Supplementary Material for: Redesigning the Market for Volunteers: A Donor Registry

For Online Publication Only

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Supplemental Table S1: Predicting Answering Solicitation Call in Round 1

	Answer Call in R1	Answer Call in R1
Sequential Treatment	0.03*	0.05
	(0.02)	(0.15)
Simultaneous Treatment	0.02	0.03
	(0.02)	(0.14)
Reg Only Treatment	0.01	0.12
	(0.02)	(0.15)
Female	-0.03***	-0.05**
	(0.01)	(0.02)
Age	0.003***	0.004***
	(0.0005)	(0.001)
Yearly Donation Rate	-0.19	1.31
	(0.29)	(1.84)
Days Since Last Donation	-0.0000321	-0.0000106
	(0.000039)	(0.0000973)
Sequential × Female	.	0.07**
		(0.03)
Sequential × Age	.	-0.0007
		(0.001)
Sequential × Yearly Donation Rate	.	-1.83
		(1.93)
Sequential × Days Since Last Don	.	-0.0000172
		(0.0001)
Simultaenous × Female	.	0.009
		(0.03)
Simultaenous × Age	.	-0.0004
		(0.001)
Simultaenous × Yearly Donation Rate	.	-2.25
		(2.01)
Simultaenous × Days Since Last Don	.	7.70e-06
		(0.0001)
Registry Only × Female	.	0.009
		(0.03)
Registry Only × Age	.	-0.001
		(0.001)
Registry Only × Yearly Donation Rate	.	-0.84
		(1.95)
Registry Only × Days Since Last Don	.	-0.000065
		(0.0001)
Observations	9357	9357
Pseudo R^2	0.007	0.008
State and Site FE	Y	Y
Call Day FE	Y	Y
Call Agent FE	N	N
Omitted Group	Don Only	Don Only
Baseline	.32	.32

Marginal effects from a probit regression reported. Robust Standard Errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Supplemental Table S2: Treatment Effects, donation after Round 1 calls

	All Donors			Answered in Round 1			
			All Attempted Calls	All	Gen Reg + Don Only	Crit Reg + Don Only	No Reg + Don Only
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Reg + Don	0.06***	0.06***	0.001	0.003	0.06***	-0.08**	-0.08***
	(0.006)	(0.006)	(0.007)	(0.02)	(0.02)	(0.03)	(0.02)
Reg Only	0.03***	0.03***	-0.03***	-0.1***	-0.1***	-0.1***	-0.08***
	(0.008)	(0.008)	(0.006)	(0.02)	(0.02)	(0.03)	(0.02)
Don Only	0.07***	0.07***	.	.	.	.	.
	(0.01)	(0.01)					
Observations	13561	13561	9414	3212	2221	653	1345
Pseudo R^2	0.03	0.03	0.09	0.03	0.05	0.05	0.05
Omitted Group	Control 1 & 2	Control 1 & 2	Don Only	Don Only	Don Only	Don Only	Don Only
Mean Probability of Omitted Group	.03	.03	.08	.17	.17	.17	.17
Controls							
Demographics	No	Yes	Yes	Yes	Yes	Yes	Yes
State & Site FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Call Day FE	No	No	Yes	Yes	Yes	Yes	Yes
Call Agent FE	No	No	Yes	Yes	Yes	Yes	Yes
χ^2 tests							
Don + Reg=Reg Only	14.47***	14.68***	13.73***	16.77***	25.13***	.19	.02
Don + Reg=Don Only	.45	.47					
Reg Only=Don Only	11.32***	11.53***					

Marginal effects from probit regressions reported. Robust Standard Errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Supplemental Table S3: Predicting Answering Solicitation Call in Round 2

	Answer Call in R2	Answer Call in R2
RegistryCondition	0.19***	0.58***
	(0.02)	(0.12)
Donation Only	0.12***	0.15
	(0.04)	(0.32)
Female	-0.006	0.03
	(0.02)	(0.03)
Age	0.004***	0.005***
	(0.0009)	(0.001)
Yearly Donation Rate	-0.11	-0.23
	(0.32)	(0.32)
Days Since Last Donation	-649946.10	1051616.00
	(709554.70)	(1071655.00)
Registry × Female	.	-0.06*
		(0.04)
Registry × Age	.	-0.003
		(0.002)
Registry × Yearly Donation Rate	.	0.62
		(1.32)
Registry × Days Since Last Don	.	-3076241.00**
		(1457537.00)
Donation Only × Female	.	0.03
		(0.08)
Donation Only × Age	.	-0.003
		(0.003)
Donation Only × Yearly Donation Rate	.	2.75
		(5.48)
Donation Only × Days Since Last Don	.	483908.90
		(3072202.00)
Observations	4636	4636
Pseudo R^2	0.37	0.37
Omitted Group	Control 1	Control 1
Mean Probability of Omitted Group	.43	.43

Marginal effects from probit regression reported. Robust Standard Errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Supplemental Table S4: Treatment Effects, donation after Round 1 calls

	All Donors			Answered in Round 1, only			
			All Attempted Calls	All	Gen Reg + Don Only	Crit Reg + Don Only	No Reg + Don Only
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Simultaneous	0.08***	0.08***	0.007	0.02	0.08***	-0.08**	-0.05***
	(0.009)	(0.009)	(0.008)	(0.02)	(0.03)	(0.04)	(0.02)
Sequential	0.07***	0.07***	-0.005	-0.02	0.04	-0.07*	-0.09***
	(0.009)	(0.009)	(0.007)	(0.02)	(0.03)	(0.04)	(0.01)
Reg Only	0.03***	0.03***	-0.03***	-0.1***	-0.1***	-0.1***	-0.08***
	(0.008)	(0.008)	(0.006)	(0.02)	(0.02)	(0.03)	(0.01)
Donation Only	0.07***	0.07***	.	.	.	.	.
	(0.01)	(0.01)					
Observations	13561	13561	9414	3212	2221	653	1345
Pseudo R^2	0.03	0.03	0.09	0.03	0.05	0.05	0.06
Omitted Group	Control 1 & 2	Control 1 & 2	Don Only	Don Only	Don Only	Don Only	Don Only
Mean Probability of Omitted Group	.03	.03	.17	.17	.17	.17	.17
Controls							
Demographics	No	Yes	Yes	Yes	Yes	Yes	Yes
State & Site FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Call Day FE	No	No	Yes	Yes	Yes	Yes	Yes
Call Agent FE	No	No	Yes	Yes	Yes	Yes	Yes
χ^2 tests							
Simultaneous=Sequential	1.10	1.34	1.34	1.85	.95	.04	4.21**

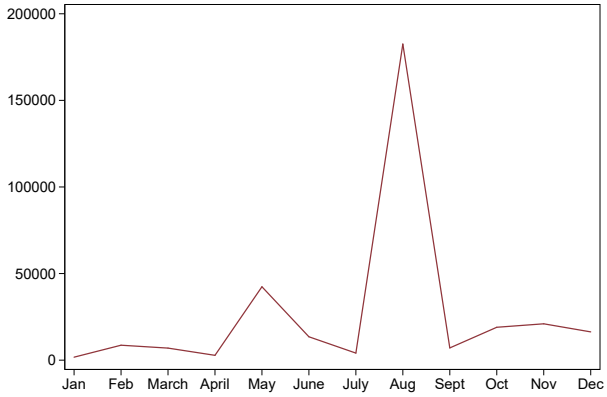
Marginal effects from probit regressions reported. Robust Standard Errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Supplemental Table S5: Predicting the Probability of Return Within 3 Weeks

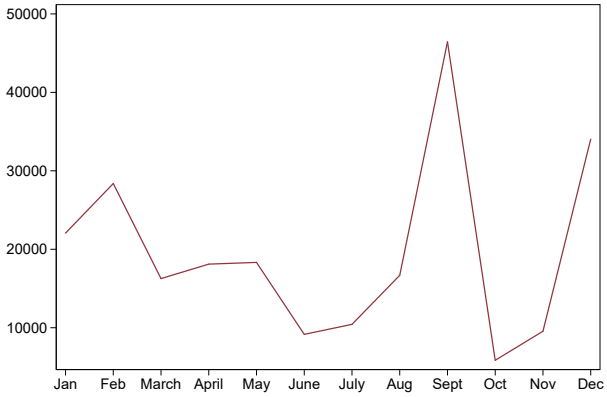
	General Registry Members	Non-Registry Members
Critical Appeal	0.16***	0.02
	(0.05)	(0.03)
Female	-0.02	-0.01
	(0.02)	(0.02)
Age	0.001	0.0009
	(0.001)	(0.001)
Days Since Last Don	1.49*	0.64
	(0.85)	(0.71)
Yearly Donation Rate	0.13	0.15
	(0.65)	(1.58)
Observations	690	312
Pseudo R^2	0.07	0.08

Marginal Effects from Probit Regression. Robust Standard Errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Supplemental Figure S1: Blood Service Solicitations



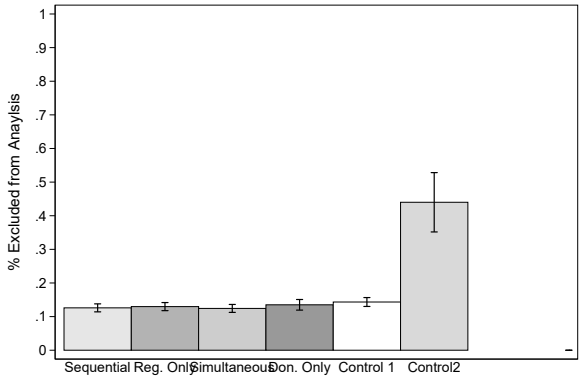
(A) 2014



(B) 2015

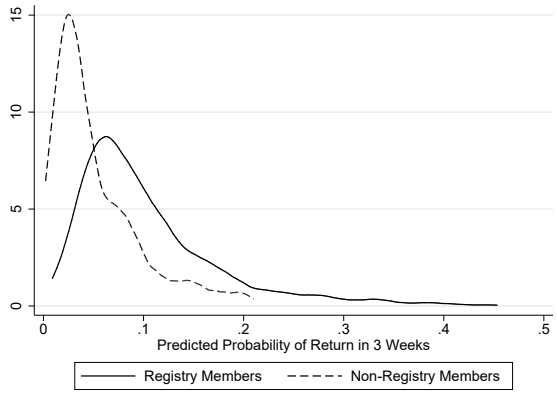
Figures

Supplemental Figure S2: Percent of Assigned Subjects Contacted Outside of the Experiment, by Treatment

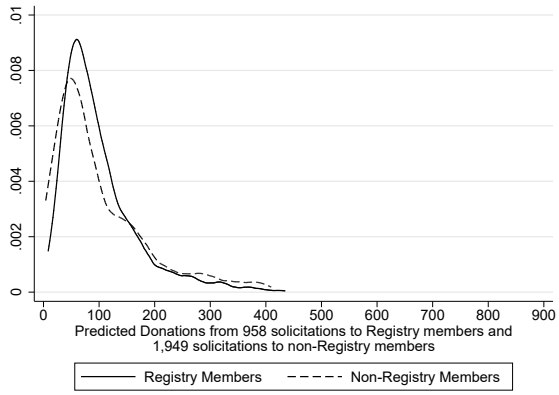


Means with 95 percent confidence intervals reported. The percent of subjects by treatment that were contacted outside of the parameters of the experiment and subsequently dropped from all analysis.

Supplemental Figure S3: Donation Within 3 Weeks of Solicitation, Registry versus Non-Registry Members



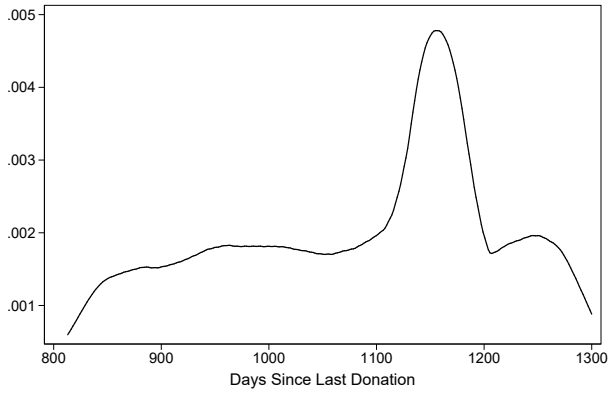
(a) Density of Predicted Prob



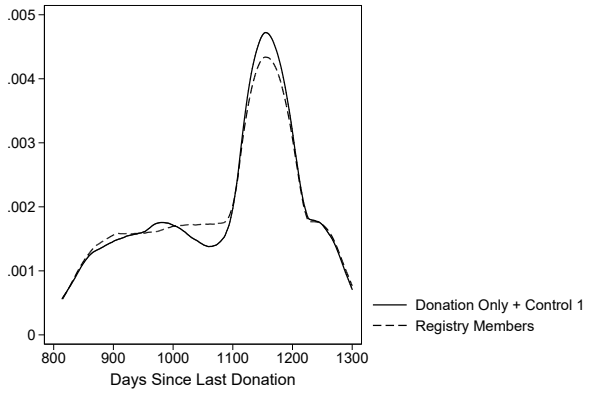
(b) Density of Predicted # Donations

In figure S3b, the mean of each distribution is 100, however the standard error of the Registry distribution is 2.62 donations, while the standard error of the non-Registry distribution is 4.78.

Supplemental Figure S4: Distribution of Days Lapsed Since Last Donation



(a) All Subjects



(b) Non-Registry Conditions & Registry Members

Supplementary Material B

Understanding Registry Demand: Donor Motivation

Pure Altruists

Let individual i's utility for altruistic behavior be separable in pure and warm glow motives (Andreoni et al., 1996; Lilley and Slonim, 2014) and given by the following function:

$$U_i(S_{-i,t}, s_{i,t}) = \beta u(S_{-i,t} + s_{i,t}) + \alpha v(s_{i,t}) - c_{i,t}(s_{i,t}) \tag{1}$$

$S_{-i,t} \geq 0$ is the total number of donations given by all other donors other than i at time t (i.e., the current supply of blood at time t) and $s_{i,t} \in \{0, 1\}$ takes a value of 1 if the individual makes a donation at t and 0 otherwise. The function u is the utility individual i receives from pure motives and the function v is the utility donor i receives from the warm glow of his donation and $v(0) = 0$. We assume that u is continuous and concave in $S_{i,t}$. The parameters $\beta \geq 0$ and $\alpha \geq 0$ determine the extent to which utility is driven by pure motives or warm glow, thus $\alpha = 0$ and $\beta > 0$ indicates a pure altruist, while $\beta = 0$ and $\alpha > 0$ indicates a warm glow giver and $\alpha > 0$ and $\beta > 0$ indicate a mixed altruist. The individual also pays a fixed cost to donate, $c_{i,t}(s_{i,t})$, where $c_{i,t}(s_{i,t} = 0) = 0$.

The individual faces uncertainty about whether his donation is actually needed, that is, he is uncertain about the relationship between the current supply $S_{-i,t}$ and how it relates to demand. Let D_t denote the current aggregate demand for blood at t, where $S_{-i,t} < D_t$ implies the individual i's donation is needed and $S_{-i,t} \geq D_t$ means that there is excess supply and individual i's donation is not needed. Let p_t be the probability that $S_{-i,t} < D_t$. If his blood is not needed, then he receives no marginal utility from making a donation through the pure altruism component of utility, but he still receives warm-glow marginal utility. Individual i donates if

$$\beta\left[p_t u(S_{-i,t}+1)+(1-p_t)u(D_t)\right]+\alpha v(1)-c_{i,t}(1)\geq\beta\left[p_t u(S_{-i,t})+(1-p_t)u(D_t)\right] \tag{2}$$

where the righthand side of the equation is the utility an individual gets from not donating (i.e., $s_{i,t}=0$). During Round 1 solicitations, individuals assigned to the Registry conditions were informed that Registry membership entailed information about a critical need for their blood type. That is, Registry members learn that $S_{-i,t}<D_t$ before making a donation decision. Thus, joining the Registry resolves uncertainty about the relationship between $S_{-i,t}$ and D_t. If a Registry member receives a solicitation, then he knows that with certainty there is need, i.e., $p_t=1$, and if the individual does not receive a solicitation then he believes there is no need for his donation, i.e., $p_t=0$.[1]

From equation 2, the marginal utility of a donation, $s_{i,t}=1$ versus $s_{i,t}=0$, is given by

$$\beta p_t\left[u(S_{-i,t}+1)-u(S_{-i,t})\right]+\alpha\left[v(1)-v(0)\right]-\left[c_{i,t}(1)-c_{i,t}(0)\right] \tag{3}$$

where the marginal utility of a donation increases in p_t, implying that Registry members receive a higher marginal utility from donation provided $\beta>0$. In other words, a donor with pure motives (i.e., $\beta>0$) receives a higher marginal utility from donating as a Registry member than he does if he is not a Registry member. Therefore, equation 3 shows that donors with non-zero pure altruistic motives will join the Registry, while other donors are indifferent about joining the Registry.

To present evidence from our experimental data that donors with pure motives self select into the Registry, we first show that donors with higher marginal utility from pure motives are also more responsive to a critical need

[1]We assume that receiving the Registry call shifts p_t to 1 and not receiving the Registry call shifts p_t to 0. This is a stronger assumption than we need. All that is needed for the result here is that if a Registry member gets a registry call, p_t increases and without a registry call p_t decreases relative to the p_t used by non-Registry members.

for blood. Differentiating equation 3 with respect to $S_{-i,t}$ we have equation 4, which shows that Registry members are also more responsive to need than non-Registry members. Equation 4 shows that as need increases (i.e., $S_{i,t}$ decreases), the marginal utility of a donation increases more for donors with higher marginal utility from pure motives. Further, equation 4 indicates that if an individual has no pure motives, $\beta = 0$, then their marginal utility of a donation does not vary with "need".

$$\beta p_t \left[\frac{\partial u(S_{-i,t} + 1)}{\partial S_{-i,t}} - \frac{\partial u(S_{-i,t})}{\partial S_{-i,t}} \right] < 0 \tag{4}$$

If donors with pure motives self select into the Registry as equation 3 has shown, we would expect that Registry members would be relatively more responsive to critical calls than non-Registry members. Recall, in Round 2, there was a critical shortage call that informed individuals that there was a critical need for their blood type within the next few weeks. Thus being more responsive not only entails an increased probability of donating, but specifically, an increase in the probability of donating within three weeks of the solicitation.

To test whether Registry members are more responsive to critical calls than non-Registry members we estimate the following equation with a probit regression

$$\begin{aligned} &Prob_i\,[\text{Donate within 3 weeks=1}] = \\ &\gamma_0 + \gamma_1 \mathbf{1}[Registry = 1] \times \mathbf{1}[\text{Critical Appeal} = 1] \quad + \gamma_2 \mathbf{1}[Registry = 1] \\ &\quad + \gamma_3 \mathbf{1}[Registry = 0] \times \mathbf{1}[\text{Critical Appeal} = 1] \quad + \gamma_4 \Psi_i + \varepsilon_i \end{aligned}$$

where Ψ_i is a vector of individual-level controls. If the Registry selects for donors who are driven by pure motives, then we hypothesize that $\gamma_1 > \gamma_3$. That is, the difference in response to the Critical appeal than the non-critical appeal will be greater for Registry members than for non-Registry donors.

Table S6 presents estimates that are consistent with the hypothesis that the Registry selects for donors who have pure motives. The sample consists of

Registry members (considers General and Critical Registries separately) from the Registry + Donation condition and subjects contacted in Round 2 from the Donation Only condition. We estimate that a General Registry member who receives a critical call is 15 percentage points more likely to donate within 3 weeks of the solicitation than a Registry member who receives the standard solicitation, whereas non-Registry members who receive the critical call are no more likely to donate within 3 weeks than non-Registry members who received the standard solicitation. The relative increase in donation rates by the Registry members in the critical call treatment is significantly larger than the relative increase by the non-Registry members in the critical call condition (one-sided p-value=.075).

Result 3 *Registry members are more responsive to the Critical call, relative to the Standard call, than subjects not invited to join the Registry.*

Commitment Device

Next, we consider whether Registry demand is driven by donors who demand commitment to donate and whether this motive for joining the Registry can also explain the pattern of donation behavior we observe in the data.

To characterize the Registry as a commitment mechanism, we use Gul and Pesendorfer (2001) model of temptation where individuals have preferences over choice menus and the Registry serves as a way for individuals to restrict their future choice set. Consider individual i's choice set $A_i = \{d_i, n_i\}$, where d_i corresponds to donate and n_i corresponds to not donate. We assume that some fraction of our sample, γ, has preferences such that the choice set $\{d_i\}$ is preferred to the choice set $\{n_i\}$. That is, some proportion γ of individuals prefers to donate. The other $1 - \gamma$ proportion always prefers to not donate. In what follows, we consider the γ proportion of individuals.

We now consider the possibility that some individuals may be tempted to "not donate" when they face choice set A_i. Following Gul and Pesendorfer (2001), we characterize temptation (i.e., a preference for commitment) as a

Supplemental Table S6: Pure Altruism

	Pr[Donate within 3 weeks of solication=1]	
	(1)	(2)
Non Reg Member × Crit Appeal	0.04	0.04
	(0.06)	(0.05)
Gen Reg Member × Crit Appeal	0.15***	0.15***
	(0.05)	(0.05)
Gen Reg Member	0.05**	0.05***
	(0.02)	(0.02)
Critical Reg Member	0.04	0.05
	(0.05)	(0.05)
Female	.	-0.03
		(0.02)
Age	.	0.0008
		(0.0008)
Yearly Donation Rate	.	0.08
		(0.51)
Days Since Last Don	.	0.8
		(0.6)
Observations	1091	1091
Pseudo R^2	0.04	0.06
Omitted Group	Don Only	Don Only
Mean Probability of Omitted Group	.05	.09
Demographics	No	Yes
State & Site FE	No	Yes
Day FE	No	Yes
χ^2 Tests		
Non-Registry × Crit <		
Gen Reg × Crit	1.85^{ψ}	2.07^{ψ}

Marginal effects from probit regressions. Outcome variable is "1" if donation occurs within 3 weeks of Round 2 call and "0" otherwise. Robust Standard Errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. $^{\psi}$, $^{\psi\psi}$ and $^{\psi\psi\psi}$ indicate statistical significance from a one-sided hypothesis test at the 10%, 5% and 1% levels, respectively.

preference for a restricted choice set,

$$\{d_i\} \succ \{d_i, n_i\} \tag{5}$$

That is, an individual who faces temptation is better off facing a restricted choice set, where the only choice is to donate, because the presence of "not donate" creates costly temptation. Gul and Pesendorfer (2001) allow for individuals to exercise self-control or to face "overwhelming temptation". Those who exert self-control will abstain from choosing "not donate" when facing A_i and have a preference relation given by equation 6, although the presence of n_i in their choice set is still costly in terms of utility. On the other hand, other individuals may face overwhelming temptation and will thus succumb to choosing "not donate" from A_i.

$$\{d_i\}] \succ \{d_i, n_i\} \succ \{n_i\} \tag{6}$$

Suppose that some fraction of individuals, α, have temptation preferences and of this fraction, let $1 - \phi$ exert self-control, while fraction ϕ face overwhelming temptation. The remaining $1 - \alpha$ fraction of individuals do not face temptation and thus will choose to donate when facing A_i. If individuals have no mechanism to restrict their choice set, the proportion of subjects that donate is given by

$$\gamma \left[\underbrace{\alpha(1-\phi)}_{\text{temptation \& self-control}} + \underbrace{(1-\alpha)}_{\text{no temptation}} \right] \tag{7}$$

However, if a mechanism is introduced by which individuals who face temptation can restrict their choice set then individuals who are unable to exercise self-control will be crowded-in to donate and the proportion who donate is given by

$$\gamma \left[\underbrace{\alpha(1-\phi)+\alpha\phi}_{\text{temptation \& mechanism to restrict choice set}} + \underbrace{(1-\alpha)}_{\text{no temptation}} \right] = \gamma \tag{8}$$

That is, when a commitment mechanism is available, the individuals who have a preference for commitment, α, will use the commitment mechanism to restrict their choice set. This increases the rate of donations by crowding-in those individuals who faced overwhelming temptation, $\alpha\phi$.[2]

We apply this temptation-commitment model to the experimental data to generate testable implications. In Round 1, individuals in the Registry condition and Donation Only condition face the choice set A_i, and due to randomization into treatment conditions, are equally likely to face temptation and self-control. In Round 1, individuals in the Registry conditions who have a preference for commitment can select into the Registry in order to restrict their choice set in the future. Equation 7 represents the predicted proportion of donations in Round 1 for individuals in both the Registry conditions and the Donation Only condition.

In the next solicitation Round (Round 2 for Registry Members and Donation Only subjects and Round 3 for Registry condition subjects who selected out of joining the Registry), individuals in the Registry conditions who selected into the Registry in Round 1 now face a restricted choice set and the rate of donation for subjects in the Registry Conditions is now given by Equation 8, while the rate of donation for the individuals in the Donation Only condition is still characterized by Equation 7.

Thus, our hypothesis 4 that Registry demand is driven by a preference for commitment results in three testable hypotheses. First, we hypothesize that Round 1 donation rates among the Registry + Donation condition and the Donation Only condition are not significantly different. We find evidence in favor of this hypothesis in columns (1)-(4) in Table S2. Second, we hypothe-

[2]Further, the fraction of individuals that faced temptation but exert self-control, $\alpha(1-\phi)$, make the donation with and without the commitment device but are better-off in terms of utility by the presence of a restricted choice set.

size that donation rates for the Donation Only treatment do not significantly change between Round 1 and Round 2, and third, the donation rates for the Registry + Donation condition will increase from Round 1 to Round 2.

The second and third hypotheses imply that the rate of increase between the Round 1 and Round 2 donation rates should be larger for the Registry + Donation condition than for the Donation Only condition. We show support for this in the main text in Figure 2b shows support for this implication. We formally test this hypothesis with first-differences regression given in Equation 9, where the dependent variable is the change in donation rates between Round 1 and Round 2, $\Delta Donate_i$. The null hypothesis is $\beta_1 = \beta_2$ and evidence consistent with the model of the Registry as a commitment device implies $\beta_1 > \beta_2$.

$$\begin{aligned} \Delta Donate_i \quad = \quad & \\ & \beta_1 \mathbf{1}[Registry = 1] \times [\mathbf{1}[Round2 = 1] - \mathbf{1}[Round1 = 1]] \\ + \quad & \beta_2 \mathbf{1}[Registry = 0] \times [\mathbf{1}[Round2 = 1] - \mathbf{1}[Round1 = 1]] + \Delta\varepsilon_i \end{aligned} \tag{9}$$

Table S7 presents evidence consistent with individuals using the Registry as a commitment device, where ΔR represents the change in proportions donating between Round 1 and Round 2. Subjects in the Registry + Donation condition increase their donation rates in the second Round of calls, relative to Round 1, by 3 percentage points, whereas there is no significant increase in donation rates for subjects in the Donation only condition (i.e., non-Registry members). As hypothesized, the rate of increase is greater among Registry Members than Non-Registry Members (one-sided p-value=.053).

Result 4 *Registry members are more likely to donate in Round 2, relative to Round 1, than non-Registry members.*

Supplemental Table S7: The Registry as a Commitment Device:

	$\Delta Donate_i$
General Registry × Δ R	0.03*
	(0.02)
Critical Registry × Δ R	-0.17***
	(0.07)
Non-Registry × Δ R	-0.02
	(0.02)
Critical Appeal in Round 2	0.26***
	(0.04)
Constant	0.11***
	(0.009)
Observations	2180
R^2	0.05
χ^2 Test:	
Gen Reg ×Δ R > Non-Reg ×Δ R	2.59^{ψ}

Differences in Differences regression estimates. Robust Standard Errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. $^{\psi}$, $^{\psi\psi}$ and $^{\psi\psi\psi}$ indicate statistical significance from a one-sided hypothesis test at the 10%, 5% and 1% levels, respectively.

Solicitation Dis-utility and Ask Avoidance

In this section, we consider the possibility that the Registry appeals to volunteers who experience direct utility loss when they are solicited for a donation and that this solicitation dis-utility drives their demand for the Registry. To examine this possible selection mechanism, we exploit the Blood Service's policy about soliciting donations. A volunteer's status, "active" versus "long-lapsed", is determined by the time since his last donation, which, in turn, determines the number of solicitations he receives from the Blood Service. An active donor receives regular solicitations from the Blood Service, while when the donor becomes long-lapsed the Blood Service significantly reduces the number of solicitations. A volunteer donor is considered to be long-lapsed until he makes another donation, then he returns to the pool of active donors and continues receiving regular solicitations. Recall, all donors in our sample are long-lapsed, meaning that they have not made a donation for at least 24

months.[3]

To model the Blood Service's solicitation pattern, we assume that an individual has an expectation about the number of solicitations he will receive in the future given his current status as a donor (active or long-lapsed).[4] Moreover, volunteers expect that if they return to the active donor pool, then the number of solicitations will increase to a higher rate and remain at that higher rate until returning to the long-lapsed pool of donors. Let T represent the number of days since the individual has been long-lapsed and let his expectation about the number of future solicitations, s, be given by $E[s|T]$, where $E[s|T=0]$ is the expectation of an active donor and $E[s|T>0]$ is the expectation of a long-lapsed donor. Thus, donor i who has been lapsed for $T>0$ faces the following decision problem,

$$U(d_i) = \begin{cases} u(d_i) - c(E_t[s|T=0]) + \varepsilon_{i,t} & \text{if donate} \\ -c(E_t[s|T]) & \text{if not donate.} \end{cases}$$

where $u(d_i)$ is the utility the donor gets from making a donation, $c(\cdot)$ is the utility cost of the expected solicitation and $\varepsilon_{i,t}$ is an idiosyncratic error term that captures shocks to the donor's utility. We assume $u(\cdot)$ and $c(\cdot)$ are increasing in their arguments.

When volunteers are invited to join the Registry, a main characteristic is the promise to "contact Registry members only once or twice a year but never more than four times" in a year. This represents substantially fewer expected solicitations than a long-lapsed donor can expect to receive by rejoining the active donor pool without the Registry (i.e., making a donation without Registry membership). Thus, if a volunteer joins the Registry and donates, then he expects the number of future solicitations following the donation to be fewer than if he donates and does not join the Registry. Let T_R represent the time since the last donation with a Registry membership, then $E_t[s|T_R=0] < E_t[s|T=0]$. The decision problem for a Registry member with

[3]Figure S4 shows that there is still significant variation in the amount of time since the last donation among our sample.

[4]We consider the "future" to be over the course of the next year.

length of lapse T'' such that $E_t[s|T = T''] < E_t[s|T_R]$ is to donate if and only if

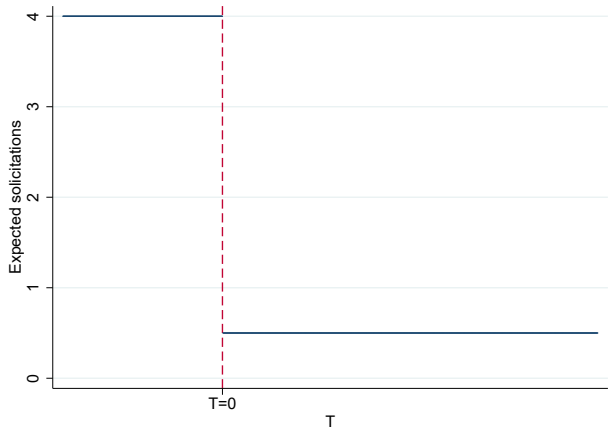
$$u(d_i) - c(E_t[s|T_R]) + \varepsilon_{i,t} \geq -c(E_t[s|T''])$$ (10)

Discussions with the Blood Service indicate that once a donor becomes long-lapsed, normal communications cease until the donor returns to the active donor pool. A donor with rational expectations about the number of future annual solicitations will expect a dis-continuity upon becoming long-lapsed, as illustrated in Figure S5a. Alternatively, if donors' expectations are adaptive, their expectations might be better characterized as in Figure S5b. In this case, donors learn over time that the Blood Service has reduced solicitations and only after a substantial period of lapse do they expect no solicitations. We consider both cases here.

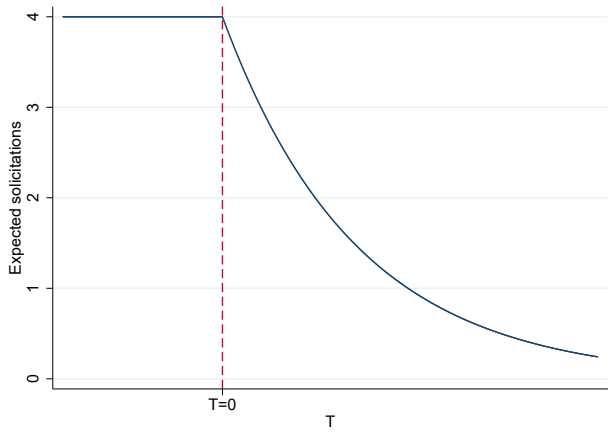
First, we note that there is likely to be heterogeneity in expectations between an individual who has been long-lapsed prior to this episode and those individuals who are long-lapsed for the first time. In particular, we expect that a volunteer with prior long-lapse experience to have more accurate expectations about the number of solicitations he will receive than an individual who is long-lapsed for the first time. Furthermore, recency bias suggests that first-time long-lapsed donors are more likely to believe that the number of solicitations during a long-lapse will be more similar to the number of solicitations as an active donor.

Unfortunately, we do not observe whether the individuals in our have been long-lapsed prior to this current lapse. However, using the sample of all blood donors who donated between 2011-2016 in Australia, we find that conditional on at least one episode of lapse, donors with longer donation histories were significantly more likely to experience a second period of lapse. That is, donors with longer donation histories are more likely to have experienced a prior period of lapse than donors with shorter donation histories. Thus, we assume that donors with longer donation histories will have more accurate expectations about the number of future solicitations as a long-lapsed donor, while donors

Supplemental Figure S5: Expectations about Future Solicitations



(a) Dis-Continuous in T



(b) Continuous in T

with shorter donation histories will be more likely to hold inflated expectations due to recency bias.[5]

We express this heterogeneity by an expectation that relies on the donor's donation history, where y is number of years an individual has been a volunteer donor (either active or long-lapsed). We assume that $E[s|T > 0, y'] < E[s|T > 0, y'']$ if and only if $y' > y''$. Consistent with Figure S5a, we maintain that $E[s|T > 0, y]$ is constant $\forall \ T$. An ask-avoidant individual joins the Registry if $E[s|T > 0, y] > E[s|T_R]$. Thus, volunteers with shorter donation histories will be more likely to join the Registry than volunteers with longer donation histories because the shorter the donation history, the greater the expected reduction in future donations by joining the Registry. Further, if $E[s|T > 0, y] < E[s|T_R]$, then an individual will join the Registry *only if* if he intends to donate; that is, if a long-lapsed donor does not intend to donate again, then he would not join because joining would increase the number of costly solicitations without any benefits.

The two testable implications from this model of solicitation dis-utility are as follows: (1) the probability of joining the Registry is decreasing in the number of years the individual has been a donor; (2) conditional on joining the Registry, volunteers with longer donation histories will be more likely to make a donation. We test these two hypotheses in Table S8. In columns (1) and (2) we test the first hypothesis by examining whether there is a relationship between the "years donating" and the probability of joining the Registry. We find no evidence in support of the first hypothesis; that is, we do not find evidence that donors with shorter donation histories are more likely to join the Registry.

In columns (3)-(6) we test the second hypothesis. To test whether, among Registry members, donation rates increase in y and subsequently, that the Registry crowds-in donations from longer-term donors who would not have donated without the Registry, we use two relevant subsamples. In columns (3) & (4), we restrict our analysis to Registry members who were solicited for

[5] A donor who has just moved from the active pool to the long-lapsed pool for the first time has recently experienced frequent solicitations.

donations in Round 1 (Registry + Donation) and individuals in Non-Registry conditions (Donation Only) who were solicited for a donation in Round 1. In columns (5) & (6), we restrict our analysis to Registry members who were solicited for a donation in Round 2 for the first time (Registry only) and Non-Registry conditions (Control Group 1) who were solicited for a donation for the first time in Round 2. We estimate the following equation with a probit regression,

$$\begin{aligned} & Prob_i\left[\text{Donate=1}\right] = \\ \gamma_0 + \gamma_1 \mathbf{1}[RegistryMember = 1] \times y \quad & +\gamma_2 \mathbf{1}[RegistryMember = 0] \times y \\ +\gamma_3 \mathbf{1}[RegistryMember = 1] \quad & +\gamma_4 \Psi_i + \varepsilon_i \end{aligned} \tag{11}$$

where $\gamma_1 > 0$ indicates that donation rates are increasing in y for Registry members and $\gamma_1 > \gamma_2$ indicates that the increase in donation rates among the longer-term volunteers are larger for Registry members than for non-Registry members, suggesting that the Registry works to crowd-in longer-term volunteers who were not likely to donate without the Registry.

In columns (3)-(4), we find that the length of a Registry member's donation history has no effect on the likelihood of donation (i.e., $\gamma_1 = 0$). Moreover, in columns (3) and (4), we find that non-Registry members with long donation histories increase their donation rates more than Registry members with long donation histories (i.e., $\gamma_1 < \gamma_2$, p-values=.053 and .063, respectively), which is the opposite of our hypothesis. Overall, we find no evidence consistent with Registry demand driven by solicitation dis-utility, nor evidence consistent with the Registry crowding-in donations from volunteers who experience solicitation dis-utility.

Result 5 *Donation history does not predict selection into the Registry. Longer donation histories are not associated with an increased probability of donating among Registry members.*

Another possible reason for the weak support of our solicitation dis-utility

Supplemental Table S8: Registry as a Selection on Solicitation Dis-utility, Expectations as Discontinuous in T

	Join General Reg Answered in R1		Donate in R1 Reg + Don & Don Only	
	(1)	(2)	(3)	(4)
YearsDonating	0.004* (0.002)	0.004* (0.002)	.	.
Years Donating × Gen Reg Members	.	.	0.0007 (0.002)	-0.0007 (0.002)
Years Donating × Non-Reg Condition	.	.	0.007** (0.003)	0.006** (0.003)
Gen Reg Member	.	.	0.05** (0.02)	0.03 (0.02)
Female	.	0.04*** (0.02)	.	0.02 (0.02)
Age	.	0.0000453 (0.0008)	.	0.001 (0.0008)
Yearly Donation Rate	.	0.08 (0.47)	.	0.2 (0.54)
Days Since Last Donation	.	0.79 (0.61)	.	0.86 (0.73)
Critical Appeal	.	.	.	-0.11*** (0.01)
Observations	1283	1283	1020	1020
Pseudo R^2	0.005	0.05	0.01	0.08
Mean Probability of Omitted Group			.09	.09
χ^2 Test:				
Gen Reg Member × T= Non-Reg × T			3.24*	3.48*
Controls				
Demographics	No	Yes	No	Yes
State & Site FE	No	Yes	No	Yes
Call Day FE	No	Yes	No	Yes
Call Agent FE	No	Yes	No	Yes

Marginal effects from probit regressions reported. Robust Standard Errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

hypothesis is that our functional form of expectations is incorrect. We consider an alternative functional form of expectations, where expectations are continuous at $T = 0$, as shown in Figure S5b. In this case, expectations are characterized by two properties:

1. Monotonicity: $E_t[s|T] > E_t[s|T']$ if and only if $T < T'$
2. Continuity: $\exists T' \in [0, T_R]$ such that $E_t[s|T_R = 0] < E_t[s|T'] < E_t[s|T = 0]$

Thus, if a donor has a $T = T'$ such that $E_t[s|T_R = 0] < E_t[s|T'] < E_t[s|T =$

0], he will select into the Registry, regardless of whether he wants to donate. On the other hand, if a donor has a $T = T''$ such that $E_t[s|T = T''] < E_t[s|T_R = 0]$ then he will select into the Registry only if he also intends to donate.

This model of Registry demand driven by solicitation dis-utility generates two testable implications. First, the smaller is T, the more likely a donor joins the Registry since individuals with a smaller T will join the Registry regardless of whether they intend to donate, while donors with a larger T will only join if they intend to donate. Second, conditional on joining the Registry, the probability of donating should increase in T since subjects with a larger T are only joining the Registry if they intend to donate. The second hypothesis also suggests that if Registry demand is driven by solicitation dis-utility, then the Registry increases donation rates by crowding-in the longest-lapsed donors who would not make a donation without the Registry since the dis-utility of solicitation that occurs from returning to the active donor pool is prohibitive.

We test these two hypotheses in Table S9. In columns (1) and (2) we test the first hypothesis by examining whether there is a relationship between the length of time a donor has been long-lapsed and the probability of joining the Registry. We find no evidence in support of the first hypothesis; that is, we cannot support the hypothesis that donors with a shorter time lapse are more likely to join the Registry.

In columns (3)-(4) we test whether, among Registry members, donation rates increase in T and subsequently, that the Registry crowds-in donations from the longest-lapsed donors who would not have donated without the Registry. In columns (3) & (4), we restrict our analysis to Registry members who were solicited for donations in Round 1 (Registry + Donation) and subjects in Non-Registry conditions (Donation Only) who were solicited for a donation in Round 1. We estimate the following equation with a probit regression,

$$
\begin{aligned}
&Prob_i\left[\text{Donate=1}\right] = \\
\gamma_0 + \gamma_1 \mathbf{1}[RegistryMember = 1] \times T \quad &+\gamma_2 \mathbf{1}[RegistryMember = 0] \times T \\
+\gamma_3 \mathbf{1}[RegistryMember = 1] \quad &+\gamma_4 \Psi_i + \varepsilon_i
\end{aligned}
\tag{12}
$$

where $\gamma_1 > 0$ indicates that donation rates are increasing in T for Registry members and $\gamma_1 > \gamma_2$ indicates that the increase in donation rates among the longest-lapsed donors is larger for Registry members than for non-Registry members, suggesting that the Registry works to crowd-in the longest-lapsed donors who were not likely to donate without the Registry.

In columns (3) and (4), we find that the length of a Registry member's lapse has no effect on the likelihood of donation (i.e., $\gamma_1 = 0$). Moreover, we do not find a significant difference in the relationship between length of a donor's lapse and his donation rate for Registry members than individuals in the Donation Only condition (i.e., $\gamma_1 = \gamma_2$, p-value=.24), suggesting that the Registry has no specific effect on the donation behavior of longer-lapsed donors.

Supplemental Table S9: Registry as a Selection on Solicitation Dis-utility

	Join General Reg Answered in R1		Donate in R1 Registry + Donation & Don Only	
	(1)	(2)	(3)	(4)
Days Lapsed (100 days)	0.85 (0.65)	0.8 (0.61)	.	0.13 (0.09)
Days Lapsed × Reg + Don Reg Members	.	.	0.54 (0.95)	0.25 (0.84)
Days Lapsed × Non-Reg Condition	.	.	2.53 (1.62)	2.23 (1.44)
Gen Reg Member	.	.	0.2 (0.14)	0.18 (0.12)
Gen Reg Member	.	.	0.2 (0.14)	0.18 (0.12)
Female	.	0.04*** (0.02)	.	0.02 (0.02)
Age	.	0.0004 (0.0008)	.	0.001* (0.0008)
Yearly Donation Rate	.	-0.04 (0.46)	.	0.15 (0.54)
Days Since Last Donation	.	.	.	.
Critical Appeal	.	.	.	-0.11*** (0.01)
Observations	1283	1283	1020	1020
Pseudo R^2	0.002	0.05	0.007	0.08
χ^2 Test:				
Gen Reg Member × T= Non-Reg × T			1.13	1.40
Controls				
Demographics	No	Yes	No	Yes
State & Site FE	No	Yes	No	Yes
Call Day FE	No	Yes	No	Yes
Call Agent FE	No	Yes	No	Yes

Marginal effects from probit regressions reported. Robust Standard Errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Supplementary Material C

Call Scripts

Round 1 Calls

Sequential Treatment Invitation to donate immediately, and then invitation to join the donation registry.

Hello, this is <AGENT> calling from the Red Cross Blood Service. May I please speak with <DONOR>? This call is recorded for quality and coaching purposes. I'm calling because our records show that you haven't donated blood for a while and you are missed. Blood donors are vital to thousands of Australians in need each year, are you still available to help with a blood donation?

[If YES to scheduling a donation]

Thank you so much for offering to come in and donate <DONOR>, while I am making that appointment for you I would also like to let you know that the Blood Service is currently establishing a donation registry, where we will only invite donors to donate when the community has a critical need for blood, for example a need for your specific blood type or a need in your local area. We would likely contact Registry members only once or twice a year but never more than four times. Would you also like to join this Registry to support Australians in need of blood during these critical times?

[If NO to scheduling a donation]

Sorry to hear you are unable to schedule a donation. However, I would like to let you know that the blood service is currently establishing a donation registry, where we will only invite donors to donate when the community has a critical need for blood, for example a need for your specific blood type or a need in your local area. We would likely contact Registry members only once or twice a year but never more than four times. Would you like to join this Registry to support Australians in need of blood during these critical times?

[If YES to joining registry]

Thank you so much for joining the Registry we really appreciate your support.

[If NO to joining registry]

Sometimes we experience critical or emergency situations when we have less than 3 days of blood supply. Would we be able to call on your help only during these most critical situations and we will not contact you at any other time.

[If YES to joining registry with limitations] Insert Comment - Joined registry (critical/emergency situations only)

[If NO to joining registry with limitations] Insert Comment - Did not join registry

[If YES to scheduling a donation]

↪ Confirm donors appointment

↪ Remind donor to eat, drink, bring ID

↪ Thank the donor for their ongoing support

Registry only Treatment Invitation to join donation registry only

Hello this is <AGENT> calling from the Red Cross Blood Service. May I please speak with <DONOR>? This call is recorded for quality and coaching. Our records show that you haven't donated blood for a while and you are missed. I am calling today to let you know that the Blood Service is currently starting a donation registry, where we will only invite donors to donate when the community has a critical need for blood, for example a need for your own blood type or a need in your local area. We would likely contact Registry members only once or twice a year but never more than four times. Would you like to join this Registry to support Australians in need of blood during these critical times?

[If YES to joining registry]

Thank you so much for joining the registry we really appreciate your support.

[If NO to joining registry]

Sometimes we experience critical situations when we have less than 3 days of blood supply. Would we be able to call on your help only during these most critical situations and we will not contact you at any other time.

[If YES to joining registry with limitations] Insert Comment - Joined registry (critical/emergency situations only)

[If NO to joining registry with limitations] Insert Comment - Did not join registry

Simultaneous Treatment Simultaneous invitation to donate immediately or join the registry

Hello this is <AGENT> calling from the Red Cross Blood Service. May I please speak with <DONOR>? This call is recorded for quality and coaching purposes. Our records show that you haven't donated blood for a while and you are missed. I am calling today for two reasons, firstly, to see if you could extend your generosity with another life saving blood donation, and secondly to let you know about our new donation registry. The Blood Service is currently starting a donation registry, where we will only invite donors to donate when the community has a critical need for blood, for example a need for your specific blood type or a need in your local area. We would likely contact Registry members only once or twice a year but never more than four times. Could we schedule a time for you to donate blood in the next couple of weeks and would you like to join this Registry to support Australians in need of blood during critical times?

[The agent should get an answer to both before proceeding]

[If YES to BOTH]

Thank you so much for offering to come in and donate <DONOR> and thank you so much for joining the registry we really appreciate your support.

[If NO to scheduling a donation and YES to joining the registry]

Sorry to hear you are unable to schedule a donation but thank you so much for joining the registry we really appreciate your support.

[If YES to Donating but NO to joining registry]

Thank you so much for offering to come in and donate <DONOR>. Sometimes we experience critical situations when we have less than 3 days of blood supply. Would we be able to call on your help during these most critical situations and we will not contact you at any other time.

[If NO to Donating and NO to joining registry]

Sometimes we experience critical situations when we have less than 3 days of blood supply. Would we be able to call on your help only during these most critical situations and we will not contact you at any other time.

[If YES to joining registry with limitations] Insert Comment - Joined registry (critical/emergency situations only)

[If NO to joining registry with limitations] Insert Comment - Did not join registry

[If YES to scheduling a donation]

↪ Confirm donors appointment

↪ Remind donor to eat, drink, bring ID

↪ Thank the donor for their ongoing support

Donation Only Treatment Standard invitation to donate

Hello, this is <AGENT> calling from the Red Cross Blood Service. May I please speak with <DONOR>? This call is recorded for quality and coaching purposes. I'm calling because our records show that you haven't donated blood for a while and you are missed. Blood donors are vital to thousands of Australians in need each year, are you still available to help with a blood donation?

Voicemail Message:

Hi <DONOR>, its <AGENT> calling from the Red Cross Blood Service. I'm calling because our records show that you haven't donated blood for a while and you are missed. Blood donors are vital to thousands of Australians

in need each year, if you are still available to help please call us on 13 14 95 to make a time to donate or to discuss further. Thanks <DONOR>.

Round 2 Calls

Standard Solicitation 1 Hello, this is <AGENT> calling from the Red Cross Blood Service. May I please speak with <DONOR>? This call is recorded for quality and coaching purposes.

<DONOR>, thank you for joining our new blood donation registry a few months back. We really appreciate that you are willing to help when your blood is especially needed. We are calling our registry members today because so many of our regular donors are unable to give due to having colds or the flu around this time, but Australia continues to need over 26,000 donations every week just to meet the ongoing needs of patients.

Are you available to help with a blood donation now?

Voicemail Message:

Hi <DONOR>, it's <AGENT> calling from the Red Cross Blood Service. Thank you for joining our new blood donation registry a few months back. We really appreciate that you are willing to help when your blood is especially needed. We are calling our registry members today because so many of our regular donors are unable to give due to having colds or the flu around this time, but Australia continues to need over 26,000 donations every week just to meet the ongoing needs of patients. If you are available to help now please call us on 13 14 95 to make a time to donate or to discuss further. Thanks >DONOR>.

Standard Solicitation 2 Hello, this is >AGENT> calling from the Red Cross Blood Service. May I please speak with >DONOR>? This call is recorded for quality and coaching purposes.

>DONOR>, we are calling today because so many of our regular donors are unable to give due to having colds or the flu around this time, but Australia continues to need over 26,000 donations every week just to meet the ongoing

needs of patients.

Are you available to help with a blood donation now?

Voicemail Message:

Hi >DONOR¿, it's >AGENT> calling from the Red Cross Blood Service. We are calling today because so many of our regular donors are unable to give due to having colds or the flu around this time, but Australia continues to need over 26,000 donations every week just to meet the ongoing needs of patients. If you are available to help now please call us on 13 14 95 to make a time to donate or to discuss further. Thanks >DONOR>.

Critical Shortage Solicitation 1 Hello, this is >AGENT> calling from the Red Cross Blood Service. May I please speak with >DONOR>? This call is recorded for quality and coaching purposes.

>DONOR>, thank you for joining our new blood donation registry a few months back. We really appreciate that you are willing to help when your blood is especially needed. We are calling our registry members today because the blood levels are very low and donations of your type >A/O> blood are urgently needed. Many Australians with life-threatening conditions will need blood in the next few weeks to stay alive. You can help them by giving blood today.

Are you available to help with a blood donation now?

Voicemail Message:

Hi >DONOR>, it's >AGENT> calling from the Red Cross Blood Service. Thank you for joining our new blood donation registry a few months back. We really appreciate that you are willing to help when your blood is especially needed. We are calling our registry members today because the blood levels are very low and donations of your type >A/O> blood are urgently needed. Many Australians with life-threatening conditions will need blood in the next few weeks to stay alive. If you are available to help now please call us on 13 14 95 to make a time to donate or to discuss further. Thanks >DONOR>.

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