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## The “Donor of the Future Project” – First results and further research domains

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### Running head: The “Donor of the Future Project”

1 **Background:** The Alliance of Blood Operators initiated a project labeled ‘Donor of the Future’.  
2 This paper gives an overview of the project results, in particular with regard to country  
3 differences.

4 **Study Design and Methods:** A large survey (N=7,663) among blood donors in six countries  
5 was conducted to analyze the effects of five global areas of changes: (1) demographic change;  
6 (2) technological developments; (3) health innovations; (4) public, behavioral, and attitudinal  
7 aspects; and (5) political, economic, and environmental issues.

8 **Results:** The main results exhibited similarities and differences between blood donors of the  
9 participating countries. Greater differences were found, for example, regarding technological  
10 developments. Whereas only blood donors from the UK and Australia would like to be  
11 informed via SMS, blood donors from all countries would like to be informed via e-mail.

12 **Conclusion:** Different priorities of donors have been uncovered. These differences give  
13 suggestions to improve the country-specific donor management. Furthermore, the key findings  
14 provide a comprehensive overview of major future research domains.

15  
16 **Keywords:** blood management, blood donors, future changes, international survey  
17

## Introduction

During recent decades, blood services were confronted with a steadily shrinking donor base and a varying blood demand [1]. Reasons are manifold, such as aging populations, medical innovations, and stricter deferral criteria [2,3]. Consequently, learning more about trends influencing the future blood donor behavior is important for blood donor services worldwide. Therefore, the Alliance of Blood Operators (ABO) [4,5] instructed the Donor Engagement and Relationship Group (DERG), to analyze the ‘Donor of the Future’ in six different countries. Therefore, internal workshops discussing future developments from an organizational perspective were realized. As a result, the experts of DERG identified the following five main areas of change: (1) demographic change; (2) technological developments; (3) health innovations; (4) public, behavioral, and attitudinal aspects; and (5) political, economic, and environmental issues.

Keeping this ABO project background in mind, the purpose of this article is twofold: First, this study presents the empirical results of the Donor of the Future project and discusses relevant differences between countries. Therewith, the nature of the article is rather practical than theoretical oriented. Nevertheless, we aim to integrate the topic in recent research and theory on blood donor management, and therewith, try to create awareness for a deeper knowledge on donor behavior issues. Second, we aim to identify future research topics for each area of change, and therewith, we provide new ideas for the blood donor management research community.

Against this background, our study makes three key contributions to blood donor management research. First, in contrast to previous studies that have examined individual present age factors relevant for blood donations, this study focuses on societal changes and future trends in blood donation behavior. Second, in contrast to previous studies on societal megatrends mostly focusing on one country or context [6-9], this study analyzes and discusses five areas of change among six countries. Third, by learning about changes influencing blood

donors, this study also contributes to the discussion on how to incentivize [10,11], recruit, and retain blood donor best [12-15].

## **Five Areas of Change**

Blood services accepted the need to recognize changing circumstances in society and try to react to new patterns and blood donation behavior. Therefore, we explain the five areas of change identified by DERG experts in a short overview, and therewith, frame our study:

**(1) Demographic change:** The demographic change is characterized by declining birth rates and an increasing life expectancy [16]. The shifting age-structure of the population is followed by a decreasing number of donors [1,17]. Additionally, the ethnical diversity of the population grows due to increasing migration [18]. However, many members of minority groups do not donate in their host country and most ethnic groups do not share the same blood characteristics [19], resulting in a shortage of minority blood types [20,21]. Consequently, the need for a more ethnically diverse blood donor pool grows [22].

**(2) Technological developments:** Technological developments ultimately change and improve the communication between donors and blood services [9]. Furthermore, the donation process can be simplified, as the pre-donation health history questionnaire can be completed online, and more donor health data can be stored [23]. Similarly, these technologies can be used to promote donation events online. Hence, it is important for blood services to know which technologies donors prefer.

**(3) Health innovations:** Health innovations create possibilities for blood services to offer diversified products and special health services, including health protecting solutions [1,24,25]. In contrast, these health innovations have the potential to expand donor requirements. The increasing mobility of individuals contains new risks for patients, such as new infections or identification of new pathogens [17]. The donation process may become stricter, resulting in

1 increasing donor loss [24]. Donors need to comply with more requirements but expect to donate  
2 without side effects [26]. An evaluation of how innovations affect donors is needed.

3       **(4) Public, behavioral, and attitudinal aspects:** Individualization is a process  
4 experienced by a population due to changing circumstances [1] and is defined with regard to  
5 personal identity, individual needs, and cultural norms [27]. Even if the general donation  
6 motives, such as awareness, reciprocity, and altruism [19] stay the same, other factors may  
7 change. Thus, a greater diversity of donors occurs. For instance, prior studies have shown the  
8 influence of family and peers on younger donors to donate for the first time [2,28,29]. Blood  
9 services want to know which special groups are important. In addition, a multicultural  
10 population [20] also results in a developing community. Migration leads to an intermixing of  
11 cultural norms and motives through the various population subgroups [30]. Blood services need  
12 to be aware of how the community's blood donation reasons change.

13       **(5) Political, economic, and environmental issues:** The World Health Organization  
14 (WHO) supports and promotes globally voluntary non-remunerated donations [31]. But prior  
15 studies show the stimulating effect of incentives [32] due to compensating effects [10,25]. On  
16 the other hand, previous studies provide evidence that incentives do not affect the quantity of  
17 blood donations [13]. Thus, various incentives are used, which provide a nonmonetary  
18 allowance [24,33]. However, not all incentives are positively perceived [34] and withdraw from  
19 using incentives may even cause negative consequences [13]. Blood services need to  
20 understand which incentives should be used or avoided in the future. Furthermore, incentives  
21 may not be the right tool to meet the blood product demand. A solution could be sharing blood  
22 products across borders [9], but blood services have to be aware of consequences for their donor  
23 bases.

# Materials and Methods

## Participants and procedure

In July 2014, the DERG cooperated with the University of Amsterdam and the University of Hamburg to conduct a survey to assess the identified changes from a blood donor perspective. Donors from eight blood services in six countries cooperated (Table 1).

[Table 1]

All blood services sent out the questionnaire to blood donors of their donor base aged between 17 and 50 years (identical for all blood services), whereby the required size was between 1,500 and 2,000 blood donors. Blood services were asked to send out as many questionnaires as needed to generate comparable sample sizes per country. The upper age limit guarantees a participant pool of donors who were able to donate at least the next 10 years. The questionnaire was mailed to about 47,000 donors, who received a reminder after two to three weeks. Participants were not offered an incentive, leading to a return rate of 16.3% (or 7,663 questionnaires). However, response rates differ between countries. Reasons might be the relationship of donors to the organizations or if donors are used to getting survey invitations. For example, in the Netherlands and Germany, where regularly surveys take place invited blood donors show the highest response rates. However, participating donors may have a generally higher possibility to keep donating in the future. As 493 respondents only answered an initial question and did not answer the questions regarding the five areas of change, the final sample consisted of 7,170 questionnaires. The sample's mean age was 36.3 years. More female donors (53.7%; n=3,848) participated. The majority (95.4%; n=6,843) were active donors. Of those, 81.7% (n=5,855) donate whole blood, 8.7% (n=624) double red cells, 5.3% (n=378) platelets, and 10.0% (n=719) plasma. The majority, 53.6% (n=3,845), stated to have donated up to three times, and 24.5% (n=1,756) donated six or more times. The sample characteristics can be found in Table 2, whereby the reader should keep in mind that the sample is not representative for the general population in each country (see limitations).

[Table 2]

## **Measurement**

The questionnaire was developed based on the insights the DERG gained from analyzing the five areas of change [5]. To increase the validity and to assess the effect of the five areas of change on blood donation behavior, the questionnaire was discussed and adjusted due to the feedback of DERG experts. The questionnaire started with an introduction, followed by the changing areas. (1) Demographic change was measured with three items related to age or ethnic background. (2) Technological developments were measured with twelve questions, focusing on information source, communication devices, or other developments. (3) Seven questions measured health innovations. Three questions covered the patients' perspective; four questions covered the donors' situation. (4) Nine questions covered the public, behavioral, and attitudinal aspects, containing donors' perspectives and expectation. (5) Political, economic, and environmental issues were measured with ten questions including various incentives and one question about sharing blood products across countries (see Table 3).

## **Statistical analysis**

To analyze the data, we used statistical software (SPSS, Version 21). All variables were descriptively analyzed. To compare the countries, we used univariate analyses of variance (ANOVAs), since the data shows variance homogeneity (significant Levene test results) and an approximate normal distribution (skewness and kurtosis values =  $|+/-3|$  and z-values =  $|+/-2.58|$ ). Answers with a score of 5 to 7 were considered to be positive; of 3 to 4.99 neutral; and of 2.99 to 1 negative. In addition, we adjusted for gender and age effects by using t-test for independent samples (Table 3). By using a median split approach, age was divided into two groups (younger: 17 to 36 years; older: 37 to 50 years).

## **Results**

The ANOVA results of the different countries illustrate significant differences. Due to the large sample size, these differences are only small prompting cautious interpretations.

[Table 3]

**(1) Demographic change:** The results show that all donors would appreciate a permissible age higher than the limit of 69 years. Donors from Australia (M=2.65), Canada (M=2.62), and the UK (M=2.61) would not approve a maximum age limit, whereas donors from Germany (M=3.09), the Netherlands (M=3.17), and the USA (M=3.58) rate this as neutral. For donors in the USA, this result is not surprising, because there is no upper age limit [35]. Overall, younger donors (M=3.28) evaluated a maximum age limit more positive than older donors (M=2.90). Regarding the registration of ethnic background, five countries rated this change positive. Only Germany indicated this registration neutral (M=4.51). Altogether, female donors (M=5.96) are more positive regarding the ethnic registration than male donors (M=5.60).

**(2) Technological developments:** Concerning the information source, five countries rated receiving information and support online neutral, whereas the Netherlands evaluated this as rather negative (M=2.91). Donors in the USA (M=5.02) and the UK (M=5.01) would like to be informed online at the website. Donors in the Netherlands (M=2.96) liked to be informed by social media less. Donors from the UK (M=5.04) and Australia (M=5.19) prefer receiving information via SMS. The possibility to be informed via e-mail was rated positively by all countries. Moreover, this item showed the highest mean values among all other sources. Clearly, younger donors show preference to being informed via website (M=4.68) and social media (M=3.91).

Regarding the communication device, all countries were positive towards a computer or laptop, whereas smartphones were rated positively by Australia (M=5.24), Canada (M=5.03), the UK (M=5.53), and the USA (M=5.07). Other new technologies were perceived neutrally by the countries, except for Germany, which evaluated this negatively (M=2.34). Overall, younger



1 donors show higher mean values regarding smartphone (M=5.02) and male donors are more  
2 open for new technologies (M=3.28).

3 Regarding other technological innovations, three countries evaluated the completion of  
4 the pre-donation questionnaire neutral, whereas Canada (M=5.19), the UK (M=5.26), and the  
5 USA (M=5.50) assessed this as positive. The need for more health data and the promotion of  
6 donation events online would not affect the future behavior. Regarding age, older donors prefer  
7 to complete the pre-health questionnaire online (M=4.91) and are more skeptical regarding  
8 online promotion (M=2.55).

9 **(3) Health innovations:** The country-specific “health innovation” results were more  
10 diversified. While four countries stated to be neutral about donating more if the need of patients  
11 increases, the Netherlands stated to be neutral towards stricter requirements (M=4.83). We  
12 found female donors to be more upset if requirements increase (M=5.25). However female  
13 (M=5.10) and younger donors (M=5.17) show higher mean values for “need of patients  
14 increase”. Donors from the Netherlands (M=5.15) and the USA (M=5.13) would support  
15 medical advances. This is also true for younger donors (M=4.97). Offering a health check  
16 stimulates donations in Germany (M=5.21), the Netherlands (M=5.00) and of younger donors  
17 (M=5.01). Donors from the Netherlands were skeptical about the invention of a needle-free  
18 donation method (M=2.89). However, younger donors would like to know how their blood was  
19 used (M=4.60).

20 **(4) Public, behavioral, and attitudinal aspects:** All countries evaluated the influence  
21 of family and celebrities as neutral. Regarding friends and colleagues, small but statistically  
22 significant differences were found. Donors in the Netherlands (M=2.97) and the UK (M=2.96)  
23 stated that friends have no influence. In Australia (M=2.99), Germany (M=2.74), the  
24 Netherlands (M=2.39), and the UK (M=2.53), colleagues had no influence. However, younger  
25 blood donors show higher mean values for family (M=4.34) and friends (M=3.82).

All countries expected a “better awareness of need” and to “feel better about themselves” as positively stimulating the population to donate. Donors in Canada, the UK, and the USA rated the “communal connection” and “medical advances” as positive. German donors evaluated “to make a difference in patients’ lives” as neutral ( $M=4.90$ ), and donors in the Netherlands assessed to “feel better about themselves” as neutral ( $M=4.80$ ). Overall, female donors evaluated a “better awareness of need” ( $M=5.66$ ), “medical advances” ( $M=5.03$ ), and “to make a difference in patients’ lives” ( $M=5.62$ ) as stronger reasons, while younger donors stated “make a difference in patients’ lives” ( $M=5.51$ ) and “feel better about themselves” ( $M=5.25$ ).

**(5) Political, economic, and environmental issues:** Blood donors in Canada and the USA generally have the same neutral opinion regarding incentives. Only “public recognition” was rated negatively, whereas “no reward” was rated positively. Australian donors assessed “payments” ( $M=2.51$ ), “discounts” ( $M=2.92$ ), “certificates” ( $M=2.70$ ), “vouchers” ( $M=2.93$ ), and “small gifts” ( $M=2.73$ ) as negative. Obtaining “certificates” ( $M=2.87$ ) was stated as negative by German donors, whereas “public recognition” ( $M=3.24$ ) had a neutral influence and “no reward” ( $M=4.13$ ) a positive one. Donors in the Netherlands valued “payment” ( $M=2.93$ ) negatively. A “paid blood donation” ( $M=2.66$ ) and “small gifts” ( $M=2.76$ ) were negatively evaluated by the UK. Sharing blood across borders was evaluated positively by all countries. Younger donors evaluate rewards ( $M=4.01$ ) and sharing blood products ( $M=5.58$ ) as more positive. Female donors are more positive towards no reward ( $M=5.26$ ).

## Discussion

Our study helps understanding better how global changes affect blood donations in Western countries. By elaborating the five areas, we present a theoretical background of future changes and shed light on current donors’ reactions to volatile conditions. Donors differ in some aspects

1 regarding the influence of the identified areas. Thus, a universal approach to improve donor  
2 management worldwide would not be applicable. Instead, different priorities between countries  
3 were uncovered. Here, the wide standard deviations of all results stress the need for a diversified  
4 approach.

5         The “demographic change” leads to an increasing proportion of older people, resulting  
6 in a decreasing potential to cover blood demands, because healthy donors of a certain age will  
7 leave the blood donation system [36]. Therefore, the upper age limit for donors was discussed  
8 earlier [37], but no uniform age restriction worldwide exists [38]. A first research stream should  
9 focus on the consequences for blood donors after reaching the maximum age and consequences  
10 for patients receiving blood from elderly donors. Because no upper age limit in the USA exists,  
11 other countries could learn from those experiences [35]. A second research stream should focus  
12 on the expectations of minority donors regarding the registration pattern and extrapolate the  
13 future demand for even more tailored products.

14         “Technological developments” are ubiquitous, and communication is developing  
15 continuously [9]. The implementation of new technologies always influences the service a  
16 blood service offers, and future research should focus on consequences of adopting innovations.  
17 A more diversified look at subgroups of donors, especially in a country-specific context, taking  
18 different levels of expertise and innovativeness into account, is needed. This is even more  
19 relevant since younger donors are more open regarding smartphone, tablet, and social media.  
20 The second research domain should focus on how implementing innovative technologies is  
21 experienced by donors to improve the service and to influence donor recruitment positively. As  
22 some blood services already have several existing new technologies -such as social media- in  
23 use, blood services which donors evaluated these technologies less preferable (for example  
24 from the Netherlands), should try to learn from more successful blood services. Surprisingly,  
25 the possibility to complete the pre-donation health questionnaire online, shows the smallest  
26 value for Australian donors, although blood donors have the opportunity to check out sample

1 questions online. However, older blood donors are in general more open to this service. Thus,  
2 before implementing this technology, it needs to be evaluated in detail.

3 “Health innovations” offer possibilities in securing the future blood need. Although  
4 previous research mainly focused on improving marketing tools [7,11], an understanding of  
5 how changing requirements should be communicated is important. As in other studies donors  
6 are willing to donate blood to meet patients’ needs [15], but they would be disappointed if they  
7 were no longer able to donate, and this is even stronger for female donors. Further research  
8 should evaluate different communication forms to counteract negative donors’ reactions.  
9 Second, the results are clear about the benefits for donors resulting from health innovations.  
10 Future research should focus on the needs and values of specific subgroups [12]. Integrating  
11 clearly defined benefits for donors in recruitment tools may increase donations.

12 Regarding “public, behavioral, and attitudinal aspects,” previous research suggests that  
13 social pressure from friends and peers and using celebrities in campaigns can trigger blood  
14 donations [12,27,28]. Our results do not allow for such overall conclusion. Only younger blood  
15 donors are more likely to be influenced by family and friends, which is in line with prior studies  
16 [2]. Future research should analyze how the influence of acquaintances changes during the  
17 donor’s career. There are indicators of a greater influence at the beginning of the donation  
18 career, which decreases over time. Additionally, previous research suggests that generational  
19 motives may influence donations [28]. Thus, future research needs to understand generational  
20 differences.

21 Related to “political, economic, and environmental issues”, research should evaluate the  
22 country-specific influence of incentives. For example, donors from Germany and the USA,  
23 where there are partially paid blood donations, rated “rewards” and “payment” higher. Although  
24 the participating blood services do not reveal any payment for donations, the acceptance of  
25 monetary rewards in these countries seems to be higher, which was also documented for other  
26 countries [34]. Furthermore, male and younger donors are in general more open to rewards,

1 which is also in line with results of other studies [2,10,13]. Analyzing whether a subgroup of  
2 donors tends to shorten its donation interval in order to obtain an incentive would be interesting.  
3 In the case of a confirmation, blood services could use this to alleviate shortages in the blood  
4 supply. Another approach to avoid shortages is sharing blood products across borders,  
5 especially since many European countries are still unable to collect enough plasma to be self-  
6 sufficient [39]. Because there is still reluctance regarding blood products from other countries  
7 researchers should deal with such views in two ways. First, knowledge about existing country-  
8 specific biases is needed. Second, an understanding of the consequences of trading blood  
9 products is important.

10 Our results suggest that blood services need to be flexible to integrate new service  
11 strategy and to meet the donors' high requirements. Although, this study was based on active  
12 blood donors, sufficient approaches to secure the future blood supply with the help of loyal,  
13 regular donors are provided. However, future studies should evaluate non-donors to enhance  
14 recruitment strategies.

15 Our study has some limitations. The number of changes was limited. Since literature  
16 reveals many possible changes, which are not always independent, an influence of "side trends"  
17 cannot be precluded [6]. Further research should derive cross-relationships and their effect on  
18 blood donor management. The number of respondents per country differed greatly. In addition,  
19 our sample is not representative regarding age, gender and donation number. Although the  
20 sample size is large, this cannot compensate the representative issue. Furthermore, the self-  
21 selected sample consists only of donors aged 17 to 50 years to gain a future perspective. For a  
22 thorough comparison, a similar and representative number of participants should be ensured.  
23 The DERG survey considered the effect from a practical perspective. Further research should  
24 assess actual effects on the donor base.

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**TABLE 1. Participating countries and organizations**

Country	Blood service	Participants	Response rate
Australia (AU)	Australian Red Cross Blood Service	1,522	14.94
Canada (CA)	Canadian Blood Services	851	17.02
Germany (GER)	German Red Cross Blood Donor Service North-East	1,412	30.11
	German Red Cross Blood Donor Service Baden-Wuerttemberg-Hessen		
The Netherlands (NL)	Sanquin Blood Supply	1,351	33.80
United Kingdom (UK)	NHS Blood and Transplant	305	15.25
United States of America (USA)	American Red Cross	2,221	10.58
	America's Blood Centers		

**TABLE 2. Sample characteristics**

	Total	AU	CA	GER	NL	UK	USA
Number	7,170	1,432	814	1,289	1,264	288	2,083
%	100	20.0	11.4	18.0	17.6	4.0	29.1
Gender							
Male	2,878	606	308	527	561	98	778
Female	3,848	767	461	662	643	117	1,138
Not stated	444	59	45	85	60	13	167
Age							
17–24	996	182	164	280	188	27	155
25–34	1,855	236	199	456	361	83	520
35–44	1,958	205	205	415	359	91	683
45–50	1,764	606	199	32	298	74	555
Not stated	597	203	47	106	58	13	170
Country of birth							
Same as organizational location	6,255	1,105	675	1,106	1,164	252	1,813
Other	362	253	86	33	35	21	95
Not stated	553	74	53	150	65	36	175
Do you (still) donate blood?							
Yes	6,843	1,389	778	1,216	1,191	277	1,992
No	217	27	16	66	60	8	40
Not stated	110	16	20	7	13	3	51
What do (did) you usually donate? (multiple answers possible)							
Whole blood	5,855	1,195	726	1,140	965	260	1,569
Double red cells or red cells	624	-	10	7	4	1	602
Platelets	378	53	15	8	18	5	279
Plasma	719	302	16	58	200	0	143
Don't know or unsure	487	39	91	136	132	29	60
How many times did you donate in 2013?							
0 times	727	165	110	156	153	33	110
Once	909	139	106	277	150	45	192
2 times	1,378	185	161	329	220	49	424
3 times	1,558	302	121	206	239	80	610
4 times	962	292	105	183	118	27	237
5 times	362	44	73	44	114	5	82
6 or more times	432	124	56	33	101	6	112
Don't know or unsure	838	178	82	61	169	33	315
Not stated	4	3	0	0	0	0	1

**TABLE 3. Five areas of change - mean values, standard deviations, and ANOVA results**

	Total M (SD)	AU M (SD)	CA M (SD)	GER M (SD)	NL M (SD)	UK M (SD)	USA M (SD)	Gender Male vs. Female	Age Younger vs. Older
<b>Demographic change</b>									
If I can, I'd be happy to continue donating when I am over 69.	5.99 (1.499)	6.30 <sup>b</sup> (1.220)	6.16 <sup>b</sup> (1.359)	5.66 <sup>c</sup> (1.670)	5.81 <sup>d</sup> (1.529)	6.30 <sup>b</sup> (1.404)	5.96 <sup>a</sup> (1.522)	5.99<6.00 n.s.	5.90<6.09***
I would approve a maximum age limit to donate blood. <sup>R</sup>	3.09 (1.935)	2.65 <sup>b</sup> (1.776)	2.62 <sup>b</sup> (1.674)	3.09 <sup>c</sup> (1.994)	3.17 <sup>c</sup> (1.882)	2.61 <sup>b</sup> (1.764)	3.58 <sup>a</sup> (2.025)	3.00<3.11*	3.28>2.90***
I have no objection when my ethnic background is recorded, which may better meet future patient needs for specific ethnicity-related blood products.	5.78 (1.797)	6.24 <sup>c</sup> (1.427)	6.18 <sup>a,c</sup> (1.466)	4.51 <sup>d</sup> (2.284)	5.72 <sup>e</sup> (1.729)	6.53 <sup>b</sup> (1.164)	6.04 <sup>a</sup> (1.520)	5.60<5.96*	5.68<5.90***
<b>Technological developments</b>									
I am likely to donate more in the future because of more online information and support being available.	3.95 (1.803)	4.02 <sup>b</sup> (1.664)	4.13 <sup>b</sup> (1.683)	3.52 <sup>c</sup> (1.760)	2.91 <sup>d</sup> (1.637)	4.23 <sup>b</sup> (1.634)	4.67 <sup>a</sup> (1.722)	3.90<3.98 n.s.	3.97>3.93 n.s.
I would prefer to be informed about blood donation events in the future									
...online at the website of the blood service.	4.61 (1.944)	4.32 <sup>b</sup> (1.894)	4.89 <sup>a</sup> (1.810)	4.31 <sup>b</sup> (2.117)	4.24 <sup>b</sup> (1.909)	5.01 <sup>a</sup> (1.844)	5.02 <sup>a</sup> (1.839)	4.45<4.72***	4.68>4.54**
...by social media (e.g. Facebook, Twitter).	3.59 (2.141)	3.46 <sup>b</sup> (2.024)	4.01 <sup>a</sup> (2.181)	3.18 <sup>c</sup> (2.208)	2.96 <sup>d</sup> (1.856)	3.96 <sup>a</sup> (2.163)	4.09 <sup>a</sup> (2.150)	3.37<3.73***	3.91>3.27***
...by SMS/text messaging.	4.11 (2.228)	5.19 <sup>b</sup> (1.853)	3.79 <sup>c</sup> (2.188)	3.43 <sup>d</sup> (2.294)	3.39 <sup>d</sup> (2.101)	5.04 <sup>b</sup> (1.939)	4.27 <sup>a</sup> (2.194)	4.10<4.13 n.s.	3.97>4.24***
...by e-mail.	5.63 (1.663)	5.86 <sup>b</sup> (1.387)	5.87 <sup>b</sup> (1.517)	5.65 <sup>a</sup> (1.872)	5.15 <sup>c</sup> (1.793)	6.02 <sup>b</sup> (1.380)	5.61 <sup>a</sup> (1.639)	5.66>5.65 n.s.	5.51<5.78***
...through computer or laptop.	5.35 (1.721)	5.56 <sup>a,b</sup> (1.506)	5.67 <sup>b</sup> (1.516)	5.09 <sup>c</sup> (2.045)	4.98 <sup>c</sup> (1.767)	5.64 <sup>a,b</sup> (1.534)	5.44 <sup>a</sup> (1.647)	5.35<5.39n.s.	5.30<5.43**
...through smartphone.	4.89 (2.031)	5.24 <sup>a,b</sup> (1.881)	5.03 <sup>a,b</sup> (1.995)	4.37 <sup>c</sup> (2.352)	4.50 <sup>c</sup> (2.076)	5.53 <sup>b</sup> (1.748)	5.07 <sup>a</sup> (1.972)	4.96>4.85*	5.02>4.79***
...through tablet.	4.20 (2.131)	4.36 <sup>a</sup> (2.008)	4.50 <sup>a</sup> (2.065)	3.38 <sup>c</sup> (2.292)	4.13 <sup>d</sup> (2.060)	4.97 <sup>b</sup> (1.916)	4.43 <sup>a</sup> (2.057)	4.29>4.14**	4.22>4.21 n.s.
...through other new technologies (e.g. google glasses)	3.15 (1.993)	3.20 <sup>b</sup> (1.884)	3.44 <sup>a</sup> (2.004)	2.34 <sup>b</sup> (1.832)	3.04 <sup>c</sup> (1.872)	3.68 <sup>a</sup> (1.987)	3.51 <sup>a</sup> (2.087)	3.28>3.04***	3.19>3.11 n.s.
I would prefer to complete the pre-donation health history questionnaire online in the future.	4.76 (2.014)	4.61 <sup>b</sup> (1.919)	5.19 <sup>a</sup> (1.867)	4.20 <sup>c</sup> (2.200)	4.84 <sup>d</sup> (1.960)	5.26 <sup>a</sup> (1.685)	5.50 <sup>a</sup> (1.734)	4.74<4.78 n.s.	4.64<4.91***
I would donate blood less in the future if blood services									
...promoted donation online (e.g. tweets, games, postings). <sup>R</sup>	2.41 (1.613)	2.89 <sup>c</sup> (1.689)	2.54 <sup>b</sup> (1.599)	2.21 <sup>a,d</sup> (1.653)	2.16 <sup>d</sup> (1.411)	2.35 <sup>a,b</sup> (1.502)	2.32 <sup>a</sup> (1.599)	2.49>2.35***	2.23<2.55***
...required more health data about me. <sup>R</sup>	2.52 (1.632)	2.26 <sup>b</sup> (1.530)	2.26 <sup>b</sup> (1.498)	2.89 <sup>a</sup> (1.773)	2.26 <sup>b</sup> (1.394)	2.05 <sup>b</sup> (1.395)	2.79 <sup>a</sup> (1.733)	2.61>2.43***	2.53>2.49 n.s.

**Table 3. Continued**

<b>Health innovations</b>									
I would donate blood more often in the future if									
...the blood needs of patients increased.	5.01 (1.781)	4.79 <sup>b</sup> (1.840)	4.80 <sup>b</sup> (1.864)	4.54 <sup>c</sup> (1.928)	5.30 <sup>a</sup> (1.551)	4.96 <sup>b</sup> (1.834)	5.36 <sup>a</sup> (1.629)	4.89<5.10***	5.17>4.87***
...it was made clear that more donations were needed to support medical advances.	4.86 (1.773)	4.82 <sup>b</sup> (1.791)	4.74 <sup>b</sup> (1.816)	4.22 <sup>c</sup> (1.891)	5.15 <sup>a</sup> (1.584)	4.92 <sup>b</sup> (1.743)	5.13 <sup>a</sup> (1.676)	4.77<4.92**	4.97>4.76***
I would be disappointed if I couldn't donate in the future because of stricter requirements for blood donation.	5.15 (1.837)	5.15 <sup>c</sup> (1.822)	5.16 <sup>a,c</sup> (1.842)	5.05 <sup>c</sup> (1.942)	4.83 <sup>d</sup> (1.789)	5.66 <sup>b</sup> (1.597)	5.33 <sup>a</sup> (1.804)	5.02<5.25***	5.22>5.09**
I would donate more in the future if blood services offer health checks.	4.78 (1.779)	4.59 <sup>a,b</sup> (1.736)	4.38 <sup>b</sup> (1.681)	5.21 <sup>c</sup> (1.804)	5.00 <sup>d</sup> (1.689)	4.53 <sup>a,b</sup> (1.791)	4.72 <sup>a</sup> (1.815)	4.85>4.74*	5.01>4.60***
It would have a great positive influence on my future blood donation behavior if									
...donating was less time-consuming.	3.93 (2.071)	3.71 <sup>c</sup> (2.010)	4.50 <sup>a</sup> (2.049)	3.51 <sup>d</sup> (2.115)	3.38 <sup>d</sup> (1.945)	4.06 <sup>b</sup> (2.317)	4.43 <sup>a</sup> (1.990)	4.02>3.87**	3.91<3.98 n.s.
...a needle-free method was invented.	3.60 (2.061)	3.72 <sup>b</sup> (2.007)	3.95 <sup>a,b</sup> (2.015)	3.08 <sup>c</sup> (2.101)	2.89 <sup>c</sup> (1.851)	3.85 <sup>a,b</sup> (2.057)	4.10 <sup>a</sup> (2.024)	3.54<3.64 n.s.	3.61>3.59 n.s.
...I was told how my blood was used.	4.20 (2.004)	4.09 <sup>b</sup> (1.905)	4.57 <sup>a</sup> (1.989)	4.40 <sup>a</sup> (2.105)	3.47 <sup>c</sup> (1.879)	4.53 <sup>a,b</sup> (2.053)	4.47 <sup>a</sup> (1.960)	4.11<4.28**	4.60>3.86***
<b>Public, behavioral, and attitudinal aspects</b>									
Who would have a great influence on your future blood donation behavior?									
My family.	4.22 (2.201)	4.02 <sup>d</sup> (2.219)	4.42 <sup>c</sup> (2.186)	4.17 <sup>d</sup> (2.309)	3.58 <sup>b</sup> (2.052)	3.68 <sup>b</sup> (2.255)	4.80 <sup>a</sup> (2.054)	4.20<4.23 n.s.	4.34>4.13***
My friends.	3.58 (2.062)	3.36 <sup>d</sup> (1.988)	3.63 <sup>c</sup> (2.097)	3.58 <sup>c</sup> (2.142)	2.97 <sup>b</sup> (1.830)	2.96 <sup>b</sup> (1.863)	4.18 <sup>a</sup> (2.050)	3.58>3.57 n.s.	3.82>3.37***
My colleagues.	3.05 (1.897)	2.99 <sup>d</sup> (1.812)	3.19 <sup>c</sup> (1.955)	2.74 <sup>b</sup> (1.853)	2.39 <sup>e</sup> (1.532)	2.53 <sup>b,e</sup> (1.652)	3.71 <sup>a</sup> (1.983)	3.11>2.99*	3.11>3.00*
Celebrities/public figures.	1.99 (1.456)	2.07 <sup>d</sup> (1.368)	1.94 <sup>d</sup> (1.448)	1.61 <sup>b</sup> (1.226)	1.83 <sup>d</sup> (1.256)	1.80 <sup>b,d</sup> (1.253)	2.32 <sup>a</sup> (1.697)	2.07>1.92***	1.96<2.02 n.s.
I believe more people will donate blood in the future because									
...of better awareness of the need.	5.56 (1.400)	5.58 <sup>b</sup> (1.323)	5.60 <sup>b</sup> (1.366)	5.05 <sup>c</sup> (1.709)	5.79 <sup>a</sup> (1.141)	5.55 <sup>b</sup> (1.352)	5.69 <sup>a,b</sup> (1.335)	5.41<5.66***	5.55<5.57 n.s.
...of greater connection with the community.	4.89 (1.636)	5.13 <sup>c</sup> (1.494)	5.16 <sup>c</sup> (1.537)	4.17 <sup>d</sup> (1.796)	4.42 <sup>b</sup> (1.564)	4.62 <sup>b</sup> (1.543)	5.39 <sup>a</sup> (1.475)	4.86<4.91 n.s.	4.81<4.97***
...of more medical advances, which require blood to extend patients' lives.	4.95 (1.588)	5.11 <sup>c</sup> (1.478)	5.00 <sup>c</sup> (1.530)	4.24 <sup>d</sup> (1.733)	4.68 <sup>b</sup> (1.529)	4.90 <sup>b,c</sup> (1.486)	5.43 <sup>a</sup> (1.441)	4.84 5.03 ***	4.89 5.01 **
...they want to make a difference in patients' lives.	5.50 (1.421)	5.59 <sup>b,c</sup> (1.327)	5.71 <sup>a,c</sup> (1.309)	4.90 <sup>e</sup> (1.726)	5.40 <sup>d</sup> (1.298)	5.44 <sup>b,d</sup> (1.410)	5.81 <sup>a</sup> (1.268)	5.33<5.62***	5.51>5.49n.s.
...they want to feel better about themselves.	5.19 (1.519)	5.25 <sup>b,c</sup> (1.458)	5.40 <sup>a,c</sup> (1.447)	5.02 <sup>d</sup> (1.626)	4.80 <sup>e</sup> (1.518)	5.09 <sup>b,d</sup> (1.453)	5.42 <sup>a</sup> (1.469)	5.15<5.22*	5.25>5.14**

**Table 3. Continued**

<b>Political, economic, and environmental issues</b>									
I believe donors in the future should be rewarded.	3.80 (2.041)	3.02 <sup>b</sup> (1.885)	3.22 <sup>b,c</sup> (1.931)	4.35 <sup>d</sup> (2.014)	3.27 <sup>c</sup> (1.885)	3.07 <sup>b,c</sup> (1.866)	4.60 <sup>a</sup> (1.920)	3.92>3.72***	4.01>3.62***
I would donate in the future if I received									
...payment.	3.22 (2.222)	2.51 <sup>b</sup> (1.940)	3.05 <sup>c</sup> (2.220)	3.62 <sup>a</sup> (2.261)	2.93 <sup>c</sup> (2.072)	2.66 <sup>b,c</sup> (2.041)	3.80 <sup>a</sup> (2.298)	3.36>3.11***	3.66>2.86***
...time off work.	3.81 (2.226)	3.23 <sup>b</sup> (2.109)	3.76 <sup>c</sup> (2.238)	4.07 <sup>a</sup> (2.271)	3.76 <sup>c</sup> (2.184)	3.44 <sup>b,c</sup> (2.173)	4.14 <sup>a</sup> (2.217)	3.87>3.75*	4.18>3.51***
...discounts.	3.57 (2.158)	2.92 <sup>b</sup> (2.002)	3.50 <sup>d</sup> (2.196)	3.65 <sup>d</sup> (2.147)	3.16 <sup>c</sup> (2.033)	3.07 <sup>b,c</sup> (2.000)	4.35 <sup>a</sup> (2.113)	3.66>3.51**	3.94>3.28***
...certificates.	3.33 (2.122)	2.70 <sup>d</sup> (1.878)	3.35 <sup>b</sup> (2.150)	2.87 <sup>c,d</sup> (1.999)	3.17 <sup>b</sup> (2.033)	3.12 <sup>b,c</sup> (2.017)	4.19 <sup>a</sup> (2.144)	3.45>3.24***	3.63>3.10***
...voucher.	3.59 (2.139)	2.93 <sup>b</sup> (1.994)	3.38 <sup>c</sup> (2.151)	3.81 <sup>d</sup> (2.074)	3.07 <sup>b</sup> (1.991)	3.01 <sup>b</sup> (1.940)	4.43 <sup>a</sup> (2.093)	3.64>3.56 n.s.	3.95>3.32***
...small gifts at the time of donation.	3.49 (2.108)	2.73 <sup>b</sup> (1.890)	3.16 <sup>c</sup> (2.043)	4.04 <sup>a</sup> (2.081)	3.09 <sup>c</sup> (1.983)	2.76 <sup>b</sup> (1.927)	4.16 <sup>a</sup> (2.107)	3.55>3.43*	3.87>3.17***
...public recognition.	2.87 (1.960)	2.58 (1.802)	2.73 <sup>b,c</sup> (1.881)	3.24 <sup>d</sup> (2.089)	2.81 <sup>a,b</sup> (1.921)	2.75 <sup>a,b,c</sup> (1.908)	2.95 <sup>a</sup> (2.009)	3.07>2.72***	3.14>2.65***
...no reward.	5.11 (1.978)	5.59 <sup>b</sup> (1.774)	5.58 <sup>b</sup> (1.775)	4.13 (2.211)	5.25 <sup>d</sup> (1.817)	5.68 <sup>b</sup> (1.675)	5.01 <sup>a</sup> (1.949)	4.90<5.26***	5.07<5.13 n.s.
I would continue to donate in the future even if blood components were shared across borders to help patients in other countries.	5.39 (1.918)	5.69 <sup>c</sup> (1.758)	5.51 <sup>b,c</sup> (1.952)	5.69 <sup>c</sup> (1.865)	5.22 <sup>a</sup> (1.720)	5.33 <sup>a,b</sup> (1.980)	5.08 <sup>a</sup> (2.087)	5.39<5.40 n.s.	5.58>5.21***

Significant differences ( $p < .001$ ) using ANOVA and REGWF post hoc test ( $p < .05$ ). <sup>a,b,c,d,e</sup> Means that shared superscripts are not significantly different ( $p > .05$ ).

Controls: Age differences were detected by using median split. Significant differences using t-test for independent samples:  $p < .001$ \*\*\*;  $p < .01$ \*\*;  $p < .05$ \*; n.s.=not significant

Measured on a 7-Point Likert scale from 1= strongly disagree to 7= strongly agree.

<sup>R</sup>Reverse coded items.