Blood stock management and supply for rare blood groups

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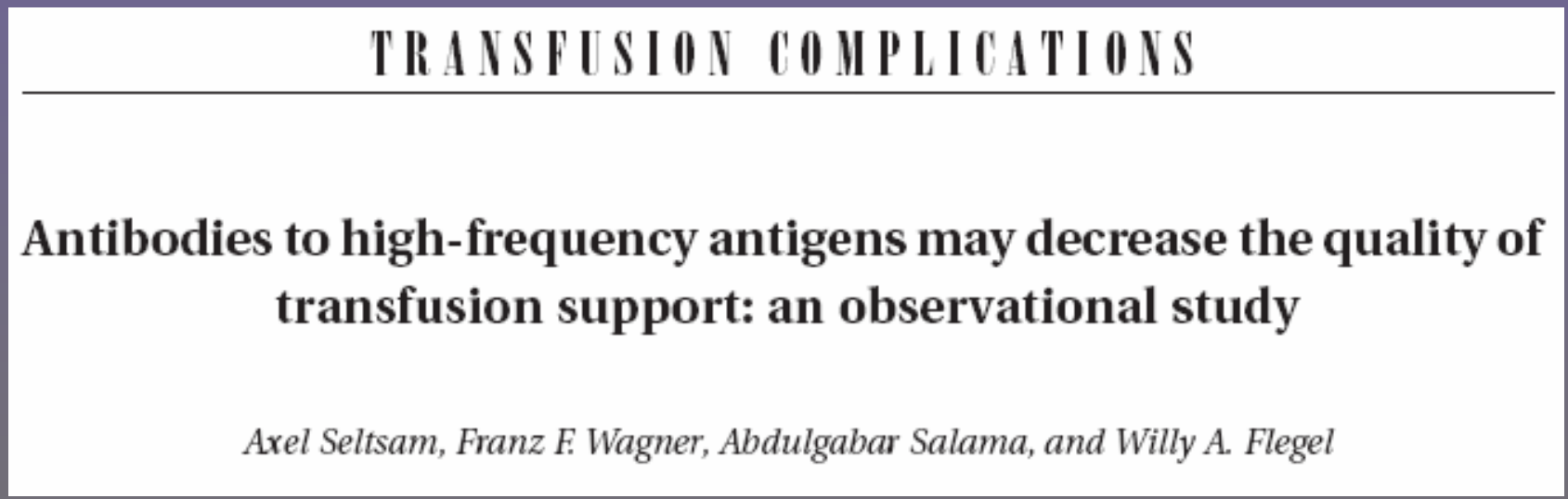
Observational study

- between May 2000
  and December 2001



TRANSFUSION COMPLICATIONS

Antibodies to high-frequency antigens may decrease the quality of transfusion support: an observational study

Axel Seltsam, Franz F. Wagner, Abdulgabar Salama, and Willy A. Flegel

TRANSFUSION 2003;43:1563-1566.

- Presentation at SVTM meeting
- Berne, Switzerland 3 Sept 2004

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Background

- high-frequency antigens
  - > 99 %
- immunized patients are rare
- blood donors are also rare
  - spontaneously detected after immunization only
  - then, they often cannot donate blood
- difficult supply
  - compatible red cell units are rare
- significant diligence and costs required
  - search
  - storage
  - transport logistics
- physicians are often in-experienced in special needs of such patients

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Rationale

- documentation of demand
  - prerequisite for financing and support
    - of donor typing programs
    - of frozen red cell programs
- documentation of clinical relevance
  - current hemovigilance systems do often not cover adverse affects caused by insufficient supply

Aim of the study

- evaluation of the current supply situation
- in all hospitalized patients
  - carrying clinically relevant allo-antibodies
  - directed against high frequency antigens (excluding k)
- current supply situation
  - population in Central Europe
    - ca. 100 Mio. inhabitants
  - survey period
    - 20 months

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Data acquisation

- written request to
  - all blood centers
  - all immunhematology reference laboratories
- asking for spontaneous reporting
- in A – CH – D
- standardized questionare
- follow up
  - until discharge from hospital
- regular contact
  - by phone/mail/Email

Patients

- total of 52 patients
- with 56 hospital admissions

TABLE 3. Antibody specificities

Antibody specificity	Number of cases observed
anti-Kp^{b}	11
anti-Vel	10
anti-Lu^{b}	8
anti-Yt^{a}	8
anti-Co^{a}	3
anti-H	3
anti-AnWj	2
anti-Kx	2
anti-MAM	2
anti-Fy^{ab}	1
anti-Ku	1
anti-Lan	1
anti-Lu8	1
anti-LW^{a}	1
anti-Rh17	1
anti-Tj^{a} (PP1Pk)	1
Total	56

- minimal estimate
- incidence: 0.04 per 100,000 inhabitants and year

Antibody specificities

- 4 antibody specificities
  - Kp^b
  - Vel
  - Lu^b
  - Yt^a

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Total	56

66 %

- in two third of all reported patients

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Transfusions

- 133 compatible red cell units
  - supplied
  - for 26 patients
- thereof, 104 red cell units
  - transfused
  - in 22 patients
- transfusion of red cell units in D:
  - relationship
  - rare red cell units to all red cell units
- 1 : 68,000

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Deviations from protocol

- 23 x reported
  - 9 x no reason for deviation communicated
- reasons
  - reported in 14 patients
  - considered acceptable in 9 patients
- in 5 patients avoidable

TABLE 2. Support strategies by country

	Number of episodes			
	Germany	Switzerland	Austria	Total
Episodes of hospitalization	42	11	3	56
Deviations from protocol	18	3	2	23
Frozen allogeneic units				
Supplied	74	0	0	74
Transfused	62	0	0	62
Fresh allogeneic units				
Supplied	25	12	0	37
Transfused	19	8	0	27
Fresh autologous units				
Supplied	18	4	0	22
Transfused	11	4	0	15

Reasons for deviation

- compatible supply not considered (n = 3)
- avoidable delay in antibody identification (n = 1)
- no cost coverage for rare blood units
  - but erythropoetin administered

  (n = 1)

TABLE 1. Deviations from standard transfusion policy in patients with antibodies to high-frequency antigens

Type of deviation from protocol	Number of episodes				Antibodies involved*
	Germany	Switzerland	Austria	Total	
No compatible blood as backup†					
Surgery	5	1	0	6	anti-Kp^b (n = 2), anti-Yt^a (n = 2) anti-Lu^b, anti-AnWj
Diagnostic procedure	1	0	1	2	anti-LW^a, anti-Fy3
Vaginal delivery	2	0	0	2	anti-Kp^b, anti-Vel
Transfusion of antigen-positive units					
Emergency transfusion‡	3	0	0	3	anti-Vel (n = 2), anti-Lu^b
Elective transfusion	3	2	0	5	anti-Yt^a (n = 3), anti-Kp^b, anti-Lu^b
Transfusions cancelled or limited	4	0	0	4	anti-Vel (n = 2), anti-Co^a (n = 2)
Diagnostic procedure cancelled	0	0	1	1	anti-Lu8
Total	18	3	2	23	

* n = 1 unless otherwise indicated.
† No transfusions performed.
‡ Lack of time to obtain compatible units made deviation inevitable.

Frozen red cell units

- significant differences in the supply strategy
  - in D: frozen red cell units are available in various regions
  - in CH: more antigen negative donors are known/available

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- no effect on the safety of the supply

International supply

- urgent demand in 14 patients
- 11 x national
  - within one day in most cases
  - mean 1.5 days
  - range 1 – 3 days
- 3 x international
  - mean 2.3 days
  - range 2 – 3 days
- mean supply period was 0.8 days longer
  - for imported red cells units

Possible supply of compatible red cell units

- 3.3 Mio. donations per year in D 1998
- correlates to
  - 5,000 Lu^b neg.
  - 5,000 Yt^a neg.
  - 830 Vel neg.
  - 330 Kp^b neg.
- permanent availability of red cell units
  - 560 Lu^b neg.
  - 560 Yt^a neg.
  - 90 Vel neg.
  - 35 Kp^b neg.
- considering shelf life of 5 – 6 weeks

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Conclusions

- insufficient supply
  in 33 % of the affected patients
- two third of cases
  require 4 antibody specificities only
- supply would be improved by
  - systematic screening for Kp^b, Vel, Lu^b, Yt^a neg.
  - enhanced awareness of the attending physicians

- optimal supply would require < 1 : 10.000
  red cell units of the whole national stocks

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ISBT Rare Donor Working Party
International Society for Blood Transfusion

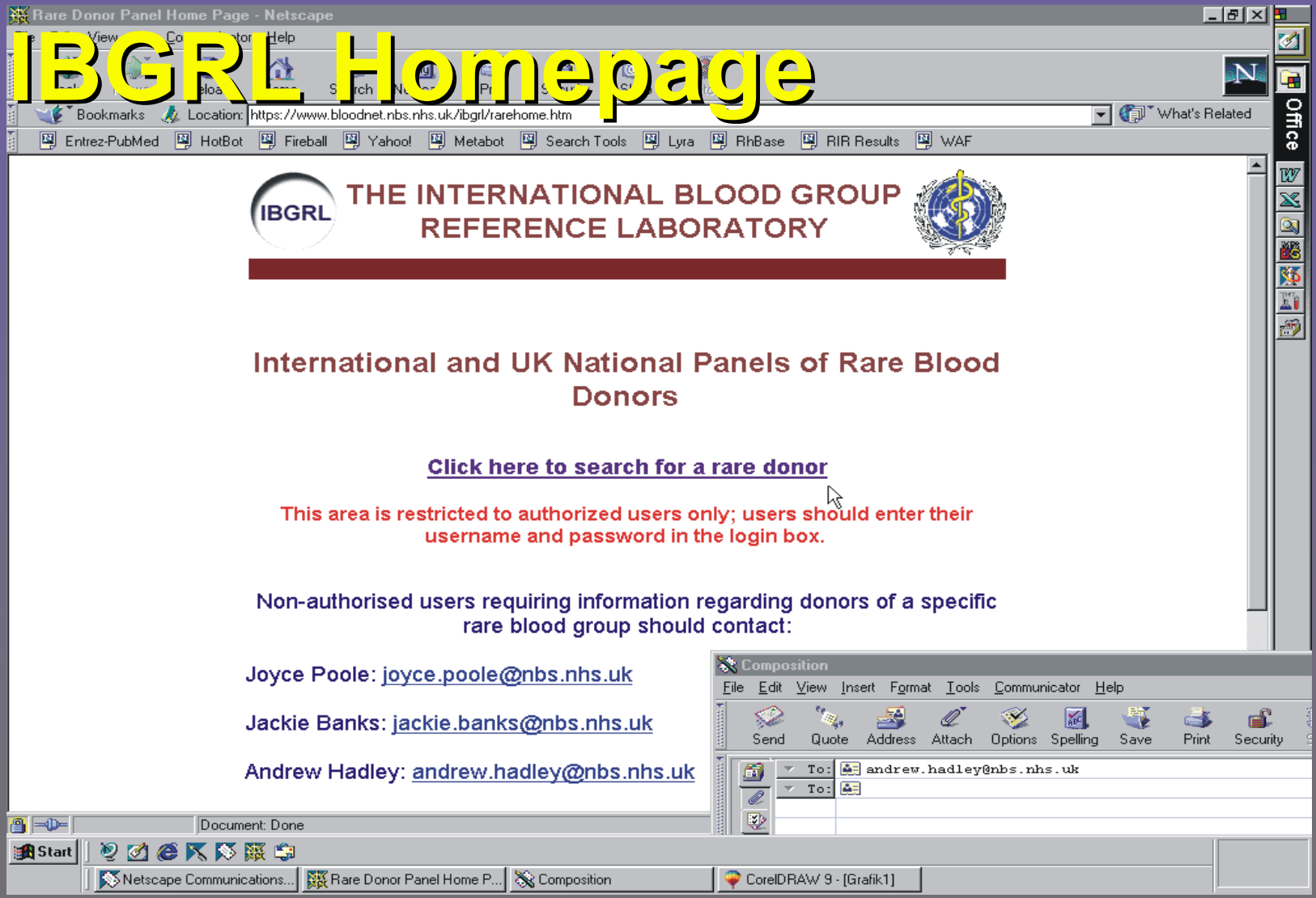
- BR – Brasil
- CN – China
- DE – Germany
- FR – France
- GB - England
- IN - India
- IS - Israel
- JP - Japan
- NL – Netherlands
- NZ – New Zealand
- SA – South Africa
- USA
- Chair: Graeme Woodfield, Auckland NZ
- ca. 14 members
- http://www.isbt-web.org/

European Frozen Blood Bank, Amsterdam
Council of Europe Bloodbank

- supply in France and England self-sufficient
- supplies 60 – 100 frozen red cells per year to the remaining European countries
  - „fraction of supply to Germany has been diminishing“ (telephone communication)
- 4.925 Euro per unit plus transport
  - „does not cover actual costs“ (tel. communication)
- actual stock of frozen units
  - http://www.sanquin.nl/sanquin-eng/sqn_home_eng.nsf

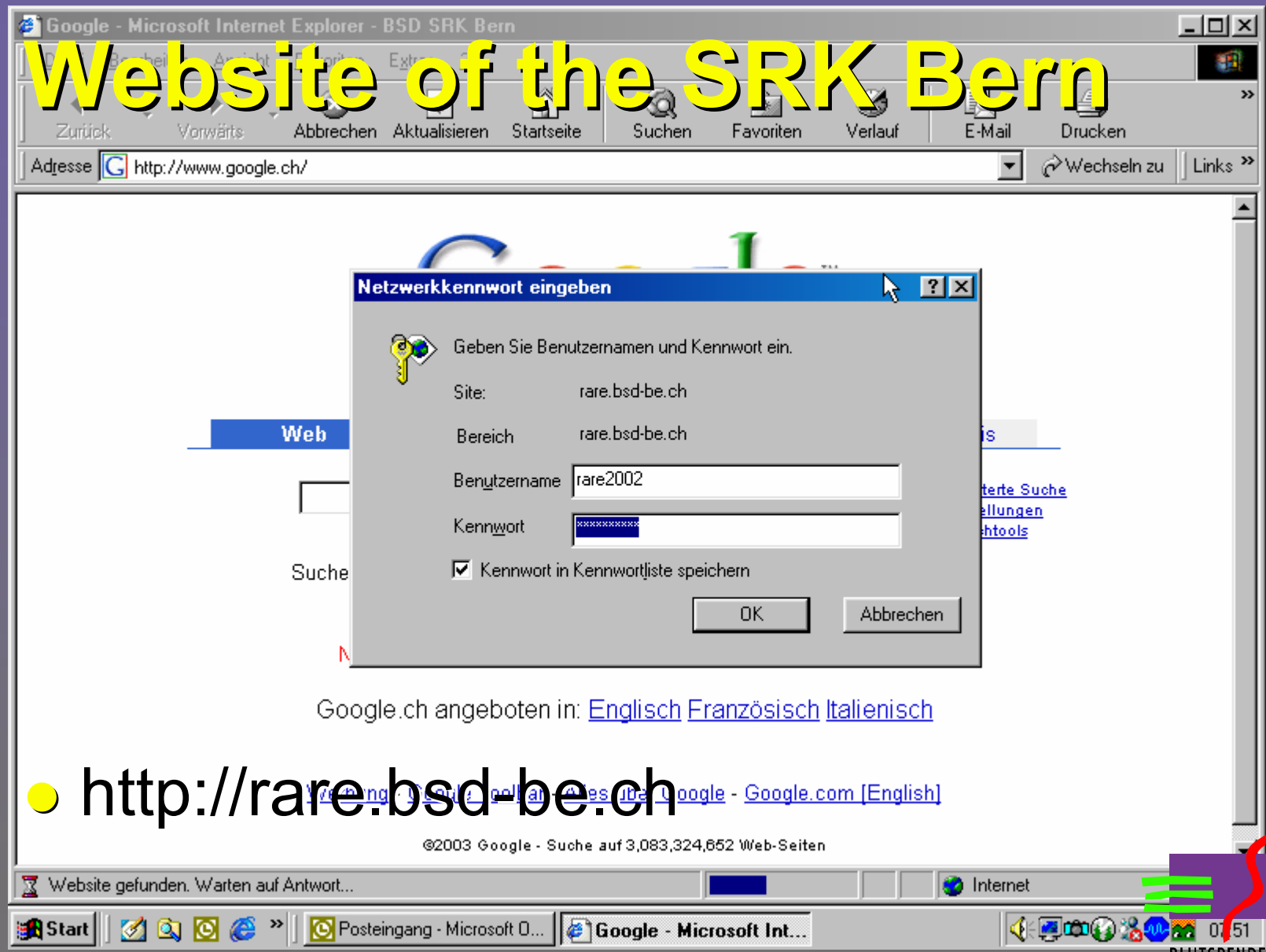
- Letter dated 25 June 2002

IBGRL Homepage



- 5 participating institutions in D & CH:
  - Baden-Baden, Berlin, Bern, Hagen, Ulm

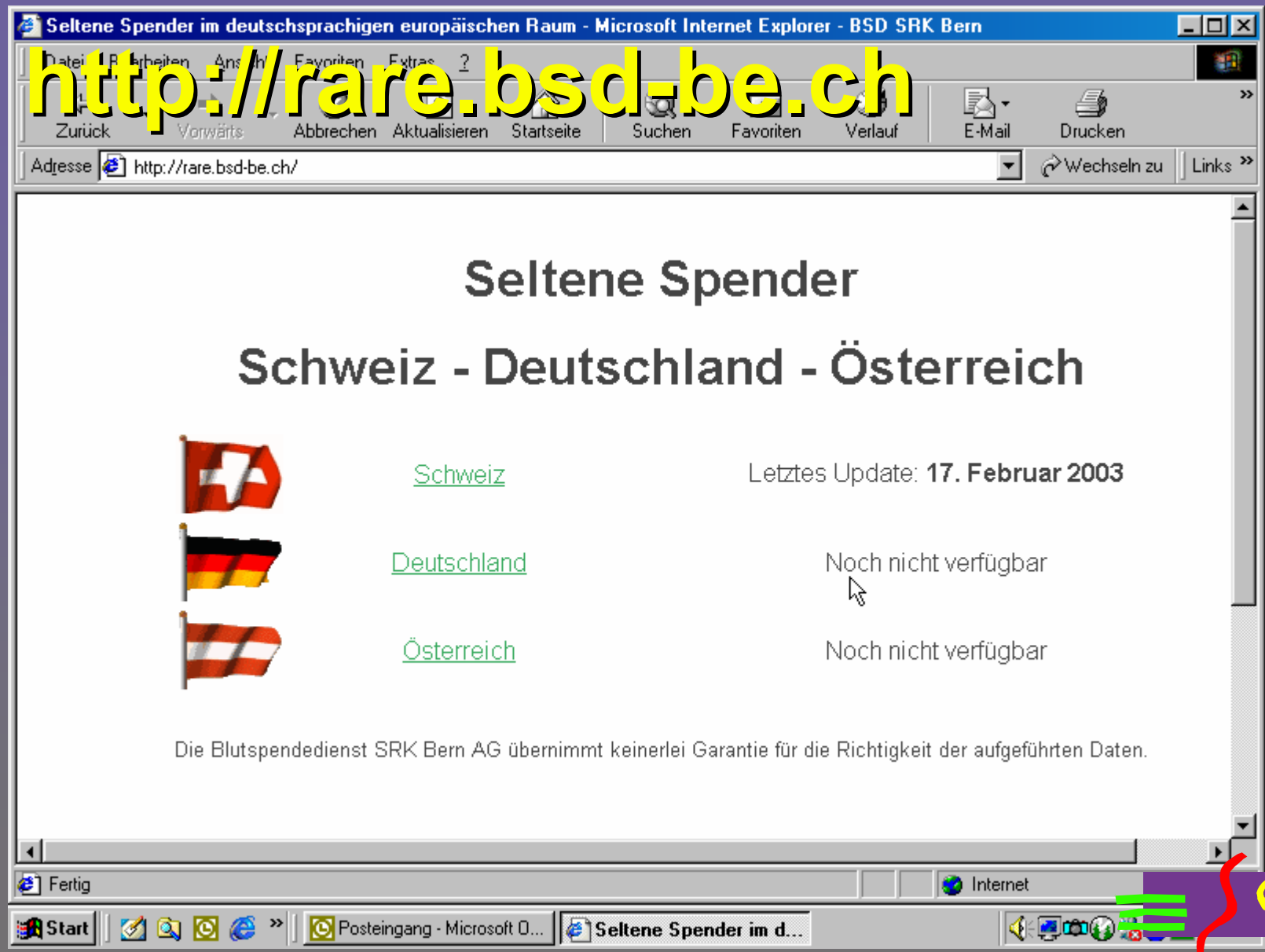
Website of the SRK Bern



- http://rare.bsd-be.ch

- kindly provided by H. Hustinx

BLUTSPENDEDIENST BERN



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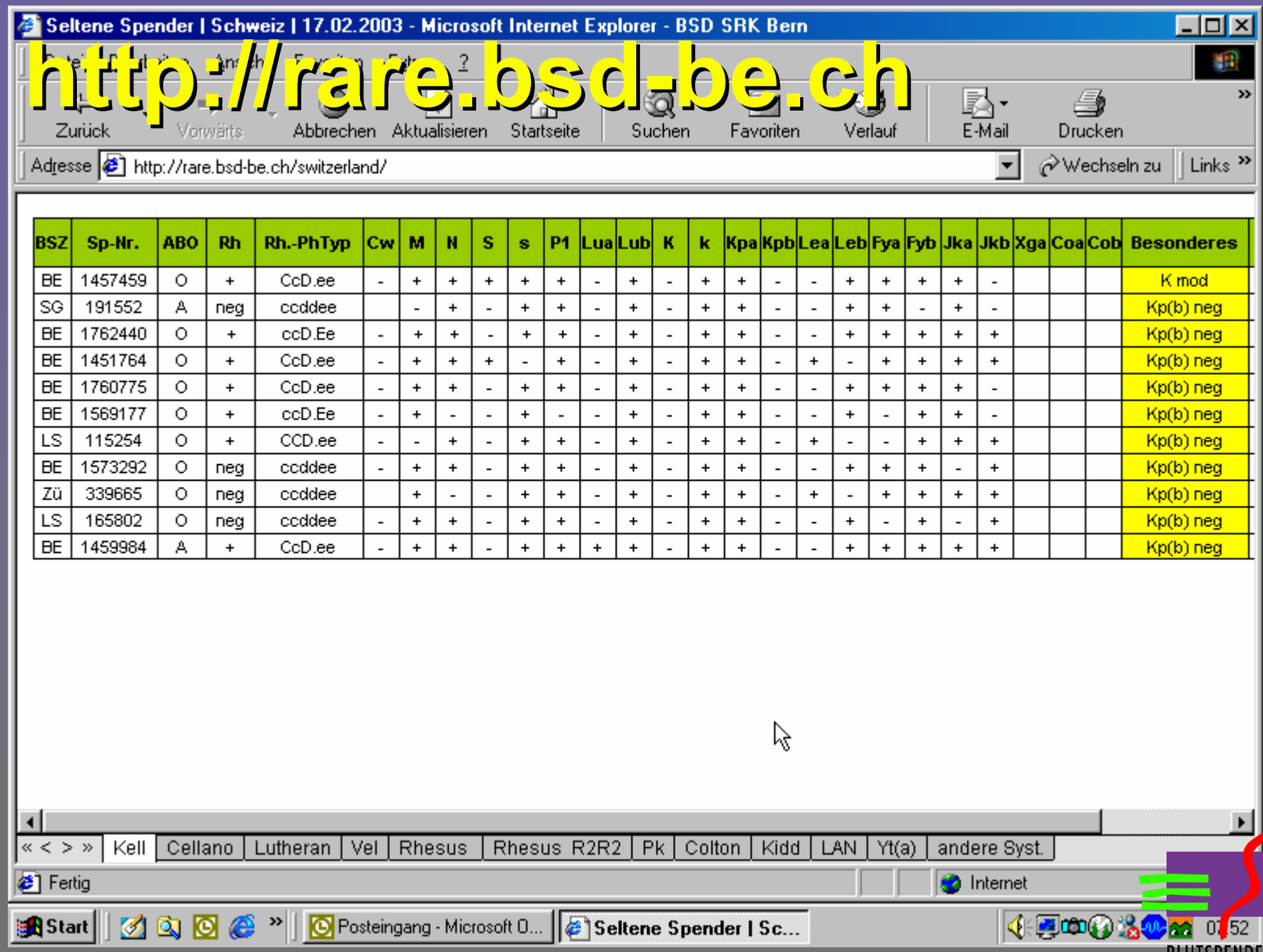

BSZ	Sp-Nr.	ABO	Rh	Rh.-PhTyp	Cw	M	N	S	s	P1	Lua	Lub	K	k	Kpa	Kpb	Lea	Leb	Fya	Fyb	Jka	Jkb	Xga	Coa	Cob	Besonderes
BE	1457459	O	+	CcD.ee	-	+	+	+	+	+	-	+	-	+	+	-	-	+	+	+	+	-				K mod
SG	191552	A	neg	ccddee		-	+	-	+	+	-	+	-	+	+	-	-	+	+	-	+	-				Kp(b) neg
BE	1762440	O	+	ccD.Ee	-	+	+	-	+	+	-	+	-	+	+	-	-	+	+	+	+	+				Kp(b) neg
BE	1451764	O	+	CcD.ee	-	+	+	+	-	+	-	+	-	+	+	-	+	-	+	+	+	+				Kp(b) neg
BE	1760775	O	+	CcD.ee	-	+	+	-	+	+	-	+	-	+	+	-	-	+	+	+	+	-				Kp(b) neg
BE	1569177	O	+	ccD.Ee	-	+	-	-	+	-	-	+	-	+	+	-	-	+	-	+	+	-				Kp(b) neg
LS	115254	O	+	CCD.ee	-	-	+	-	+	+	-	+	-	+	+	-	+	-	-	+	+	+				Kp(b) neg
BE	1573292	O	neg	ccddee	-	+	+	-	+	+	-	+	-	+	+	-	-	+	+	+	-	+				Kp(b) neg
Zü	339665	O	neg	ccddee		+	-	-	+	+	-	+	-	+	+	-	+	-	+	+	+	+				Kp(b) neg
LS	165802	O	neg	ccddee	-	+	+	-	+	+	-	+	-	+	+	-	-	+	-	+	-	+				Kp(b) neg
BE	1459984	A	+	CcD.ee	-	+	+	-	+	+	+	+	-	+	+	-	-	+	+	+	+	+				Kp(b) neg

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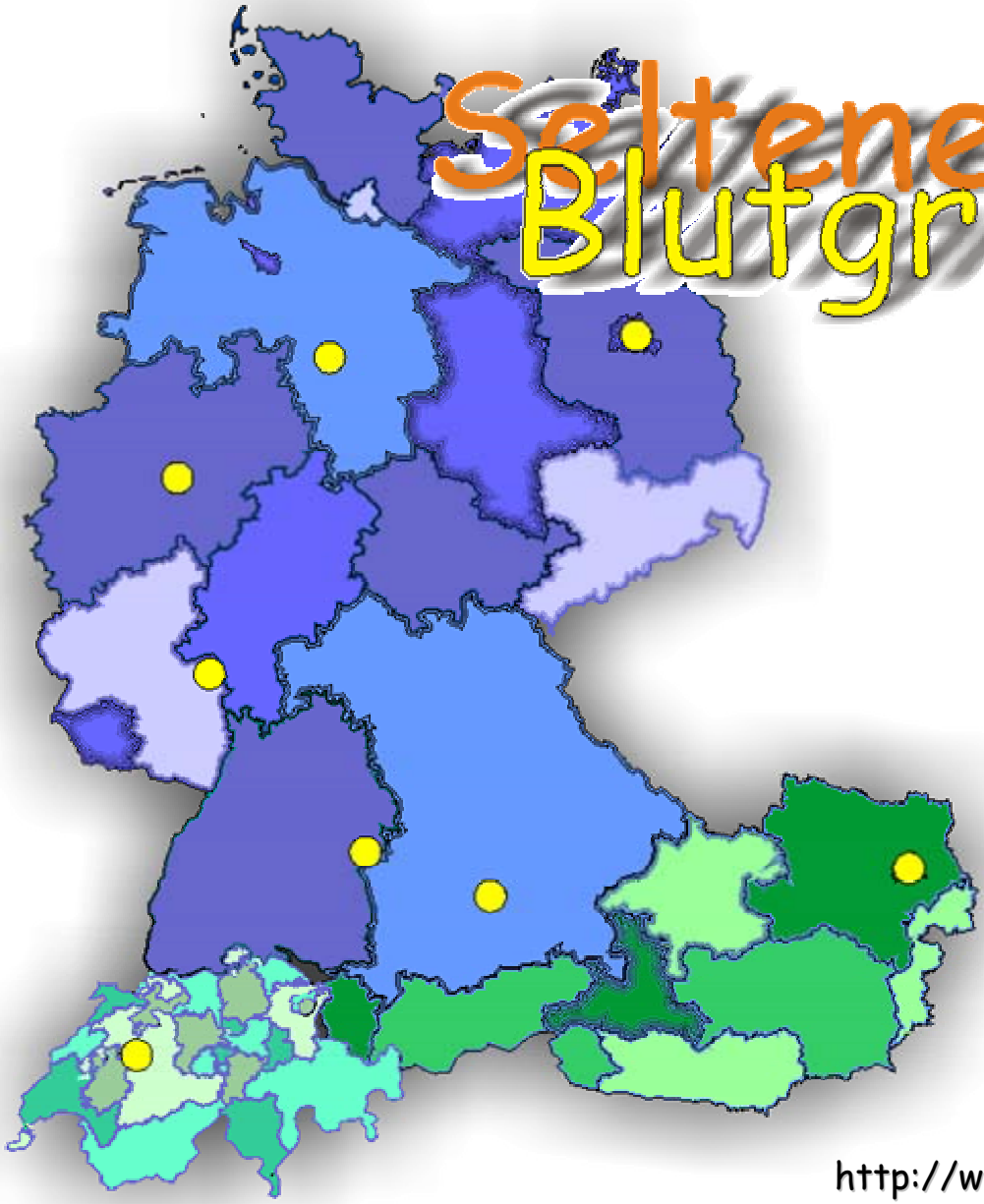
- kindly provided by H. Hustinx

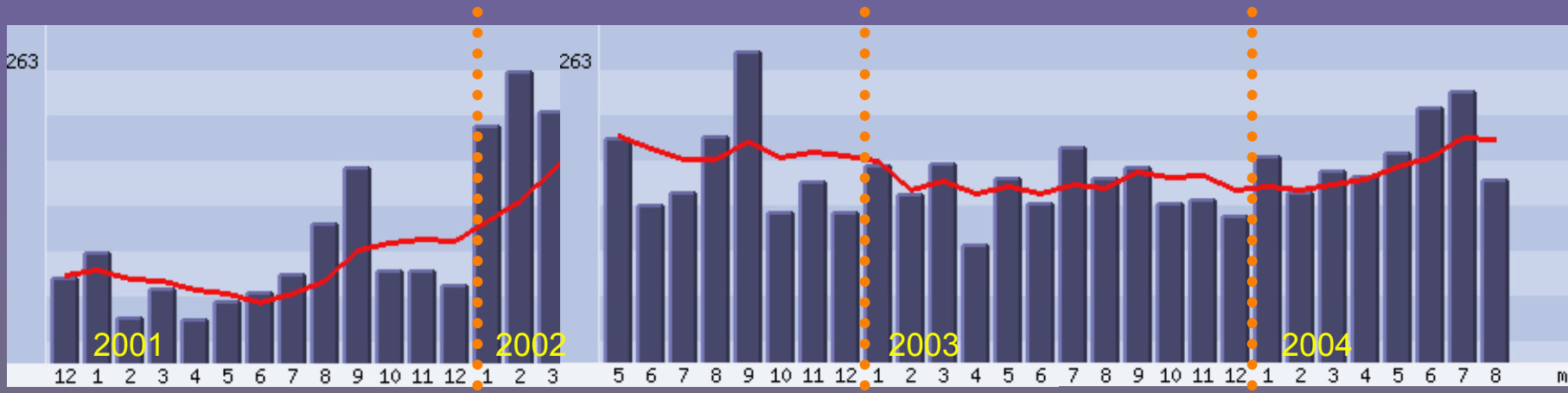
Seltene Blutgruppen

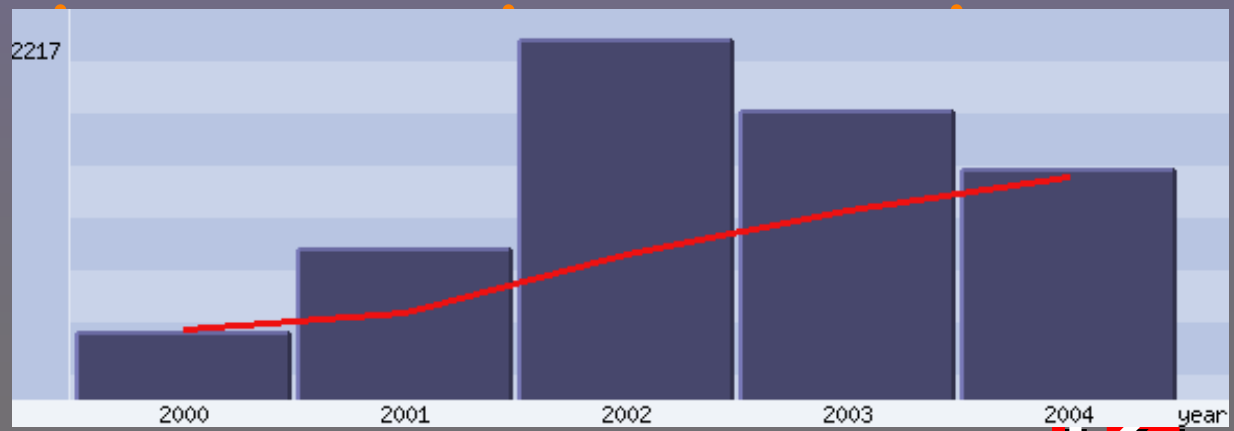


DGTI Sektion Immunhämatologie Gentechnik

http://www.uni-ulm.de/~wflegel/RARE/

Webpage statistics July 2004





http://www.uni-ulm.de/~wflegel/RARE/ ulm

SCARF Homepage

ulm

„Local Exchange Net“

- DGTI Working Party
  „German Rare Donor Program“
- Organization of the Local Exchange Net
  Dr. M. Tilmann, Berlin
- current participants
  - Ahrens, Böhlen-Bodmer, Endres, Flegel, Förstemann, Glameyer, Hustinx, Ladewig, Lonicer, Petershofen, Scharberg, Seltsam, Sternberger, Tilmann, Wagner/München, Wagner/Springe, Zimmermann

Concluding remark

Only the systematic screening among donors will prevent shortages in the supply of red cell units with rare blood groups.

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