to give blood. Donors may experience these fears but make the decision to give blood despite their concerns.⁴⁹ Whether such fears are legitimate or serve mainly as rationalization to avoid giving blood remains unclear.¹² General fears about the donation process have been alluded to as a primary source of negative motivation for at least one quarter to one third of nondonors,^{13,41,44} with specific fear of needles identified by 15% to 27% of those deciding not to give blood.^{13,41} First-time donors fear pain more often than those who have previously give blood^{24,32} along with a greater fear of the "unknown." Likewise, anxiety may be generally exaggerated initially, with a range of 19% to 37% of donors reporting being nervous before the donation process. However, anxiety was observed to decrease as the number of donations increased and the donor became more accustomed to the experience.⁵⁰

Short-Term Donor Deferral

Volunteer blood donors may not return for subsequent donations because of temporary deferral, including low hematocrit, sore throat, fever, or use of disallowed medication within established time periods before the donation point. Anticipation of temporary or permanent deferral has been frequently cited as a reason to avoid donation.⁵¹ Piliavin⁵² surveyed over 1200 donors to determine the role of temporary deferral on later donations. First-

Table 2. Sources of Positive Motivation for Blood Donation

Positive Motivator	Reference (% Cited, Specific Concept)
Altruism	13, 14, 31, 33, 34, 44 (also duty)
Community	26 (35%), 75, 76
Incentives	39, 41 (87% not motivated by money)
	40 (20% want items of limited value; 46%-58% want medical testing)
Personal benefit	44 (28% health)
	33 (personal fulfillment)
General pressure to donate	44, 26 (11% multigallon donors);
	11 (higher yield in "intense collection environments")
	15 (if lower self-esteem especially vulnerable to pressure as motivator)
Personal request	33 (56% donate only because of peer pressure)
	11 (19% nondonors asked to give vs 38% first-time donors vs 54% repeat donors)
	17 (38% first-time donors give with a friend)
Personal contact	45, 46 (for 1st time donor, face-to-face by recruiter more effective than phone contact)
	15 (face-to-face most effective for recruitment)
Request from other donors	13 (75% donors had family/friends already as donors)
	2 (45% donors cited contact with other donors as main reason why give blood)
Awareness	11 (#1 reason cited why gave blood)
	58 (27% current/lapsed donors-primary motivator)
Self-Esteem	36, 37, 33, 14 (decreased self-esteem in donors vs nondonors)
	13 (donors experience increased self-esteem after donation)
Don't know why they give	38, 32 (2nd most common reason cited)

time donors who had received a short-term temporary deferral (STTD) and those who had no donor deferral (NDD) were compared for later donor behavior. In a 6-month follow-up period, only 2.8% of the STTD first-time donors returned for a second donation versus 27.3% of those donors who were not deferred. The investigator proposed that first-time donors interpreted temporary deferral as a psychological reason justifying why they should not repeat blood donation.

Halperin et al⁵³ found similar results in a longitudinal study of donor behavior in which donors with STTD were matched with donors with NDD by sex, age, and date of donation and followed for over 4 years. Return rate and total number of donations were compared between the 2 groups. Those individuals with NDD were 29% more likely than the STTD donors to return for further donation (80% vs 62%, $P < .001$). In terms of total units of blood donated, donors with NDD gave 81% more blood (13798 units vs 7615 units) and averaged 1.45 units/year/donor versus 1.03 units/year/donor for those with STTD. The reason for deferral also played a role, with return rate by deferral code ranging from 11% to 34% and differences measured in units of blood donated by deferral code ranging from 43% to 202%.

Short-term temporary deferrals can have acutely negative effects on first-time donors in particular.

In Noonan et al's⁵⁴ study of 187 donors with STTD, only 11% returned despite phone calls and letters in follow-up; however, none of the first-time donors (0/64) with STTD returned. In a study⁵⁵ designed to promote retention of deferred donors, considerable effort to contact donors with STTD within 3 to 4 weeks after their deferral resulted in a doubling of the return rate of STTD donors from 24% to 47% within the first 6 months after deferral. All of these studies underscore the importance of the potential effects of short-term deferral on subsequent donor behavior and emphasize the central goal of blood centers to keep donors in the pool.

Permanent Deferral and Medical Reaction

Close to 60% of potential donors claim concerns about possible chances of being medically disqualified as a donor or physical reactions to blood donation as sufficient reasons not to give blood.^{24,41} But, as for other fears, the apprehension regarding deferral or reactions may simply serve as justification to avoid giving blood.¹² Approximately 10% of individuals who attempt donation experience some form of adverse reaction (eg, syncope, 2%-9%)¹⁵ often resulting in a negative attitude that may limit or delay return donations.¹⁸ Ranasinghe and Harrison⁵⁶ investigated 1 specific type of "bad experience" as viewed by blood donors, evaluating the effects of significant bruising on subsequent

donation behavior in the United Kingdom. No significant difference was noted in repeat donations between those donors who experienced bruising during blood collection versus those donors who did not sustain bruising. Adverse reactions were shown to have no effect on the return behavior of multigallon donors.¹⁰ Again, as for fear and anxiety, first-time donors were more susceptible to worries about and the negative effects of medical deferral and donor reactions.

Lack of Awareness

Ignorance or being unaware of the need for blood or other aspects of the donation process has been consistently identified as a negative factor in potential donor decision making.^{44,57} The lack of being specifically asked to give blood is the chief reason provided why nondonors failed to give¹¹ and may also explain poor return rates among the majority of donors. Analysis of 9000 current, lapsed, and nondonors in the United Kingdom determined that 27% of the current or lapsed donors were primarily motivated by awareness of the need for blood coupled with an understanding that individual donors may personally need blood in the future.⁵⁸

Apathy

Defined often as "a state of indifference, lack of feeling," apathy has been cited as a major reason

for about 16% to 20% of nondonors as to why they do not choose to give blood.^{24,41} Oswalt¹², however, hypothesized that this concept is misleading in that nondonors are rarely indifferent. Rather, the majority of individuals questioned about their willingness to give blood appear to recognize the importance of blood donation and state they would agree to give if the "correct conditions" were in place.² The "correct conditions" may encompass motivators, physical status, and aspects of the donation process, which presumably do not meet the standards of nondonors or do not continue to meet the standards of lapsed donors. Only about 20% of eligible nondonors in the general population actively decide not to give blood in the future;¹¹ yet, less than 10% of the eligible population actually donates blood.³ A more accurate reason why so many potential donors decide not to pursue donation is likely inertia rather than apathy.²

A listing of common sources of negative motivation is provided in Table 3.

PROCESS MEASURES

General Donation Experience

First-time donors may possess greater concerns about discomfort and fear of the donation experience, whereas repeat donors tend to be more focused on the donation process and the blood center. Repeat donors often perform a cost-benefit analy-

Table 3. Sources of Negative Motivation for Blood Donation

Negative Motivator	Reference (% Cited, Specific Concept)
Fear (general)	12, 13, 44, 41 49 (both nondonors & donors have fears, emphasis on fears exaggerated). 41 (36%) 24 (23%) 11 (61%)
Fear of needle	41 (27%) 13 (15%)
Fear of pain	2, 32, 24, 13 (new donors more than repeats)
Fear of deferral	9, 52
Fear of medical disqualification	41 (60%) 24 (57%) 51 (frequently cited) 27 (may represent rationalization)
Anxiety-nervousness	44, 41 (37%) 13 (19%) 50 (decreases as number of donations increase)
Unaware/ignorant of need	44, 57, 60 (primary reason cited by minority students)
Never asked to give	11 (#1 reason by nondonors why don't give)
Apathy	41 (16%), 24 (16%), 12 (likely not real reason) 2 (more likely inertia vs apathy)

sis based on their prior experiences and recalculate whether it is "worthwhile" to donate again.¹⁵ Negative donation experiences account for about 6% to 19% attrition for all donors and 20% to 41% of the dropout rate for first-time donors.³⁰

Convenience

General convenience of the process is rated as very important by most donors, with "inconvenience" identified as a primary barrier to donation by 13% to 19% of lapsed or nondonors.^{13,24,41,57} Overall, convenience or lack thereof has been shown to be a major factor separating the high-volume donor from those who give less often and was cited as the second most important reason why nondonors do not give blood.¹¹ Perception of convenience of the donation process varies with donation frequency: 54% of nondonors thought the donation process was convenient compared with 60% of those giving blood for the first through third times and 72% of donors who had previously given blood 4 or more times.¹¹ These data do not clarify whether the more frequent donors simply accepted any inconvenience because they were more accustomed, or more committed, to the process or if the findings reflect heightened concerns about inconvenience by individuals who rarely or ever gave blood based on inexperience, misinformation, or rationalization. The site where donation takes place is considered an important deterrent to donation if it is specifically perceived as inconvenient.^{11,15} Thus, mobile units, worksite- or school-based drives, and opportunities for donation close to population centers are essential to donor recruitment and retention.⁵⁹

Center Staff

Treatment of donors by the staff who provide the technical and administrative oversight of blood donation is a key factor in the donation decision. In Thomson et al's³⁰ study of "safe" donors, most donors rated their overall donation experience as good to excellent (96%), with high levels of satisfaction with their treatment (98%) and the skill level of the technical staff (96.3%). For donors who reported a very positive donation experience, the attrition rate was quite low (2.3%-3.0%). However, donors who gave a fair to poor rating of the waiting period (13.8%) or physical well-being during and/or after the donation process (6.3%) were less likely to return for subsequent donations

(6.2%-19% attrition). These findings were especially relevant to first-time donors, for whom attrition rates among those who reported negative donation experiences ranged from 19.7% to 40.9%. In comparison, first-time donors who provided positive ratings about the donation process showed significantly lower attrition rates (10.7%-14.1%, $P \leq .0001$). In this study, the donor's view of treatment by the center staff (OR, 3.0) and the level of physical well-being during and after the donation process (OR, 6.0) were the 2 factors with the strongest predictive value for future donation ($P \leq .001$). Waiting time was also an important predictor: donation time of 2 hours or less was associated with increased donor retention (OR ≥ 1.5 , $P \leq 0.039$). However, in this study, analysis of return behavior was based on stated intent to return rather than actual documented return rates.

A review of aspects of the blood donation process that may affect decision making and behavior is included in Table 4.

Because blood donation by minorities tends to be significantly reduced compared with whites, Oswalt and Gordon⁶⁰ investigated the motivation of minority students to determine the relation to donation behavior. Of 120 minority college students surveyed, 33% had donated blood, for whom the primary motivational factor was cited as altruism. Similar negative motivators, including fear, decreased awareness of the need to give, and perceived lack of time, were identified for minority subjects as those reported for whites. The investigators concluded that educational and socioeconomic factors, rather than motivational, were the prime reasons for lower rates of blood donation among minorities as compared with whites.

THEORETIC MODELS AND METHODOLOGIES IN BLOOD DONATION STUDIES

Social Capital and Public Goods

Interpretation and application of some of the findings published in the literature may be facilitated through attention to theoretic models and an understanding of the methodologic limitations in specific cases. A widespread theory used to explain donor behavior draws from the concepts of social capital and public goods. In keeping with the preference toward a voluntary, public, nonprofit, low-cost blood system, von Schubert⁶¹ applied the theory of public goods to blood donation to explain

Table 4. Process Measures that Influence Blood Donation

Donation Process Measure	Reference (% Cited, Specific Concept)
General donation process	30 (6%-19% attrition for all donors, 20%-41% attrition for first-time donors due to negative donation experience) 30 (first-timers more concerned about discomfort, repeat donors more focused on donation process)
General convenience of process	57, 41 (19% inconvenient), 24 (13% inconvenient) 13 (13% perceived process as inconvenient); 11 (54% nondonors vs 60% 1st through 3rd-time donors vs 72% \geq 4th time donors perceive process as convenient) 11 (#2 reason after "never been asked" cited by nondonors as why don't give, major factor to separate frequent vs less frequent donors) 59 (61%-91% want weekday schedule not weekend)
Convenience of site	11, 15 (major deterrent if inconvenient) 59 (mobile units, employment sites important)
Treatment by center staff	9, 30 (OR = 3.0 perception of staff treatment, strongest predictor of return donor behavior, 2%-3% attrition if good-excellent treatment by staff)
Waiting time	15 (10% donors complain of long wait) 56 (perceived wait, not actual waiting time, especially during first donation, most predictive of later repeat donation)
Total time for process	59 (75% want \leq 90 min for entire donation process, including travel time) 30 (7% projected attrition if previous donation took $>$ 2 hr) 15 (perception of wait more important than actual time waited)
Short-term temporary deferral (STTD)	9, 52 (2.8% return after STTD vs 27% if not deferred) 53 (62% return after STTD vs 80% if no deferral, nondeferred give 81% more units blood over 4-yr period) 54 (11% return after intensive follow-up efforts but 0% of first-time donors after STTD)
Questions for health history	30 (8% dropout rate if perceived as too personal)
Reaction during donation	15 (2%-9% experience syncope) 18 (10%-12% have bad experience, reduced return rates) 10 ("bad" experience has negative effect on first-time donors not on multigallon donors) 56 (no effect on repeat donations after bruising)

Abbreviation: OR, odds ratio.

the altruistic motivations of donors. Donors show a lesser tendency to desire a "free ride"⁵⁰ related to public goods in general and a greater commitment to responsible stewardship of social capital.

Personal Norm and Attribution of Responsibility

Other sociopsychological theories and approaches to interpreting motivation and decision making in blood donation have been cited. Personal norm proposes that donors possess the feeling that they "ought" to give blood, whereas attribution of responsibility to oneself suggests that individuals cannot simply make excuses for lack of action.⁶² Changes in motivation across the donor cycle may be explained by the attribution of responsibility to oneself theory. The influence exerted by external motivators, such as social pressure, decreases as the level of intrinsic motivation (eg, sense of duty or responsibility) increases.

Health Belief Model and Intended Behavior

The aim of most studies of donor characteristics and motivations is to develop a profile that might be used to predict donor behavior, thus promoting further blood donations. However, surveys have generally focused on respondent attitudes, beliefs, and intents, without necessarily reflecting actual behavior. The Health Belief Model⁶³ incorporates intent into its concept of knowledge, attitude, and practice in that intent most frequently precedes behavior. Promotion of intent may be important as a first step in decision making toward sustained return behavior. Oswalt and colleagues⁶⁴ contacted inactive donors in 3 ways to attempt to facilitate repeat donations: group A, notified of dates when a blood mobile would be nearby; group B, notified of blood mobile dates and requested to choose a time when they intended to donate blood; and group C,

informed of upcoming drive through general publicity only. Those individuals who were asked to specify their intent (group B) showed higher rates of donation than those informed by other means.

Reports of intention to return have varied widely, from Piliavin and Callero's¹⁸ finding of 39% to 57% of donors who indicated they were certain to return to Thomson and associates whose survey found almost 97% of their cohort intended to donate again within the next 12 months.³⁰ Actual dropout rates among first-time donors are much higher (89% for women and 63% for men²⁴); thus, intention may represent an unreliable surrogate as a predictor of subsequent donor behavior.

Opponent-Affective Process

To aid in predicting donor behavior, Zillmer et al.³¹ tested 245 college students before blood donation and at 3 different time points after donation was completed. Mood was measured by using the mood adjective checklist, and anxiety was identified as present at the highest levels before donation, with positive feelings of elation elevated after the donation experience. The investigators interpreted these findings as indicative of an opponent-affective process, which is similar to an addiction in which negative feelings are replaced by a sense of exhilaration because of the specific action of blood donation. In line with this theory, first-time donors, in particular, would need to be encouraged to overcome the initial anxiety and negative feelings to reach the point of elation postdonation.

Evaluation of Motivational Factors

Reports from studies of motivational factors need to be examined for how accurately they represent the complexity of reasons most donors show in deciding to give blood. Attitudes, motivation, and behavior have frequently been organized and measured along a 1-dimensional continuum ranging from absent/very low to very high. Such measurements fail to take into account the competing elements, both positive and negative, that are involved in decision making. Cacioppo and Gardner⁶⁵ suggest the use of a 2-dimensional grid to evaluate attitudes that affect the blood donor decision. Although positive motivators such as altruism may account for some aspects of the decision-making process, negative deterrents including personal fears, time constraints, and lack of knowledge also impact behavior. Understanding both

positive and negative forces and their interactive roles is essential in designing successful and cost-effective interventions.

Measurement Techniques

Because attitudes are closely linked to affect, cognition, and behavior, Breckler and Wiggins⁶⁶ warned against simply using a bipolar scale to measure attitude. Instead, they recommended all dimensions be measured simultaneously. In their study of both donors and nondonors, implementation of 3 new scales, in addition to an attitude scale measured on a continuum, showed affect to be more strongly correlated with the number of prior donations than cognition. Thus, how the donor felt about donating blood was identified as the key factor in the blood donation decision and subsequent behavior, showing greater impact than what the donor knew about the collection process and need for blood donation.

Issues of interviewer bias and question threat were raised by Lightman⁶⁷ in a study of altruism in Canadian blood donors, which compared responses with identical questions asked by both personal interview and mail survey. Incongruities in responses were shown to be caused by methodologic problems rather than representing actual differences in the motivation, attitudes, and behavior reported by subjects.

The approaches used to predict and present trends in blood donation have also been questioned in terms of techniques used in data collection and interpretation. The delay between collecting donation rates and reporting these data can vary from 1 to 4 years or more, meaning projections of future trends may be based on outdated information^{5,68,69} and seldom on real-time data. Other aspects of the blood donation system may also have significant impact on trends, as shown by Whyte⁹ who developed a logical predictive model of return behavior of blood donors in Australia. What appeared initially to be large shifts in the blood collection trends and projections, on further analysis were explained as small (2%-4%) decreases in donor retention rates at 2 years. Had these donors actually returned to collection centers at that point to repeat donation, the overall trends would have been unchanged.

APPLICATION OF FINDINGS TO DESIGN OF INTERVENTIONS

Routinely, the study of donor characteristics and motivation has been undertaken as a means to identify significant variables that affect the blood donation decision and other key components of the collection process. Frequently, studies report long lists of attributes that describe their sample. By using discriminate analysis technique, Burnett¹⁴ evaluated the results of 577 questionnaires completed by donors and nondonors in 1 city to attempt identification of the most relevant variables and the integration of characteristics into a meaningful model for both donors and nondonors. The composite profile of donors in 1982 revealed some new variables not previously reported. A typical donor was a family man, often possessing rarer blood types, with higher education but lower sense of self-esteem, who was concerned about his health and family and unwilling to take significant risks. Nondonors were described as having opposite traits. The results of this study advise against developing interventions that are generically designed to target both donors and nondonors. As an example, an appeal using fear or guilt as a theme may serve as strong motivation for a group of donors but may be ineffective in recruiting nondonors.

Much of the earlier literature tended to describe donors compared with nondonors rather than explore the differences within the donor group by using multivariate analyses. Because such a small subgroup (3% to 8%) of the overall population represents regular donors, Ibrahim and Mobley⁷⁰ pursued forging a strategic linkage between recruitment and retention as a means to build and maintain a repeat donor pool. Phone interviews were conducted with 521 blood donors to determine differences between "high" and "low" donors. The profile of multiple-giving donors revealed a married man educated at the high school or trade school level with many friends or relatives as recipients of blood transfusions and who had experienced the blood donation process as highly satisfactory and convenient. With personal gratification noted as the primary motivator for high donors, a blood drive campaign focused on promotion of self-esteem and humanitarianism would be more likely to appeal to this targeted group.

Frequency of donation might be enhanced

through simple, practical approaches as well. As a mechanism to address the hypothesis that donors easily forget when they are eligible to give blood again, written reminders were sent to French donors.⁷¹ However, the frequency of mobile collection units to particular sites was also increased as a second intervention to determine the effect of this variable on donor return behavior. An increase in the frequency of blood donation was shown to be secondary to the greater number of mobile unit visits but was not related to reminders of upcoming donation due dates.

Building on data drawn from the literature, Gimble and colleagues⁷² identified the issues of donor knowledge, donor deferral, waiting time, and convenience as being important for recruitment and retention of blood donors. Twenty-four collection sites were paired with an equal number of other sites and randomly assigned as either experimental or control. Recruitment brochures explaining eligibility to donate and criteria for temporary deferral, as well as other aspects of the collection process, were distributed to the 24 experimental sites 2 weeks in advance of the blood drive. Three drives were held at each site. No significant differences were reported between the sites or various blood drives over time. The brochures were not shown to expand recruitment or to facilitate the return of donors who had received a temporary deferral. Although this educational approach focused on 1 factor of the blood donation decision and resulting behavior, recruitment and retention are multifactorial in nature. The lack of efficacy shown by this intervention may underscore the need to design approaches that integrate multiple variables of equal or potentially greater importance to blood donor behavior.

CONCLUSIONS

Based on the review of the literature for the past 3 decades or more, studies have reported (1) demographic profiles of the populations evaluated, (2) what donors and nondonors claim are their major reasons to give or refrain from giving blood, and 3) general effectiveness of some forms of social pressure and incentives and potential use for long-term retention of donors.

Some studies considered pivotal in the literature date from a time period that reflects an earlier donor pool, many of whom are aging or no longer serving as donors.⁵¹ More recent surveys, even of

large numbers of subjects, often draw the sample from a limited number and type of blood center, representing about 5% to 8% of total donors.⁶ Thus, findings do not necessarily reflect the donor pool nationwide. The investigation of the characteristics of more contemporary donors has revealed donor profiles largely similar to previous studies, except for increased proportions of women and minority first-time donors in some cases. Interpretation of these data should be performed in view of the question of whether demographics mirror the donor pool to assist in targeted recruitment or if targeted recruitment actually leads to the reported demographics.¹⁵ In uncommon cases in which an individual center focused on recruitment of donors with atypical demographics (eg, minority donors), an expansion of the number of atypical donors was reported.⁶

Continued targeted recruitment of the historically desirable blood donor tends to result in the same type of blood donor overall. Successful marketing to 35-year-old white men who are Rh negative may be a major goal of blood centers, but this approach is unlikely to diversify the donor pool. Theoretically, the "best" donor is a "safe" donor who is intrinsically motivated to continue donating on a repeated basis, with gender, age, educational level, or other personal characteristics considered as lesser issues.

Few recent studies of donor motivation have been published. Piliavin's¹⁵ review of the literature through the 1980s cited issues related to time required for the donation process, length of history taking, inconvenient hours or location, other sources of delay, and fear of temporary or permanent deferral as major deterrents to initial and repeat donation. Two decades later, these issues appear to persist. In fact, issues of time and donor convenience may be considered even more significant obstacles to blood donation now than in previous decades.³⁰ The vast majority of nondonors, rather than being directly opposed to blood donation, actually indicate they would give if "correct" conditions were present.² Apparently, the "correct" conditions are difficult to achieve as evidenced by the extremely high rates of nondonors and individuals who drop out after their first donation.²⁴ The practical challenges encountered by potential donors who often deal with long commutes, 2-job households, care of children and aging parents, and

chronic overscheduling may be distinct from the major impediments identified by earlier generations of donors.⁷³ Modern sources of positive and negative motivation are worth exploring through scientifically sound investigations involving representative cohorts. Future studies might also pursue the role of incentives that have been proposed historically but never used, such as a tax incentive similar to that given to other charitable donations.³⁴

Motivation and behavioral outcomes are not static elements in blood donation, arguing that well-designed and executed interventions could potentially alter motivations, attitudes, and resulting behaviors. Application of findings from published studies toward design and implementation of interventions to promote donor recruitment and retention merit a multifactorial approach. Addressing a single aspect of the decision-making process, or ignoring the interplay of knowledge, attitudes, motivation, and behavior when assessing potential donors or designing interventions, is less likely to achieve desired goals.

Strategies that focus on retaining return donors and transforming first-time donors into repeaters would be beneficial. The reasons underlying the decision to give blood the first time tend to differ from the rationale to give repeat donations and likely alter over time. Changes in motivation may reflect the life cycle of the donor, moving from the first-time donor experience to early repeat (1 to 3 times) donor to repeat donor (4 or more times) to multigallon donor.¹¹ In addition to positive forces influencing the decision to donate blood, barriers to donation are also constantly present and may interfere with the translation of attitudes, motivation, and intention into actual behavior. Motivational factors might be modified in their importance as an individual moves through the donor life cycle, chooses not to give beyond the initial donation, or stops (lapsed donor). Use of surrogate end points, such as stated intent rather than actual donation behavior, should be used and interpreted with caution. Investigations of what respondents, particularly nondonors, do not say or are not asked could greatly contribute to the understanding of motivational factors impacting the blood donation decision.

Decision making and behavior related to blood donation are complex concepts and likely need to be evaluated on many levels simultaneously. The

complicated nature of decision making requires close attention to the theoretic basis, methodologic approaches, and analytic techniques used in its study. Investigations are needed that use optimal methodologies to assess research questions and well-designed strategies to test hypotheses and

produce generalizable findings. As new deferrals and the aging population potentially impact the current donor base, cost-effective approaches leading to long-term success in donor recruitment and retention are essential in assuring a safe, sufficient, national blood supply in the future.

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