THE NAMIBIAN HAEMOVIGILANCE REPORT FOR 2023-2024 FINANCIAL YEARS

THE 11TH HAEMOVIGILANCE REPORT

NAMBTS
donate life

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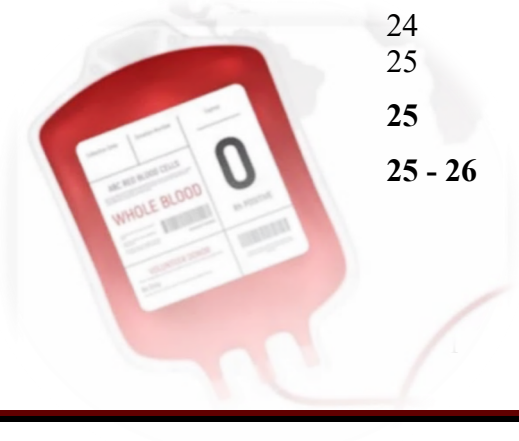

Introduction

The Namibian Haemovigilance Reports have been published annually or biannually since 2009. The 11th Namibian Haemovigilance report provides an overview of the blood transfusion chain over a two-year period, from 1 April 2022 to 31 March 2024, namely, 2023 & 2024 financial years.

Haemovigilance in any country is the monitoring of donation, production of safe blood components, blood usage and related adverse events. The blood transfusion chain from vein-to-vein is a matter of team work between all key stakeholders of the National Blood Programme of Namibia. All of these stakeholders in the transfusion chain contribute to the standard of blood transfusion delivered to the Namibian population.

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The public healthcare sector of Namibia is the major consumer of blood and blood components and a substantial amount of the yearly governmental health budget goes directly to the supply of blood to public patients in need. Approximately N$ 139 million was spent for the 2023 financial year on blood and blood products and all necessary laboratory tests by the Ministry of Health and Social Services (MoHSS), and approximately N$ 158 million for the 2024 financial year.

The objective of this haemovigilance report is to provide feedback to all stakeholders in the transfusion chain. To identify challenges in the national blood system and implement corrective and preventative actions to improve the quality of blood transfusion in Namibia.

Acknowledgements

The Blood Transfusion Service of Namibia (NAMBTS) appreciate the contributions made by all key stakeholders of the National Blood Programme, individuals in both the private and public healthcare sector, and NAMBTS divisions towards this report. We encourage quality reporting to identify risk associated with the transfusion of blood and blood components to ensure that appropriate measures are implemented to improve transfusion safety within Namibia.

Dr. Hagen Förtsch
Medical Director
NAMBTS
17 November 2025

Abbreviations and Acronyms

Ab	Antibody
Ag	Antigen
AHTR/DHTR	Acute/Delayed Haemolytic Transfusion Reaction
AIDS	Acquired Immunodeficiency Syndrome
Anti-HIV	HIV antibody test
Anti- Hep B	Hepatitis B antibody test
Anti-Hep C (c)	Hepatitis C antibody (core) test
APH	Ante partum Haemorrhage
BB	Blood Bank
BeST	Better and Safer Transfusion
Ca	Cancer
°C	Degree Celsius
COVID 19	Corona virus pandemic
DAT	Direct Antiglobulin Test
D(HIV/HBV/HCV)	Discriminatory test
DIC	Disseminated intravascular coagulation
DOB	Date of birth
DARs	Donor Adverse Reactions
EDTA	Ethylene diamine tetra acetic acid
ENT	Ear, Nose and Throat
F	female
FDP	Freeze Dried Plasma
FFP	Fresh Frozen Plasma
FNHTR	Febrile Non-Haemolytic Transfusion Reaction
GACUB	Guidelines on the Appropriate Clinical Use of Blood and Blood Products
GIT	Gastrointestinal Tract
g/dl	gram per decilitre
Hb	Haemoglobin
HBsAg	Hepatitis B Surface Antigen
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HCWs	Health Care Worker/s
HELLP	Haemolysis, Elevated Liver Enzymes, Low Platelets
HIV	Human Immunodeficiency Virus
HQ	Head quarters
HV(R)	Haemovigilance (report)
HTC/HTCs	Hospital Transfusion Committee/s
ITP	Immune thrombocytopenic purpura
ml(s)	millilitre (s)
M	Male
M&E	Monitoring and Evaluation
MoHSS	Ministry of Health and Social Services
MVA	Motor vehicle accident
NAMBTS	Blood Transfusion Service of Namibia
NAT	Nucleic Acid Testing
NBI	National Bioproducts Institute
NIP	Namibia Institute of Pathology
NUST	Namibia University of Science and Technology
O&G	Obstetrics and Gynaecology
PBM	Patient Blood Management
PLT	Platelet
PPH	Post-partum haemorrhage
PTB/TB	Pulmonary Tuberculosis /Tuberculosis
PV	Per vagina
RCC	Red Cell Concentrate
SA	South Africa
SOPs	Standard Operating Procedures
SP	Source plasma (apheresis)
TACO	Transfusion Associated Circulatory Overload
TAD	Transfusion associated dyspnoea
TPHA	*Treponema pallidum* Hemagglutination Assay
TR/TRs	Transfusion Reaction(s)
TRALI	Transfusion Related Acute Lung Injury
TRR/TRRF	Transfusion Reaction Report (Form)
TTI (s)	Transfusion Transmissible Infection(s)
VDRL	Venereal Disease Research Laboratory test
WB	Whole Blood
WBTP	Wrong Blood to Patient
WHO	World Health Organization

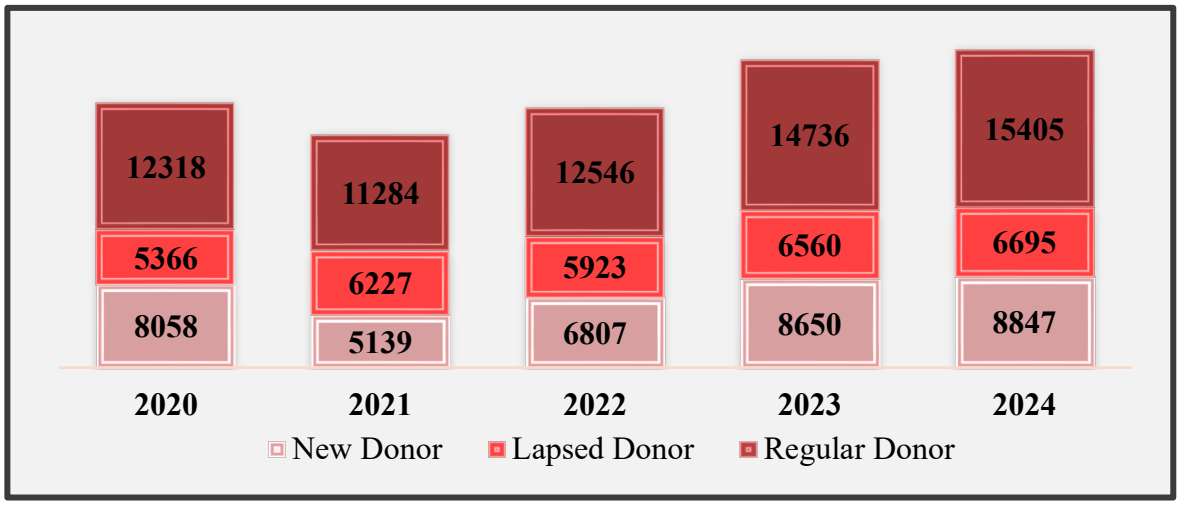
Section 1 – Collection & Preparation of Blood and Blood Components

1.1 Blood Donors

1.1.1 Blood Donor Categories

NAMBTS collects blood from voluntary non-remunerated blood donors as recommended by the WHO. Notably, about 1.1% of the Namibian population donated blood during the two years under review. A total of 29 946 blood donors donated whole blood during the 2023 financial year, of which 46% were regular donors, 22% lapsed donors and 29% new donors. In the 2024 financial year, a total of 30 947 donated whole blood of which about 50% were regular donors while new donors were 29% and lapsed donors constituted 22%. There was a significant increase in the number of new donors from the 2021 financial year to the current years under review as all COVID-19 restrictions were lifted and blood collections recommenced at schools and tertiary institutions. On average each regular donor donates twice a year. The graph (figure 1.1) below shows a comparison of the number of blood donors per category who donated blood each financial year for the past five years.

Figure 1.1: Number of Donors categorized into Lapsed, New and Regular Donors over the past five years:



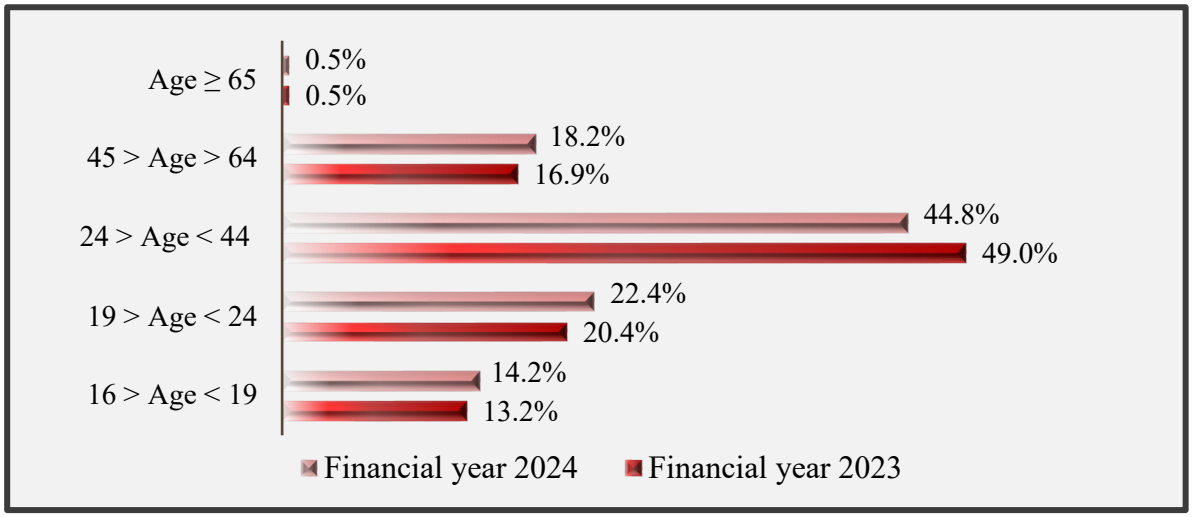
1.1.2 Blood Donor Demographics

During the two financial years under review, more females (54%) than males donated. In terms of blood donations by age category, about 45% and 49% of blood collections in 2023 and 2024 respectively, were from donors in the age category 25 > Age ≤ 44 years. This was followed by age group 19 > Age ≤ 24 years at 22% and 20% for the 2023 and 2024 financial year. While about 17% of donations were collected on average from 45 > Age ≤ 64 during the two years under review. As expected less than 1% blood donations were collected from donors older than 65 years, as shown in the Figure 1.2.

The age distribution of blood donors in Namibia shown in the graph (figure 1.2) below suggests that on average 14% of blood was collected from schools i.e., learners (age group 16 > Age ≤ 19) years during the years under review.

The proportion of donations from schools and colleges dropped significantly during the COVID-19 pandemic (2020/2021) due to restrictions which caused them to close for extended periods of time. An increase of about 3% in blood collection from the age group (16 > Age ≤ 19 years) has been noted during the current review as all restrictions have been lifted. However, this remains 7% less than collections from this age group during the pre-Covid-19 pandemic period (2018/2019).

Figure 1.2: Proportion of donations by donor age group for the 2023 and 2024 financial years:



1.1.3 Donor Deferrals

Donors who fail to meet the eligibility criteria for blood donation are deferred either temporarily or permanently to ensure either recipient and/or donor safety, depending on the reasons for deferral. The reasons for a permanent deferral are primarily due to the presence of a TTI as indicated in section 2 of this report.

A blood donor who is deferred temporarily may be readmitted to donate again after a waiting period while resolving the problem that precluded the donor from donating. A total of 1116 constituting 4% of donors bled in 2023 financial year and 1765, 5% of donors bled in the 2024 financial year were deferred temporarily for various reasons as summarized in table 1.1. Blood donors were mostly deferred for low haemoglobin level, 47% in 2023 and 63% for 2024 financial year, followed by donors deferred for being sick, on medication or having undergone a medical procedure, 21% and 16% for 2023 and 2024 financial year, respectively. The increase of donors being deferred for low haemoglobin, indicates pre-existing anaemia or donation related anaemia in regular donors due to an estimated iron loss of 200 – 500mg per donation. This high deferral rate for low haemoglobin can compromise the blood supply and donor safety if drastic

interventions are not implemented to resolve the problem.

The third highest reason for deferral was pregnancy or breast feeding as indicated in table 1.1 below. A significant number of donors are also deferred for acupuncture, body piercing, tattoo or undergoing permanent make-up at 6% for 2023 and 4% for 2024 financial year.

These four deferral reasons account for more than 85% deferrals during the two years under review, which is similar to the previous years.

Table 1.1: Temporary deferrals of blood donors during the 2023 & 2024 financial years:

Deferral reason	Donors deferred in 2023 Financial year	Donors deferred in 2024 Financial year
Abnormal antibodies	10	2
Accidental Exposure to Blood	5	3
Acupuncture/body piercing/ tattoo/ permanent make-up	71	73
Age (over 65)	23	51
Animal/Human Bite	2	6
Biological false positive/ inconclusive results	7	11
Blood transfusion	0	1
Bradycardia/ tachycardia	18	24
Non-sexually transmitted Hepatitis/Hepatitis contact	3	0
High Risk Behaviour	35	25
Hypertension	25	36
Hypotension	8	15
Immunization / Vaccination	5	7
Low Hb	520	1107
Occupational Exposure/Hazzard	0	1
On Medication	62	67
Operation/Diagnostic procedure	92	76
Polycythaemia/Haemochromatosis	19	28
Pregnant/ breast feeding	126	66
Sick on medication/undergone medical procedure	76	152
Underweight	9	14
TOTAL	**1116**	**1765**

1.2 Blood Donations

NAMBTS collects four types of donations namely; whole blood, plasmapheresis, plateletpheresis and erythrocytapheresis donations. Each of these donations will be outlined separately in the sections below.

1.2.1 Whole Blood Donations

According to the World Health Organization, the median blood donation rate in lower-middle- and low-income countries, most of which are in Africa, ranges between 5.0 and 6.6 units per 1,000 population. In contrast, upper-middle-income countries such as Namibia and South Africa have a median rate of 16.4 donations per 1,000 population.

Namibia's whole blood donation rate stood at 14.2 per 1,000 population in 2023 and improved slightly to 14.9 per 1,000 in the 2024 financial year, reflecting strong national performance. Notably, Namibia had already surpassed 60 countries in 2018 that reported fewer than 10 units per 1,000 population, an indicator of the country's above-average blood supply relative to many African nations.

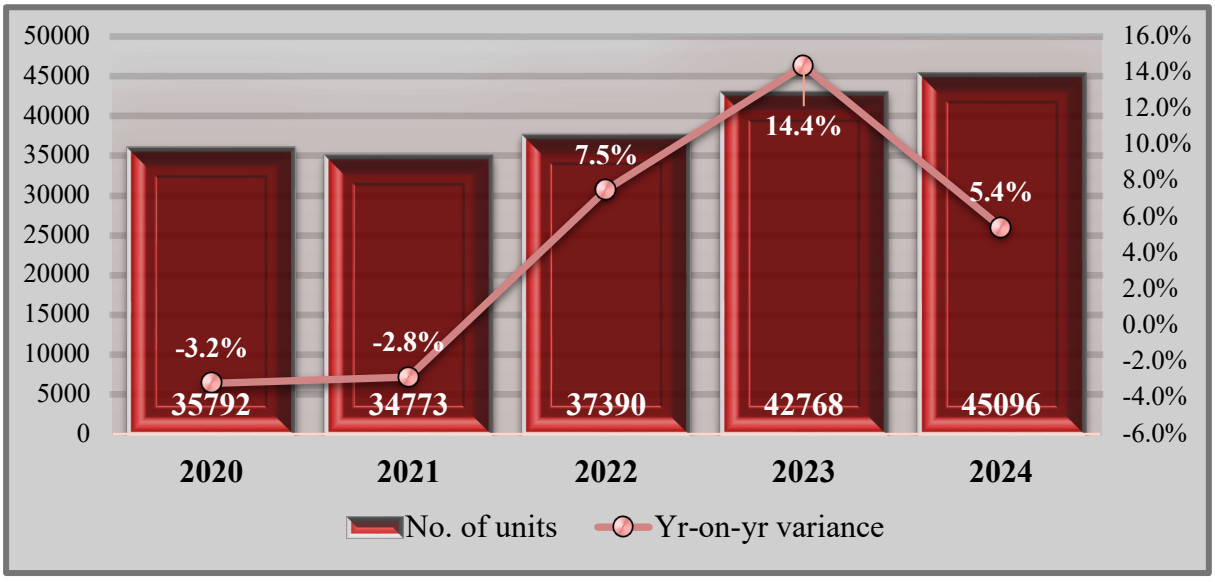
Figure 1.3 illustrates annual whole blood collections for the 2020 to 2024 financial years. There was a noticeable decline in collections during 2020 and 2021, coinciding with the COVID-19 pandemic, with collections dropping to 35,792 units in 2020 and further to 34,773 units in 2021, year-on-year decreases of 3.2% and 2.8%, respectively.

Recovery began in 2022 with a 7.5% increase in donations (37,390 units), followed by a sharp rise of 14.4% in 2023 (42,768 units). This growth is largely attributed to targeted donor retention strategies, especially efforts to engage repeat donors.

In 2024, the number of units collected continued to rise to 45,096, a 5.4% increase from the previous year, indicating a stabilization in collection levels. During this year, fixed sites contributed the highest proportion of collections (37%), followed by worksites (16%) and long-distance mobile clinics (>150 km), which accounted for 14%.

Additionally, blood group O donors comprised the majority of whole blood collections, 58% in 2023 and 57% in 2024. This aligns with transfusion demand trends, particularly the use of group O red cell concentrates (RCC), as further discussed in section 4.1.

Figure 1.3. Comparison of Annual Total Whole Blood Collections (2020 – 2024):



1.2.2 Plasmapheresis Donations

Plasmapheresis utilizes a device that collects whole blood from a donor, separates the blood into components allowing plasma to be diverted into a separate bag and return all the cellular components to the donor. A donor can donate between 650-850 ml of source plasma

per procedure depending on his/her blood volume. Plasma not used for transfusion will be sent to the National Bioproducts Institute (NBI) for fractionation to manufacture plasma derived medicinal products (PDMPs). Source plasma was primarily used for the purpose of transfusion during the years under review. In the 2023 financial year 48% of the source plasma collected was used for transfusion and 45% of the 3 364 000 litres collected during the 2024 financial year.

In the 2023 financial year 3683 plasmapheresis donations were made of which 18 were part of the Rabies Hyperimmune Programme, compared to 4729 plasmapheresis donations made in the 2024 financial year of which 102 of these were part of the Rabies Hyperimmune Programme. The Rabies Hyperimmune Programme was introduced to collect plasma from rabies vaccinated individuals, the plasma is then shipped to South Africa where is it fractionated to make Human Rabies Immunoglobulin (HRIG), which is in turn supplied back in Namibia. HRIG is used to treat patients suspected to have been exposed to rabies virus or a rabid animal.

1.2.3 Plateletpheresis Donations

NAMBTS has been collecting apheresis platelets since 2007 which were the only supply of platelets for transfusion. However, pooled platelets were introduced in 2016 due the improvement of the product safety with the introduction of donation-nucleic acid test (ID-NAT). During the two years under review 689 and 686 platelet collections were made by means apheresis. The platelet yield (platelet concentration) in the majority of these donations were sufficient to be split into two adult platelet concentrates. The average split rate for the 2023 and 2024 financial years were 93% and 91%, respectively. The high split rate resulted in the production of 2640 units during the two years under review, 1330 units in 2023 and 1310 units in 2024 financial year.

1.2.4 Erythrocytapheresis Donations

Erythrocytapheresis is an apheresis procedure by which red blood cells are separated from whole blood by the apheresis device allowing red blood cells to collected in a separate bag while returning other cellular components to the donor. Erythrocytapheresis allows NAMBTS to collect two standard RCC units and is thus called the Double Red Cell Programme. This programme has been introduced by NAMBTS in March 2023, hence only 37 erythrocytapheresis donations were made during the 2023 financial year. A total of 559 erythrocytapheresis donations were made during the 2024 financial year allowing NAMBTS to produce 1118 standard adult RCC units. Products collected by means of this apheresis procedure are leucodepleted. Leucodepleted products have a reduced frequency of FNHTR, reduced risk of HLA alloimmunization, CMV transmission and have a reduced infectious risk associated with transfusion related immunomodulation (TRIM) in patients who are chronically transfused. Leucodepleted products are recommended for the majority of paediatric patients, especially if born prematurely and during the early neonatal period due to their reduced immunity, which resulted in the

decision by NAMBTS to issue leucodepleted RCC to paediatric patients. In the 2023 financial year only 5% of paediatric RCC used were leucodepleted when the programme was introduced, compared to the 38% leucodepleted paediatric RCC which were used during the 2024 financial year.

Section 2 – Transfusion Transmissible Infections (TTI's) of donated blood

All blood and blood components collected by NAMBTS are tested for human immune-deficiency virus (HIV 1 & 2), hepatitis B virus (HBV), hepatitis C virus (HCV) and syphilis as recommended by the WHO.

Every blood donation is screened routinely using serology and ID-NAT tests. The results of the screening tests are interpreted using standard algorithms that determine the final outcome of results and identify donations with discordant results that require further confirmatory testing. The final outcome of both routine and confirmatory tests, determine the usability of the donation or components made from it as well as the management of the blood donor.

2.1 TTI results in 2023 and 2024 Financial Year

The TTI results for blood donations collected during the 2023 and 2024 financial years, as shown in Tables 2.1 and 2.2, demonstrate that the overall TTI prevalence among donations was 1.05% in 2023 and 0.95% in 2024, indicating a slight improvement in blood safety over the two years.

In both years, Hepatitis B Virus (HBV) had the highest prevalence, recorded at 0.55% in 2023 and 0.52% in 2024, consistent with trends observed over the past decade. Syphilis followed as the second most prevalent infection, with a prevalence of 0.26% in 2023 and 0.18% in 2024. The prevalence of HIV was 0.14% in 2023 and 0.15% in 2024, while Hepatitis C Virus (HCV) had the lowest prevalence at 0.10% and 0.11%, respectively.

New donors continued to exhibit the highest TTI prevalence, with rates of 0.82% in 2023 and 0.78% in 2024, which is expected as this group is less screened and includes first-time participants. In contrast, regular donors, those who have donated consistently, recorded the lowest prevalence, at 0.17% in 2023 and 0.14% in 2024, reflecting the importance of effective pre-donation education, risk assessments and consistent screening. Lapsed donors showed intermediate prevalence levels at 0.07% in 2023 and 0.04% in 2024.

When compared with national population-level estimates, where HIV and HBV prevalence exceeds 10%, the relatively low TTI rates among blood donors reflect the success of NAMBTS in recruiting and retaining low-risk donors, which is a cornerstone of maintaining a safe and reliable blood supply.

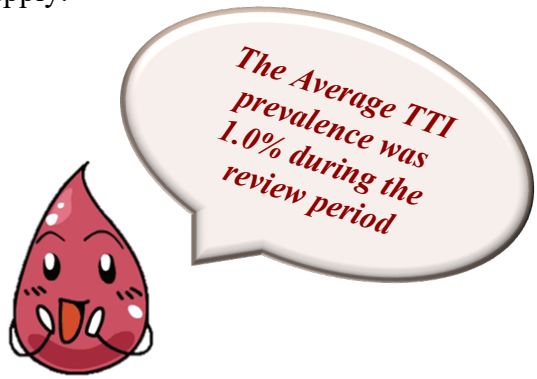


Table 2.1: Positive donations and TTI prevalence for 2023 Financial Year

	HBV	HIV	HCV	Syphilis	Total TTI	Prevalence
Lapsed donors	9	6	3	13	31	**0.07%**
New donors	234	42	24	86	386	**0.82%**
Regular donors	18	16	20	25	79	**0.17%**
Total	**261**	**64**	**47**	**124**	**496**	**1.05%**
Prevalence	**0.55%**	**0.14%**	**0.10%**	**0.26%**	**1.05%**	

Table 2.2: Positive donations and TTI prevalence for 2024 Financial Year

	HBV	HIV	HCV	Syphilis	Total TTI	Prevalence
Lapsed donors	2	7	4	8	21	0.04%
New donors	249	49	31	67	396	0.78%
Regular donors	14	18	20	17	69	0.14%
Total	**265**	**74**	**55**	**92**	**486**	**0.95%**
Prevalence	**0.52%**	**0.15%**	**0.11%**	**0.18%**	**0.95%**	

Section 3 – Blood wastage

3.1 Whole blood & RCC wastage at NAMBTS

Table 3.1 shows that the average total discard rate for red cell concentrate (RCC) at NAMBTS during the 2021–2024 financial years was 3.5% (excluding short bleeds). This represents a notable improvement compared to the 5.5% average recorded during the 2017–2021 period, reflecting better stock management practices and a reduction in collections from first-time donors, who typically present a higher risk of TTI (transfusion-transmissible infections).

Despite the overall improvement, discard rates in 2023 (3.4%) and 2024 (4.7%) were both above the four-year average. The 2024 financial year recorded the highest discard rate of the period, driven largely by expiry-related losses, which alone accounted for 2.3% of total collections—the highest expiry rate observed in the dataset. This increase was primarily due to an oversupply of blood group A units, which exceeded usage needs and led to surplus expiry.

The discard rate due to TTI positivity remained steady at around 1.3% to 1.4% across all four years, indicating consistent donor screening protocols. Other discard causes, including breakages during processing (0.2%–0.6%), clotting (0.2%–0.4%), and miscellaneous factors such as donor-related issues and unsuitable units, contributed marginally to the overall rate.

In response to the elevated discard rate in 2024, NAMBTS has initiated efficiency-focused strategies aimed at better aligning collection volumes with demand, particularly for specific blood groups. These measures, combined with ongoing efforts to improve donor profiling and forecasting, are expected to result in reduced wastage and enhanced component availability in future periods.

Table 3.1 Whole blood and RCC discards from NAMBTS (2021-2024)

Year	2021	2022	2023	2024
Total Whole blood units collected	34773	37390	42768	45096
Short bleeds	541	461	653	732
Number of units discarded	1502	1612	2103	2829
Total discards rate (Excluding Short Bleeds)	**2.8%**	**3.1%**	**3.4%**	**4.7%**
TTI - Infectious disease positive (% of total collected)	1.3%	1.4%	1.3%	1.3%
Expired (% of total collected)	0.4%	0.5%	1.2%	2.3%
Broken during processing (% of total collected)	0.4%	0.6%	0.2%	0.2%
Clotted (% of total collected)	0.3%	0.2%	0.3%	0.4%
Other reasons (% of total collected)	0.3%	0.4%	0.4%	0.5%

***NOTE:** '**Other reasons'** included the following: Donor related: abnormal antibodies in donor blood, donors on medication, over bleeds, temperature out of range, unsuitable for transfusion (coded donors, lipaemic blood).*

3.2 Platelet wastage at NAMBTS

As shown in Table 3.2, the average platelet discard rate at NAMBTS over the 2022–2024 financial years was approximately 9.6%. The leading cause of discards was expiry, accounting for an average of 7.5% of platelets produced, while the remaining 2.1% were discarded due to other factors such as TTI, breakages, and sterility failures.

A notable spike in discard rates occurred in 2021, reaching approximately 16.5%, the highest in the six-year period, as illustrated in Figure 3.1. This increase may be attributed to the COVID-19 pandemic, during which a likely mismatch between production and demand led to overproduction. In an effort to ensure consistent availability, NAMBTS may have overcompensated.

The inherently short shelf life of platelets has historically contributed to high discard rates. In response to this, NAMBTS introduced key interventions in late 2022, including the use of a suspending fluid that extended platelet storage to 7 days, as well as the implementation of sterility testing. These quality improvements had a measurable impact.

Despite these advancements, discard rates increased again in the subsequent years, rising to 11.0% in 2023 and 11.5% in 2024, with expiry-related discards alone reaching 8.6% and 10.0%, respectively. This trend suggests that while technological solutions have improved shelf life and safety, operational challenges, namely demand forecasting and production alignment, persist.

Figure 3.3 provides a visual representation of platelet discard and expiry trends from 2019 to 2024, with the orange line indicating the target total discard rate of 10%. Years such as 2021 and 2024 (particularly when sterility testing was not conducted) exceeded this benchmark, while 2022 remained well below it, reflecting the success of interventions implemented in that year.

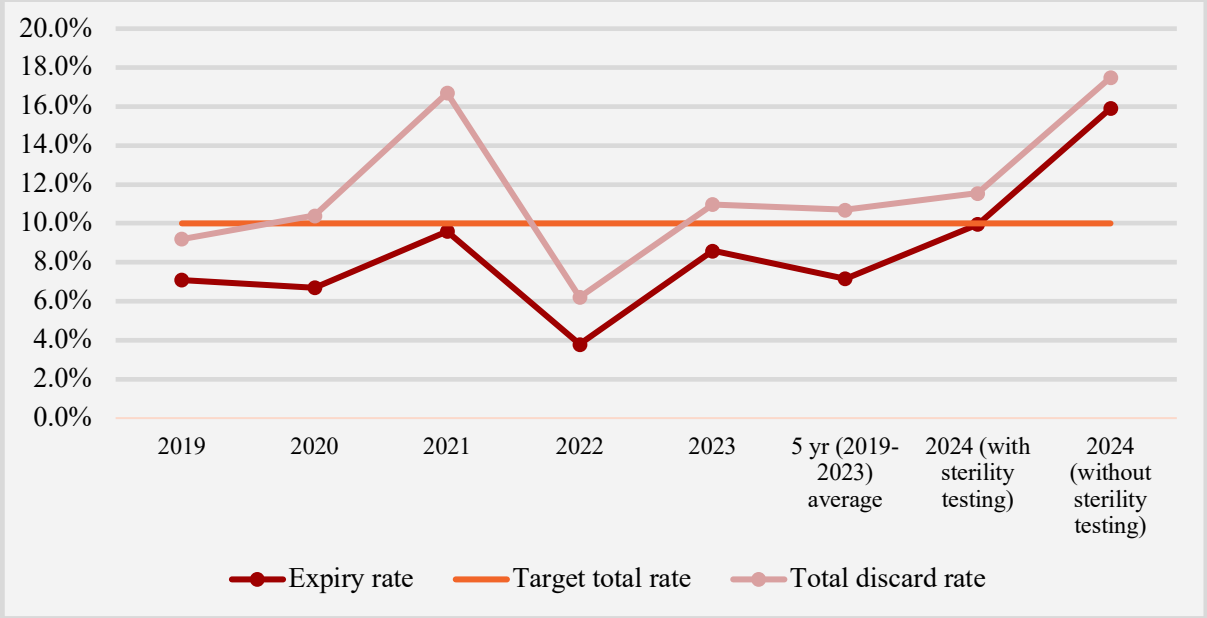
The data also highlight the critical role of sterility testing in reducing losses. In 2024, discard rates were within acceptable limits when sterility testing was in place; however, when excluding sterility testing there was a sharp increase in total discards. This underlines the importance of continuing such quality assurance practices to safeguard product availability and reduce wastage.

Table 3.2: NAMBTS Platelet Discards from 2022 – 2024 Financial Year

Platelet Discards/Financial Year	2022	2023	2024
Produced	2280	2919	2927
Discarded	141	318	338
% total discard rate	**6.2%**	**11.0%**	**11.5%**
Expired (% of total collected)	3.8%	8.6%	10.0%

NOTE: *These figures includes adult dose platelets collected by apheresis and pooled platelets produced from buffy coats but excludes paediatric dose platelets.*

Figure 3.3: NAMBTS Platelet Discards & Expiry Rate from 2019 – 2024:



3.3 Blood wastage in hospitals

Hospital blood wastage refers to blood and blood components which are discarded within hospitals rather than being administered to the patient. Namibia however does not have a system currently in place to monitor blood wastage within hospitals. Blood wastage in hospitals can be due to various reasons and should be monitored. Monitoring blood wastage within hospitals will allow NAMBTS to identify gaps and provide focused training on these gaps to minimize blood wastage and ensure a sustainable blood supply.

Section 4 – Blood and Blood Component Usage

NAMBTS issued a total of 109 695 units of blood and blood components in the two years under review, 54 099 and 55 596 units in the 2023 and 2024 financial year, respectively. An average increase of 3% was observed in blood and blood component usage between the two years under review, however, adult RCC usage increased by 7%. On average 75% of all blood and blood components issued by NAMBTS were adult RCC, indicating that RCC is the most commonly required blood component and the main

driver of blood transfusion within Namibia. The table below illustrates a decline in FFP and Platelet Concentrate usage in Namibia between the 2023 and 2024 financial years.

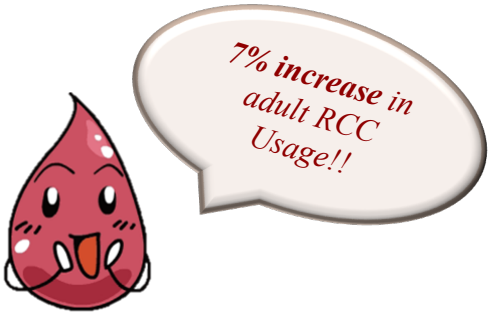


Table 4.1: Blood and Blood Components Issued by NAMBTS during the 2023 & 2024 Financial Year:

Blood and blood component	2023	2024
Red Cell Concentrate (RCC)	**42236**	**44572**
Adult	39530	42551
Paediatric	2706	2021
Fresh Frozen Plasma (FFP)	**8794**	**7974**
Adult FFP	2657	1265
Adult source plasma (SP)	4951	5341
Adult apheresis FFP	465	671
Paediatric source plasma (SP)	536	474
Paediatric apheresis FFP	185	223
Platelet concentrate	**2941**	**2909**
Adult apheresis Platelets	1257	1210
Pooled platelets	1298	1332
Paediatric apheresis Platelets	386	367
Whole Blood (WB)	**128**	**141**
TOTAL	**54 099 units**	**55 596 units**

4.1 Usage of Red Cell Concentrate (RCC):

A total of 86 808 units RCC were issued to Hospitals and Healthcare facilities in Namibia in the 2023 and 2024 financial year, of which the majority were adult RCC units. During these two years, 82 081 adult RCC units and 4727 paediatric RCC units were issued. The RCC units were issued mainly to public healthcare facilities (84%) compared to private healthcare facilities (16%). The majority of RCC units, both adult and paediatric, were issued to Katutura Intermediate Hospital (15%), Oshakati Intermediate Hospital (13%) and Windhoek Central Hospital (12%) as illustrated in the graph (figure 4.1). Although there was an increase in blood and blood components issued by NAMBTS to hospitals and health care facilities, Katutura Intermediate Hospital and Windhoek Central Hospital had a 0.4% and 0.7% decline between the 2023 and 2024 financial year respectively after the principles of Patient Blood Management had been incorporated into training.

The majority of adult RCC units issued to all hospitals during the 2024 financial year was Blood Group O (58%). Amongst the major public hospitals serviced by NAMBTS blood banks, the highest Blood Group O adult RCC units were issued to patients in Onandjokwe Hospital (58%). This usage of blood group O RCC is expected to decrease at Onandjokwe

Hospital during the 2025 financial year with the opening of a blood bank at the facility. A significant amount of adult RCC's used in other smaller public hospitals where crossmatching services are provided by the National Institute of Pathology (NIP) are blood group O (71%) as illustrated in figure 4.2. This indicates that these NIP laboratories are still reluctant to perform crossmatches, however this needs to be addressed with training to reduce the high demand of blood group O collections and the risk of antibody-antigen reactions in the recipient when transfused with uncrossmatched ABO-compatible units

Figure 4.1: RCC usage to individual hospitals during the 2023 & 2024 Financial year:

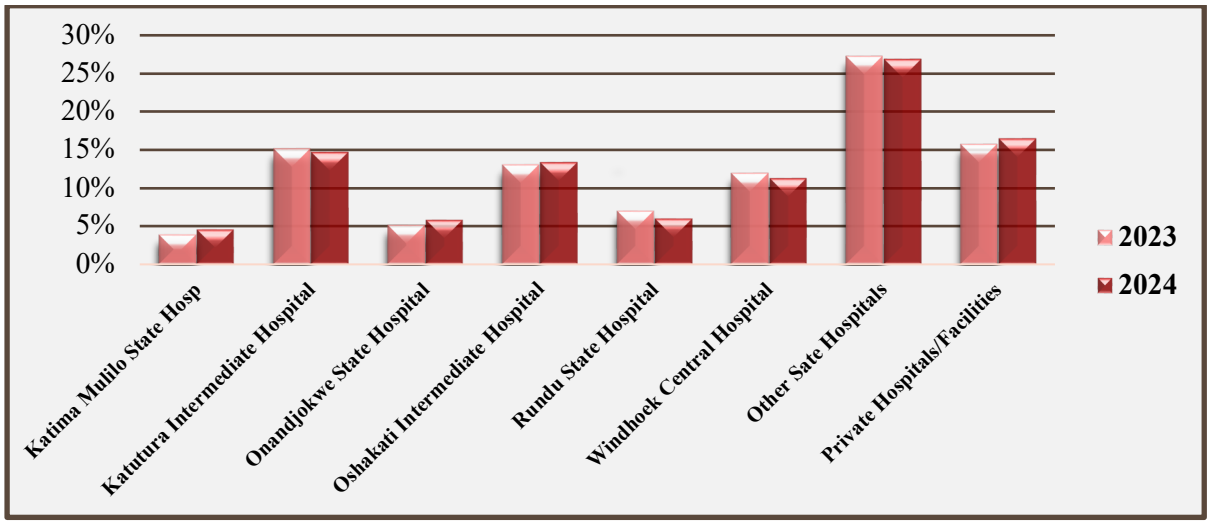
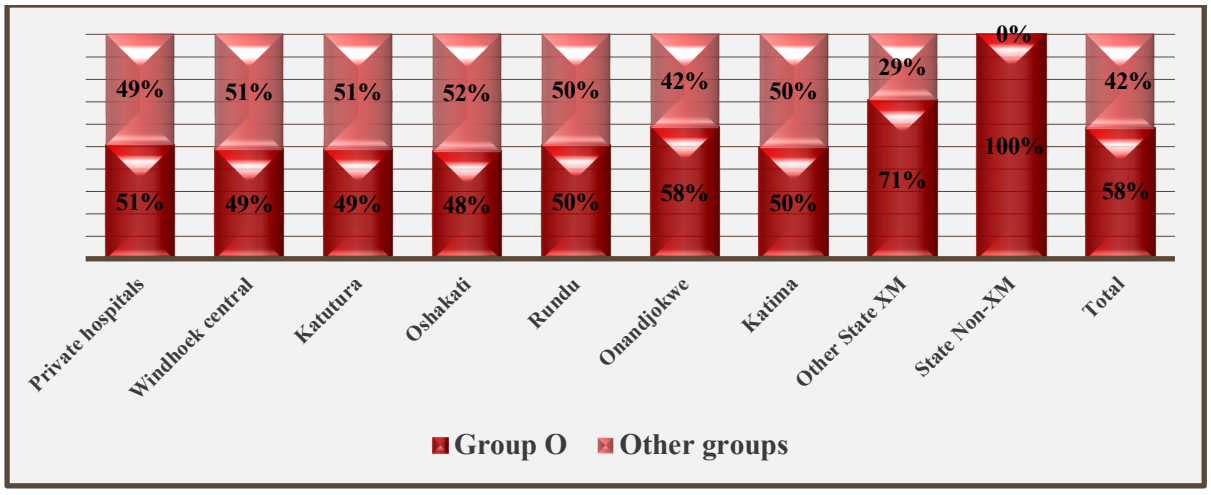


Figure 4.2: Proportion of adult RCC usage per blood group in the 2024 Financial year:

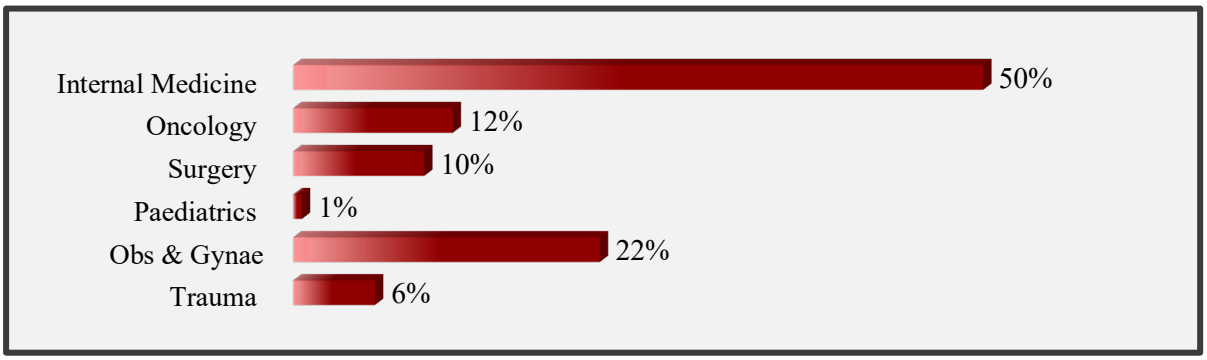


4.1.1 Adult RCC Usage

The Blood Transfusion Service of Namibia depends on clinicians and/or hospitals to complete and return blood requisition forms to ensure that data regarding a blood recipients' transfusion history can be captured in the LIS database to determine blood and blood products clinical usage. However, during the two years under review 32% of units either had no clinical diagnosis on the blood requisition form (11%) or was

categorized as null (21%). If categorized under null insufficient data was provided by clinicians or was returned late to the BTS for data capturing. Despite continuous efforts these numbers still remain high. Internal Medicine used 50% of the remaining 56 260 adult RCC units issued by NAMBTS, followed by obstetrics and gynaecology (22%) and oncology (12%) as illustrated in the graph (figure 4.3) below. The number of units used by internal medicine could be overestimated due to the fact that when no specific category was indicated on the requisition form and the clinical diagnosis matched this category it was categorized under it, i.e., gastrointestinal bleeding which could also be due to a surgical cause.

Figure 4.3: Adult RCC usage per diagnostic category in 2023 & 2024 financial year, excluding No diagnosis/Null:



4.1.1.1 Internal Medicine Adult RCC Usage

During the two years under review the 28 446 RCC units were used in the internal medicine department. Anaemia (55%), gastrointestinal bleeding (15%) and sepsis/septic shock (6%) were the most common clinical diagnoses and contributed to 28 446 RCC units used in internal medicine.

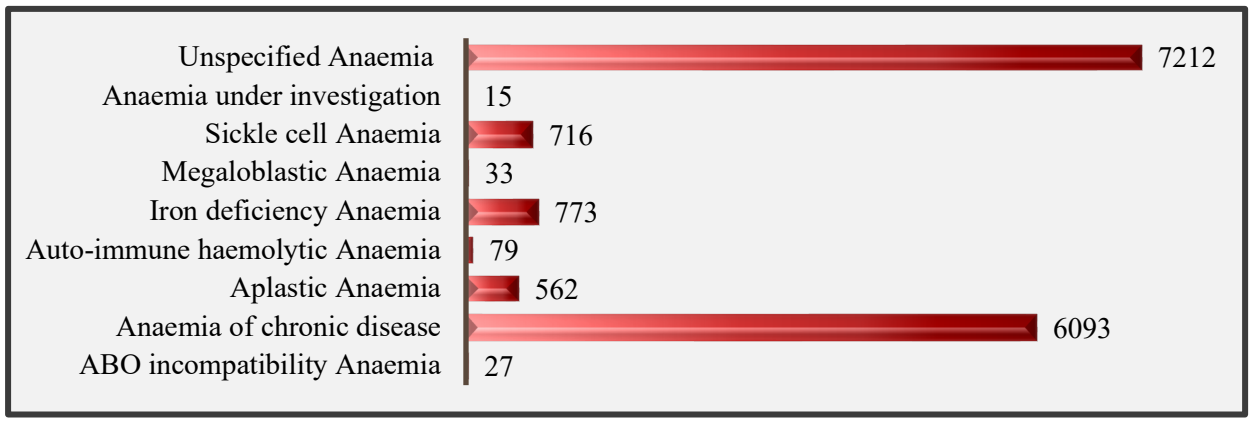
The majority of RCC units used in internal medicine was due to unspecified anaemia (25%, 7212 units) and anaemia of chronic disease (21%, 6093 units) as illustrated in figure 4.4. This suggests clinicians may be reluctant to specify a clear diagnosis on blood requisition forms, using the non-specific term "anaemia of chronic disease" instead when the underlying condition is still being investigated or when no definitive diagnosis has been established but transfusion is required. RCC usage for a 'specified' anaemia (9%, 2190 units) was due to iron deficiency (773), sickle cell anaemia (716), aplastic anaemia (562), autoimmune haemolytic anaemia (79), megaloblastic anaemia (33) and ABO incompatibility (27).

Gastrointestinal bleeding was the second most common cause for RCC usage ranging from unspecified, upper or lower gastrointestinal bleeding, of which upper gastrointestinal bleeding (7%) was the most common indication for RCC usage in this category, followed by lower gastrointestinal bleeding (6%) and unspecified gastrointestinal bleeding (2%) during the two years under review. However, during the 2023 financial year lower gastrointestinal bleeding was the most common cause of gastrointestinal bleeding and contributed for 1356 RCC units used. Sepsis and septic shock constituted to 1647 units being used in internal medicine which can significantly be reduced with improvement of primary health care services to ensure prompt identification and

management of infections to enhance iron absorption.

In internal medicine, 25% of RCC units were used for unspecified anaemia which is not a proper diagnosis…

Figure 4.4: RCC unit usage for anaemia during the 2023 & 2024 financial years from Internal Medicine:



4.1.1.2 Obstetrics & Gynaecology Adult RCC Usage

Obstetrics and Gynaecology was the second highest user of adult RCC during the two years under review, i.e., 12 520 units, of which obstetrics used 55%. The majority of RCC used for obstetrics were due to emergencies during the two years under review which is similar to previous years. The most common usage of RCC for obstetric emergencies were due to postpartum haemorrhage (39%, 2685 units), antepartum haemorrhage (21%, 1449 units) and pre-eclampsia, eclampsia and HELLP syndrome (8%, 557).

Anaemia related to pregnancy or in the postpartum period used 1021 units (15%) of RCC in obstetrics which can be reduced significantly with adequate peri-partum care such as early antenatal care, use of haemostatic medication to reduce blood loss during delivery and hematinic medication in hemodynamically stable individuals. Clinicians requested for 898 units (13%) of RCC during or after a caesarean section which could probably be reduced by enhancing surgical blood-saving techniques.

Implementation of PBM strategies can significantly reduce the need for blood transfusions in obstetrics relating to anaemia in pregnancy, delivery and in the postpartum period.

The majority of RCC used by gynaecology was due to gynaecological emergencies (58%, 3258 units) followed by dysfunctional uterine bleeding (37%, 2073 units). Miscarriages ranging from incomplete, complete to septic were the major causes of RCC usage for gynaecological emergencies by using 2082 units (37%) of all the units used for gynaecology, followed by either uncomplicated or complicated ectopic pregnancies (21%).

4.1.1.3 Oncology Adult RCC Usage

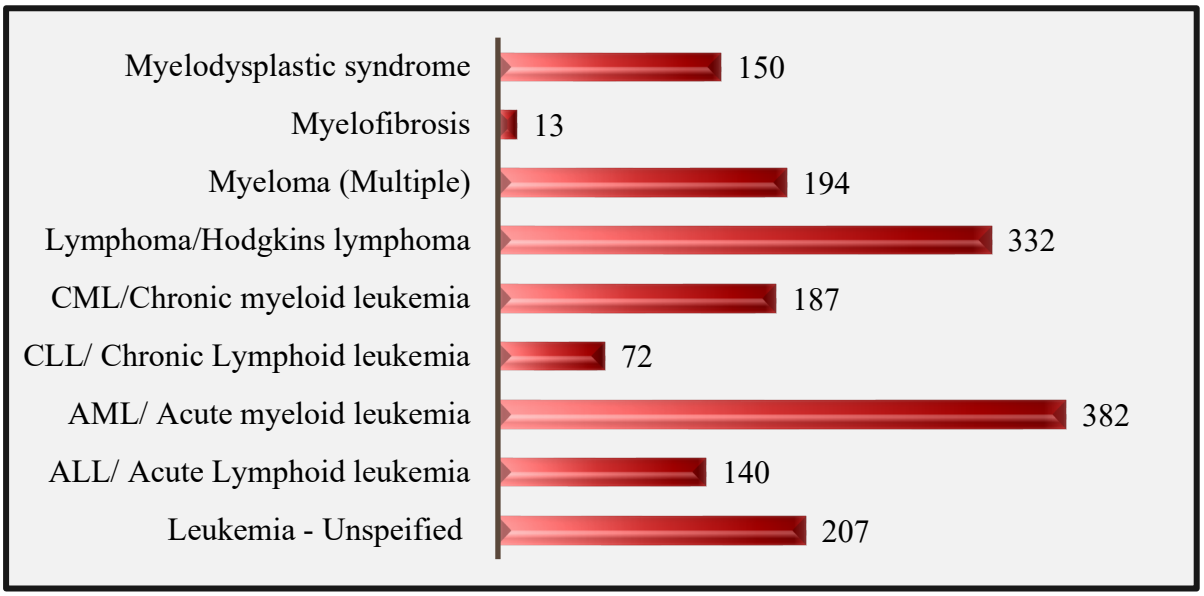
Oncology was the third highest user of adult RCC during the two years under review, indicating that cancers require a large amount of blood in Namibia. Oncology used 6516 units of adult RCC during the two years under review which is almost 2000 units more than the previous two years.

Cervical cancer was the highest user of RCC under oncology (19%, 1238 units)), followed by all leukaemias (15%, 988 units) and prostate cancer (9%, 609 units). During the previous review approximately 1420 units of RCC were used for cervical cancer and breast cancer alone, which is 182 units less than the current review. Cervical cancer will be reduced significantly by promoting HPV vaccination in schools, encouraging women of reproductive age to go for regular screening, and facilitating voluntary medical male circumcisions.

***Cervical cancer is the main driver of RCC usage* in oncology.**

Haematological oncology also used a significant amount of RCC units during the two years under review (23%, 1514 units), of which all leukaemias used the majority, followed by lymphomas (5%, 332 units) and multiple myelomas (3%, 194 units) as illustrated below in figure 4.5.

Figure 4.5: Haematological oncology adult RCC unit Usage during the 2023 & 2024 financial year:



4.1.1.4 Surgery & Trauma Adult RCC Usage

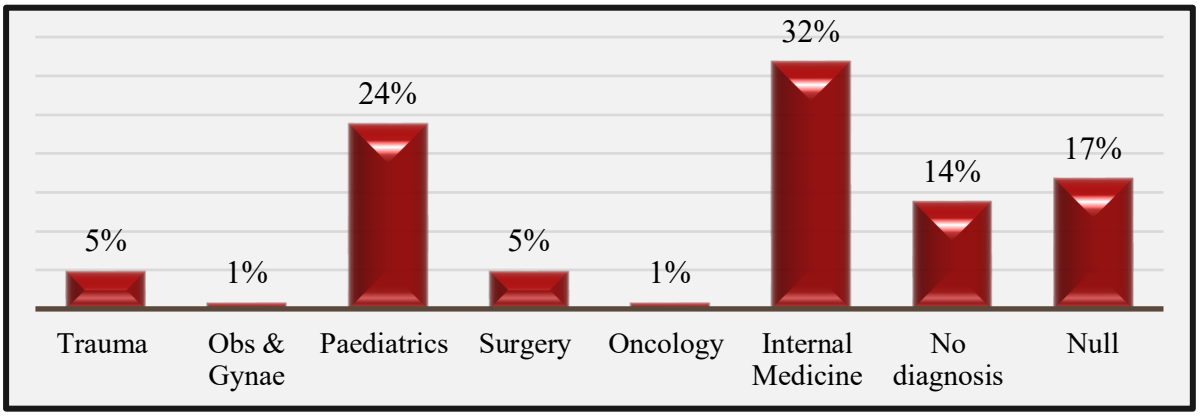
The surgery departments used 5350 adult RCC units during the two years under review, however this is likely an underestimation since various clinical diagnosis' can be treated by the surgical departments but get categorized under internal medicine. General surgery used the bulk of adult RCC units (36%, 1941 units) amongst the various surgical departments, followed by orthopaedic surgery (21%, 1148 units) and urology (10%, 526 units). The most common uses for adult RCC in general surgery was for

an acute abdomen/laparotomy (378 units), large or small bowel obstruction (340 units) and abscess/abscess drainage (331 units). About 3336 adult RCC units were used for trauma cases, however this should be significantly higher since emergency blood is often used for these cases and health care workers fail to complete blood requisition forms when an emergency unit is taken from the hospital emergency fridge.

4.1.2 Paediatric RCC Usage

In total 6082 paediatric RCC units were used in the two years under review. This can be an underestimation, since children can have the same diagnoses as adults and many of the diagnosis are possibly entered under the adult diagnoses' category, i.e., internal medicine. This factor thus limits the data extraction for paediatric patients. NAMBTS recently introduced a paediatric category on the blood requisition form in an attempt to improve data collection for paediatric patients. It is possible that adult RCC units were used for paediatric patients, since the volume of RCC required might be more than that of a standard paediatric RCC unit and thus categorized under an adult category. With the recent introduction of the paediatric category on the blood requisition forms, an additional 354 adult RCC units can be added to paediatric RCC usage. Paediatric RCC units can also be used for adult patients if no adult RCC is available, or instead of expiring or discarding the units. The various categories for which paediatric RCC units were used are illustrated in figure 4.6 below.

Figure 4.6: Paediatric RCC Usage per category in the 2023 & 2024 financial year:



An adult RCC unit can be split into three paediatric units to reduce the exposure of children to various blood donors. Paediatric RCC was primarily used for prematurity (31%), kwashiorkor or malnutrition (17%), neonatal sepsis (10%), haemolytic disease of the newborn (8%), anaemia of the newborn (8%), gastroenteritis (8%) and neonatal jaundice (6%) which required exchange transfusion. The high need for blood transfusion in malnourished children indicates that anaemia and malnutrition remain a significant public health burden for Namibia.

4.2 Usage of Whole Blood (WB)

A total of 185 Whole Blood (WB) units were used for clinical purposes during the 2 years under review. As is recommended, whole blood was mainly used for exchange transfusions in neonatal jaundice (83%, 109 units), for paediatric patients.

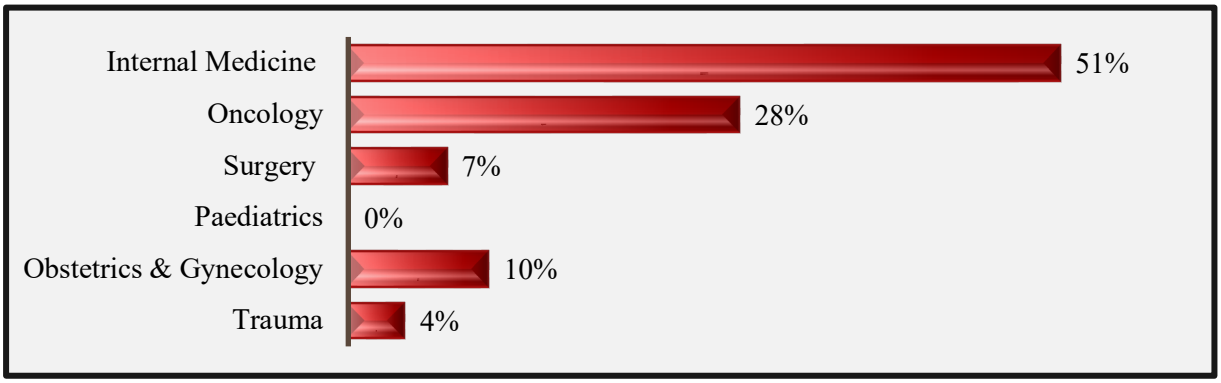
4.3 Usage of Platelets Concentrate

A total of 5863 platelet concentrates, 5110 adult units and 753 paediatric units, were used during the two years under review. Adult Apheresis Platelets (2472 units) made up for 48% of platelets issued during the two years under review. All paediatric platelets are collected by an apheresis technique. However, during the two years under review 25% of platelet units either had no clinical diagnosis on the blood requisition form (11%, 657 units) or was categorized as null (14%, 838 units). The majority of platelet concentrates were used by internal medicine, followed by oncology and obstetrics & gynaecology.

4.3.1 Adult Platelet Concentrate (Apheresis & Pooled) Usage

A total of 5110 adult platelet concentrates were used during the two years under review, of which 52% were pooled platelets. Twenty-five percent of requisitions for adult platelets had no diagnosis (545 units) on the blood requisition form or were categorized as null (739 units). Although a significant number of units had no diagnosis/null category a significant reduction of 8.5% was observed currently from the previous review. The remaining 3826 units were mainly used by internal medicine (51%, 1955 units), Oncology (28%, 1056 units) and Obstetrics & Gynaecology (10%, 336) as illustrated below in figure 4.7.

Figure 4.7: Adult platelet concentrate usage per diagnostic category in 2023 & 2024 financial year, excluding no diagnosis/null:



4.3.1.1 Internal Medicine Adult Platelet Usage

Internal medicine accounts for the majority of adult platelets used during the two years under review, 1955 units. These units were mainly used for haematological conditions (67%, 1315 units), and infectious or inflammatory conditions (14%, 269 units). For haematological conditions, the majority of units were used for ITP/Thrombocytopaenia

(459 units), aplastic anaemia (338 units), pancytopenia (197 units) and unspecified anaemia (173 units). The clinical diagnosis of "ITP or Thrombocytopenia" should be separated on the NAMBTS data system, as "thrombocytopenia" is not considered a clinical diagnosis, but rather a manifestation of a disease and therefore an underlying cause should be specified.

Infectious or Inflammatory conditions contributed to 14% (269 units) of platelets used in internal medicine, of which the majority were used for sepsis, septicaemia and septic shock (135 units), followed by malaria (43 units), tuberculosis (31 units), HIV/AIDS (11 units) and pancreatitis (10 units).

4.3.1.2 Oncology Adult Platelet Usage

Twenty-eight percent (1056 units) of the 3826 units captured under a specific diagnostic category were used in the management patients diagnosed with cancer. The majority (77%) of these 1056 units under oncology were used for haemato-oncological conditions of the 423 platelet concentrates used to manage haemato-oncological conditions, the majority (300 units) were used for patients with leukaemia (unspecified, ALL, AML, CLL and CML), followed by lymphoma (65 units), myelodysplastic syndrome (30 units) and multiple myeloma (28 units).

4.3.1.3 Obstetrics & Gynaecology Adult Platelet Usage

Seventy-nine percent (288 units) of the 366 platelet units used for obstetrics and gynaecology were used in obstetrics, mainly for various obstetric emergencies i.e., Eclampsia, DIC or HELLP Syndrome (108 units), APH (42 units) and PPH (38 units). The 78 units used in gynaecology were mainly for miscarriages (28 units) and uncomplicated or complicated ectopic pregnancies (16 units).

4.3.2 Paediatric Platelet Concentrate Usage

A total of 753 paediatric units were used during the two years under review, of which 15% (112 units) had no clinical diagnosis on the blood requisition forms and 13% (99 units) were categorized under null. The majority of the units were used for internal medicine (274 units), paediatrics (136 units), oncology (48 units) and obstetrics & gynaecology (42 units). The 136 platelet units used for transfusion in paediatric patients were generally due to neonatal sepsis (27%, 38 units), prematurity (25%, 35 units) and neonatal jaundice/exchange transfusion (16%, 22 units).

4.4 Fresh Frozen Plasma, Source Plasma & Apheresis Plasma Usage

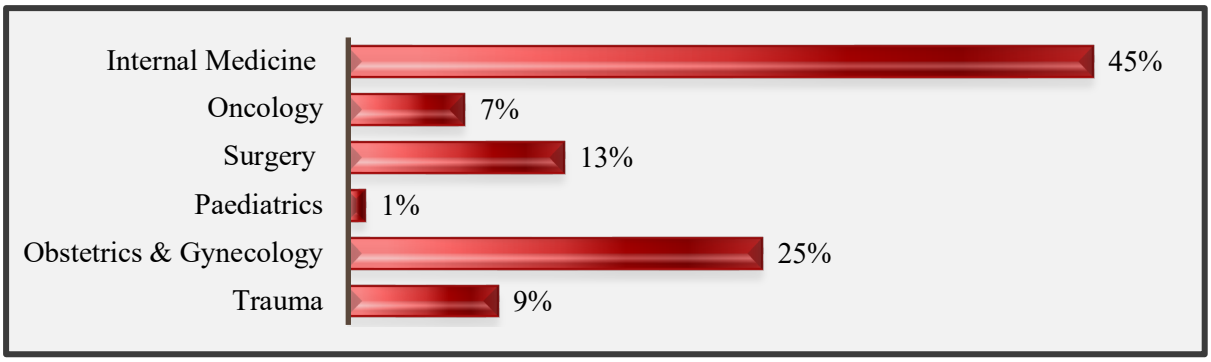
During the two years under review a total of 16 796 units of plasma were used for transfusion purposes of which 15 380 were adult units. Most plasma used for transfusion was collected by means of an apheresis procedure, namely apheresis FFP and source

plasma, and the remainder of the units are derived from whole blood in adults. Source plasma (11 325 units) was mainly used for transfusion in both adult and paediatric patients, followed by apheresis FFP (1360 units) and FFP (3929 units). Additional plasma not used for transfusion is exported to the National Bioproduct Institute (NBI) for fractionation to make plasma derivatives i.e., Freeze Dried Plasma (FDP).

4.4.1 Adult Plasma Usage

Sixty-seven percent (10 315 units) of adult Source Plasma (SP) was used for transfusion during the two years under review, followed by apheresis FFP (7%, 1136 units) and FFP (26%, 3929 units) derived from whole blood. No diagnosis was indicated on the blood requisition form for 2129 units and 2256 units were categorized under the null category, which constitutes 25% of all adult plasma products used. The remaining 10 994 units were mainly used by internal medicine, obstetrics & gynaecology and surgery as illustrated in figure 4.8 below.

Figure 4.8: Adult plasma usage per diagnostic category in 2023 & 2024 financial year:



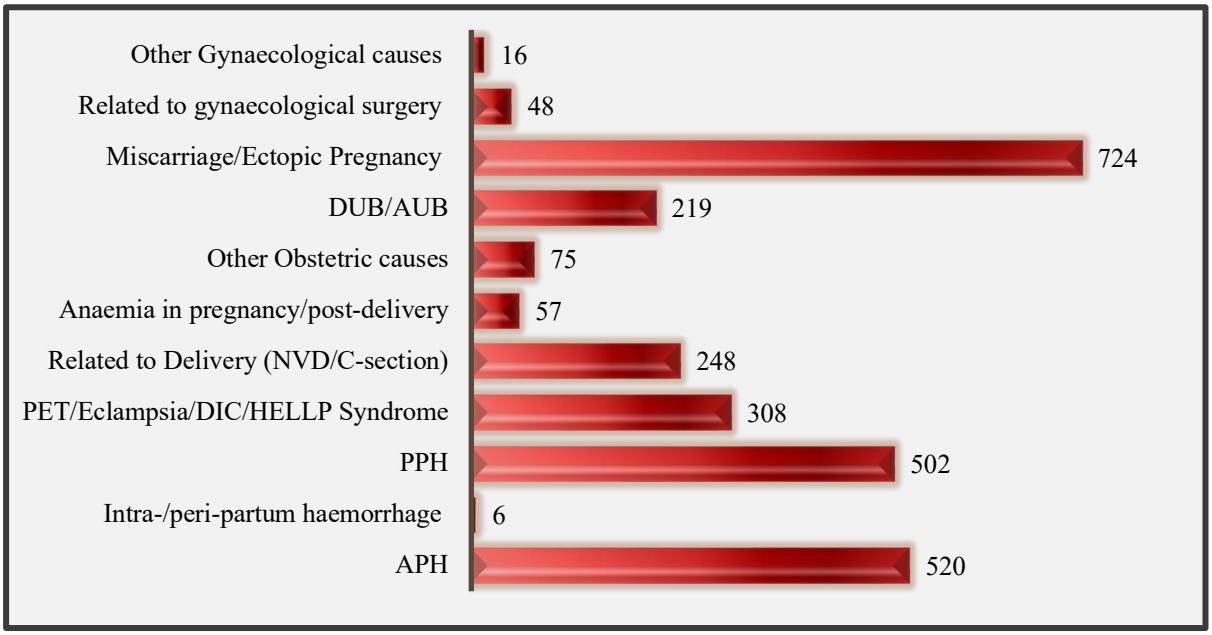
4.4.1.1 Internal Medicine Adult Plasma Usage

Internal medicine accounts for a large bulk of adult plasma used during the two years under review, 4953 units. These units were mainly used for haematological conditions (33%, 1616 units), gastrointestinal bleeding (25%, 1248 units), infectious or inflammatory conditions (19%, 966 units) and hepatic conditions (9%, 438 units). The main haematological conditions for which plasma units were used for were unspecified anaemia (494 units), anaemia of chronic disease (348 units), ITP or thrombocytopenia (374 units) and pancytopenia (75 units). Gastrointestinal bleeding used 1248 plasma units, mainly for upper gastrointestinal bleeding (19%, 941 units), lower gastrointestinal bleeding (4%, 176 units) and unspecified gastrointestinal bleeding (3%, 131 units). Septicaemia, sepsis and septic shock is the primary contributing factor to plasma transfusions in infectious/inflammatory conditions, which accounts for 796 plasma units used (16%) during the two years under review. Hepatic conditions only used 438 units of plasma, mainly for liver failure (4%, 192 units) and chronic liver disease (2%, 94 units), i.e., Liver Cirrhosis.

4.4.1.2 Obstetrics & Gynaecology Adult Plasma Usage

Sixty-three percent (1716 units) of the 2723 plasma units used for obstetrics and gynaecology were used for obstetric diagnoses, primarily obstetric emergencies such as APH (520 units) and PPH (502 units), and pre-eclampsia (PET), eclampsia, DIC, HELLP Syndrome (308 units). Plasma units used during delivery were primarily for caesarean sections (238 units). The 1007 plasma units used in gynaecology were mainly for miscarriages (371 units) and uncomplicated or complicated ectopic pregnancies (353 units) as illustrated in figure 4.9, which accounts for 27% plasma usage in obstetrics & gynaecology. This indicates that plasma units were likely used for massive haemorrhage management in obstetrics & gynaecology.

Figure 4.9: Indications for plasma unit usage in obstetrics & gynaecology during 2023 & 2024 financial year:



4.4.1.3 Surgery Adult Plasma Usage

The surgery departments used 1497 adult plasma units during the two years, however this is likely an underestimation since various clinical diagnoses can be treated by the surgical departments but get categorized under a different category i.e., upper gastrointestinal bleeding. General surgery used the bulk of plasma units (53%, 800 units) used amongst the surgical departments, followed by orthopaedic surgery (9%, 140 units) and cardiothoracic surgery (7%, 105 units). The most common uses for adult plasma in general surgery was for an abscess or drainage thereof (260 units), an acute abdomen/laparotomy (159 units), and large or small bowel obstruction (119 units).

4.4.2 Paediatric Plasma Usage

During the two years under review 1416 paediatric plasma units were used, of which 20% (i.e., 281 units) were used for a paediatric diagnosis. An additional 58 adult plasma units were used for a paediatric diagnosis, which can be split into 3 paediatric

plasma units. A total of 339 plasma units were used for transfusion in children, mostly due to prematurity (129 units), neonatal sepsis (72 units) and neonatal jaundice (56 units). A considerable amount of paediatric plasma usage, 320 units, were categorized under internal medicine, mainly due to haematological causes (32%, 102 units), such as unspecified anaemia, diagnoses like these can be categorized under internal medicine if no category has been indicated on the blood requisition form.

4.4.3 Freeze Dried Plasma (FDP) Usage

FDP is FFP that has undergone the process of lyophilization to produce a freeze-dried product in a powder form, allowing it to be reconstituted and administered to a patient when FFP is not immediately available, especially in peripheral hospitals for major haemorrhage. FDP is equivalent to FFP regarding coagulation properties; however, FDP has some logistical advantages such as easy storage and has a longer shelf-life. Despite these advantages the use of FDP should be limited to ensure that it is available for patients with major haemorrhage in the peripheries of Namibia. Despite efforts to limit the use of FDP where FFP is readily available, there has been a significant increase in FDP usage during the 2024 financial year when compared to the 2023 financial year, especially in hospitals in the public healthcare sector of Namibia. The public hospitals used 405 units of FDP during the 2023 financial year and 1093 units in the 2024 financial year. FDP usage alone during the 2024 contributed to N$ 2,583,157.95 of the MoHSS expenditure for blood and blood components. The majority of FDP in the public healthcare sector was used in Keetmanshoop State Hospital (17%, 183 units), followed by Katima Mulilo Hospital (11%, 125 units), Onandjokwe Lutheran Hospital (11%, 123 units), Outapi District Hospital (10%, 105 units) and St. Mary's Hospital Rehoboth (8%, 87 units)

Section 5 – Donor & Recipient Adverse Events related to the collection & transfusion of Blood and Blood Products

5.1 Recipient Adverse Events:

5.1.1 Transfusion Reactions:

A transfusion related adverse event is defined as any undesirable and unintended occurrence before, during or after transfusion of blood or a blood component, which may also be related to the administration of blood. This may be due to an error or incident which occurred in the laboratory and/or the hospital and may or may not result in a transfusion reaction.

All adverse events related to blood transfusions have to be reported as part of the Namibian haemovigilance system. Although the reporting rate of transfusion reactions gradually increased from 2007, the overall prevalence per unit issued to hospitals is 0.7%, which is still low compared to the global prevalence of 1-3%. Continuous

education should be provided by NAMBTS and the MoHSS to health care workers to ensure that they are able to identify transfusion reactions and understand the importance of reporting adverse events related to the transfusion of blood and blood components.

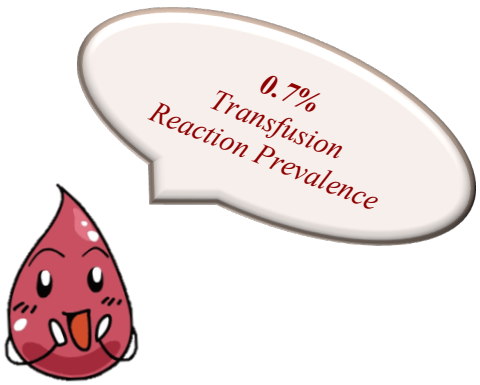
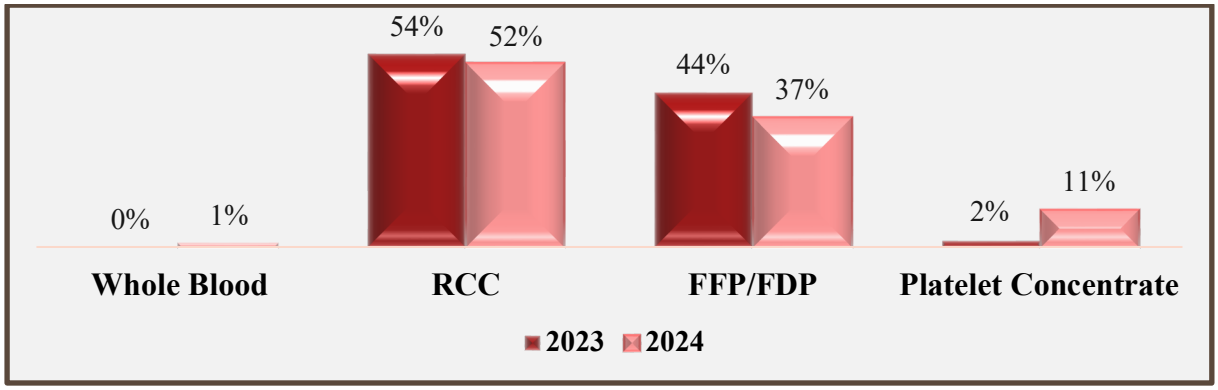


Table 5.1: Transfusion Reactions to blood & blood components during the 2023 & 2024 financial year:

	Allergic Reaction	Anaphylactoid Reaction	FNHTR	AHTR	DHTR	TRALI	TACO	TAD	Other
2023	68	12	63	5	0	0	0	0	1
2024	38	8	41	2	0	1	1	2	0
Total	**106**	**20**	**104**	**7**	**0**	**1**	**1**	**2**	**1**

Two-hundred fifty-two (252) transfusion reactions were reported in the 2 years under review. Ten of these reactions reported to NAMBTS were ruled out as transfusion reactions due to isolated pre-transfusion anxiety, suspected autoimmune haemolytic anaemia, dilutional coagulopathy and post-operative nausea and vomiting etc. Mild to moderate allergic reactions were the most common (44%), followed by febrile non-haemolytic transfusion reactions (43%) and anaphylactoid reactions (8%) as shown in table 5.1. Percentage of blood and blood components most prevalent for transfusion reactions during two years under investigation were as follows; blood components containing large volumes of plasma, i.e., FFP and FDP, were responsible for 67% of all allergic transfusion reaction ranging from mild to severe, with RCC (22%) and platelets (10%) making up the rest. However, only 10% of blood components containing large volumes of plasma contributed to severe allergic reactions, anaphylactoid reactions. FNHTR were mainly associated with RCC transfusions (87%), with FFP (8%) and platelet concentrate (2%) contributing to the remainder of the FNHTR's. Transfusion reactions were most commonly associated with the transfusion of RCC (53%) followed by FFP/FDP (40%), platelets (6%) and whole blood (1%) during the two years under review. The graph (figure 5.1) illustrates the blood and blood components associated with transfusion reactions during 2023 and 2024 financial years.

Figure 5.1: Percentage of blood and blood components associated with transfusion reactions during the 2023 & 2024 financial year:



5.1.2 Wrong Blood to Patient (WBTP) Incidents:

WBTP Incidents occur when crossmatched blood of a patient is administered to the wrong patient. These incidents can result in fatal outcomes and are preventable if proper identification of a patient is followed at all times. During the two-year period under review eight incidents of wrong blood transfusions to a patient were reported, of which three (38%) were transfusions with ABO incompatible blood. Only one of these ABO incompatible blood transfusions resulted in an acute haemolytic transfusion reaction which fortunately did not result in a fatal outcome. All of the incidences were due to hospital errors where the standard operating procedure were not followed by the Health Care Workers and the pre-transfusion identification check was omitted.

The distribution of these incidences was equal amongst public and private health care facilities.

5.1.3 Recipient Adverse Reaction Incidents:

During the period under investigation two Recipient Adverse Reaction Incidents were reported due to laboratory errors. One incident occurred when a staff member issued an expired paediatric platelet unit and the incident was only corrected after 10mL of the unit was transfused to the patient. The second incident occurred when a positive screen was missed during the pre-transfusion compatibility testing which resulted in a mild acute haemolytic transfusion reaction. Corrective and preventative actions were taken by retraining staff members on NAMBTS standard operating procedure.

5.2 Donor Adverse Events

NAMBTS depend on voluntary non-remunerated blood donors to maintain an adequate blood supply, therefore it is of utmost importance to ensure the safety of these donors. All Donor Adverse Reactions (DAR's) are recorded regardless of severity, since 2019 when the NAMBTS policy changed. Severe donor reactions are immediately reported to the NAMBTS Medical Officer, and mild to moderate donor reactions are reported to the donor clinic supervisor within two working days of the

occurrence of the reaction and documented on a standard form, Record of Adverse Donor Reaction FRM/DON/001.

Three hundred eighty-four (384) DARs were reported in the years under review i.e. 254 and 130 in the 2023 and 2024 financial years, respectively. Most were related to whole blood donations, 94% and 92% in the 2023 and 2024 financial year respectively. DAR's were mostly observed amongst female donors and first-time donors, 74% and 43%, respectively during the years under investigation.

During this period under review a total of 93689 units of blood and blood components were donated. This indicates an average donor reaction rate of 0.4%. The severity of DAR's are classified according to the IHN guidelines; mild reactions are if the symptoms are subjective, i.e. the donor complained of being unwell, moderate reactions are if there were visible signs and symptoms i.e. objective signs observed by the clinic sister or surrounding people and severe reactions are if any medical intervention was required.

The majority of DAR's observed amongst donors were mild VVR (61%), followed by moderate VVR (24%) and haematoma formation (10%) during the two years under investigation as illustrated below in table 5.2. VVR were mostly observed amongst first time donors compared to haematoma formation which is mostly observed amongst regular blood donors.

Table 5.2: Donor Adverse Reactions to blood donation during the 2023 and 2024 Financial Year:

	Mild VVR	Moderate VVR	Severe VVR	Haematoma	Nerve Injury	Citrate	Others
2023	161	52	8	28	1	3	1
2024	72	39	6	11	1	1	0
Total	**233**	**91**	**14**	**39**	**2**	**4**	**1**

5.3 Near Misses:

There were three near misses during the two years under investigation which were resolved. One blood product with wrongly recorded expiry date was issued to hospital and one expired RCC was issued the day after expiry. Both of these products were recalled and returned to NAMBTS. One wrong blood in tube was collected, which was noted at the hospital blood bank and new blood sample was requested.

5.4 Mortalities associated with Blood Transfusion:

There were two cases of potential patient mortalities reported to NAMBTS during the two years under investigation based on the temporal association between the patient's death and blood transfusion. It remains a challenge to make a definitive diagnosis that a mortality is caused by a blood transfusion due to the lack of clinical detail on the Transfusion Reaction Report Form and lack of resources to carry out post-mortems and required investigations. However, a transfusion reaction might have contributed to the death in one of these reported deaths. An AHTR might have contributed to the mortality of a patient with ABO haemolytic disease of the newborn after a whole blood transfusion where anti-A,B contained in the plasma could have exacerbated haemolysis if maternal anti-A,B IgG were present in the fetal circulation. In cases of ABO haemolytic disease of the newborn, it is recommended that reconstituted whole blood should be used for exchange transfusions.

Section 6 – Lookback Programme

Lookback investigations must be done by a Blood Service in all cases of possible transfusion-related transmission of a disease, which can either be a donor- or recipient-triggered. During the 2023 and 2024 financial year no lookback investigation was undertaken by NAMBTS

Section 7 – Recommendations

All stakeholders of the Namibian Blood Programme should act on recommendations made to strengthen the vein-to-vein transfusion chain.

Recommendations	
NAMBTS	- Improve electronic data collection, i.e., data should be editable once NAMBTS requisition forms from blood-issuing NIP laboratories arrive at Windhoek HQ, even if this is delayed (i.e., after invoices have been sent). - NAMBTS blood banks must be computerized for immediate electronic capture of and verification of transfusion history. - Improve compatibility testing and identification of antibodies, i.e., autoantibodies in cases of AIHA.

	- NAMBTS must continue to educate clinicians about the importance of the Lookback Programme so as to ensure a safe blood supply and to fill the blood recipient's cell phone number on the requisition form to improve traceability. - NAMBTS should do hospital audits to identify gaps in health care worker knowledge regarding blood transfusion and do focused training on these gaps identified. - Implement a system to monitor blood wastage within hospitals and implement corrective actions to ensure that a scare resource is not wasted.
MoHSS	- Revise the GACUB guidelines with PBM in mind to reduce unnecessary blood transfusions and ensure online availability of these guidelines. - Provide training on the revised GACUB guidelines to clinicians, adequate completion of blood requisition and transfusion reaction report forms. - Make all revised blood transfusion-related documents available online and in printed version at all peripheral hospitals. - Establish a National Blood Authority which consist of all major stakeholders of the National Blood Programme to play an advisory role to the MoHSS to enhance the quality of blood transfusion services provided to the Namibian population in need.
Hospitals	- Implement a PBM programme within hospitals to reduce blood usage and wastage within hospitals. - Strengthen hospital transfusion committees (HTCs) by making an HTC mandatory in all hospitals who use a large amount of blood per year and in smaller hospitals incorporate blood transfusion on therapeutic committee meetings as a permanent agenda point. - HTCs should ensure that guidelines and procedures provided by the MoHSS and NAMBTS are implemented within hospitals by health care workers.
NIP	- Ensure that NAMBTS blood requisition forms are return to NAMBTS headquarters in a timely-manner to reduce the unspecified (Null) blood requisitions which cannot be allocated to a specific blood recipient. - Retraining of NIP personnel on crossmatching to ensure that more group-specific blood is issued and reduce the unnecessary issuing of emergency (Group O) blood. This will reduce shortages of blood group O units and enhance patient safety.