02.

BLOOD SERVICES GROUP

We are committed to ensuring the safety and sustainability of the nation's blood supply, and engaging our donors regularly to improve their blood donation experience.

ENGAGING & COMMITTED

PEOPLE AND VALUES

We strive to develop, nurture and upskill our people, who are at the heart of the organisation.

CLINICAL NURSE LEAD PROGRAMME

With the implementation of our Clinical Nurse Lead (CNL) programme, qualified staff nurses can now take the lead for blood collection activities at our Bloodbanks.

The CNL role not only provides our staff nurses with additional professional development opportunities, but also solves the issue of medical screening personnel shortages. Many of the tasks that could previously only be done by medical screening professionals and doctors, can now be performed by our CNLs.

Such tasks include:

- Medical screening and medical care at Bloodbanks
- Clinical assessment of donors with adverse reactions
- Ensuring appropriate management is instituted in accordance with relevant guidelines and standards
- Counselling of deferred donors and donors with low haemoglobin levels

To ensure the highest standards of donor safety and blood collected, only experienced, knowledgeable and qualified staff who meet the training and competency requirements will be allowed to take on the CNL role.

As of Q1 2022,

we have **3 fully trained CNLs**

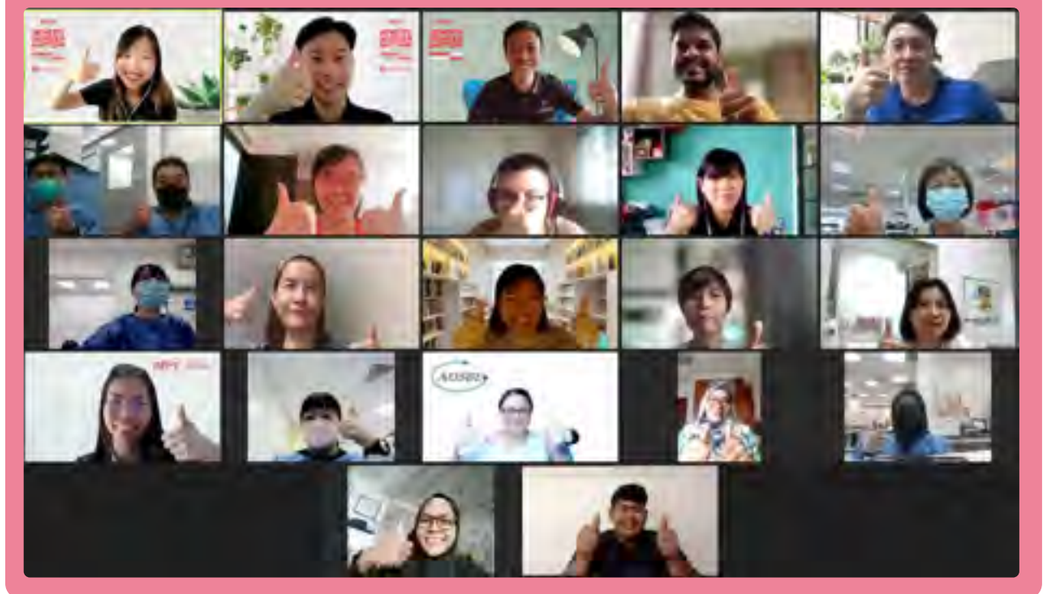
To train a total of 6 CNLs

OPERATION & TECHNOLOGY ROADMAP WORKSHOP

From September to November 2021, we collaborated with the NTUC Industry Training & Transformation team to conduct a virtual workshop, titled "Operation & Technology Roadmap".

In line with our objective to build a sustainable workforce that will be able to support the transformation of our blood supply operations through automation, the workshop focused on instilling in our staff a greater sense of ownership and a better understanding of the need for change. Through this workshop, our staff got the chance to co-create ideas and identify gaps in skillsets, as well as explore new job functions for process automation.

The next step will be to roll out a training roadmap to prepare our team to be ready for these newly identified processes.



FOR OUR DONORS

We endeavour to make the blood donation experience comfortable and convenient for our donors.

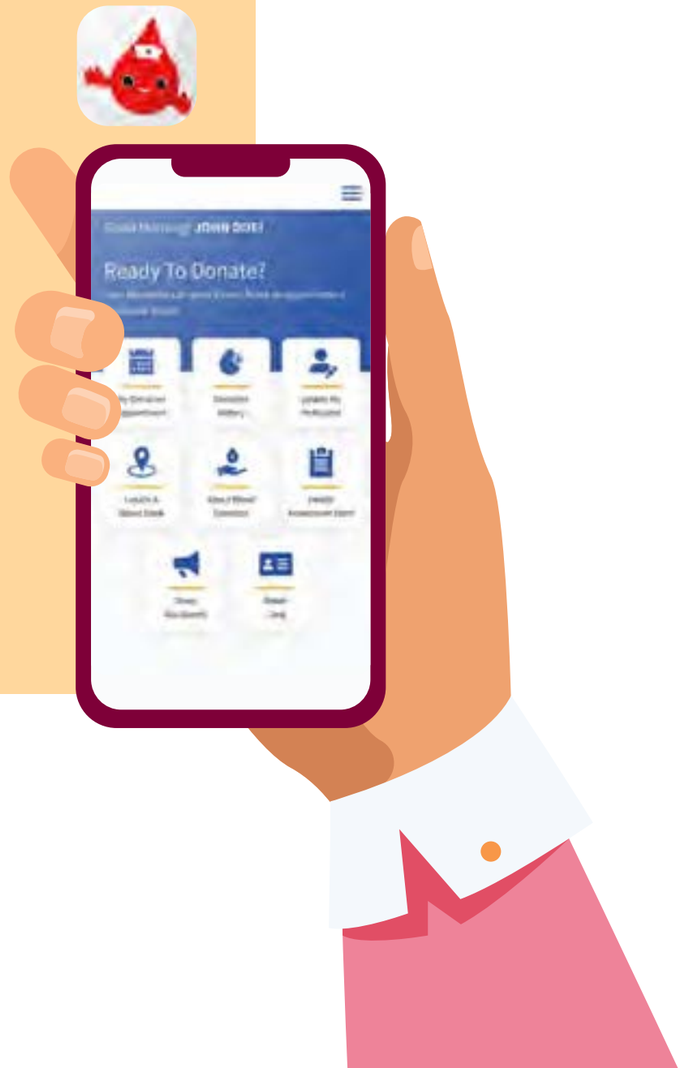
DONOR MOBILE APP

In September 2021, HSA launched our first-ever DonateBlood mobile app, which was jointly created with the Singapore Red Cross (SRC). This is part of a series of digital initiatives aimed at making the blood donation process more convenient. The DonateBlood app allows donors to easily access blood donation-related services anytime and anywhere with their mobile phone.

Such services include:

- Donation appointment
- Donation history (including their milestones, total number of donations)
- Updating their particulars
- Health Assessment Form
- Digital Donor Card
- Information about blood donation

To ensure relevance of the app, HSA and SRC gathered donors' inputs on the user experience via focus group discussion during the app development phase. Moving forward, we will continue to gather feedback to further enhance and improve the app.



EXPANSION OF SATELLITE SITE AT DHOBY GHAUT EXCHANGE

Ever since its launch in 2012, Bloodbank@DhobyGhaut's (BB@DG) average daily blood collection has jumped 87%, from 47 units in 2012 to 90 units in 2021. Last year, BB@DG's collection accounted for 26% of our total blood collection.

In response to BB@DG's growth, we embarked on an expansion project to accommodate more donors at the site. Completed in 2022, the new BB@DG features a more spacious donor waiting area and refreshment area for improved donor experience.

Enhancements at the newly renovated BB@DG

An increased floor area from

264 square metres → 299 square metres

Increased daily collection capacity of

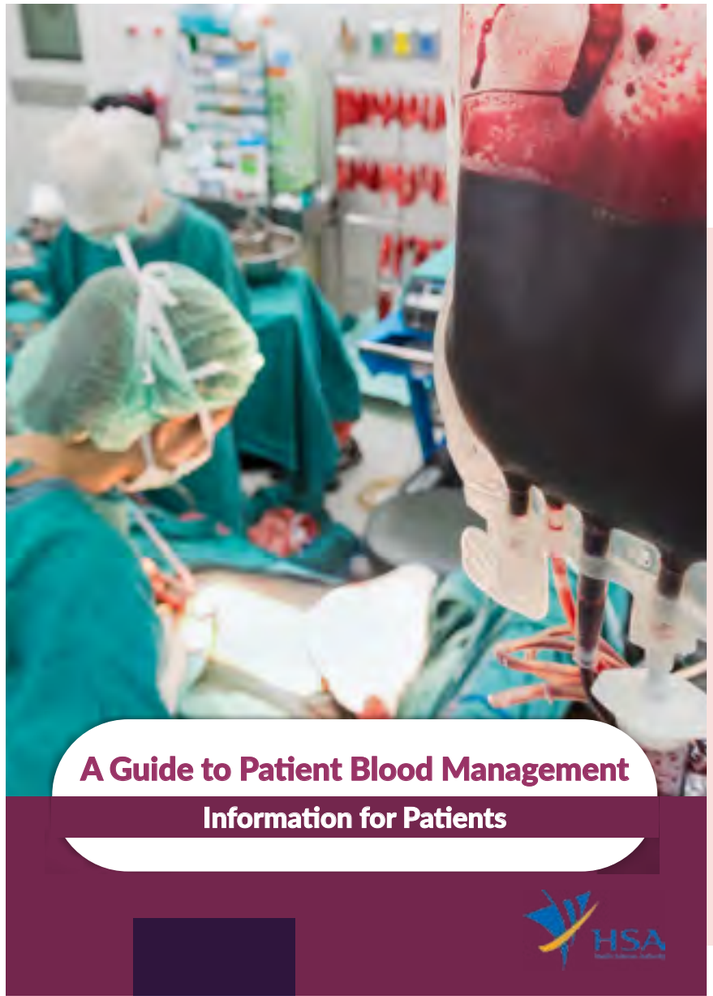
98 units

Larger waiting area for donors

Additional room for medical screening

KNOWLEDGE AND INNOVATION

In our efforts to maintain a best-in-class blood services outfit, we are constantly building our knowledge base and innovating new processes.



IMPROVING PATIENT BLOOD MANAGEMENT (PBM) KNOWLEDGE

In addition to our regular audits and sharing of good practices on PBM with the public hospitals in Singapore, we came up with a patient information leaflet on PBM.

The leaflet contains useful information about PBM as well as strategies to enhance red blood cell production and minimise blood loss. The leaflet also provides advice for patients to discuss with their doctors about PBM, with the aim of optimising their haemoglobin level and reducing transfusion requirements.

This brochure has been distributed to all hospitals as well as made available on our website.

IMPROVED SAFETY AND ADEQUACY OF BLOOD PRODUCTS

In July 2021, we implemented two new initiatives to enhance the safety and adequacy of our blood supply.

Extension of platelet shelf life from five days to seven days

Leading up to the implementation, we conducted extensive time-based bacterial contamination detection studies, as well as monitored quality control indicators of both apheresis and whole blood derived pooled platelets to ensure safety and quality of platelets for use in transfusion therapy over the extended seven-day period.

This extended shelf life allows us to better manage our platelet inventory, as well as reduce product wastage.

Provision of plasma-reduced platelets

Plasma is the main media used for storing platelets for transfusion therapy. However, in rare situations, plasma proteins can lead to allergic reactions in patients who cannot tolerate large volumes of plasma.

To cater to the needs of such patients, we validated and optimised the process of removing excess plasma from platelet units to produce plasma-reduced platelets.

HELPING PRIVATE HOSPITALS DEVELOP PRE-TRANSFUSION TESTING CAPABILITIES

As private hospitals started to manage their own plasma and platelet inventory, they have also developed their own pre-transfusion testing capabilities. This will ensure that they are able to supply compatible blood and blood products to their patients in a timely manner.

To assist them with their transition, we conducted on-site training for our private hospital counterparts on how to set-up their crossmatching laboratories.

INTRODUCING NEW TESTING SERVICE AND METHODOLOGY TO IMPROVE TRANSPLANT OUTCOMES AND TEST TURNAROUND TIME

The upcoming introduction of a new testing service – killer cell immunoglobulin-like receptors (KIR) genotyping, will assist clinicians in selecting the most suitable donors for haplo-identical haematopoietic stem cell transplants, thereby improving transplant outcomes when full matched donors are not available.

The use of the new real-time Polymerase Chain Reaction (PCR) methodology in human leukocyte antigen (HLA), human platelet antigen (HPA) and KIR genotyping, coupled with an automated analysis software, will significantly reduce the need for manual post-PCR procedures and interpretation of results, thus freeing up man hours and hence improving test turnaround times.

To enhance efficiency and better synergise our efforts, we made several infrastructural changes.

INFRASTRUCTURAL CHANGES

CONVERSION OF CELL PROCESSING LAB TO CELL & GENE THERAPY FACILITY

To better reflect our current work and direction, the Cell Processing Lab that was built as a prototype in 2006 has been renamed to the Cell & Gene Therapy Facility (CGTF).

In addition to the name change, the lab has also undergone infrastructural modifications to incorporate new capabilities, such as viral-related and genetically modified cell manufacturing.

Among the reasons for this change was a growing interest and patient demand for the use of Chimeric Antigen Receptor (CAR)-T Cells for relapsed leukaemia and lymphoma. Hospitals needed a facility that could support the piloting of gene modified viral vector work.

The launch of CGTF is exciting as it gives us the capability to not only manufacture CAR-T cells locally, but also enables us to translate and scale up other viral vector-based cell therapy works.

To better serve our stakeholders, we worked with partners on various blood-related clinical trials and studies.

OUR COLLABORATIONS

VALIDATION WORK FOR LENTIVIRAL-BASED GENE THERAPY PRODUCTS

We collaborated with SCG Cell Therapy Pte Ltd to evaluate and validate the cell therapy manufacturing process for SCG101 – an autologous T-cell receptor (TCR) T cell therapy for patients with Hepatitis B virus (HBV) related hepatocellular carcinoma (HCC).

This process is performed in our renovated CGTF in full compliance with current GMP requirements.

Our validation results will be able to support globally TCR T cell therapy clinical trials in Singapore and the US, and hopefully improve treatment outcomes for HCC patients.

STUDY ON THE SAFETY AND EFFICACY OF CRYOPRESERVED PLATELETS IN HYPOPROLIFERATIVE THROMBOCYTOPENIC PATIENTS

In August 2021, we completed our collaborative study with DSO National Laboratories and Singapore General Hospital on the preparation and use of frozen whole blood derived pooled platelets for transfusion therapy.

Currently, platelets are stored in room temperature and have a short shelf life of seven days. Freezing of the platelets can significantly extend its shelf life to at least two years. Through this collaboration, we were able to study the safety and efficacy of the frozen platelets in preventing bleeding among patients with very low platelet counts.

PROVISION OF RESIDUAL PLASMA SAMPLES FOR DENGUE SERO-PREVALENCE STUDY

To support blood and public health safety, we collaborated with the National Environment Agency from July to September 2021 to provide de-identified residual plasma samples. These samples came from blood donors who consented to use their residual blood samples for research purposes. This study is conducted periodically to generate information on disease epidemiology and geospatial analysis of dengue immunity.

MANUFACTURING OF CD19-DIRECTED AND DUAL CD22/19-DIRECTED CAR-T CELLS

We worked closely with KK Women's and Children's Hospital to produce CD19-directed and dual CD22/19-directed CAR-T cells for children and adult patient trial participants.

In line with the newly released Cell, Tissue and Gene Therapy Products (CTGTP) regulatory framework, we ensured that we are in compliance with the new guidelines on GMP for CTGTP for manufacturers. New biosafety procedures to handle viral-related processing, which is carried out in our CGTF, were also drafted.

If the trials are successful, it will pave the way for the production of safe and effective locally made CAR-T cell products that can serve as alternatives to other commercial products, and provide access to potential life-saving treatment.