

Centralization of the blood supply in The Netherlands: past, present and future



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Blood and Beyond

6 April 2019 | 1

Agenda

- Sanquin Blood Supply
- Consolidation blood supply 2008 → 2019
- Sanquin Blood Bank 2019
- Consolidation National Screening laboratory
- Future operational and research aspects

About Sanquin

- Sanquin is responsible for supplying blood in The Netherlands on a not-for-profit basis
- The hundreds of thousands of donors who give blood on a voluntary basis are the heart of the organization
- Core activity: producing and supplying blood and plasma products for treating patients – safely and efficiently
- Every year about 300,000 people in The Netherlands receive a blood product – varying from accident victims to cancer patients

The Netherlands



- Number of inhabitants: 17.619.112
- Surface area: 41,528 km²
- Number of hospitals: 92/132

History

- 1925 First donor service in Rotterdam;
- 1930 Dutch Red Cross blood transfusion service founded
- 1946 Founding Central Laboratory Blood supply (CLB);
- 1973 Central Blood Transfusion Commission's plan for blood banks; 22 foundations were established;
- 1998 A single organisation: 22 blood banks and CLB merge into Sanquin;
- Integration: from 22 to 9 blood banks;
- 2001 Consolidation: from 9 to 4 blood banks;
- 2008 Centralisation Laboratories: 4 to 1 National Screening Laboratory
- 2010 Final consolidation: from 4 to 1 blood bank;
- 2015 Production: from 4 to 2 locations
- 2016 Start next transformation National Screening Laboratory

More than just blood

Blood collection

- Recruiting and medically examining donors
- Collecting blood and plasma

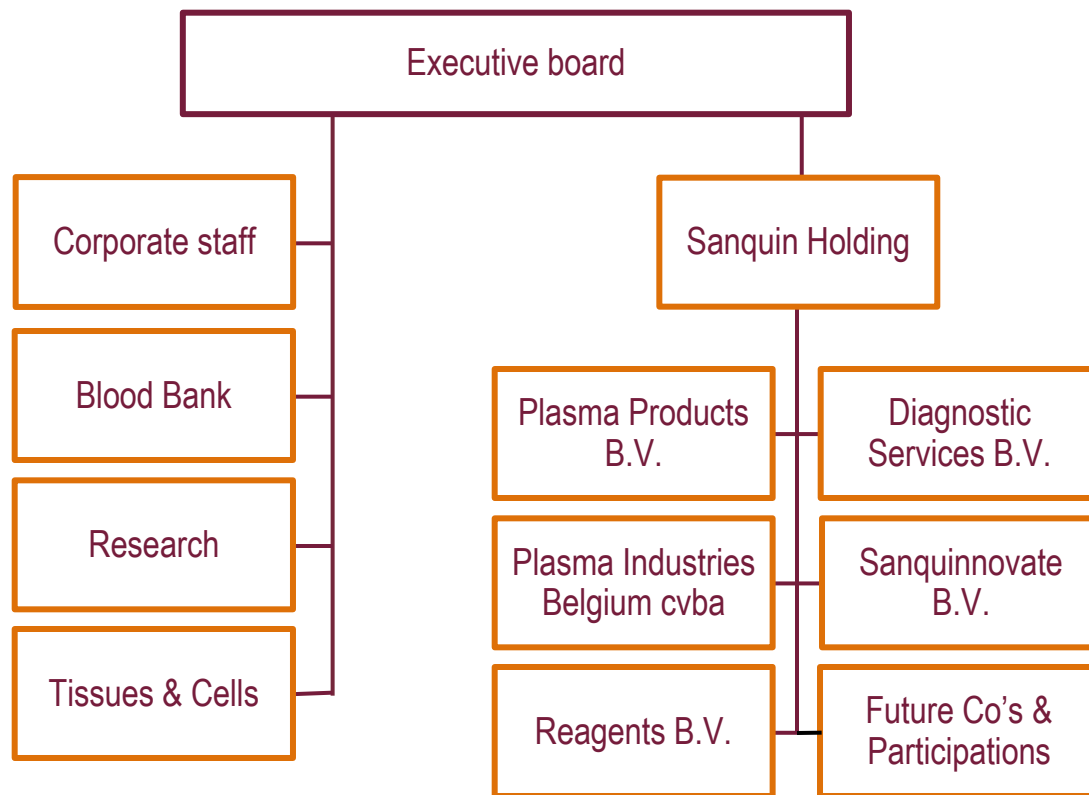
Products and supply

- Processing and testing blood and blood products
- Stock management
- Supplying products (blood, plasma, medicines, reagents) and services to hospitals and other customers

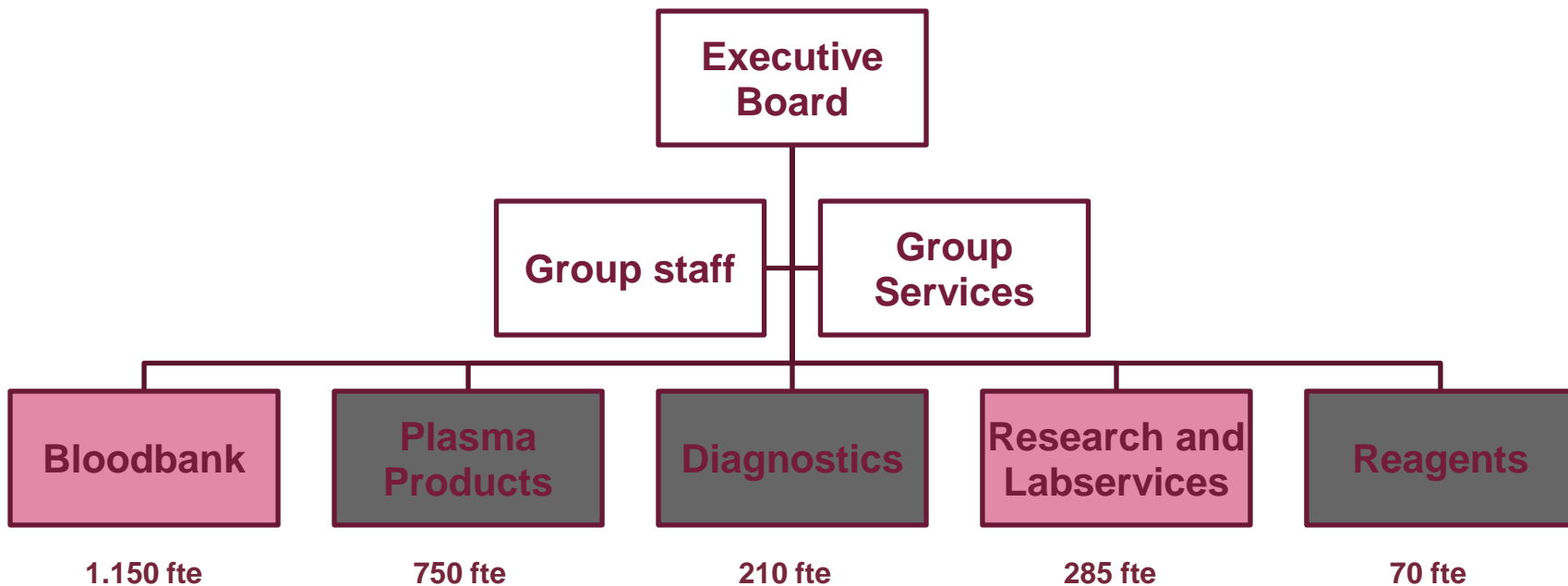
Research, education and advice

- Performing scientific research
- Advising customers about products and services
- Carrying out diagnostics

Organisation



Organisation



Sanquin Amsterdam HQ



Key figures blood supply 2017 (1/2)

Type		purpose
Recovered plasma	119.000 kg	Fractionation
Aferesis plasma	181.000 kg	
Aferesis plasma	5.000 kg	SD plasma
Specific hyperimmuun plasma	11.000 kg	Fractionation of hyper immunoglobulins



Key figures blood supply 2017 (2/2)

Donor population	2017
Number of registered donors	331.472
Donation frequency (blood donors)	1,50
Donation frequency (plasma donors)	5,20
Number of donations	726.565
Number of donors per 1000 habitants	19,40



Consolidation blood supply 2012-2019



Going back in time: 2012

- 2010: Consolidation from 4 to 1 Blood bank completed; however:
- Pressure from government and hospitals continues → work on further improvements in business operations
- The model of one Blood bank organisation is the solid funding to develop new business operations and policies

“Repair the roof when the sun shines”

instead of

“React to accomplished facts”

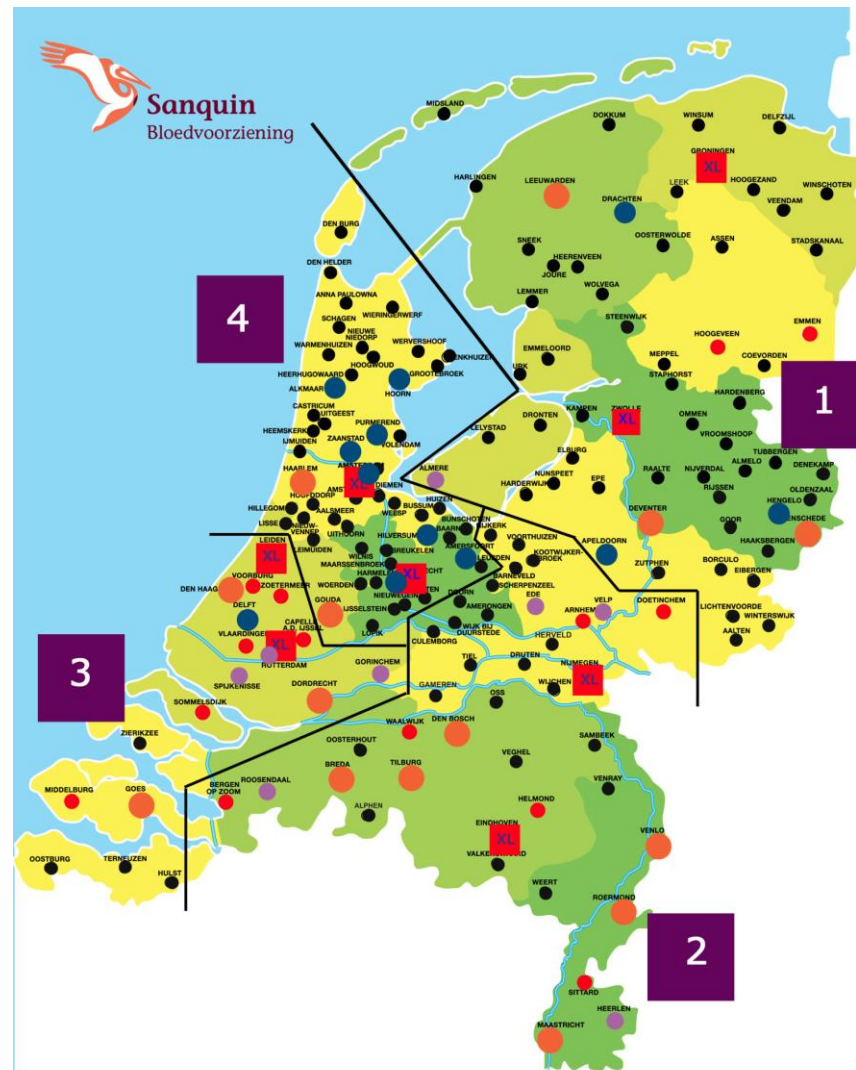
Blood Bank 2015: *The Blueprint*

- Create the conditions for a long term healthy organisation:
 - for the blood supply in The Netherlands
 - for the employees of Sanquin
- Sanquin has to continue improving efficiency, product quality, delivery reliability and client focus
- Centralisation and uniformation whenever possible
Decentralisation whenever a must
- Unforeseen circumstances, new technologies and new demands will continue to challenge the dynamics of the organisation

Blood collection

- 4 regions: 2x XL locations
- Medical donor affairs: 8 regions
- Electronic donor questionnaires
- Calamity plans

Teken	Wat	Omschrijving	AL
●	S	MOL/MAL	112
●	M1	Combi (VB en PF): 2 – 4 sessies p.w.	14
●	M2	Combi (VB en PF): 5 à 6 sessies p.w.	8
●	M3	Combi (VB en PF): > 6 sessies p.w.	12
●	L	Combi (VB, PF en TC): > 8 sessies p.w.	14
■	XL	Grote locaties > 10.000 donors of op strategische geografische locatie; alle afnamesoorten en bijzondere taken	8



Main lessons learned

What went well?

- Client focus
 - intensive contact regarding delivery of products by distribution points
- Social aspects related to people who would lost their job

Unavoidable

- Uniformation prior centralisation due to necessary equipment replacement
- Agitational organisation

The future towards 2015

What we didn't see in 2012 in the crystal bowl

- From announcement in 2012 towards implementation in 2015
 - this period appeared to be too long
- Less staff needed: gaps during the transition process
- Faster change from 4→2 production locations
- Even more attention needed for the remaining staff



Sanquin Bloodbank 2019

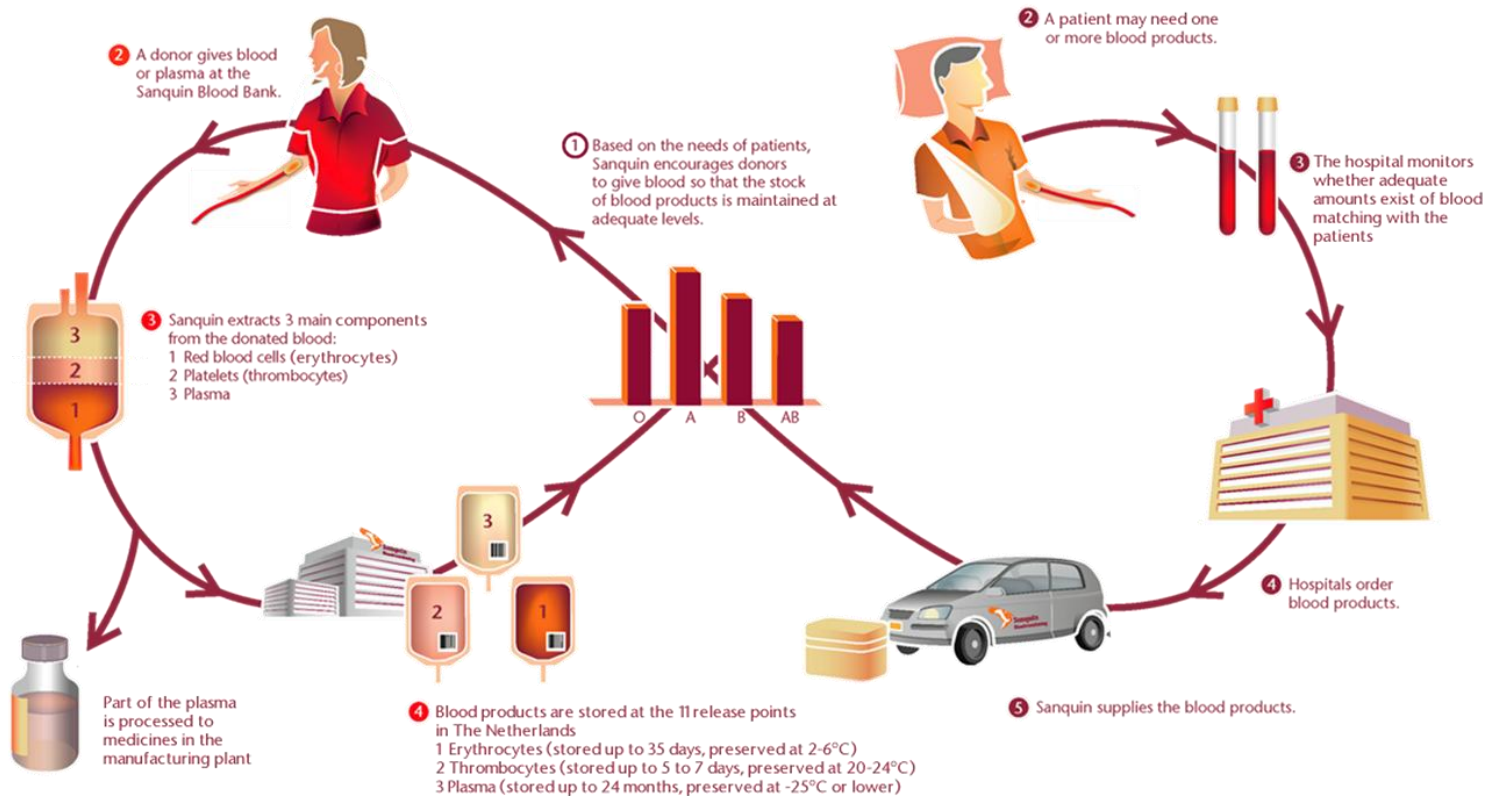


Collection and processing

- 136 donation locations
 - 50 fixed
 - 86 mobile
- approx. 1.150 FTE
- 2 processing sites
 - Amsterdam
 - Nijmegen
- 7 distribution points



The blood supply chain in The Netherlands



Daily production numbers (5 days a week)

- 800 – 1000 whole blood donations per day
- 135 – 150 pooled platelets per day
- Collections: 30% morning
 70% afternoon/evening



Logistics Whole Blood Donations

After collection cooling to 20°C (1,4-butaandiol plates)

2x daily: collection and transport to processing locations

Temperature controlled transport (18-24°C)

<24 hours after collection processing must be completed:

- Erythrocytes
- Pooled platelets
- Plasma frozen



Stock management

streef	3486	1302	2828	700	455	221	77	68	9137
	0pos	0neg	Apos	Aneg	Bpos	Bneg	ABpos	ABneg	dagen
Nederland	v	v	v	v	zr	v	zr	zr	7,63
Aantal:	3590	1225	3039	668	891	245	101	128	9887
Tov streefvoorraad:	103,0%	94,1%	107,5%	95,4%	195,8%	110,9%	132,0%	188,2%	108,2%
Leverdagen	7,21	6,59	7,52	6,68	13,71	9,42	11,22	16,00	7,63
voorraadverschil in aantallen tov streefvrd	104	-77	211	-32	436	24	25	60	
k		0, A, B pos					B neg, AB pos en neg		
voorraad is laag		voorraad < 3,5 leverdagen					voorraad < 4,5 leverdagen		
m		0, A, B pos					B neg, AB pos en neg		
voorraad is matig		Voorraad ≥ 3,5 en < 5,5					Voorraad ≥ 4,5 en < 6,5		
v		0, A, B pos					B neg, AB pos en neg		
voorraad is optimaal							Voorraad ≥ 6,5 en ≤ 10		
zr		0, A, B pos					B neg, AB pos en neg		
voorraad is te ruim		voorraad > 8 leverdagen					voorraad > 10 leverdagen		

Whole blood donation: weekly planning

Pull system

Week X:

Thursday: target whole blood donations based on stock levels

Friday: donation center planning

Week X+1:

send invitations to donors

Week X+2:

donations

Platelets: daily production planning

Pull system

- > 90% pooled platelets (from 5 buffy coats)

Daily target per bloodgroup, calculated using BloodScore™

- Daily replenishment targets
- Production capacity
- Mean +SD of daily usage
- Risk of outdating versus risk of shortage

Release of products

- At the day of production
- eProgesa
- One-by-one
- At the same day allocation to the distribution points



Storage of blood products at distribution locations



- Erythrocytes 35 days at 2°- 6 °C



- Platelets, 7 days, 20°- 24°C



- Fresh Frozen Plasma, 2 years, -25°C
- Omniplasma (SD plasma), 4 years, -18°C

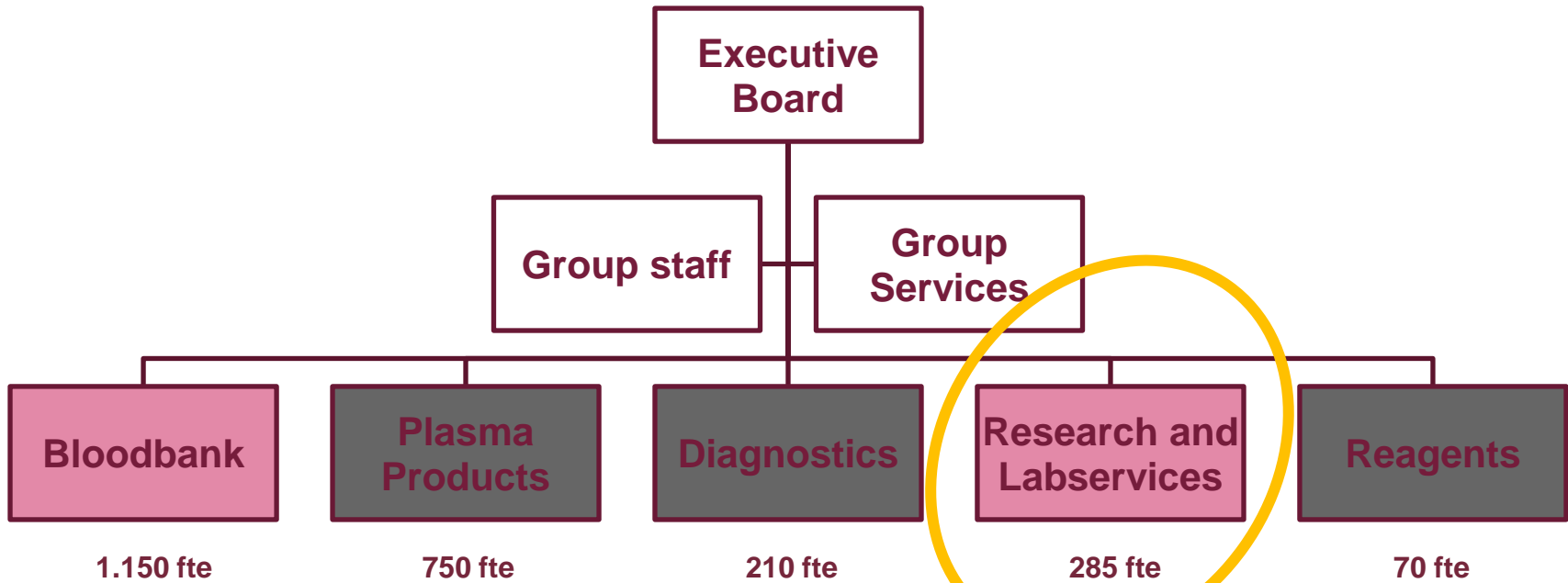
Product losses caused by outdating

Product	Loss outdating at	Target	2018
Erythrocytes	Bloodbank	0,25%	0,08%
Erythrocytes	Hospital	0,50%	0,28%
Thrombocytes composed	Bloodbank	3,00%	1,06%
Thrombocytes composed	Hospital	5,00%	5,51%

National Screening laboratory Sanquin (NSS)

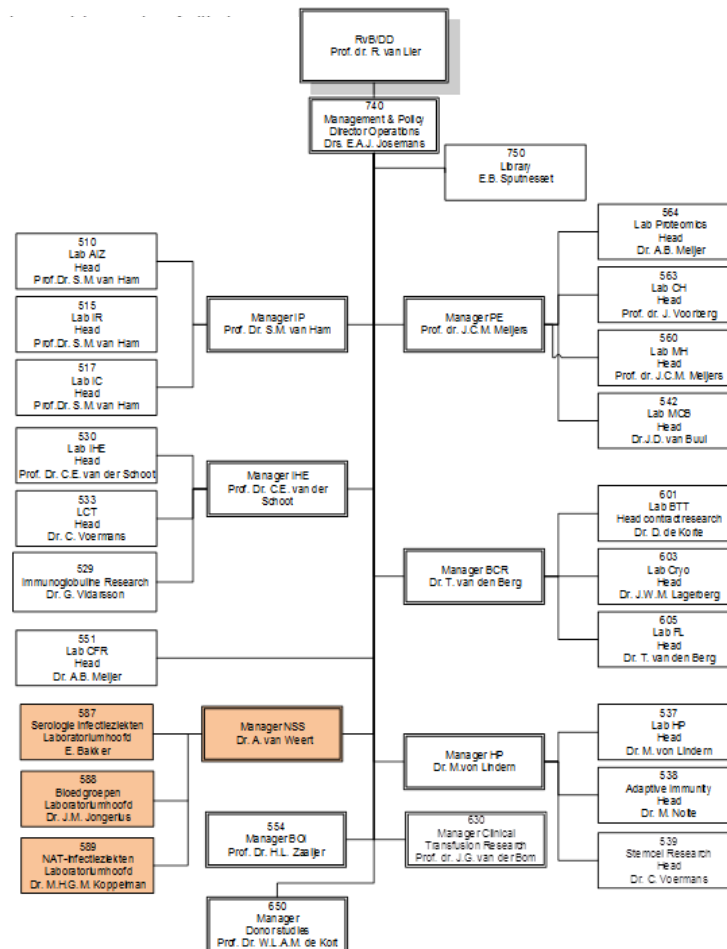


ORGANISATION



 Public
 Private

National Screening Laboratory Sanquin



National Screening laboratory Sanquin 2008



Pre-/Post-analysis

3x PRO-V
9x centrifuges



Virus serology

5x PRISM next
1x Architect



Blood group serology

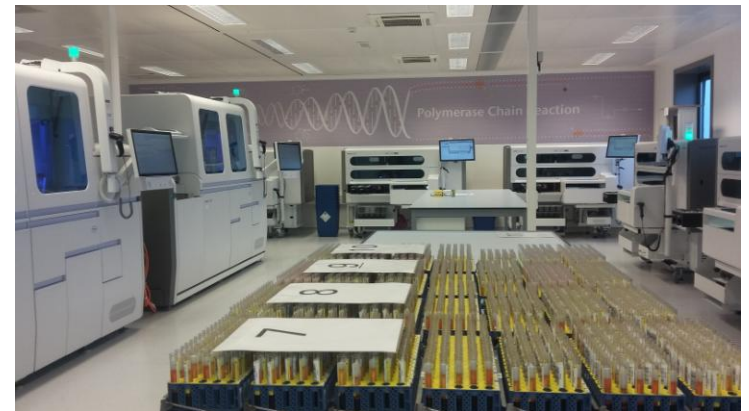
4x PK7300
4x Magister

NAT screening

8x S201
4x Hamiltons

Transformation NAT-screening

- 2008: S201
- 2013: MPX2
- 2016: cobas 6800
- 2017: HEV (fresh blood products)
→ pools of 24



Cobas 6800 (2x)

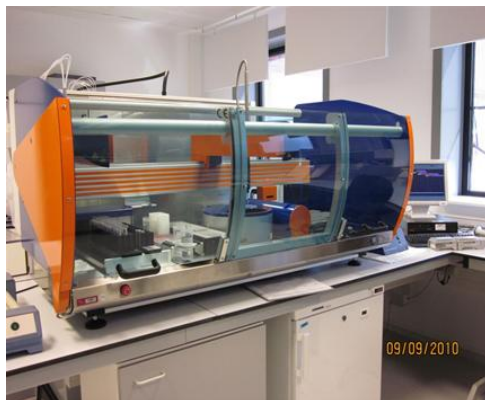
Cobas p680 (5x)

Transformation Blood group serology

- ABO, RhD, C,c,E,e,K and a-*Tp*
- Phenotyping other RBC-antigens
C c E e C^w K k Fy^a Fy^b Jk^a Jk^b S s
M N Le^a Le^b P₁ Kp^a Lu^a Wr^a Co^b
- - No retesting required by Blood bank
- - Direct availability from stocks: Blood bank and hospitals



Olympus PK7300 (4x)



March 2019
Magister → Magister C24

Initiated:
PK7300 → PK7400



Transformation pre-analytics

2008

PVT PRO-V
Centrifuges

2017

Replacement centrifuges
- validation centrifugation times → shorter
- 6 centrifuges (3 less)

2018

Replacement pre-/post- analysis robots
- Automate 2500
- additional quality control
- increased tube selection feasibilities



Hettich Rotixa 500RS (6x)
Automate 2500 (3x)

Transformation Infection serology

- 2008
PRISM next
- 2013
HTLV new donors only → Architect
- 2018
Alinity s
- 2019 (initiated)
Tecan (anti-Parvo B19, anti-Malaria,
anti-Coxiella burnetii)
- 2017 Extra testing: ferritin (Architect)



Alinity s (5x)

National Screening laboratory Sanquin 2008



Pre-/Post- analysis

3x PRO-V
9x centrifuges



Virus serology

5x PRISM next
1x Architect



Blood group serology

4x PK7300
4x Magister

NAT screening

8x S201
4x Hamiltons

National Screening laboratory Sanquin 2018



**Pre-/Post-
analysis**

3x Automate
6x centrifuges



**Virus
serology**

5x Alinity s
1x Architect

**Blood group
serology**

4x PK7300
3x Magister



**NAT
screening**

2x Cobas 6800
5x p680
2x p360
2x Hamiltons

Staff planning NSS

Throughput requirements:

Priority: 9:30 am

Whole blood: 2:00 pm

Plasma: 5:00 pm

Program	Mon	Tue	Wed	Thu	Fri	Sat
Night shift Pre-analysis and NAT	2	2	2	2	2	1
Infection serology	1	3	3	3	3	2
Infection serology Other	1	1	1	1	1	1
NAT screening	1	2	2	2	2	1
Bloodgroup serology	1	5	5	5	5	3

Future operations and research

Topics

- Continued process improvements
- Donor recruitment and retention
- Need for plasma increases → impact on testing
- Complexity variety of testing increases → IT
- WNV outbreak scenarios
- Usutu virus: risks for patients?

Colourfull future





Thank you!



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