

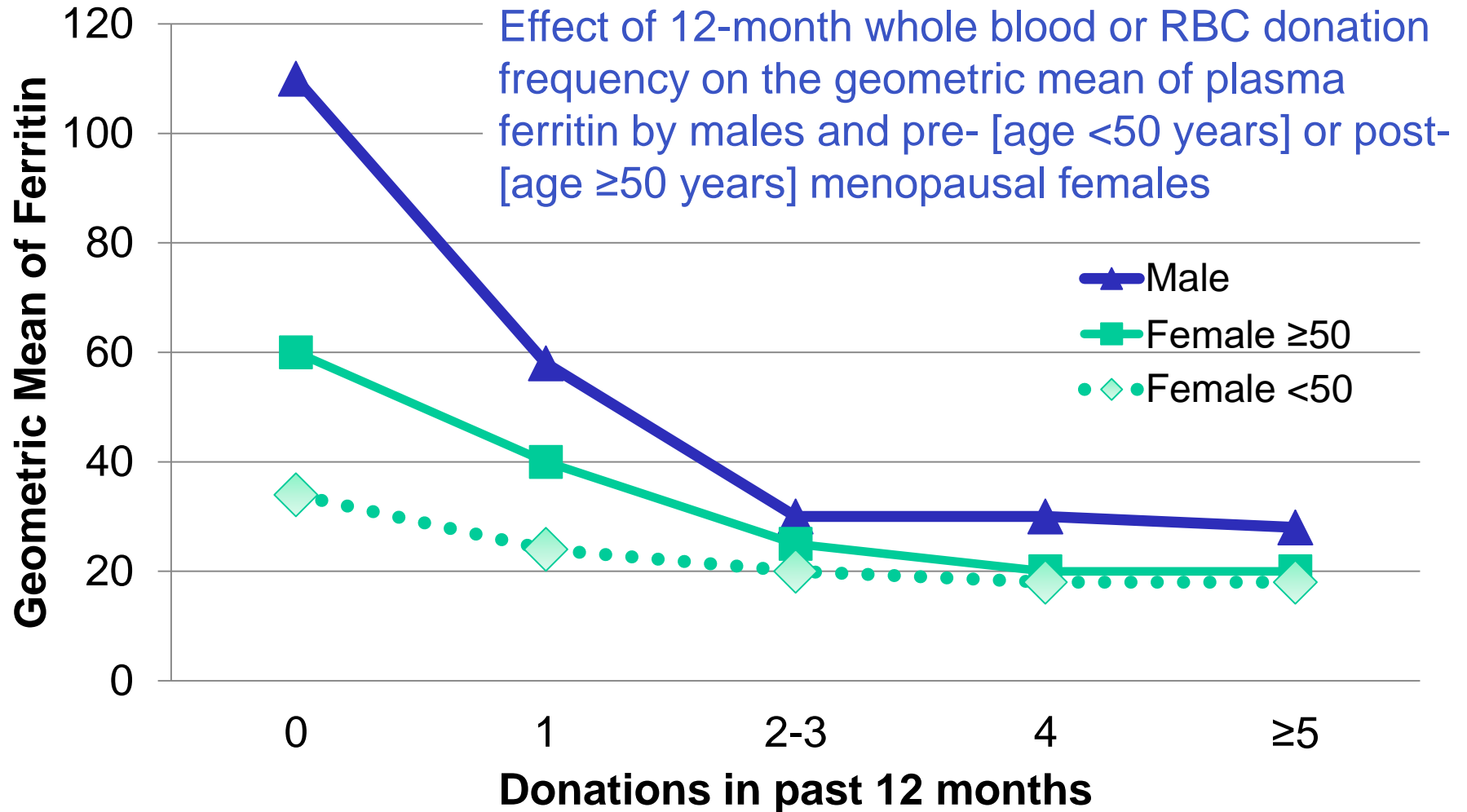
Strategies on Protection of Iron Stores in Plasma Donors

Toby L. Simon, MD
Senior Medical Director
CSL Behring

With acknowledgement to George Schreiber,
PPTA

- Source Plasma (SP) donation is associated with little red blood cell (RBC) loss; there is no information on iron status for frequent SP donors.
- Despite little RBC loss, questions about accumulated loss over a large number of donations were raised during the November 2011 FDA Workshop on Hemoglobin Standards and Maintaining Adequate Iron Stores in Blood Donors.
 - SP industry decided to conduct a large cohort study of the association between frequent donation and ferritin levels

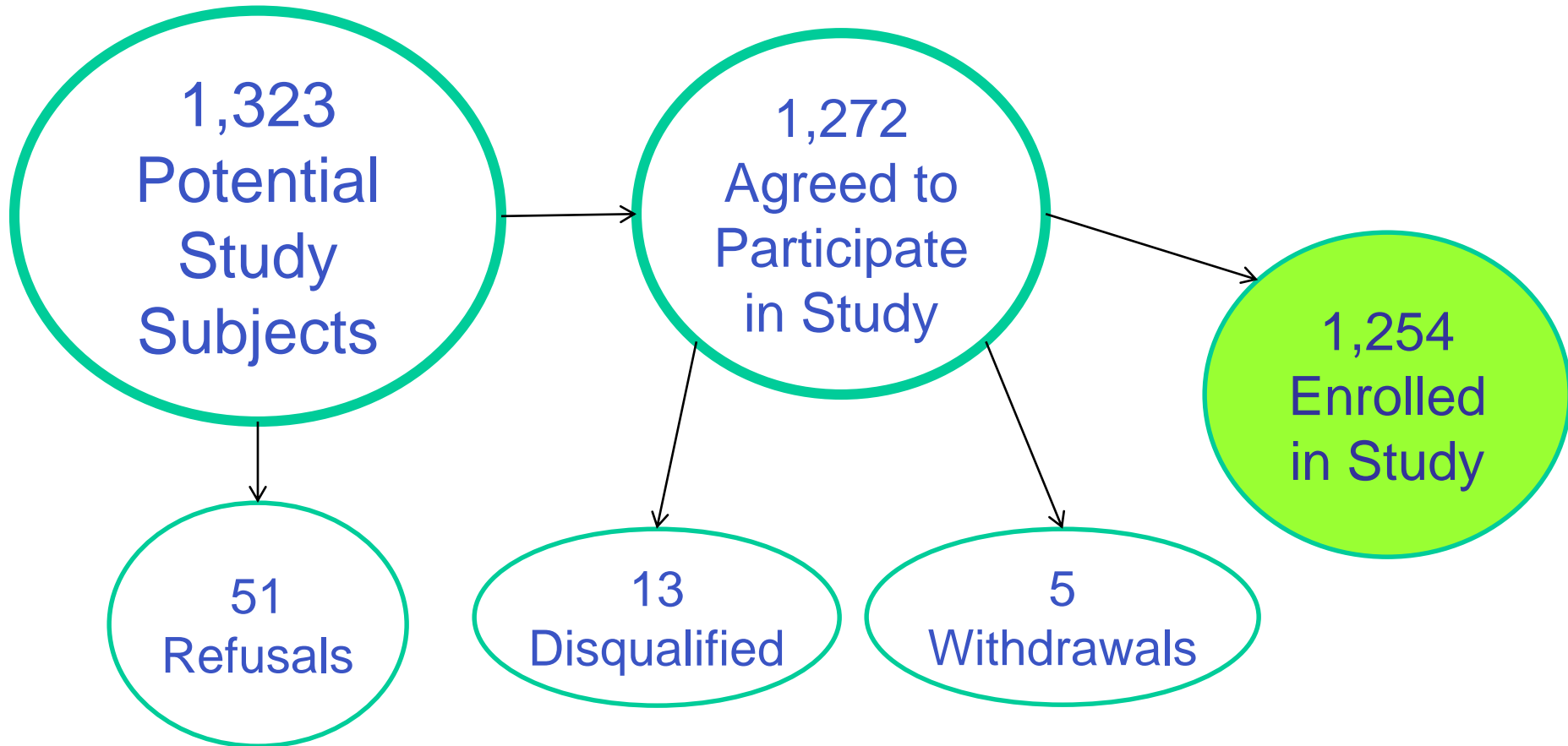
Whole Blood Donors



Cable RG, Glynn SA, Kiss JE et al. for the NHLBI Retrovirus Epidemiology Donor Study-II (REDS-II). Iron deficiency in blood donors: analysis of enrollment data from the REDS-II Donor Iron Status Evaluation (RISE) study. *Transfusion* 2011; 51: 511-22.

Ferritin Levels in Plasma Donors (FLIPD) Study

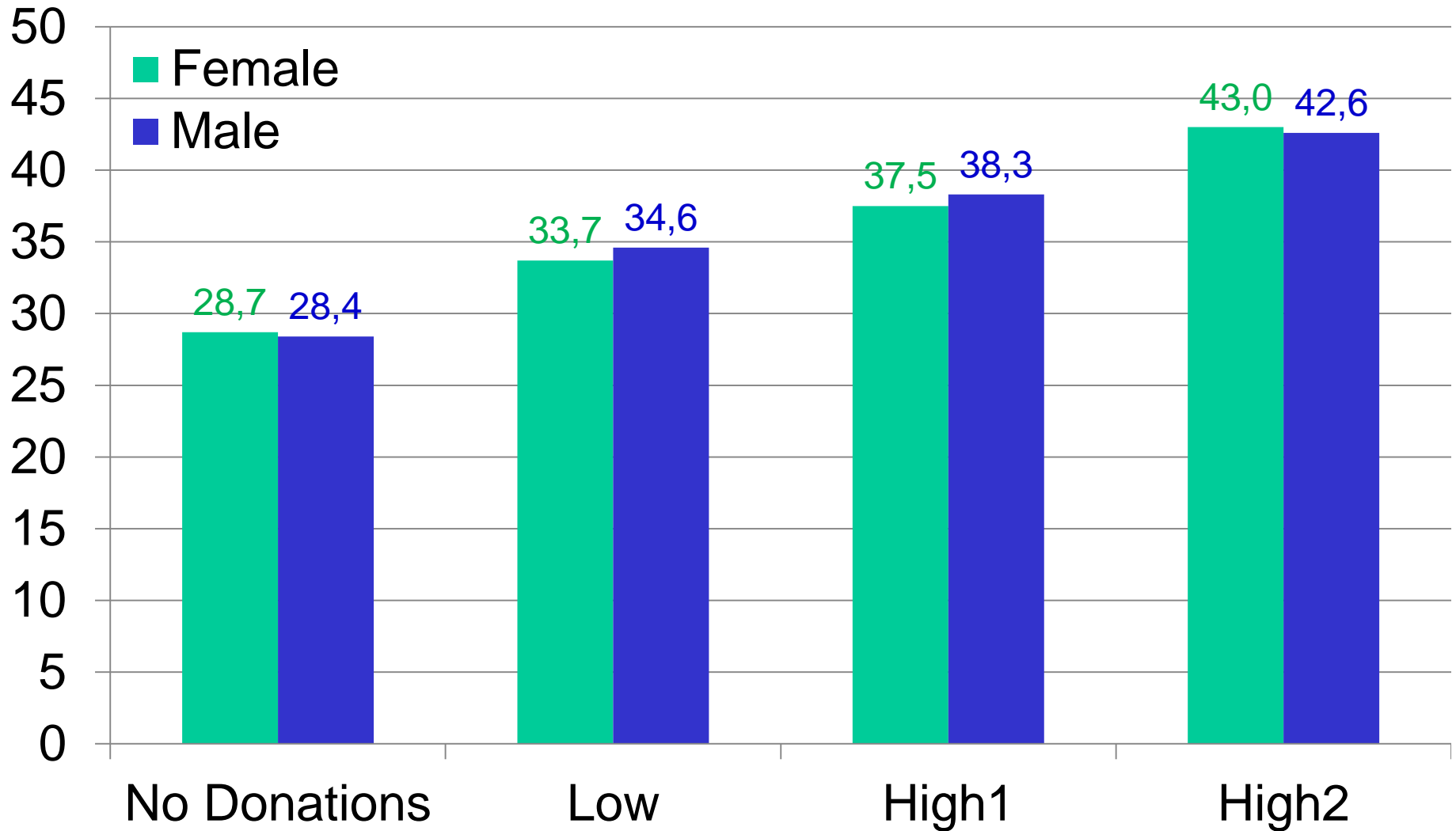
- Examine ferritin levels in SP donors associated with donation frequency
- Protocol received independent IRB approval
- Donors administered informed consent
- Conducted as a delinked cohort study
- Three companies participated (Biolife Plasma Services, CSL Plasma and Grifols)



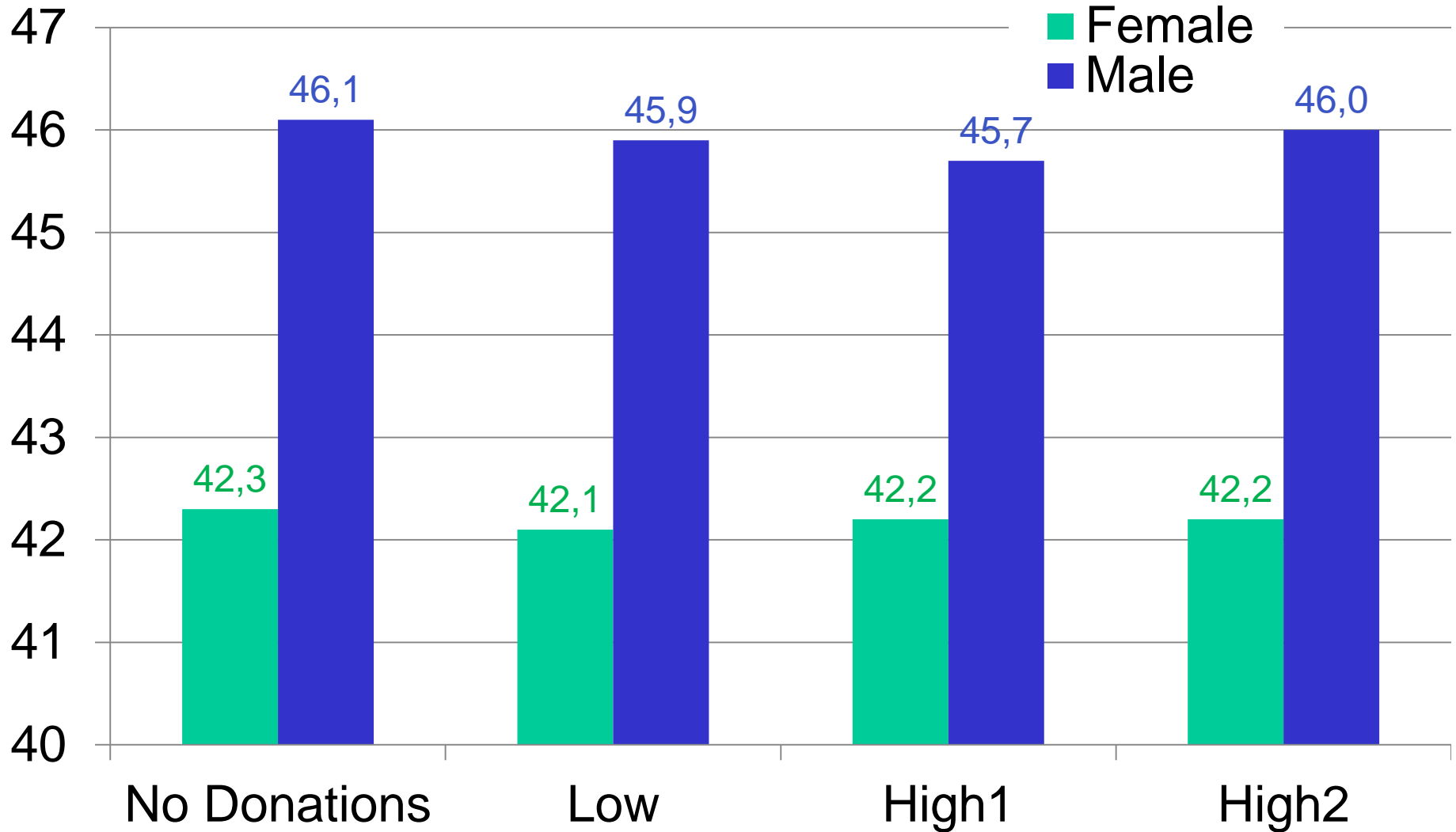
4 Donor Frequency Groups

Donor Frequency Group	# Donations Prior 12 Months	# Enrolled in Study	Female	Male
No Prior Donations ("No Donations")	0	309	164 (53%)	145 (47%)
Low Frequency Donors ("Low")	1-24	306	168 (55%)	138 (45%)
High Frequency Donors ("High1")	25-69	342	181 (53%)	161 (47%)
High Frequency Donors ("High2")	≥70	297	156 (53%)	141 (47%)
ALL	ANY	1254	669 (53%)	585 (47%)

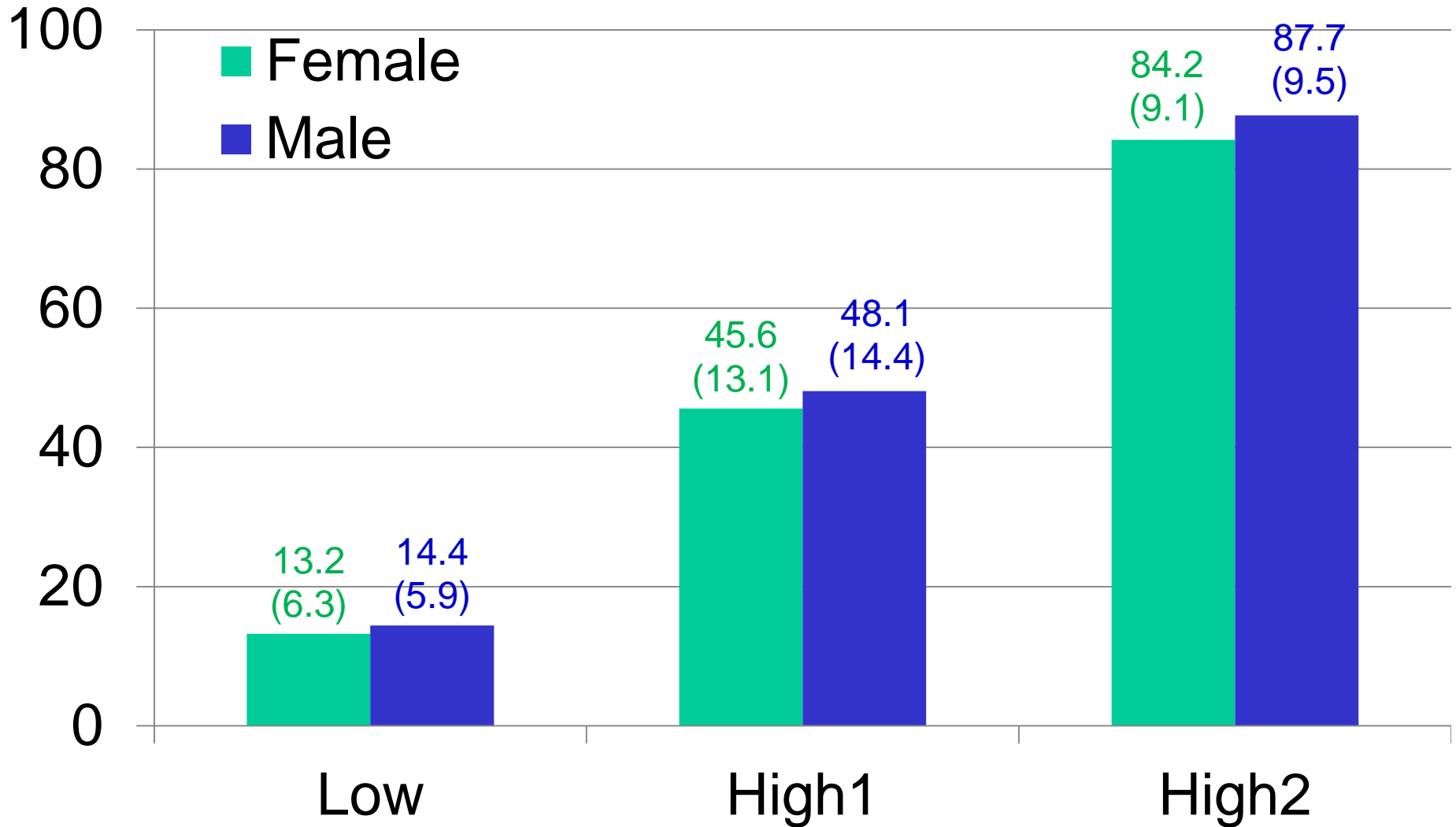
Age (years) – Mean



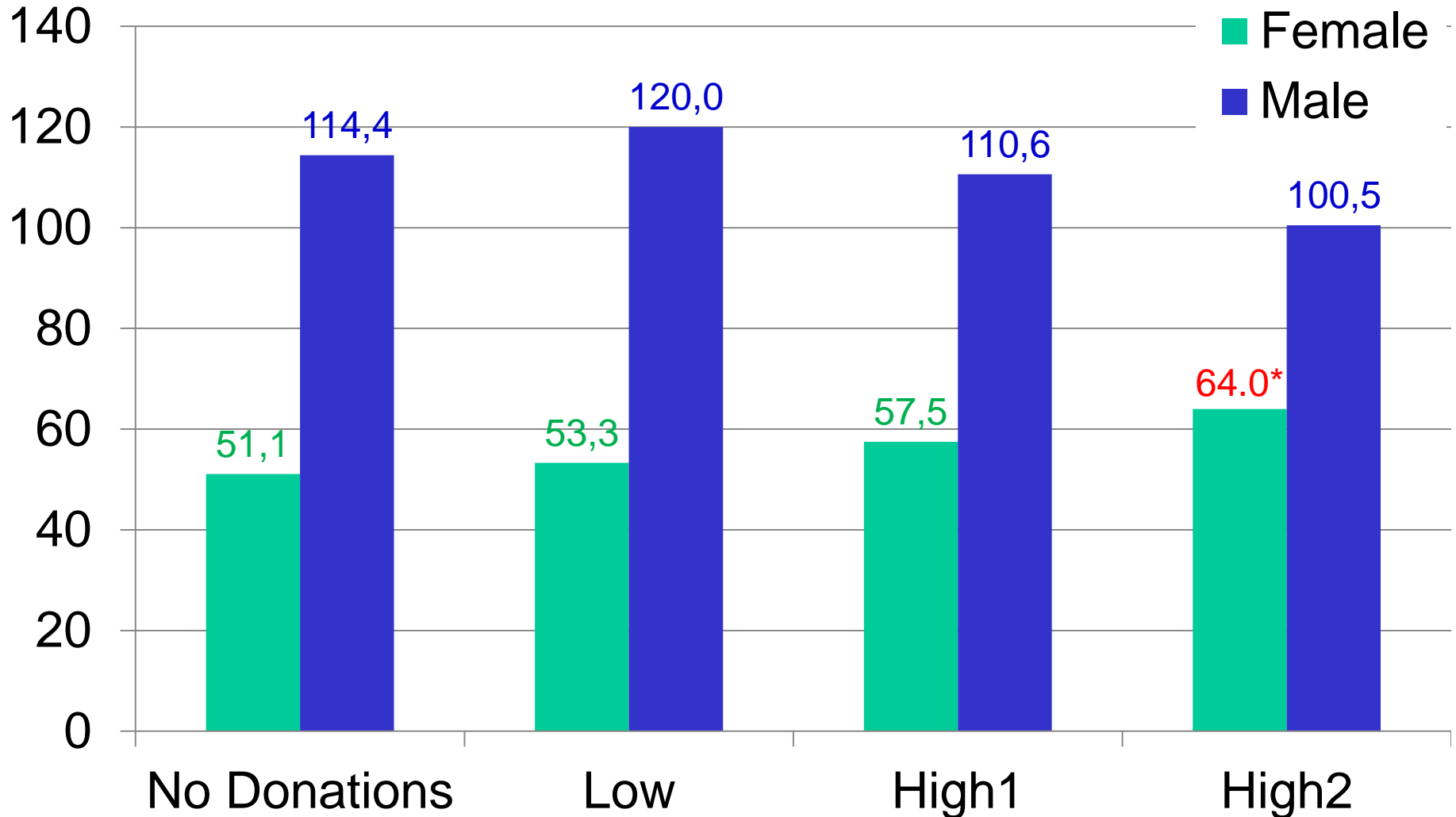
Baseline Hematocrit (%) – Mean



SP Donations in Prior 12 Months – Mean (SD)



Ferritin (ng/mL) – Mean



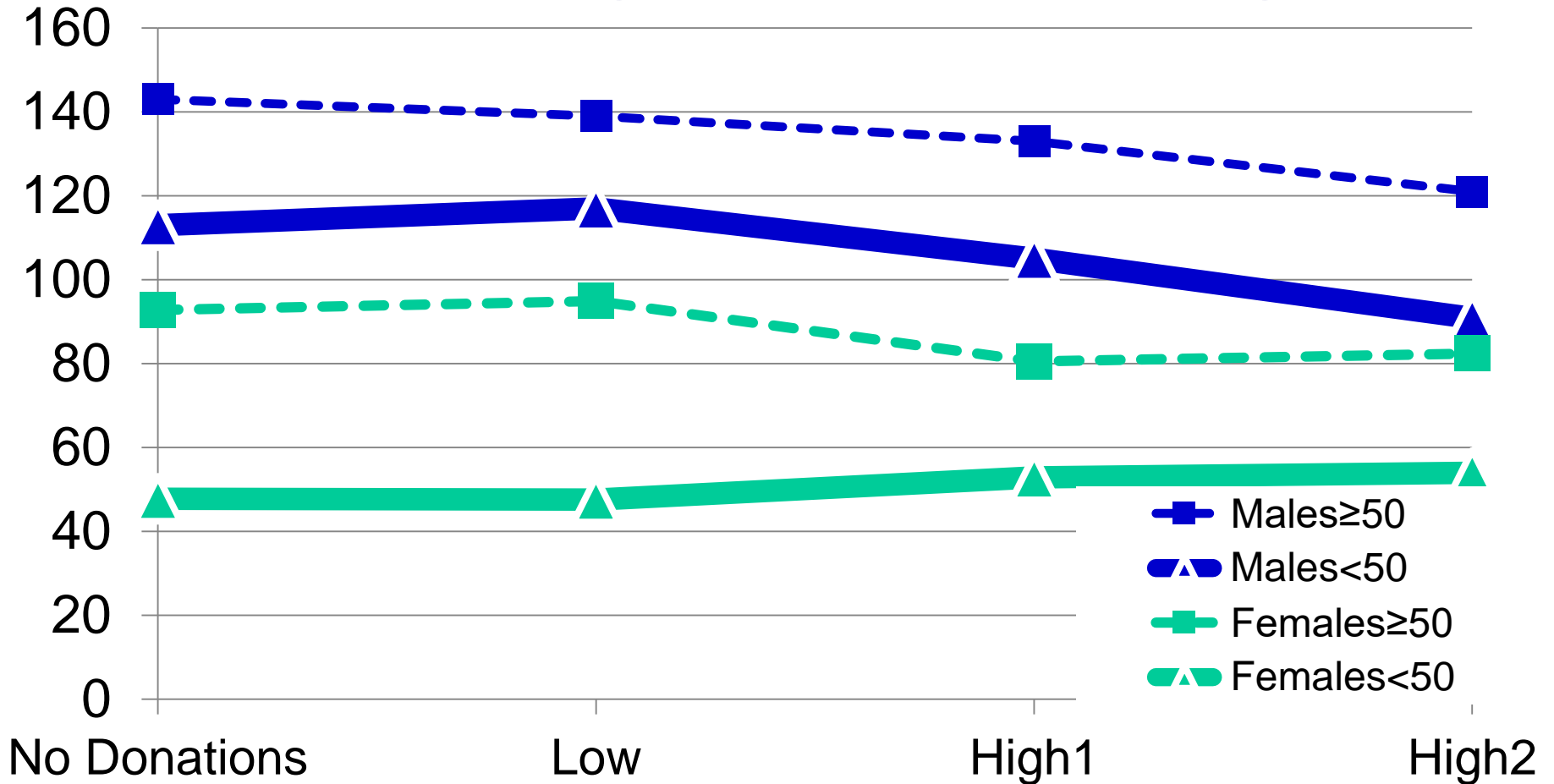
* $p \leq .02$; no donations versus high2

14th Střešovice Blood Transfusion Day

Ferritin* – Mean Differences Between Frequency Groups (Unadjusted)

	N	Mean ± SD	Difference No prior-low/high Mean (95% CI)	p-value (2-sided)
Females				
No donations	164	51.1 ± 41.2		
Low	168	53.3 ± 49.8	-2.2 (-12, 7.7)	0.66
High1	181	57.5 ± 52.9	-6.4 (-17, 3.7)	0.22
High2	156	64.0 ± 57.3	-13 (-24, -2.0)	0.02
Males				
No donations	145	114 ± 73.4		
Low	138	120 ± 75.8	-5.7 (-23, 11.8)	0.52
High1	161	111 ± 77.9	3.7 (-13, 20.8)	0.67
High2	141	100 ± 85.5	13.9 (-4.6, 32.4)	0.14

Ferritin (ng/mL), by Gender & Age



Mean Differences in Ferritin Levels* Between Frequency Groups

	Unadjusted		Adjusted	
	Difference No prior-low/high Mean (95% CI)	p-value (2-sided)	Difference No prior-low/high Mean (95% CI)	p-value (2-sided)
Females				
Low	-2.2 (-12, 7.7)	0.66	0.6 (-10.0, 11.2)	0.91
High1	-6.4 (-17, 3.7)	0.22	3.2 (-7.2, 13.7)	0.54
High2	-13 (-24, -2.0)	0.02	3.5 (-7.7, 14.6)	0.54
Males				
Low	-5.7 (-23, 11.8)	0.52	3.2 (-15.0, 21.3)	0.73
High1	3.7 (-13, 20.8)	0.67	-8.1 (-25.8, -9.5)	0.37
High2	13.9 (-4.6, 32.4)	0.14	-21.3 (-39.9, -2.7)	0.03

Donors with Absent Iron Stores (AIS) (Ferritin < 12 ng/mL)

	No donations	Low	High1	High2	Total
Females	12/164 (7%)	9/168 (5%)	5/181 (3%)	2/156 (1%)	28/669 (4%)
Males	1/145 (1%)	0/138 (0%)	0/161 (0%)	2/141 (1%)	3/585 (<1%)

Median Ferritin and Percent of Donors with AIS, for SP (FLIPD) and WB (RISE) Donors, by Donation Frequency and Gender

	Median Ferritin (ng/mL)		AIS (%)	
	No Donations	High Frequency*	No Donations	High Frequency*
Females				
FLIPD	39	45	7.0	2.1
RISE	37	19	6.4	27.1
Males				
FLIPD	100	84	1.0	0.7
RISE	108	25	0.0	16.4

* High Frequency:

FLIPD: ≥ 25 donations in 12 months

RISE: Females ≥ 2 donations in 12 months

Males ≥ 3 donations in 12 months

Hematocrit Deferral Rates (%) by Gender and Donation Frequency

	Low	High1	High2
Females*	3.7	2.5	1.9
Males	0.1	0.3	0.2

* $p \leq .005$

For both female and males, correlation is low between hematocrit and donation frequency and ferritin level.

- **Frequency of donation; $r < 0.03$ males and females**
- **Ferritin level; $r = -0.02$ males, $r = 0.11$ females**

- **Female frequent donors have higher ferritin levels than donors with no donations**
- **For males, although frequent donors had lower ferritins than those with no donations, the differences were not statistically or clinically significant**
- **Few SP donors have AIS and for most, ferritin values are well within the normal range**
- **Iron depletion seen with frequent WB donation does not occur with frequent SP donation**
- ***Schreiber, Brinser, Rosa-Bray, Yu and Simon, Transfusion 2018;58;951-959***

- Few SP donors are AIS and for most, ferritin values are well within normal range.
- Frequent SP donation is not associated with:
 - Lower plasma ferritin values
 - Reduced body iron stores
- Unlike the situation with WB and Platelet donation, iron depletion is neither a short-term nor long-term issue associated with SP donation.
- Our data confirm that iron depletion and deficiency are not outcomes of Source Plasma Donation. Thus, measures needed to protect whole blood and platelet donors are not needed for Source Plasma Donors.