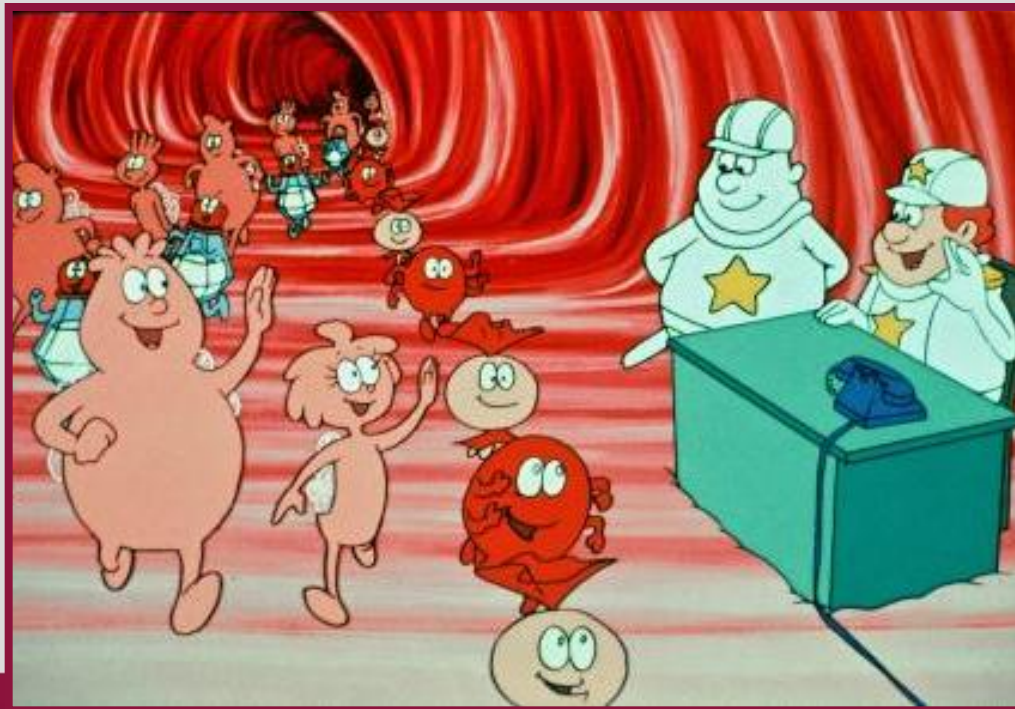


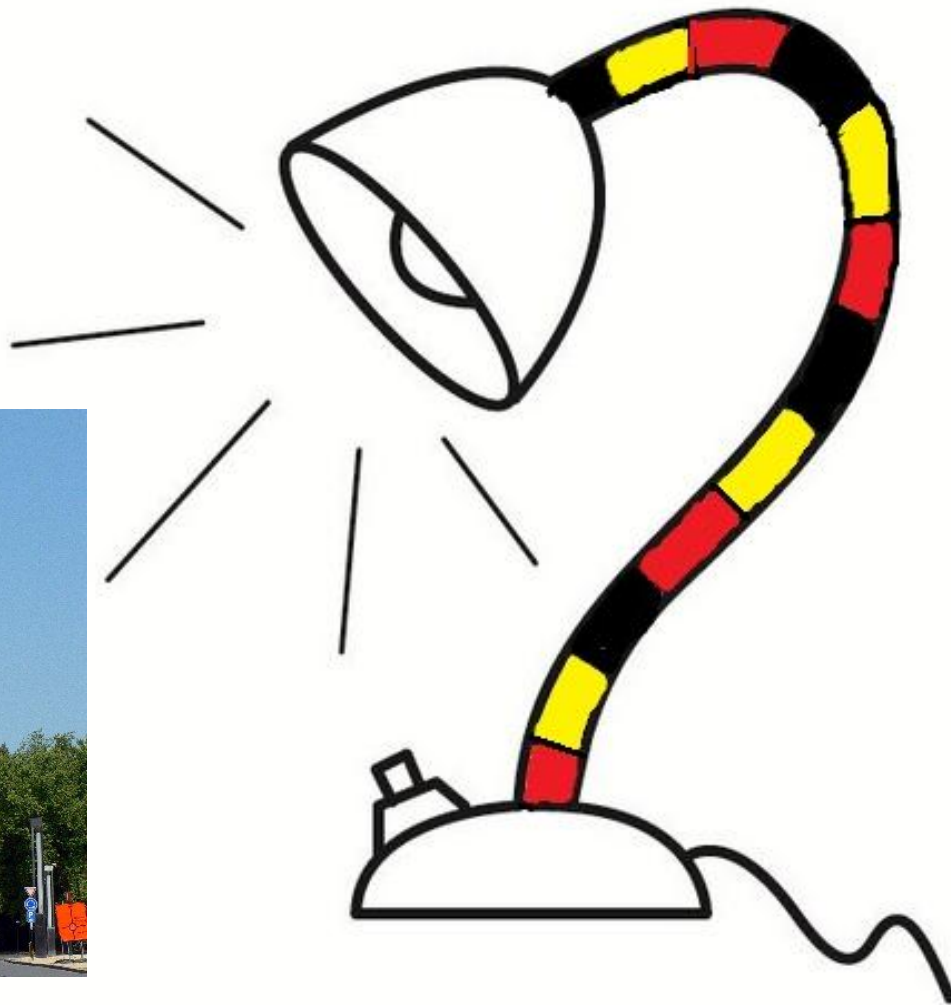
Prevention of anaemia in blood donors : iron or not iron



International
Haemovigilance
Network

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de Belgique 

Mindy



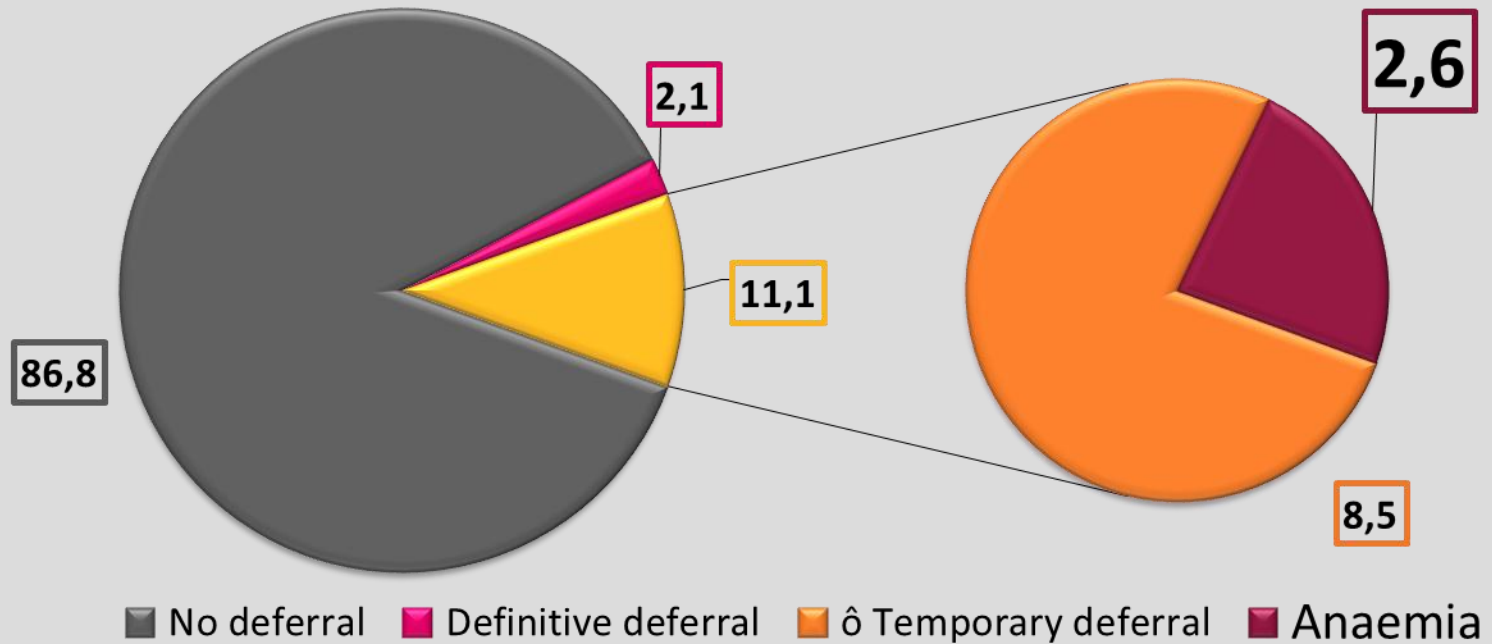
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Introduction



Low haemoglobin is the most common reason for blood donor deferral

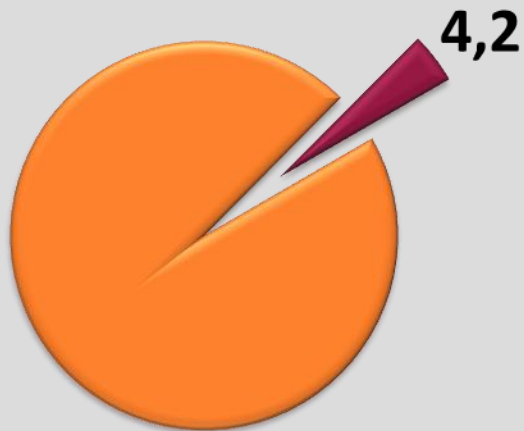


Data 2012 from SFS, Belgian Red Cross

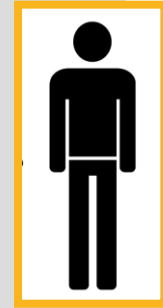
Introduction



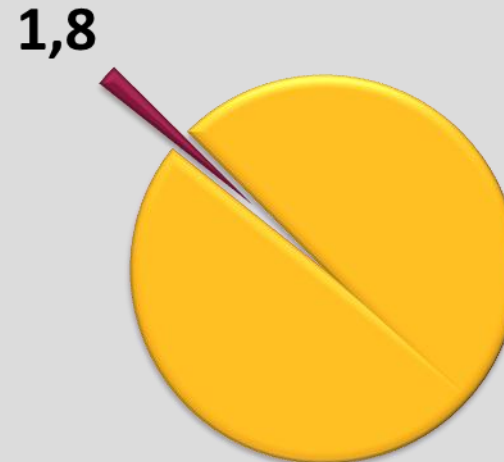
12,5 g/dL



■ Anaemia



13,5 g/dL



■ Anaemia

In nearly 80% of the cases, the Hb level is less than 0,5 g/dL below the threshold allowed for blood donation

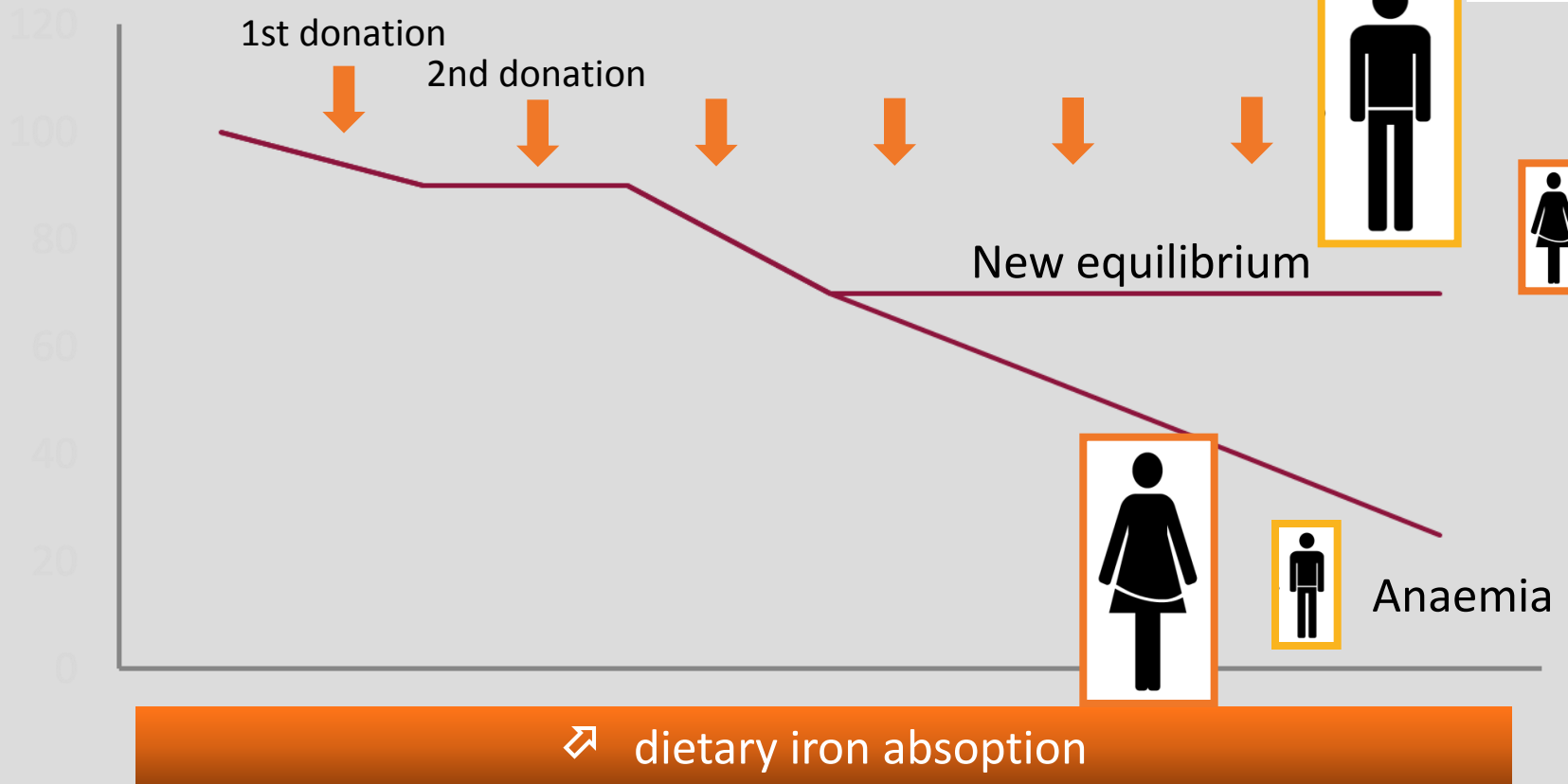
Data 2012 from SFS, Belgian Red Cross

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Introduction



Iron stores



Influence of the frequency of blood donation !

Introduction



Iron deficiency is known to be associated with adverse physical, cognitive and reproductive outcomes !

Impact of (temporary) deferral on blood supply :

- An important number of donors will never return
- or will return only once
- Longer delay before next donation (compared to non deferred donors)
- Fewer contribution of blood donations

Prevention of donor deferral is a key point for an adequate blood supply !

Screening tests for iron deficiency detection

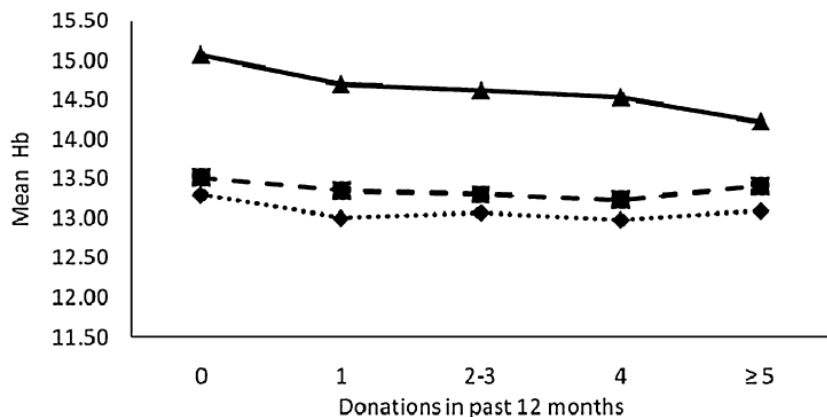


Fig. 1. Effect of 12-month whole blood or RBC donation frequency on venous Hb by males (▲) and pre- (◆, age < 50 years) or postmenopausal (■, age ≥ 50 years) females.

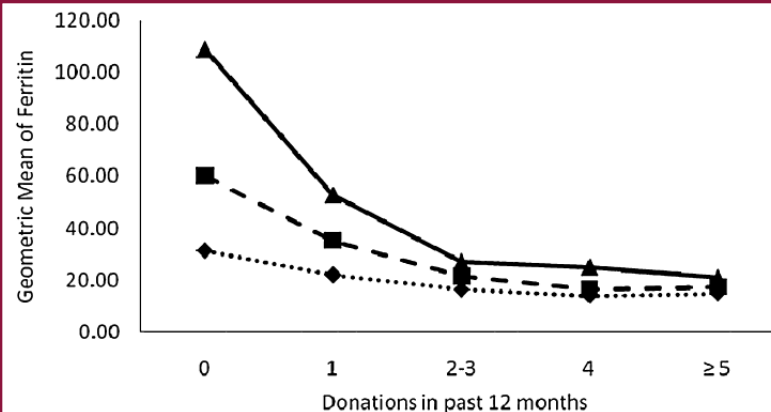


Fig. 2. Effect of 12-month whole blood or RBC donation frequency on the geometric mean of plasma ferritin by males (▲) and pre- (◆, age < 50 years) or (■, age ≥ 50 years) postmenopausal females.

TABLE 1. Medians (2.5%-97.5% range) for venous Hb, ferritin, sTfR, and log(sTfR/ferritin) and proportion with AIS and IDE by enrollment cohort

Cohort	Hb (g/dL)*	Ferritin (ng/mL)	sTfR (mg/L)	Log(sTfR/ferritin)	AIS (%)	IDE (%)
Females						
FT or RA	13.3 (11.5-15.2)	37 (9-175)	2.7 (1.7-4.8)	1.8 (1.1-2.6)	6.4	24.7
Frequent	13.2 (11.4-15.2)	19 (5-68)	3.1 (1.8-6.6)	2.2 (1.5-3.0)	27.1	66.1
Males						
FT or RA	15.1 (12.8-17.4)	108 (29-430)	2.7 (1.6-4.4)	1.4 (0.8-2.1)	0	2.5
Frequent	14.5 (12.0-16.6)	25 (6-117)	3.1 (1.8-8.0)	2.1 (1.3-3.1)	16.4	48.7

* Post vHb samples were converted to predonation values using the formula $\text{Pre vHb (g/dL)} = \text{Post vHb} + 0.8423 - (0.002035 \times \text{weight [lb]})$.

Iron deficiency in blood donors



Thre main predisposing factors :

1° Donation intensity

2° Sex

3° Body weight

Iron deficiency in blood donors

1° Donation intensity : Strongest effect = number of donations in the previous two years (REDS-II Donor Iron Status Evaluation (RISE) study)

4 – 5 donations : OR to have AIS = 5,3

7 – 9 donations : OR → 13,5

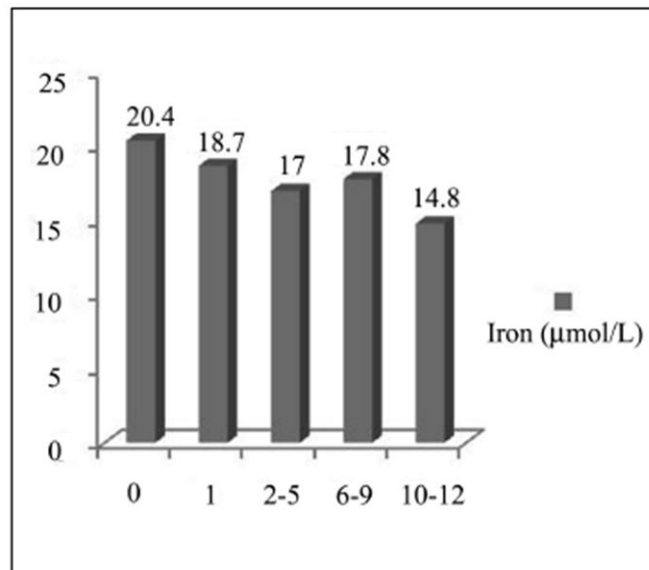


Figure 1 - Iron concentration of blood donors according to frequency of donation.

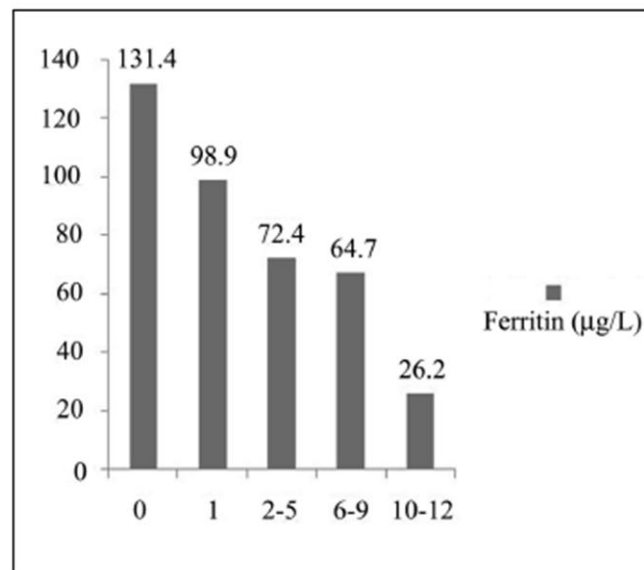
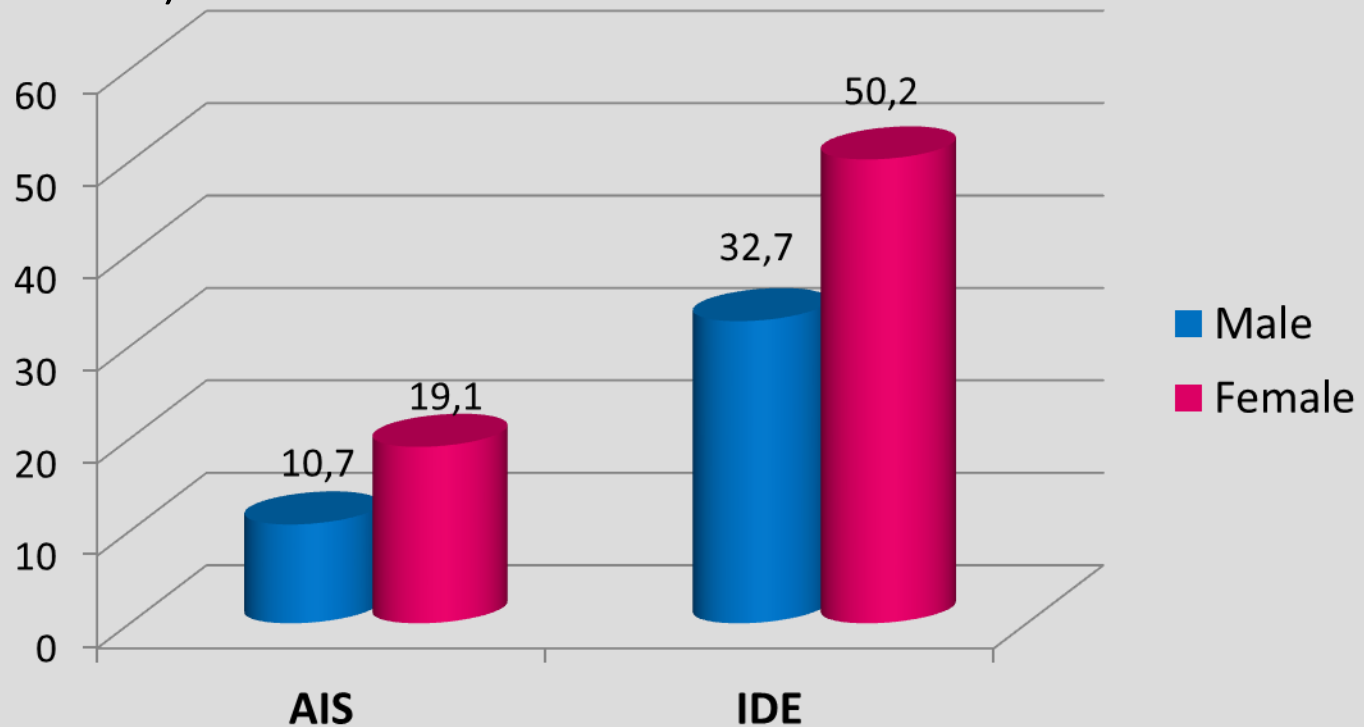


Figure 2 - Ferritin concentration of blood donors according to frequency of donation.

Iron deficiency in blood donors

2° Sex (all donors):



Ferritin < 12 µg/L

$p < 0,0001$

$p < 0,0001$

sTfR / log ferritin index $\geq 2,07$

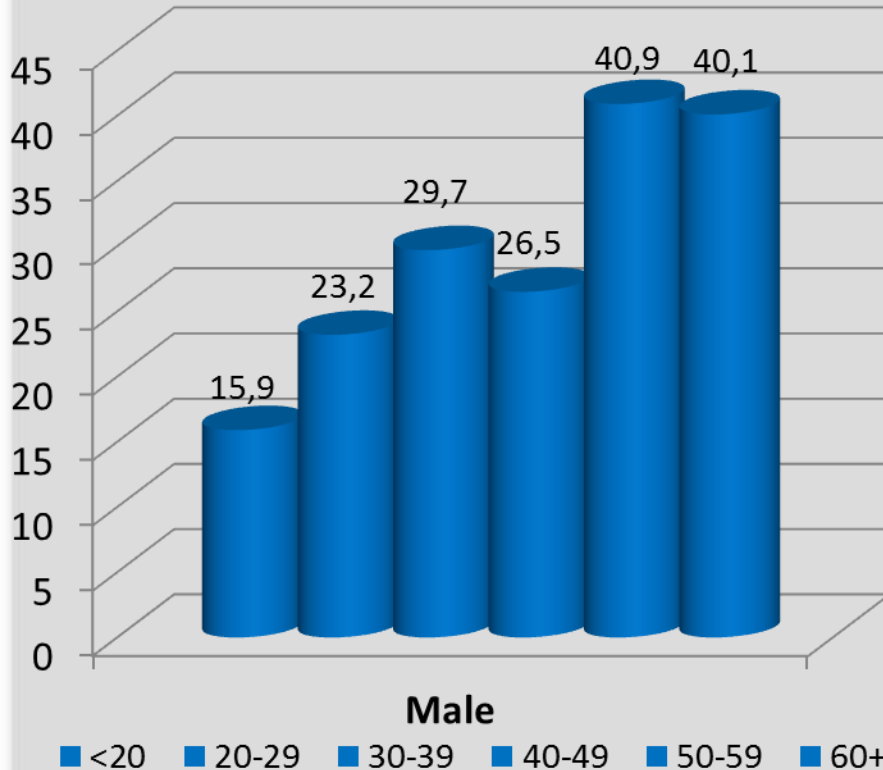
REDS-II Donor Iron Status Evaluation (RISE) study (Cable et al, Transfusion 2011)

Iron deficiency in blood donors

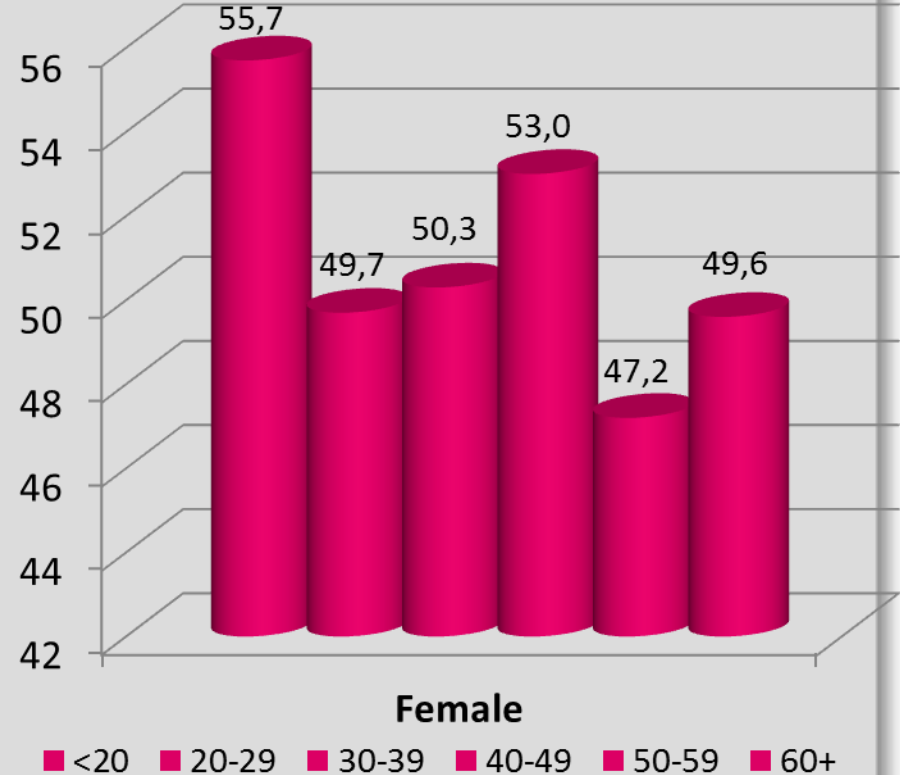


2° Sex... and age !

% with AIS



% with AIS



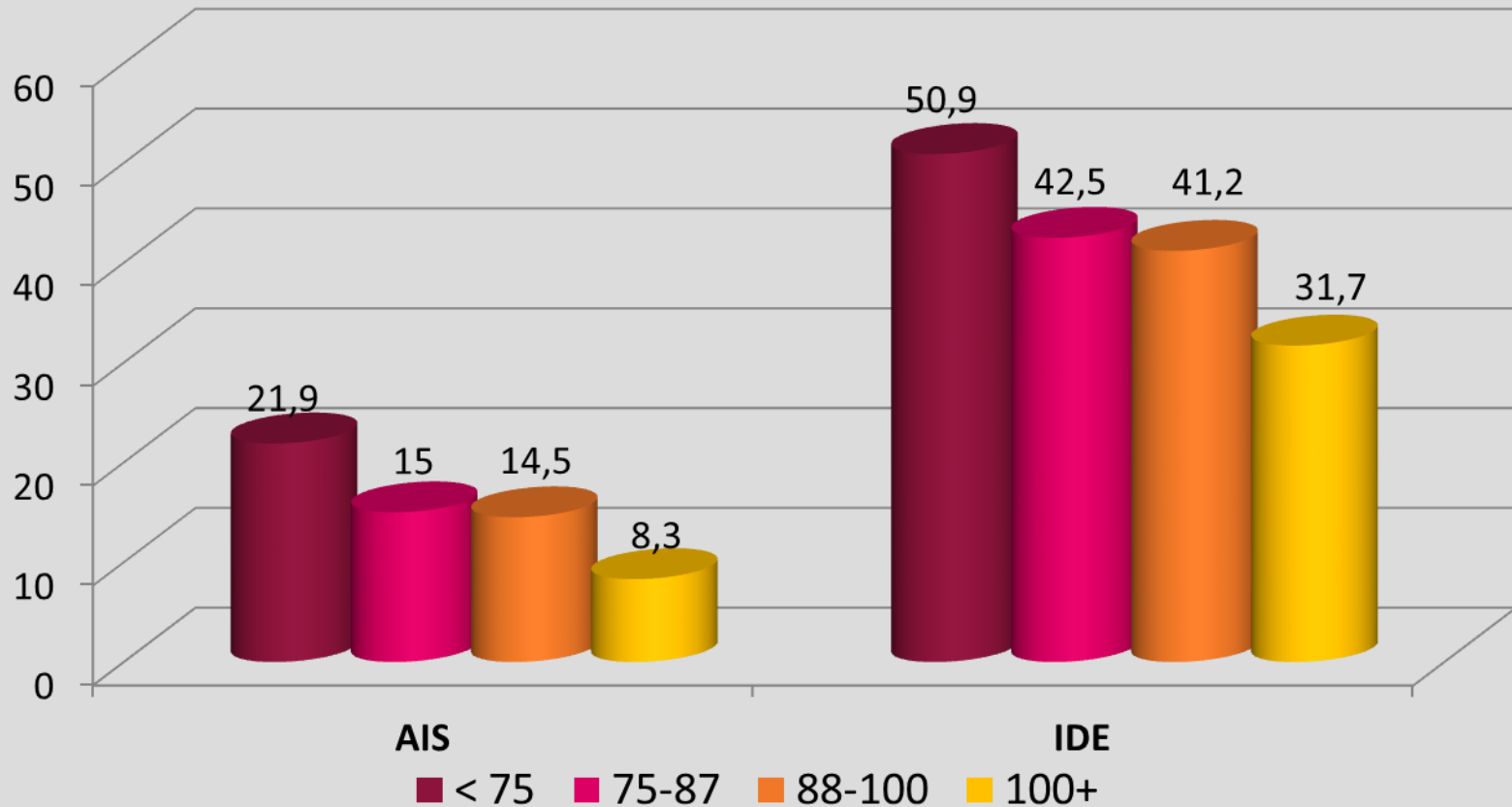
REDS-II Donor Iron Status Evaluation (RISE) study (Cable et al, Transfusion 2011)

Iron deficiency in blood donors



3° Body weight

$p < 0,0001$



REDS-II Donor Iron Status Evaluation (RISE) study (*Cable et al, Transfusion 2011*)

Prevention and treatment of iron deficiency in blood donors



Main action points :

- 1° Actions on the donation procedure
- 2° Donor's education
- 3° Iron supplementation

All measures participate in the decrease of iron depletion
but also in the reduction of low Hb deferral rate !

Prevention and treatment of iron deficiency in blood donors



1° Actions on the donation procedure :

- 1) Reduce the frequency of blood donation*
- 2) Decrease the blood volume collected*
- 3) Repeat Hb testing

** taking into account the predisposing factors (sex and weight)*



The impact of any measure
on the blood supply must be considered !

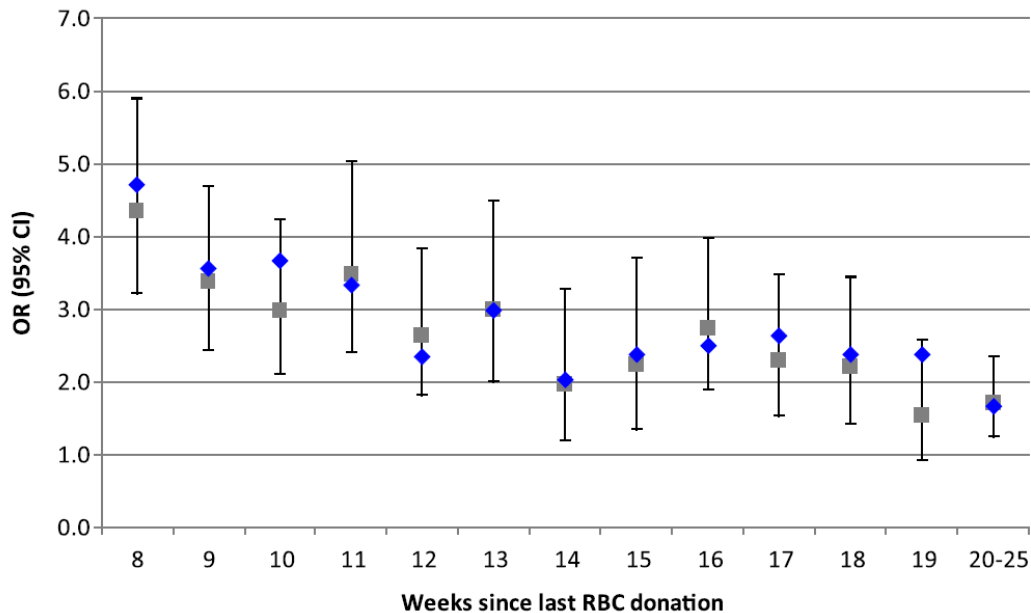
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Prevention and treatment of iron deficiency in blood donors



1° Actions on the donation procedure :

1) Reduce the frequency of blood donation : increase the interval between two donations



Cable et al, Transfusion 2012

Fig. 2. Adjusted ORs and 95% CIs for AIS overall and for females alone by weeks since last RBC donation. ORs are based on reference group of donation intervals of at least 26 weeks. (■) Mean ORs for all donations; bars represent 95% CI. (◆) Mean ORs for female donations (no 95% CI presented). There were insufficient male observations with AIS to analyze by week.

Prevention and treatment of iron deficiency in blood donors



1° Actions on the donation procedure :

2) Decrease the blood volume collected



Taille \ Poids	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166
50												430	430	430	430	430	430	430	430	430	430	450
51											430	430	430	430	430	430	430	430	430	450	450	450
52									430	430	430	430	430	430	430	430	430	430	450	450	450	450
53							430	430	430	430	430	430	430	430	430	430	450	450	450	450	450	450
54					430	430	430	430	430	430	430	430	430	430	450	450	450	450	450	450	450	450
55				430	430	430	430	430	430	430	430	430	430	450	450	450	450	450	450	450	450	450
56		430	430	430	430	430	430	430	430	430	430	450	450	450	450	450	450	450	450	450	470	470
57	430	430	430	430	430	430	430	430	430	450	450	450	450	450	450	450	450	450	450	470	470	470
58	430	430	430	430	430	430	430	430	450	450	450	450	450	450	450	450	450	470	470	470	470	470
59	430	430	430	430	430	430	450	450	450	450	450	450	450	450	450	470	470	470	470	470	470	470
60	430	430	430	430	430	450	450	450	450	450	450	450	450	450	470	470	470	470	470	470	470	470
61	430	430	430	450	450	450	450	450	450	450	450	450	450	470	470	470	470	470	470	470	470	470
62	430	430	450	450	450	450	450	450	450	450	450	470	470	470	470	470	470	470	470	470	470	470
63	430	450	450	450	450	450	450	450	450	450	470	470	470	470	470	470	470	470	470	470	470	470
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65	450	450	450	450	450	450	450	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
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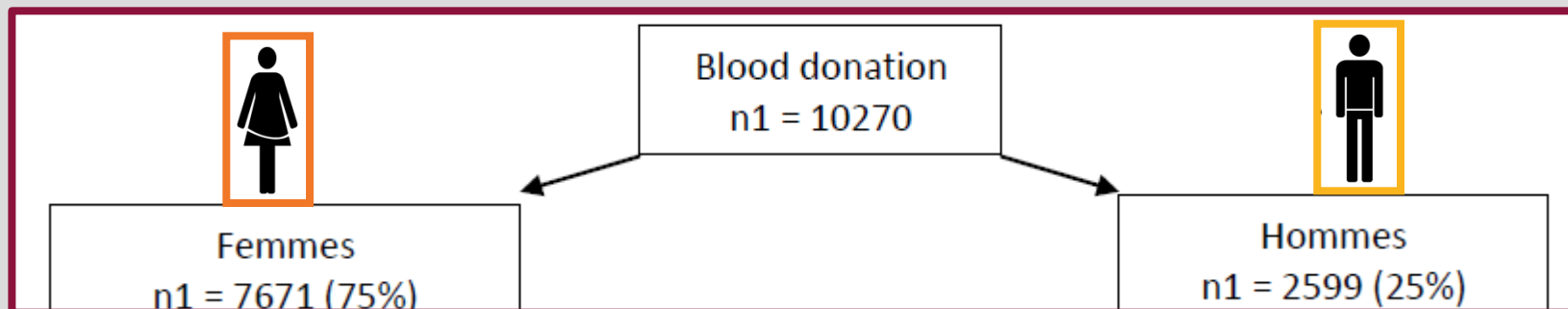
Prevention and treatment of iron deficiency in blood donors



1° Actions on the donation procedure :

3) Repeat Hb testing

- Period 1: 1/1/2010 – 31/8/2011 (607 days) ; n1 = 17228



Females							
Period	Hb < 12.5	Hb <12.0	Hb <11.5	Hb<11.0	Hb<10.5	Hb<10.0	Hb<9.5
01/01/2010 to 31/08/2011	2613 (34.1%)	657 (8.6%)	103 (1.3%)	6 (0.08%)	2 (0.03%)	1 (0.01%)	0

Males							
Period	Hb < 13.5	Hb <13.0	Hb <12.5	Hb<12.0	Hb<11.5	Hb<11.0	Hb<10.5
01/01/2010 to 31/08/2011	718 (27.6%)	178 (6.8%)	18 (0.6%)	3 (0.12%)	0	0	0

Prevention and treatment of iron deficiency in blood donors



1° Actions on the donation procedure :

3) Repeat Hb testing

Changing
the criteria

Doctor's
information

Females							
Period	Hb < 12.5	Hb <12.0	Hb <11.5	Hb<11.0	Hb<10.5	Hb<10.0	Hb<9.5
01/01/2010 to 31/08/2011	2613 (34.1%)	657 (8.6%)	103 (1.3%)	6 (0.08%)	2 (0.03%)	1 (0.01%)	0
01/09/2011 to 30/06/2012	834 (26.3%)	196 (6.2%)	22 (0.7%)	4 (0.13%)	0	0	0
01/07/2012 to 31/12/2012	374 (23.4%)	79 (4.9%)	11 (0.7%)	2 (0.13%)	0	0	0
Males							
Period	Hb < 13.5	Hb <13.0	Hb <12.5	Hb<12.0	Hb<11.5	Hb<11.0	Hb<10.5
01/01/2010 to 31/08/2011	718 (27.6%)	178 (6.8%)	18 (0.6%)	3 (0.12%)	0	0	0
01/09/2011 to 30/06/2012	213 (20.6%)	46 (4.4%)	6 (0.6%)	1 (0.10%)	0	0	0
01/07/2012 to 31/12/2012	101 (19.6%)	26 (5.0%)	4 (0.8%)	0	0	0	0

Prevention and treatment of iron deficiency in blood donors



2° Donor's education:

- ➔ Accurate information about the reasons for low Hb deferral
- ➔ Advice on iron repletion

LE FER ... PARLONS EN

VOUS AVEZ BESOIN DE FER : NE L'OUBLIEZ PAS !

Pour construire les globules rouges qui transportent l'oxygène dans tout votre corps, vous avez besoin de fer. Comme, chaque jour, vous perdez une petite partie de vos globules rouges, votre corps doit trouver suffisamment de fer dans votre alimentation, pour compenser la perte journalière.

Si vous êtes une femme en âge d'avoir des enfants, vous êtes plus exposée à une carence en fer par la perte de sang qui se produit lors de vos règles.

LE DON DE SANG ACCENTUE LA PERTE FER

Lorsque vous donnez du sang, vous perdez environ 250mg de fer que votre organisme devra compenser dans les jours qui suivent.

Sur base des analyses que nous réalisons (hémoglobine, hémocrite et numération des globules rouges), le médecin peut vous demander de prendre des comprimés de fer afin de prévenir une anémie.

Dans ce cas, N'OUBLIEZ PAS de les prendre TOUS et respectez les quelques conseils d'alimentation repris dans cette brochure.

Editeur responsable: D. Sondag-Thull, Service du Sang - rue de Stalle 96, B-1180 Bruxelles - SR6_INFORMER_F_01

LE MÉDECIN VOUS DEMANDE DE PRENDRE DU FER : SUIVEZ SES CONSEILS !

COMMENT PRENDRE LES COMPRIMÉS DE FER ?

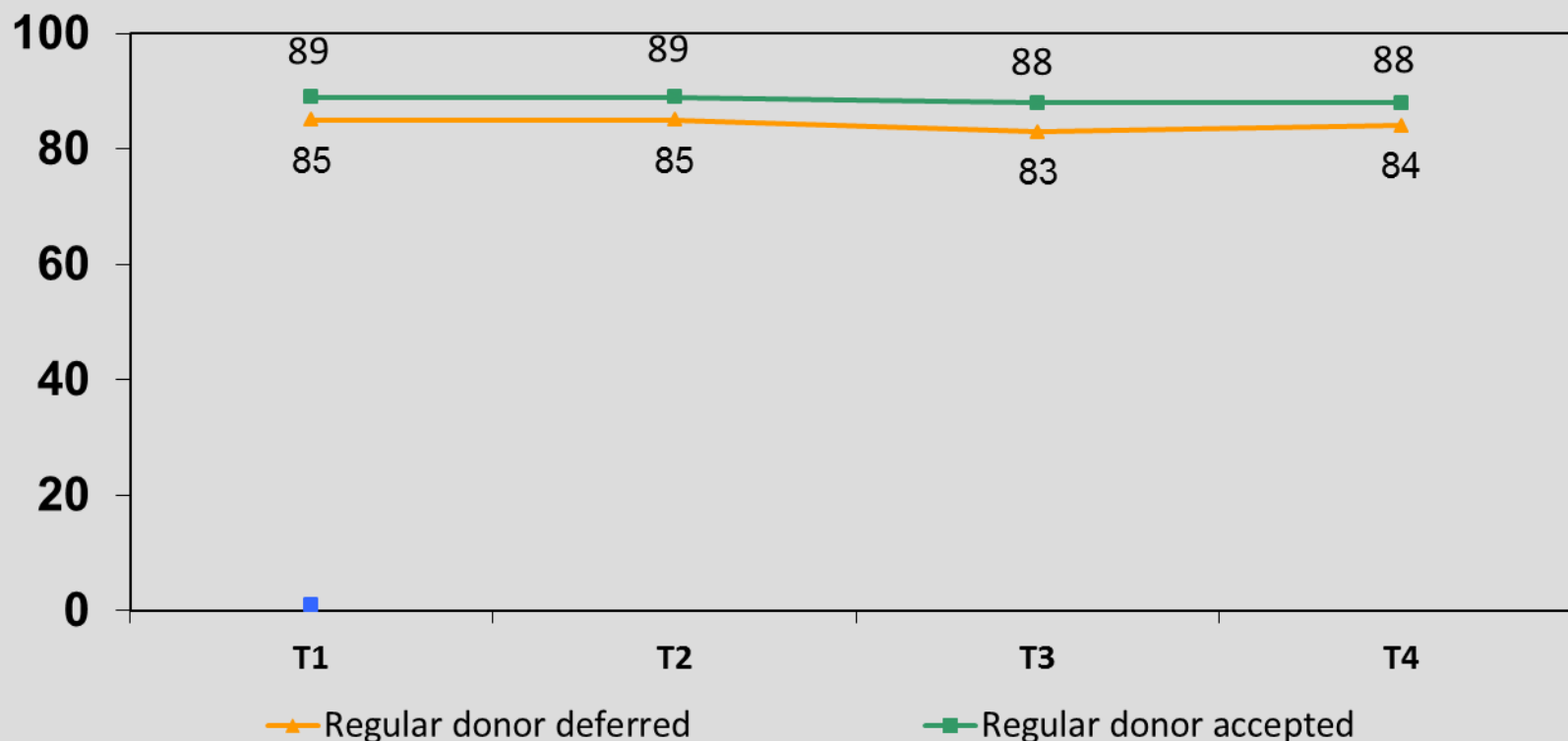
- > 1 comprimé par jour de préférence avec un jus d'orange (boisson riche en vitamine C car cela favorise l'absorption du fer par l'organisme) !!!
- > De préférence à jeun ; si cela vous est impossible vous pouvez le prendre à un autre moment mais l'absorption sera un peu moins bonne.
- > Evitez de consommer du café ou du thé en même temps car cela diminue l'absorption de fer par l'organisme
- > La prise de comprimés de fer peut occasionner l'apparition de selles foncées, de constipation ou de diarrhée. Dans ce cas, espacez la prise de comprimés (1 tous les 2 jours) ; l'important étant que vous preniez TOUS les comprimés qui vous ont été remis.



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Impact of deferral on the 12-month retention

% donors who will return in the next 12 months



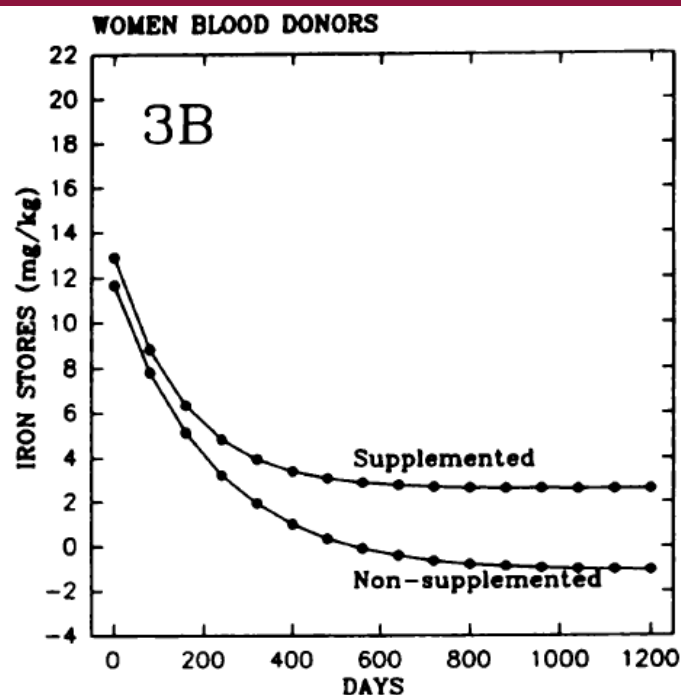
Definitively deferred persons were excluded from the statistics.

Prevention and treatment of iron deficiency in blood donors



3° Iron supplementation:

2) Iron supplement → \searrow OR for AIS and IDE



Garry et al, Am J Clin Nutr 1995

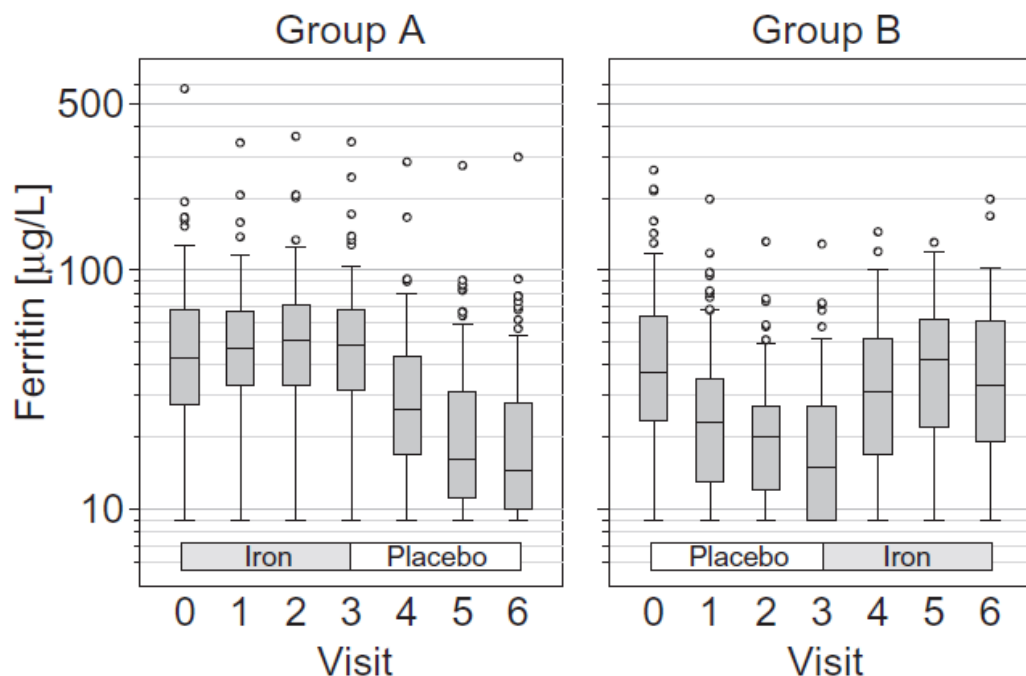


Fig. 2. Box-plot for serum ferritin.

Radtke et al, Transfusion 2004

Prevention and treatment of iron deficiency in blood donors



3° Iron supplementation:

- Individualized : based on the donor's baseline serum ferritin level ($< 12-15\mu\text{g/L}$)
- Ferritin level measurement is recommended once a year in frequent donors
- Different schemes (Cf *Newman, Transfusion 2006*)
- Special attention to (premenopausal) women
- **Total dose** : ≥ 2000 mg of elemental iron
- Limited adverse events
- Compliance

Conclusions

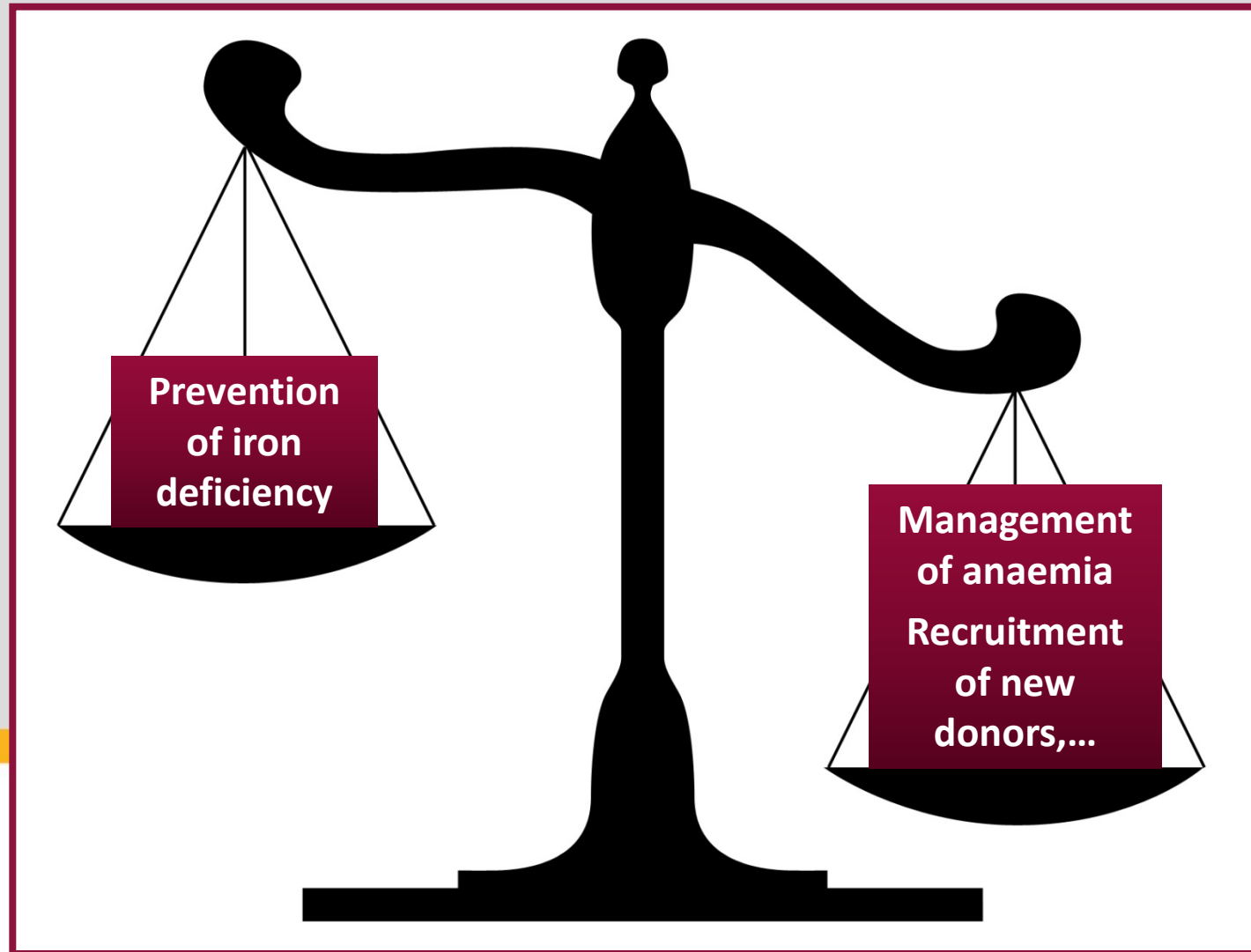


- Optimizing donor safety is of paramount importance !
- The demand for blood will continue to increase ...
- It is essential to identify those donors more susceptible to iron depletion.
- Precautionary measures must be applied to these « at-risk » donors.
- A systematic dosage of ferritin for at least all donors giving blood twice a year should be firmly considered.

Conclusions

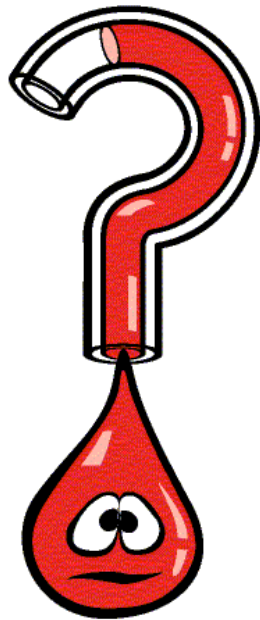


- In a cost-benefit model :



« Voluntary donors give their blood altruistically, without anticipation of personal benefit but with the expectation of no harm from donation. »

GM Brittenham, Transfusion 2011



Thank you for your attention