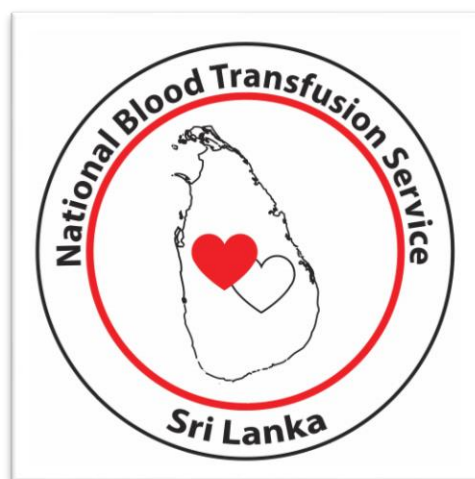


ANNUAL STATISTICS REPORT 2019

NATIONAL BLOOD TRANSFUSION SERVICE

SRI LANKA



Statistics Unit
National Blood Transfusion Service

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Introduction

National Blood Transfusion Service (NBTS), Sri Lanka is a special campaign coming under the Ministry of Health. It is the sole supplier of blood and blood products to all government hospitals and majority of private sector hospitals. There are 102 Hospital Based Blood Banks & 2 standalone Blood Centers affiliated to 24 cluster centers depending on the geographic distribution. Out of the 102 Hospital Based Blood banks three blood banks are still not functioning (Kiribathgoda, Deniyaya, Medawachchiya).

Vision

To be a unique model for the world securing Quality assured blood services, through a nationally coordinated system.

Mission

To ensure the quality, safety, adequacy and cost effectiveness of the blood supply and related laboratory, clinical, academic and research in accordance with national requirement and WHO recommendations .

National Blood Transfusion Service

The Director NBTS, being the chief executive officer of the organization, is responsible for implementation and supervision of the common decisions taken by the organization.

Each cluster Centre is headed by a Consultant Transfusion Physician or a senior medical officer. Consultant Transfusion Physicians also provide clinical guidance to blood banks within the cluster.

This report compiles the consolidated statistics of the performance of blood banks of the National Blood Transfusion Services for the year 2019.

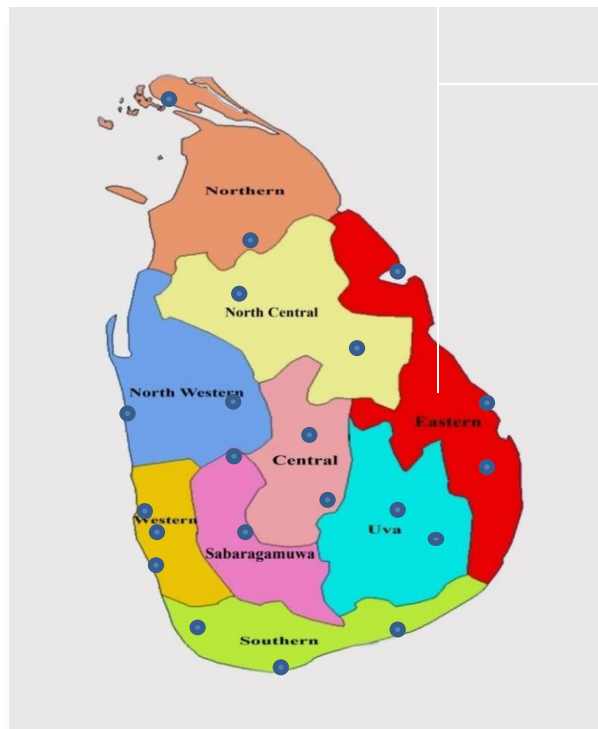
Cluster System and Blood Bank Distribution of National Blood Transfusion Service - 2019

North Central	
ANURADHAPURA	
Anuradhapura Padaviya Thambuththegama Medawachchiya	
POLONNARUWA	
Polonnaruwa Medirigiriya Dehiattakandiya	

Northern	
VAVUNIYA	JAFFNA
Vavuniya Chettikulam Mannar	Jaffna Kilinochchi Point Pedro Mullativu Thellippalai

Eastern		
BATTICALOA	TRINCOMALEE	AMPARA
Batticaloa Valachchenai Kattankudy Kalawanchikudi	Trincomalee Kantale Kinniya Muththur	Ampara Akkarepattu Kalmunai - North Kalmunai - South Mahaoya Sammanthurai Pothuvil

Central	
KANDY	PERADENIYA
Kandy Theldeniya Matale Dambulla	Peradeniya Gampola Nawalapitiya
NUWARA ELIYA	
Nuwara Eliya Dikkoya Rikillagaskada	



Sabaragamuwa	
RATNAPURA	KEGALLE
Ratnapura Embilipitiya Balangoda Kahawatta	Kegalle Mawanella Karawanella Warakapola

UVA
BADULLA
Badulla Diyatalawa Mahiyanganaya Welimada
MONARAGALA
Monaragala Bibile Wellawaya

North Western	
KURUNEGALA	CHILAW
Kurunegala Dambadeniya Kuliyapitiya Nikaweratiya Galgamuwa	chilaw Marawila Puttalam

Western				
COLOMBO	RAGAMA	GAMPAHA	MAHARAGAMA	KALUTARA
NBC	CNTH	Gampaha	CIM Apeksha	Kalutara
NHSL	Kiribathgoda	Wathupitiwala	Awissawella	Horana
CSHW	Negambo	Meerigama	Homagama	Kethumathi
CSTH	Welisara	Minuwangoda		Panadura
DMH				
LRH				
SJGH				
Accident Ser.				
IDH- Angoda				
CEBH- Mulleriyawa				
NINDT- Maligawaththa				
Army Hospital				
KDU				

Southern		
KARAPITIYA	MATARA	HAMBANTOTA
Karapitiya	Matara	Hambantota
Mahamodara	SRBC Kamburugamuwa	Tangalla
Balapitiya	Kamburupitiya	Tissamaharamaya
Elpitiya	*Deniyaya	Walasmulla
Udugama		

Comparison of Annual Blood Collection

Table 1: Comparison of Annual Blood Collection

Year	Voluntary Collection	Replacement Collection	Total Collection
2014	380,367	0	380,367
2015	395,500	0	395,500
2016	414,175	0	414,175
2017	423,668	0	423,668
2018	450,640	0	450,640
2019	444,515	0	444,515

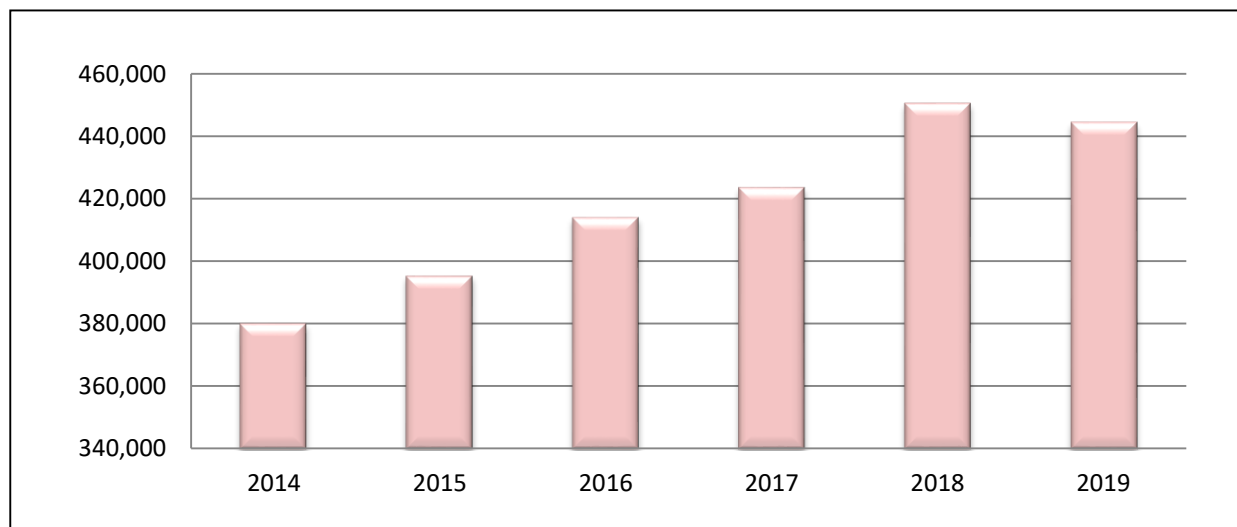


Figure 1: Yearly comparison of blood collection

Month	2018	2019
January	36100	37922
February	37953	40335
March	39843	37043
April	34791	32587
May	35397	35864
June	40258	38975
July	39177	37868
August	36573	38425
September	37009	33901
October	36129	35513
November	38865	34894
December	38588	41188
Total	450683	444515

Table 2: Comparison of Monthly Blood Collection in 2018 and 2019

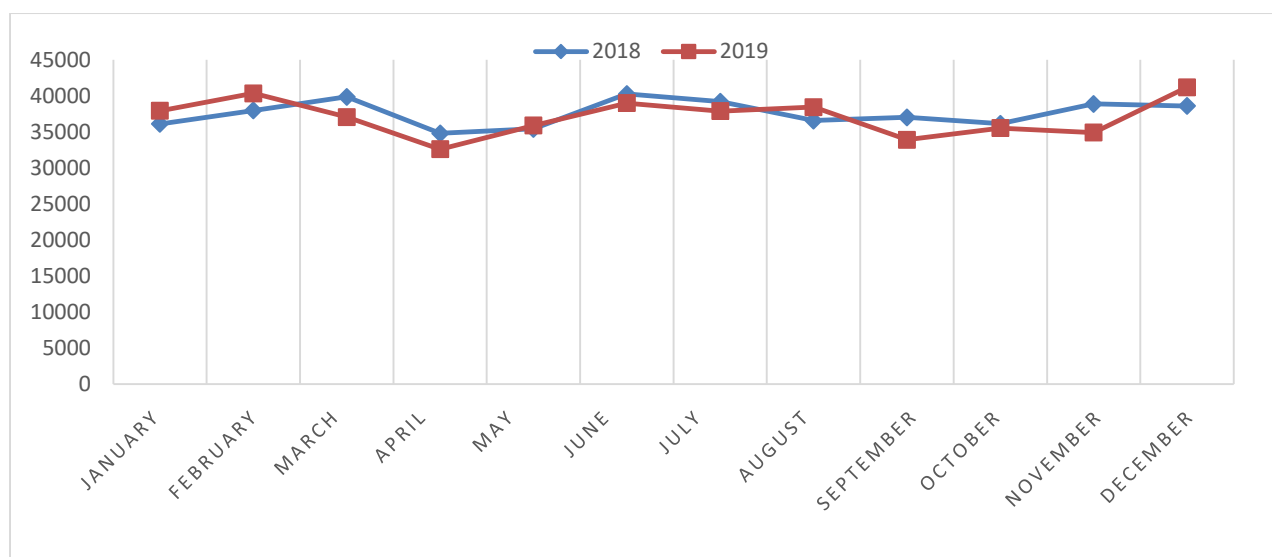


Figure 2: Comparison of Monthly Blood Collection in 2018 and 2019

Blood Collection Cluster wise

Table 3: Total blood collection cluster wise

Cluster	Number of Mobiles	In-house Donations	Mobile Donations	Total Donations
Ampara	173	1615	10199	11814
Anuradhapura	284	1962	21734	23696
Badulla	252	1155	15018	16173
Batticaloa	76	864	4520	5384
Chilaw	177	864	11914	12778
CIM	240	3657	23374	27031
CNTH	271	874	21334	22208
Colombo	916	7733	75232	82965
Gampaha	195	1017	12087	13104
Hambantota	75	386	4708	5094
Jaffna	200	3262	9531	12793
Kalutara	219	713	12955	13668
Kandy	291	2461	28126	30587
Karapitiya	263	931	21088	22019
Kegalle	109	512	7047	7559
Kurunegala	440	2855	43303	46158
Matara	250	414	22947	23361
Monaragala	131	446	7955	8401
Nuwara Eliya	64	417	2788	3205
Peradeniya	228	643	15786	16429
Polonnaruwa	179	1290	11734	13024
Ratnapura	257	919	16941	17860
Trincomalee	68	685	4655	5340
Vavniya	46	876	2988	3864
Total	5404	36,551	407,964	444,515

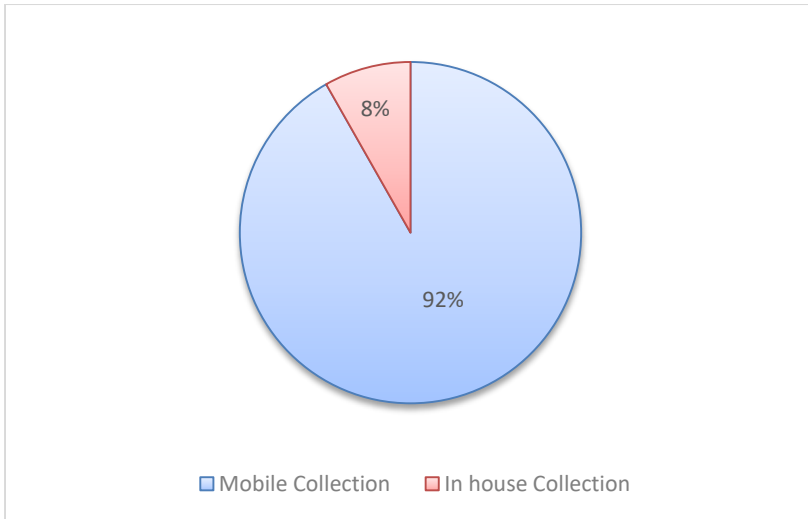


Figure 3: Distribution of total blood collection by mode of collection

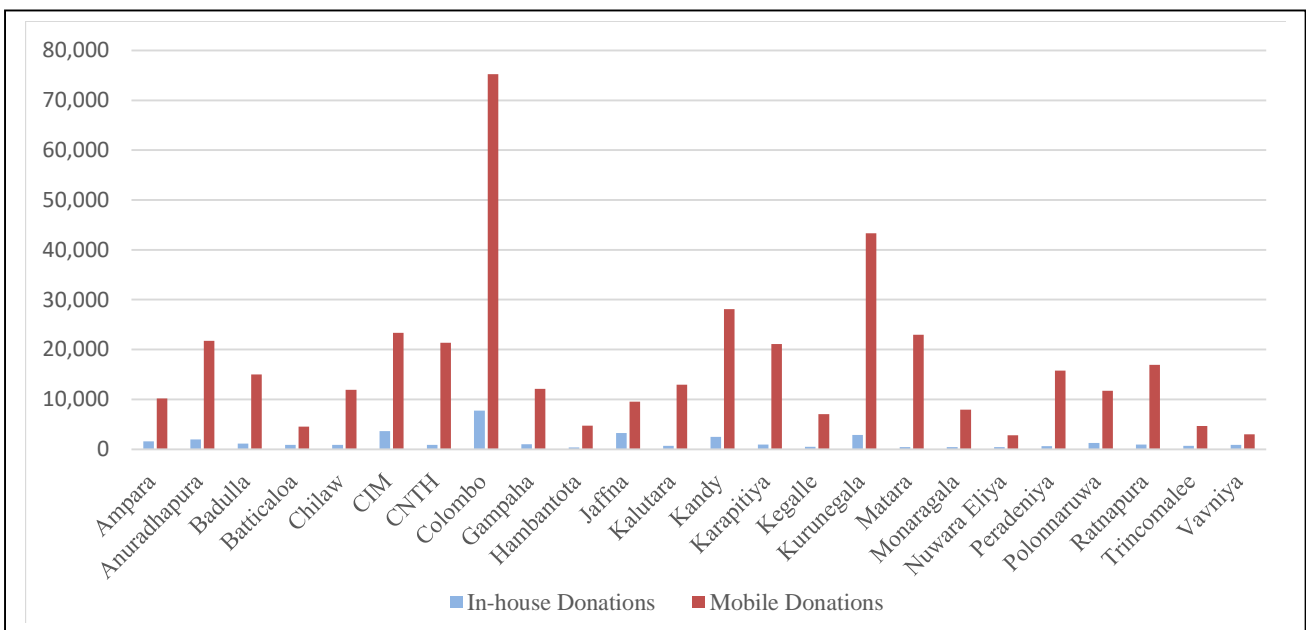


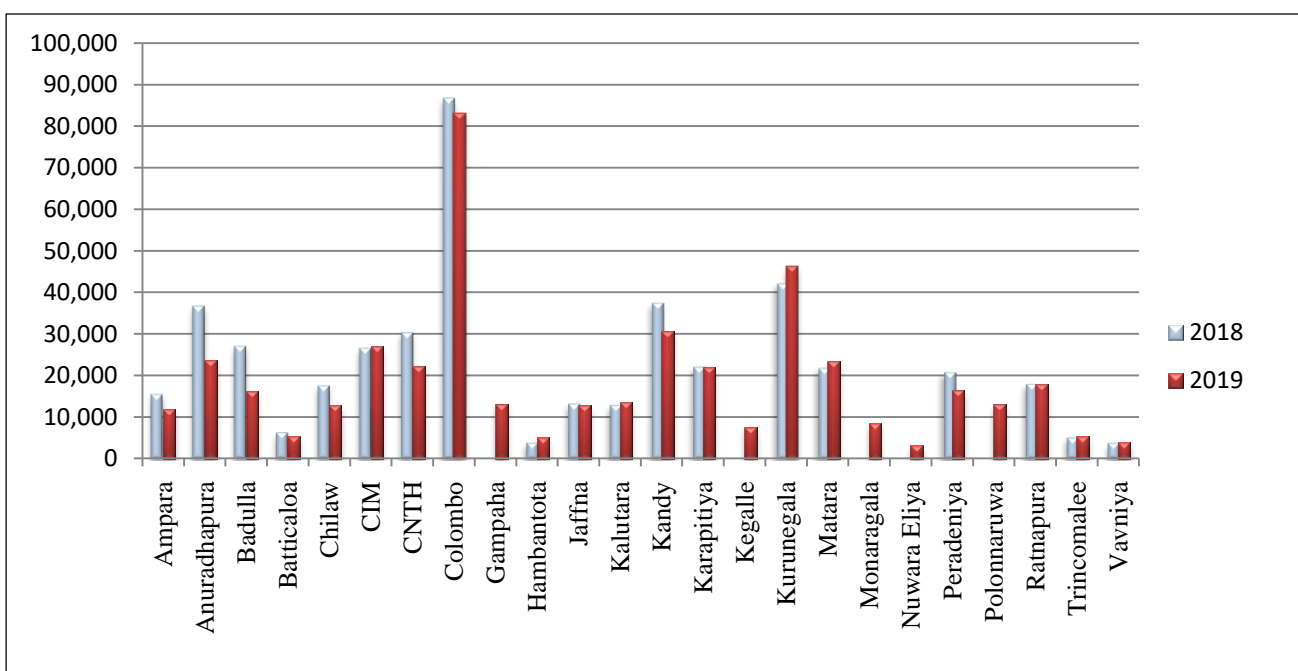
Figure 4: Total blood collection cluster wise

Comparison of Cluster collection with previous year

Table 4: Comparison of cluster blood collection with previous year

Cluster	2018	2019
Ampara	15,668	11,814
Anuradhapura	36,860	23,696
Badulla	27,258	16,173
Batticaloa	6,523	5,384
Chilaw	17,762	12,778
CIM	26,740	27,031
CNTH	30,464	22,208
Colombo	86,563	82,965
Gampaha	-	13,104
Hambantota	4,067	5,094
Jaffna	13,344	12,793
Kalutara	13,094	13,668
Kandy	37,574	30,587
Karapitiya	22,228	22,019
Kegalle	-	7,559
Kurunegala	42,223	46,158
Matara	21,948	23,361
Monaragala	-	8,401
Nuwara Eliya	-	3,205
Peradeniya	20,949	16,429
Polonnaruwa	-	13,024
Ratnapura	18,145	17,860
Trincomalee	5,242	5,340
Vavniya	3,987	3,864

Figure 5: Comparison of cluster blood collection with previous year



Monthly Blood Collection

Table 5: Monthly variation of total blood collection

Month	Number of Mobiles	Mobile Donations	In-house Donations	Total Donations
January	448	35036	2886	37922
February	485	38230	2105	40335
March	476	34746	2297	37043
April	373	26870	5717	32587
May	391	31862	4002	35864
June	455	36230	2745	38975
July	449	35461	2407	37868
August	488	35907	2518	38425
September	459	31108	2793	33901
October	450	32893	2620	35513
November	448	31506	3388	34894
December	482	38115	3073	41188
Total	5404	407,964	36,551	444,515

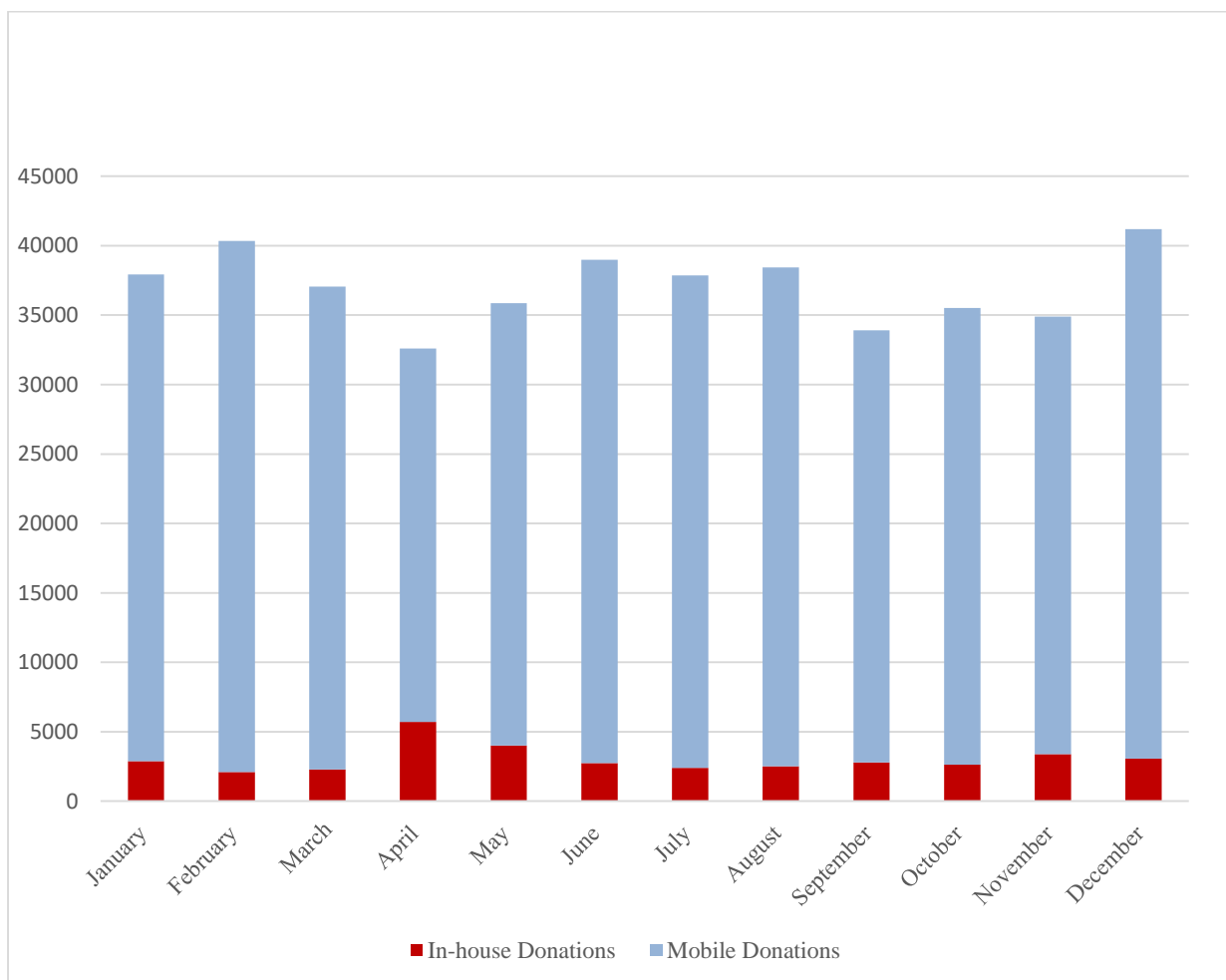


Figure 6: Monthly variation of blood collection

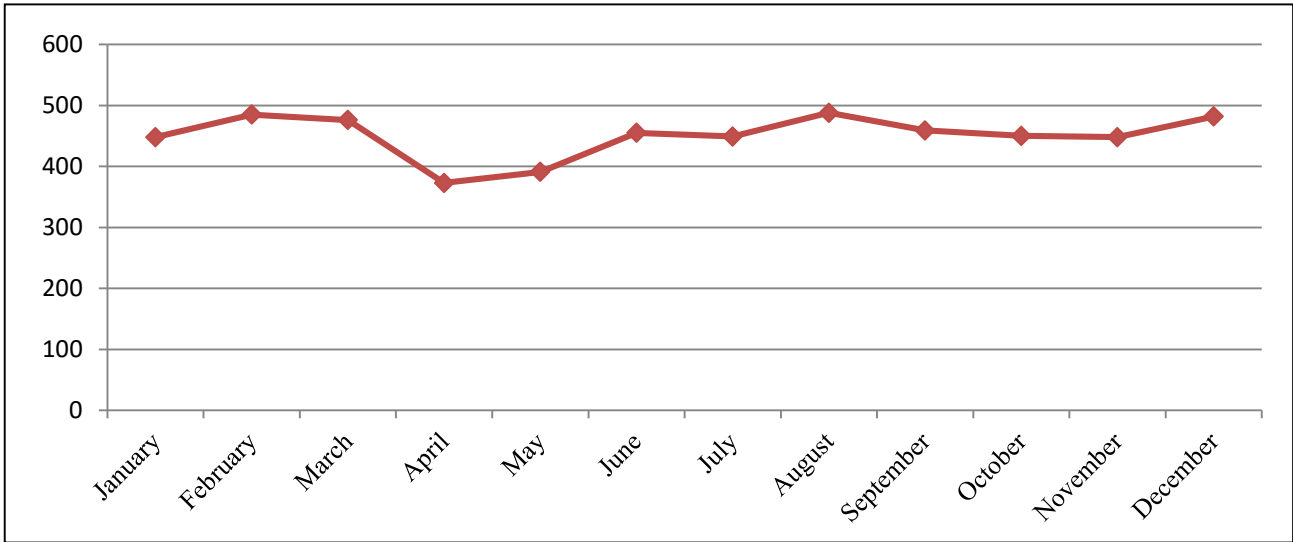
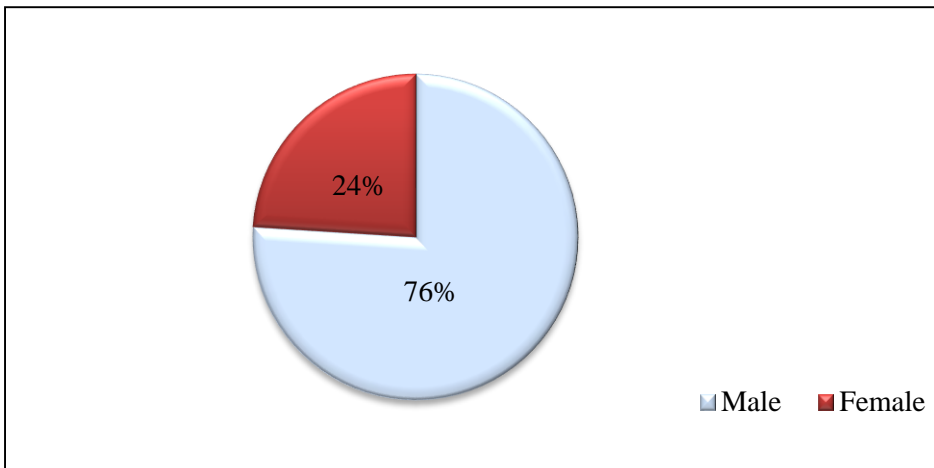
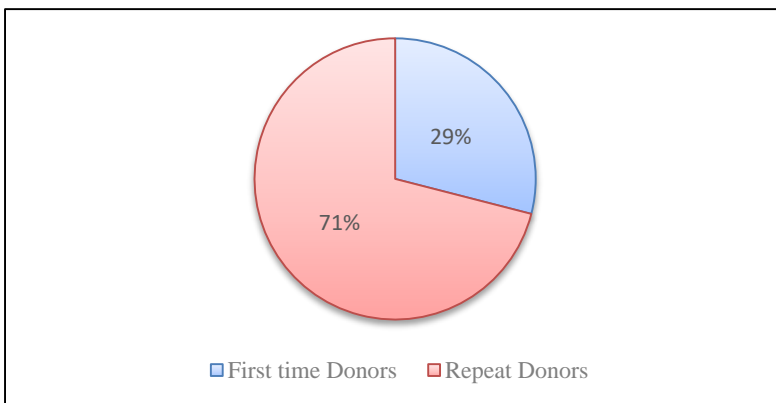


Figure 7: Monthly variation of number of mobiles



Male - 337,831 (76%)
 Female - 106,684 (24%)

Figure 8: Gender distribution of blood donation in Sri Lanka



First time Donors = 128,909 (29%)
 Repeat Donors = 315,606 (71%)

Figure 9: Donor population according to their number of donations

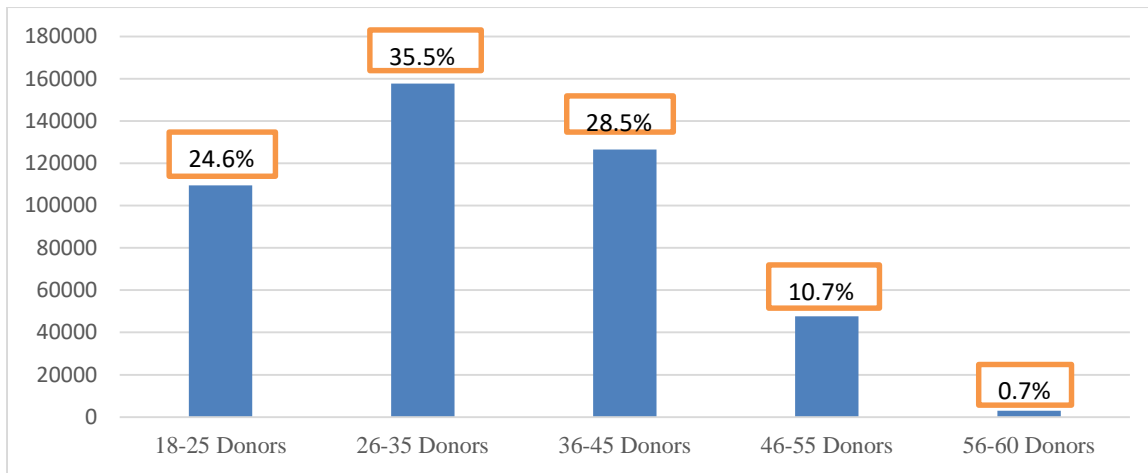


Figure 10: Donor population according to their age category

ABO and Rh group distribution of blood collection

Table 6: ABO and Rh group distribution of blood collection

	A	B	AB	O	Bombay O	Other	Total
Rh D Positive	92,184	117,339	23,355	186,385	31	0.00%	419,294
Percentage	20.738%	26.397%	5.254%	41.930%	0.007%	0%	94.326%
Rh D Negative	5,472	6,792	1,387	11,540	0.00%	0.00%	25,191
Percentage	1.231%	1.528%	0.312%	2.596%	0.00%	0.00%	5.667%
Weak D	4	4	0	22	0	0	30
Percentage	0.001%	0.001%	0%	0.005%	0.00%	0.00%	0.007%
Total	97,660	124,135	24,742	197,947	31	0	444,515

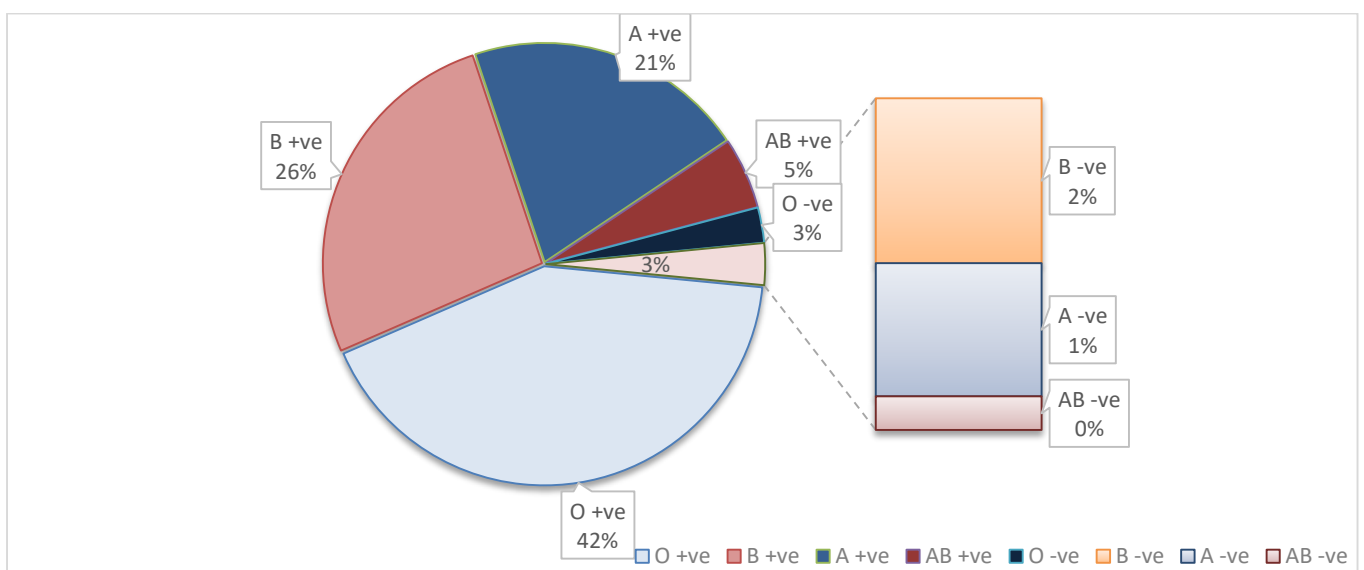


Figure 11: ABO and Rh distribution of donor population

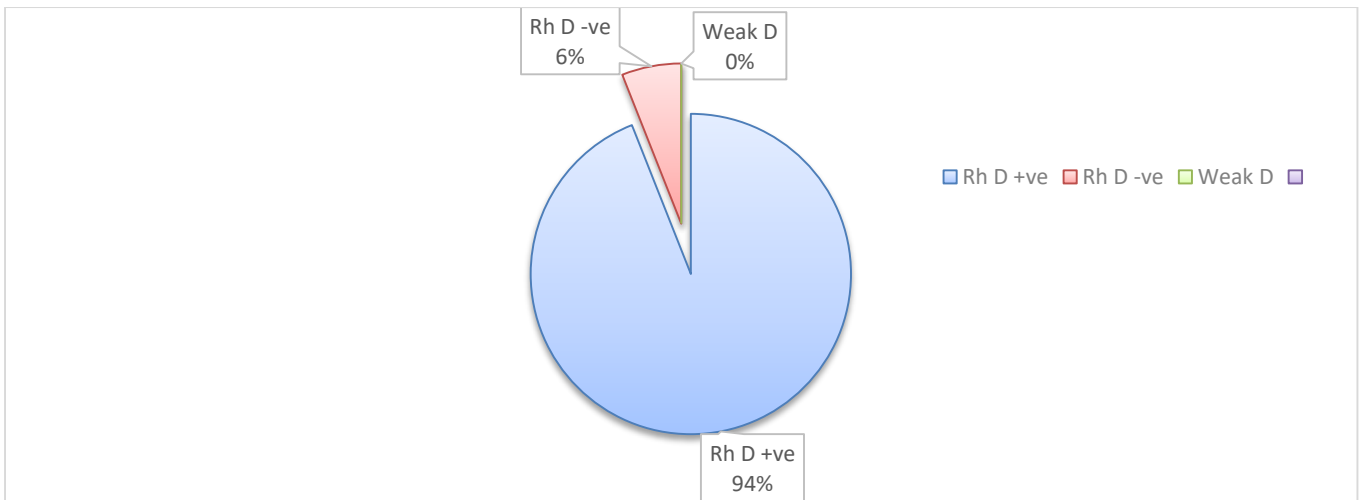


Figure 12: Rh distribution of donor population

Blood component preparation

Table 7: Comparison of Component preparation with previous years

	2014	2015	2016	2017	2018	2019
RCC	379,774	393,348	408,959	417,792	446,098	443,235
Platelets	220,335	244,071	248,644	252,865	263,720	274,499
FFP	344,091	344,788	369,299	378,983	390,671	399,052

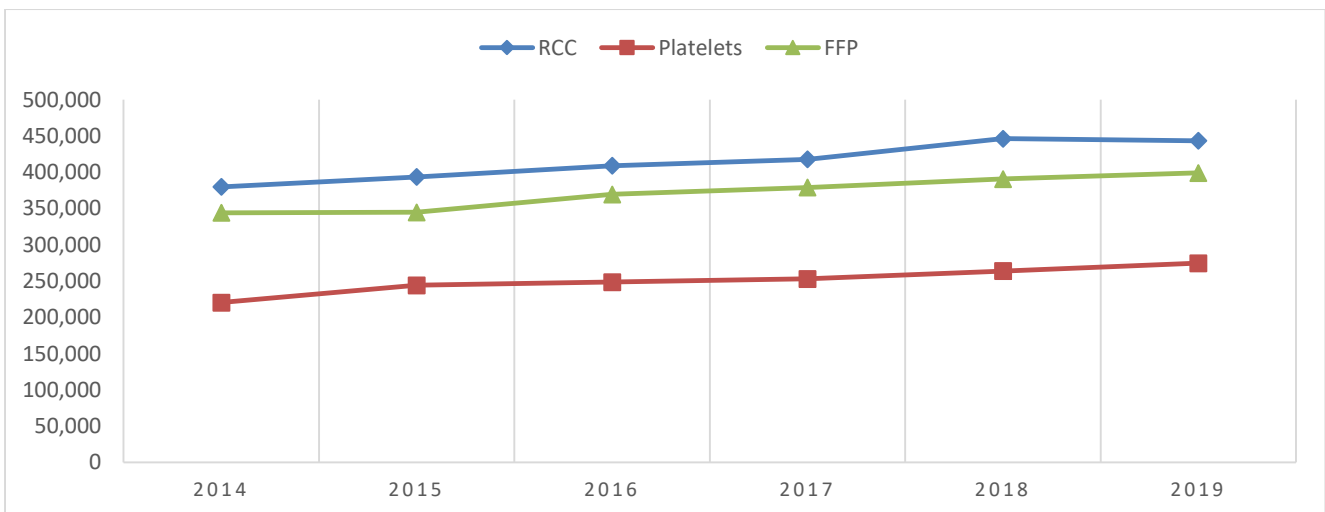


Figure 13: Comparison of blood component preparation

Platelet Aphaeresis Donations- 2019

Table 8: Platelet aphaeresis donations

Blood Bank	No. of procedures	No. of Units collected
Ampara	8	57
Anuradhapura	25	219
Apeksha	787	9060
Army Hospital	2	10
Badulla	20	209.6
Batticaloa	109	792
CNTH	8	91
Jaffna	55	565
Kalutara	2	21
Kamburugamuwa	11	72
Kandy	254	3323
NBC	858	11288.4
Total	2139	25,708

Statistics of RCC Cross matches & Issues

Table 9: Distribution of red blood cell requests, cross matches and issues

Cluster	Requests	Cross matches	Issues
Ampara	29914	24604	11638
Anuradhapura	49205	37346	21755
Badulla	40099	31803	15526
Batticaloa	20819	20066	8692
Chilaw	31908	25458	12267
CIM	51182	46982	24413
CNTH	70614	43381	24383
Colombo	245685	170168	69764
Gampaha	30565	18307	8484
Hambantota	31057	29074	9969
Jaffna	48201	25279	13017
Kalutara	38622	26730	11317
Kandy	99722	58351	29798
Karapitiya	84890	83129	21393
Kegalle	32990	33838	9650
Kurunegala	98015	85046	45510
Matara	25712	13992	7119
Monaragala	18050	18242	7054
Nuwara Eliya	11870	13765	4055
Peradeniya	42305	30239	12686
Polonnaruwa	26773	17731	11127
Ratnapura	55481	37123	17461
Trincomalee	14456	9804	4487
Vavniya	9563	9568	4635
Total	1,207,698	910,026	406,200

Statistics of other blood component usage

Table 10: Comparison of Blood component Issues in 2018 and 2019

	FFP	PC	Cryo	CSP/ Plasma	Buffy Coat
2018	156,512	151,741	48,622	7,032	1,254
2019	148,562	147,627.8	47,776	5,746	1,263

Statistics of HLA Laboratory

At the moment in government sector HLA Testing is carried out in National Blood Centre and Blood Bank-National Hospital Kandy.

Table 11: Comparison of HLA Laboratory Statistics (At NBC)

Typing and cross matches	2014	2015	2016	2017	2018	2019
Class 1	2293	2288	2015	1253	2415	} 1702
Class 11	2297	2214	1777	1099	2415	
Cross match	1365	1471	2490	1954	828	703
B27	352	194	319	492	602	543
PRA (Class I , Class II)	179	295	484	475	2456	1255
Transplantation						
Kidney (Patients ,Donor)	2455	2094	1589	1027	2017	1704
Bone Marrow (Patients, Donors)	192	108	167	163	264	387
AP Donor	11	32	171	7	0	84
Cadaveric Donor	7	15	11	34	30	41

PRA - Panel Reactive Antibodies

Table 12: HLA Laboratory Statistics (At Blood Bank/National Hospital Kandy)

Typing and cross matches	2019
Cross match	210
PRA (Class I , Class II)	190
Transplantation	
Kidney (Patients ,Donor)	356
Bone Marrow (Patients, Donors)	06
AP Donor	276
Cadaveric Donor	20

Statistics of Reference Immuno-haematology Laboratory

Table 13: Comparison of Reference Immuno-heamatology laboratory statistics

Test category	2014	2015	2016	2017	2018	2019
Difficult compatibility testing	2413	2656	2767	3003	3702	3142
Antibody Screening	1640	1263	3266	4440	4525	6064
Antibody titrations	243	394	241	272	399	384
DAT profile	637	603	702	1013	1027	1323
Extended phenotypes	303	439	414	363	395	362
Cold agglutination titration	38	154	47	42	48	54
Iso haemagglutination test	80	54	97	53	102	72
Haemolysin test	26	55	97	156	132	178
Confirmation of Bombay O	111	22	15	10	14	7
Elution studies	30	26	30	50	82	57
Transfusion reaction investigations	14	49	21	39	48	67

Table 14: Reference lab - detailed investigations

Investigations	2017	2018	2019
Blood Grouping (ABO & Rh D)	4995	5755	7353
DAT	3715	4384	5894
Antibody Identification	3358	3356	4034
Enzyme Panels	53	82	69
ABO/Rh Group Confirmation	315	411	350
Donath-Landsteiner Test (DL)	15	25	13
Cross Matching	1544	2127	2082
Rh Phenotyping	5156	5270	4969

Statistics of Reagent Laboratory

Table 15: Comparison on Statistics of reagent preparation

Reagents prepared	2014	2015	2016	2017	2018	2019
PBS working solution (L)	5565	7785	3965	-	-	-
PBS stock solution (L)	620	810	3965	-	-	-
Alsever's solution (L)	148	172	274	396	328	332
Antibody screening cells (mL)	39,255	45,650	162,800	188,800	194,580	174,552
Anti-A1 (mL)	482.5	775	1450	906	1281	1734
Anti -H (mL)	327.5	475	1125	678	990	669
ABO reverse grouping cells (mL)	28,275	3,7625	120,200	132,300	147,180	129,648

Quality Management Unit

Table 16: Quality Monitoring of Blood Components and Reagents

Component	Number
RCC – without AS	460
RCC- BCR-AS	324
Platelets - PRPD	467
Platelets - BCD	355
Platelets -AP	109
FFP	76
Cryoprecipitate	00

Reagent Testing	Number
QC testing of A,B,O cells	12 Sets
QC testing antibody screening red cells	12 Sets

Table 17: Quality control laboratory performance

Investigation of Quality Related Incidents

Component	No of Units
RCC	86
Platelet	8
FFP	10
Visual checking of platelets	6115

Special Studies

Special Study Type	No. of Units
Plasma Reduced Platelet Concentrate	12

Evaluations done

Evaluation done	Number of products evaluated
Khan Tubes, Glass slides and Pencils	09
Blood bag	01
Anti A,AB,B & D Antisera	22
Measuring Cylinder	03

SL-NEQAS programs conducted

Program	No. Of cycles	No. of test kits prepared
NEQAS Blood Group Serology	2 cycles	120 x 2
NEQAS TTI	2 cycles	120 x 2

Special Quality Monitoring Tests (HBB Referrals)

Component	No of Units
RCC	62
Platelet	61
FFP	10
Cryo	00

Summary of tests

	Type of test	No. of Tests
1	Full Blood Count	3837
2	PH	2021
3	Blood Culture	356
4	% Haemolysis	983
5	DAT	36
6	Antibody Screening	108
7	Microscopy testing for Agglutinations	36
8	Factor VIII Assay	94
9	Fibrinogen Assay	94
10	Evaluations	35

Statistics of Teaching and Training Unit

Table 18: Training programs conducted for Staff categories of NBTS

	Staff Category	Number of trainees
1	Medical Officers	Total - 114
	2 weeks	03
	4 weeks	75
	6 weeks	36
2	Nursing Officers	Total - 103
	Matrons	0
	Nursing sisters	1
	NO – 6 weeks + NBTSIS	102
3	Medical Laboratory Technologists	07
4	Junior Staff	45

Table 19: Other Staff Categories

	Staff Category	Number of trainees
1	Haematology Diploma Trainees	16
2	Virology MD Trainee	3
3	Medical Students	Total - 459
	• University of Colombo	221
	• KDU	84
	• University of Sri Jayawardanepura	154
4	MLT students	189
5	Nursing Students	243
6	Intern pharmacists	22
7	Health Assistant - Navy Officers	54

Table 20: CME Programme

	Topic	Participants	Number
1.	Encouraging the Heart self-motivational and positive attitude development at workplace	CTP,MO	29
2.	Encouraging the Heart self-motivational and positive attitude development at workplace	PHI,NO, MLT	28
3.	Workshop on Advanced Techniques in Immunohaematology	CTP,MO,MLT	90
4.	Workshop on Next Generation Sequencing Technology	CTP,MO,MLT	35
5.	Workshop on Therapeutic Plasma Exchange	CTP,MO	95
6.	Workshop on Stem Cell Transplantation	CTP,MO	51

NAT facility at National Blood Centre

Introduction:

Nucleic Acid Testing (NAT) was introduced to the National Blood Centre (NBC) with the Project for the Introduction of State of Art Technology funded by the Netherlands.

Nucleic Acid Testing directly amplifies and detects the genetic material (DNA or RNA) of viruses in order to screen for the existence of transfusion transmitted infections in donated blood (E.g.: Human Immunodeficiency Virus(HIV), Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV).

Advantages of implementing NAT in the National Blood Transfusion Service:

- Even though there is a high cost for the infrastructure and consumables, NAT provides the following advantages,
- Safeguard the blood safety furthermore by reducing the window period by early detection of viral infections before appearance of antibodies.
- Fulfills an International requirement for the provision of plasma products for Plasma Fractionation Plants.
- Detects mutant, variant viruses that may not be detected by antibody detection methods.

Table 21: Summary of Nucleic Acid Testing

Month	Total Samples	Total WL	Total Invalids	Total Reactive	Serology Reactivity			Serology Non-Reactive
					HBV	HCV	HIV	
January	5918	6617	112	3	0	0	1	2
February	5840	6516	0	5	4	0	0	1
March	3507	3936	173	1	1	0	0	0
April	2169	2442	491	2	0	1	0	1
May	6372	7217	459	3	0	0	0	3
June	6657	7398	550	3	0	1	0	2
July	7144	7976	576	7	1	1	2	3
August	6628	7499	274	3	1	0	0	2
September	6105	6898	283	10	3	1	1	5
October	6252	7058	2	4	0	1	1	2
November	6358	7099	158	5	2	0	2	1
December	7409	8268	126	5	0	0	4	1
Total	70359	78924	3204	51	12	5	11	23

Discriminatory tests

Serology non-reactive	Discriminative tests reactive	Discriminative tests non-reactive
23	0	23

Stem Cell Transplantation

- ❖ Hematopoietic stem cell transplantation (HSCT) is the transplantation of multi potent hematopoietic stem cells, usually derived from
 - Bone marrow
 - Peripheral blood
 - Umbilical cord blood

which may be of autologous or allogeneic in origin.

- ❖ It is most often performed for patients with haematological malignancies, such as multiple myeloma or leukemia and for congenital disorders of the blood and bone marrow such as thalassemia and sickle cell disease.
- ❖ Advantages of the peripheral stem cell transplant :-
 - Less invasive than bone marrow harvesting
 - No need of anesthesia

A team from the National Cancer Institute (Apeksha Hospital) (including blood Bank staff) was trained at the St. Vincent's Hospital, Sydney, Australia on stem cell transplantation. Additional training for NBTS staff was provided in the Netherlands.

First stem cell collection from a patient diagnosed with Multiple Myeloma was carried out at the Blood Bank of Apeksha Hospital on 24th October, 2016. Processing of the collected unit and cryopreservation was carried out at the National Blood Centre. First patient was transplanted on 5th of December 2016. First two collections as well as the first transplantation were done by the local team under supervision of experts from St. Vincent's.

Table 22: Statistics of Stem cell transplantation for the year 2019

Number of patients	25
Cryopreservation procedures	26
Infusion procedures	24

PATHOGEN INACTIVATION OF PLATELETS

The possibility of transmitting infectious organisms via blood products and plasma derivatives (donor derived or contaminated microorganisms) is a major public health concern worldwide.

Ability to ensure the safety of the blood supply with donor screening and laboratory testing is limited as it requires prior knowledge of the possible infectious agents, and development of effective laboratory tests for each agent. In addition to that, there is no method to detect transfusion transmissible infections during the window period.

Pathogen Inactivation is a proven method for preventing risk of Transfusion Transmitted Infection and bacterial contamination.

There are two main techniques for pathogen inactivation

A. Chemical Inactivation

E.g.: Solvent Detergent Treatment (SDT): -

Used on plasma products, this method results in the lysis of cell membranes and viral envelopes leading to more than 5.4 to 6.0 log reductions of sensitive pathogens.

B. Photo Chemical Treatment

This is applicable to plasma and platelet products. Currently available methods include Intercept & Mirasol.

Pathogen Inactivation at NBC used Intercept technology on pooled platelets.

Pathogen Inactivation was started as a Pilot project at NBC and concluded in mid-2019.

Table 23: Statistics of PI platelets for 2019

Duration	PI Platelets production
01/01/2019 – 30/06/2019	251

Advantages of Pathogen Inactivation

1. Reduce the risk of TTI
2. Increase the shelf life of platelets up to 7 days
3. There is evidence that it prevents Transfusion Associated Graft Versus Host Disease.

FROZEN RED CELL (FRC)

Red Blood Cells (RBC) can be frozen and stored for up to 10 years.

There are two methods for frozen red cell preparation: -

1. High Glycerol method (frozen red cells are stored at - 86C⁰)
2. Low Glycerol method (frozen red cells are stored at - 120C⁰)

This technique has many advantages.

- Frozen Red Cell (FRC) have a long shelf life
- A stock of rare blood groups (Such as Bombay O) can be frozen and preserved for future usage.
- Patients with special conditions such as multiple red cell antibodies who require blood will get benefits out of this.

Since 2015, NBTS Sri Lanka also started this practice of freezing Red Blood Cells, like many developed countries.

Both international and local training programs have been conducted on this technology for the staff of NBTS.

Table 24: Statistics of Frozen Red Cell procedure for the year 2019

Blood group	No. of Red Cell Units Frozen	No. of Red Cell Units Deglycerolized	No. of Red Cell Units Transfused
Bombay O Rh D Positive	3	4	2
Bombay O Rh D Negative	-	1	-
A Rh D Positive	-	2	-
A Rh D Negative	-	-	-
B Rh D Positive	2	2	-
B Rh D Negative	-	9	-
AB Rh D Negative	-	-	-
O Rh D Positive	3	11	-
Total	8	29	2