醫療財團法人
台灣血液基金會
Taiwan Blood Services Foundation

2017 Annual Report

2017
Annual Report

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捐血救人 Taiwan Blood Services Foundation

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Message from the President

Since I took over the president, I have deeply recognized the missions falling on my shoulders. Not only must I ensure the normal operation of the Taiwan Blood Services Foundation (TBSF) as a non-profit organization, but I must also ensure the sufficiency of blood for clinical use in Taiwan, so that all walks of life can have a healthful, safe, and effective blood service to protect their medical rights.

In 2017, our colleagues worked so hard together to have achieved some fruitful results in several key tasks. Among them, we have succeeded in persuading the hospitals to fully use the leukoreduced blood products, which are the best choice for patients with blood transfusions. We have also been striving to make blood quality better and better. In 2017, we used the theme of "The Pioneer of Safe and Sufficient Blood Supply " to participate in the accreditation for 2018 SNQ (Symbol of National Quality) in the category of "Peripheral Medical - Public Welfare Service Group" and we passed the evaluation to win the certification. Later, we were also awarded "Silver Award" in the National Biotechnology and Medical Care Quality Award. This represents that the jury has rated us as the No. 1 in Asia for our services in providing high-quality blood for safe clinical use.

We uphold our professionalism and enthusiasm to serve and we stay true in every job. I understand that TBSF is an important part of the medical care system in Taiwan. Luckily, with the excellent examples of my predecessors serving as standards, I hope to lead all my colleagues to work together to carry on our core values and missions so as to create another peak for our TBSF.

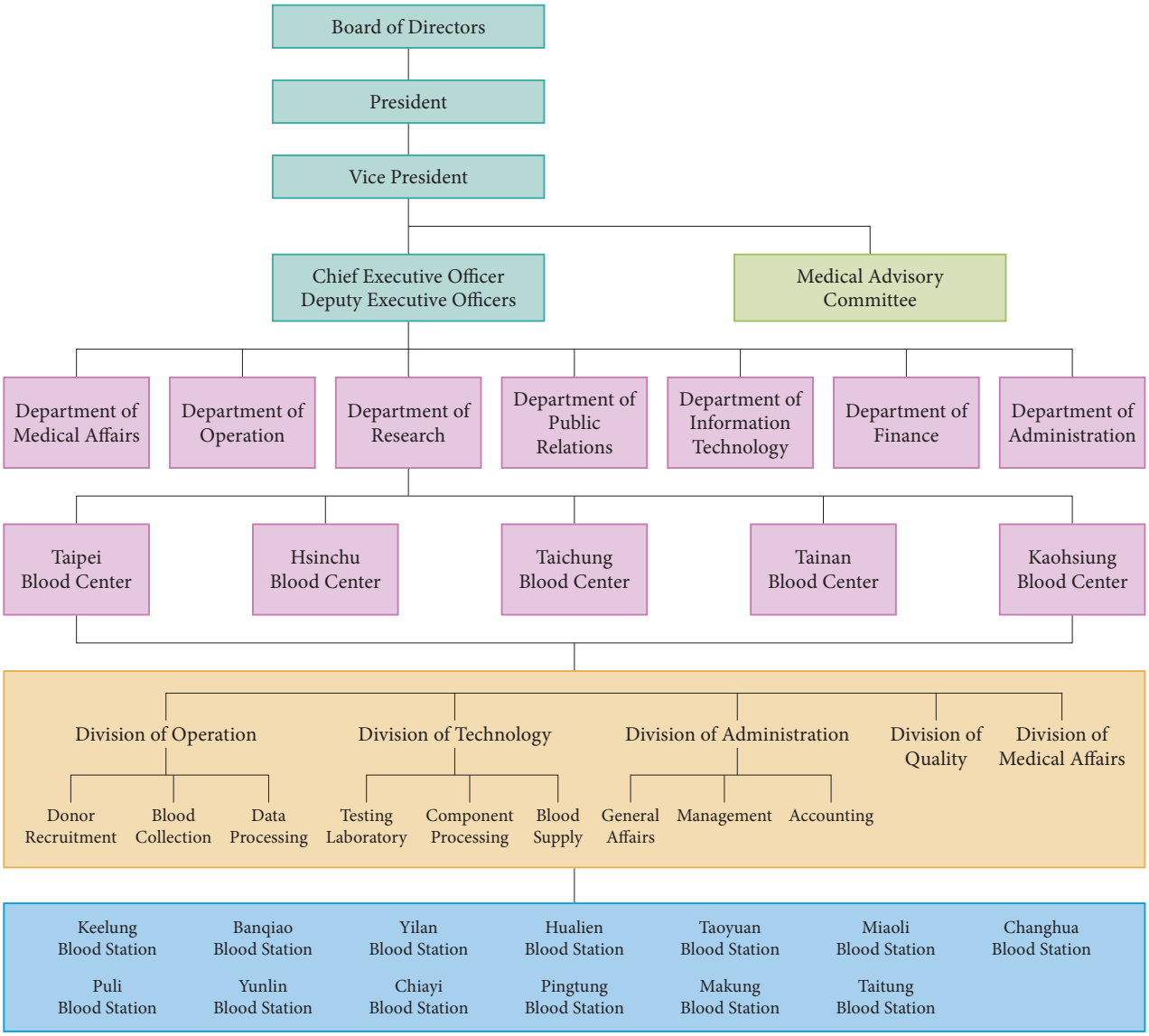
President

Goal and Missions

The Foundation is to practice a voluntary non-remunerated blood donation system, to conduct donation and supply of blood, to improve the quality of blood for medical use, to protect the rights of patients, and to enhance the health of the citizens. Specifically, the missions of the Foundation are:

1. To plan and implement blood donation services.
2. To establish blood donation systems, and to conduct research and development on safe blood use.
3. To conduct research on blood science and technology.
4. To collect , laboratory-test, and supply blood for patients of public and private hospital.
5. To conduct research on the health maintenance of blood donors.
6. To conduct matters concerning the use and safety management of blood suitable for transfusion.
7. To plan and supply blood in large quantity at times of major disasters or wars.
8. To commission toll fractionation , to storage and supply domestic plasma derived products.
9. Other matters concerning blood donation and supply.

Organization



There are 2 centralized testing laboratories in Taipei and Kaohsiung Blood Center.

Chronicles
(1974-2017)

1974

April • Chinese Blood Donation Association was formally established on April 19.

August • Taipei Blood Center was established on August 1.

1975

October • Taichung Blood Center was established on October 31.

1976

September • The donation ceremony of the first blood donation mobile, "Ren-Yi Bloodmobile", was held on September 3.

December • The Kaohsiung Blood Center was established on December 21.

1977

September • The Technical Advisory Council was formed on September 14. In order to increase the control over blood quality, improvements in blood screening, and other handling processes related to the collection, testing, derivative production, supply, and disposal of blood, as well as other technical issues, experts and researchers were specifically invited to join the council to provide specific suggestions. The first batch of council members included Yan, Chun-Hui, Liu, Zhen-Hui (Director of Experimental Diagnosis Department, currently known as Department of Laboratory Medicine NTU Hospital), Huang, Yun-Fei (Director of Hematology, Tri-Service

General Hospital), and Dr. R. Palmer Beasley (Maxwell Finland Award in 2011, Hepatitis B Foundation's Distinguished Scientist Award in 2010).

1978

June • Chinese Blood Donation Association began issuing the bi-monthly "Blood Donation Newsletter".

July • Taipei Blood Center was the first to start the production and supply of blood component products. During the initial stages, the center supplied packed RBC, washed RBC, WBC concentrates, platelets, FFP, and FP.

September • Dr. Baruch S. Blumberg visited Taipei Blood Center and proposed that plasma tested positive for HBsAg could be used to manufacture Hepatitis B vaccines. (Dr. Baruch S. Blumberg was the co-recipient of the Nobel Prize in Physiology or Medicine in 1976 for discovering the Hepatitis B)

1979

August • Kaohsiung Blood Center began the production and supply of blood component products.

October • Taichung Blood Center began the production and supply of blood component products.

1980

January • To support the blood donation campaign, Taipei Mayor Lee Teng-Hui (later became the first elected President in Taiwan) encouraged citizens to participate actively in the blood donations and arrived at Taipei Blood Center, becoming the 150 thousandth blood donor in Taipei.

1981

April • Began to supply frozen RBC, frozen deglycerolized RBC, and cryoprecipitate.

July • Tainan Blood Center was established on July 1.

1982

January • Tainan Blood Center began the production and supply of blood component products.

1983

January • Taipei Blood Center began to conduct apheresis blood donations, and offered WBC apheresis and platelet apheresis services.

March • Hsinchu Blood Station, Taipei Blood Center was established on March 1.

1984

July • Taipei Blood Center and National Taiwan University (NTU) Hospital collaborated to establish the "Hemophilia Care & Research Center" on July 18.

1985

January • Hualien Blood Station was established on January 16.

April • To promote national research and development in blood science and technology, the National Science Council, Executive Yuan collaborated with South African Medical Research Council to delegate Lin Su-Juan (Supervisor of Component Departmnet, Taipei Blood Center) to South African National Blood Service to learn the dry powder production techniques of cryoprecipitate for a period of 2 months.

1986

November • Due to illness, one French priest in Taiwan required to transfuse C,e and Fya antigens negative, group O blood. Taipei Blood Center immediately contacted French National Blood Service (EFS) and delivered 1,600 units of the same blood type to Taipei in time for transfusion.

1987

March • The bi-monthly "Blood Donation Newsletter" published by the Chinese Blood Donation Association was changed to a monthly publication, "The Blood".

April • When the car bomb attack occurred in Colombo, Sri Lanka on April 21, Taipei Blood Center immediately provided about 11 thousand units of frozen plasma to Sri Lanka by air transport. The incident created the first precedent of Taiwan providing blood supplies in foreign assistance.

June • Effective from June, the Department of Health, Taiwan Provincial Government revoked all blood bank operations jointly organized by the Red Cross and the ten county hospitals, and

ceased all paid donations; as well as assisted the hospitals to set up their blood banks, supplied by the Chinese Blood Donation Association, to improve the blood quality.

1988

January
- Began HIV antibody screening test for all blood donors.

1989

January
- Increased the maximum age limit of blood donors to 65 years old

December
- To prevent blood donations from high-risk AIDS groups and other unsuitable donors, the Blood Centers have issued out "Considerate Call leaflet", whereby donors could call to notify the Centers if the blood donated is unsuitable for use to avoid jeopardizing harming the health of recipients.

1990

January
- Chinese Blood Services Foundation was formally established on January 1.

September
- Due to the unrest, Sri Lanka made requests to Taiwan for plasma and other medical supplies. The Foundation immediately sent 200 bags of frozen plasma by airfreight to Sri Lanka to assist the wounded for the first time.

1991

January
- Ceased sending blood usage notices.
- The Department of Health, Executive Yuan reduced the legal age for blood donation from 18 to 17.

April
- Hualien Blood Center was established on April 1.

1992

May
- Hsinchu Blood Center was established on May 1.
- Magong Blood Station was established on May 1, becoming the first blood donation station established on the outlying islands.
- Began HCV antibody screening test for all blood donors.
- Began to supply leukocyte-reduced RBC.

September
- Began to provide HLA Class 1 and antibody screening services.

- Chinese Blood Donation Association was awarded the first "National Public Service Award – Social Service Award".

1993

January • President Lee Teng-Hui issued a public plea for blood donations, urging the people to participate actively in the blood donation campaign and be a happy donor.

February • Began to provide HLA matching services in platelet apheresis

July • The first case of AIDS window period infection in Taiwan occurred on July 21.

1994

March • In accordance with Department of Health, Executive Yuan regulations, with effect from March 1, blood donors must present their Identification Cards or other certification when donating blood. At the same time0, to eliminate the risks of people abusing the blood donation for testing AIDS, all donors would not be notified of the HIV test results.

October • With effect from October 1, a pilot trial was implemented to change intervals between whole blood donations (including 250cc and 500cc) to 3 months.

November • With effect from November 3, an additional 1% was charged in every unit of blood transfused as the relief fund for HIV contacted via blood transfusions.

December • To protect the right to know of blood donors, the testing reports were once again sent to donors. Besides HIV testing results, the donor should be notified of all other testing items.

1995

July • Began HIV-2 screening test for all blood donors from July 1.

October • Effective from October 1, the interval between whole blood donations of 250cc would be resumed to 2 months whereas the interval between whole blood donations of 500cc would be resumed to 3 months.

1996

January • With effect from January 26, Anti-HTLV inspection was implemented on blood products to ensure the safety of medical blood supplies.

1997

January • The "TBSF" plasma derivative production was officially launched on January 1.

April • Taipei Blood Center was the first to conduct pilot trials of plasma apheresis donation.

1998

February • Began RBC irregular antibody screening test

April • Established the first public umbilical cord blood bank in Taiwan, and collaborated with Department of Obstetrics & Gynecology, NTU Hospital, formally commencing the collection of umbilical cord blood.

1999

November • The 10th Western Pacific Regional Congress of the International Society of Blood Transfusion (ISBT) was held in Taipei from November 11~14, during which the Foundation and the Blood Centers present on 29 scientific abstracts

December • The Foundation was awarded the second National Public Service Award on December 29.

2001

April • Began to supply leukocyte-reduced platelets apheresis.

November • On November 5, the Foundation passed UKAS ISO 9001: 2000 accreditations and a certification conferring ceremony was held.

2002

June • In order to prevent new type Creutzfeldt-Jakob diseases (CJD), effective from June 25, the Department of Health amended the health requirements of blood donors whereby donors are ineligible to donate if they have traveled to or resided in United Kingdom for more than 3 months, shortened from 6 months. Donors who have traveled to or resided in Europe for a cumulative time of 5 years or more from 1980 were also included in the donation eligibility conditions.

2003

January • The online donor inquiry system was officially launched on January 28.

May • The severity of the SARS outbreak greatly impacted the blood donation and supplies of the Blood Centers.

2005

January • Effective from January 1, the calculation for the annual donation volume and the number of apheresis donations conducted a year of the donor was changed from calendar-based computations to birthdate-based computations.

2006

June • The Foundation established a free Donor Service Hotline 0800-099-519 on June 1 to provide comprehensive services.

2007

June • On June 6, an HLA-matched umbilical cord blood was sent to the Bone Marrow Transplant Center in Hong Kong.

2008

January • The domestic "TBSF" component derivatives were officially supplied to the hospitals and medical institutes for use on January 1.

April • The Foundation was officially renamed as "Taiwan Blood Services Foundation" on April 28.

July • To strengthen services to the donors, beginning from July 1, cholesterol, uric acid, and ferritin inspection services were offered to regular donors (donated blood within the past three years) every six months to increase the health awareness of donors and encourage them to protect their health.

2009

September • The "Automatic Low-Temperature Archive Samples Bank" built within Hsinchu Blood Center was completed and launched on September 1.

2010

January • The "Inventory Stock Management System" of the Foundation was activated on January 1,

vastly improving procurement and warehousing efficiency.

2011

May
- On May 30, the Foundation donated 1,249 bottles of "TBSF" High Purity Factor IX Concentrate, and commissioned DHL to deliver the supplies to the "World Federation of Hemophilia" in Dublin, Ireland, where the supplies would be donated to 14 other countries, such as Bangladesh, Philippines, Tunisia, Kenya, Jordan, Egypt, Lebanon, Bolivia, El Salvador, Nicaragua, Paraguay, Moldova, Uzbekistan, and Kyrgyzstan.

June
- On June 27, the Foundation delivered a second batch of supplies containing 2,400 bottles of "TBSF" High Purity Factor VIII Concentrate to the "World Federation of Hemophilia" in Dublin, Ireland, where the supplies would be donated to 6 other countries, such as Myanmar, Laos, Sudan, Cuba, Paraguay, and Kyrgyzstan.

July
- On July 18, the Foundation delivered a third batch of supplies containing 2,462 bottles of "TBSF" High Purity Factor VIII Concentrate to the "World Federation of Hemophilia" in Dublin, Ireland, where the supplies would be donated to 5 other countries, such as Bangladesh, Vietnam, Syria, Ecuador, and Uzbekistan.

October
- The Taipei Blood Center obtained the cGMP certification on October 5.
- The Taichung Blood Center obtained the cGMP certification on October 27.

November
- The Tainan Blood Center obtained the cGMP certification on November 17.
- The 2011 Asia Regional Congress of the International Society of Blood Transfusion (ISBT) was held in Taiwan from November 19~23, during which the Foundation and the Blood Centers present 55 scientific abstracts.

December
- Hsinchu Blood Center obtained the cGMP certification on December 1.
- Kaohsiung Blood Center obtained the cGMP certification on December 9.

2012

March
- The Reference Laboratory of Taipei Blood Center obtained the Taiwan Accreditation Foundation (TAF) certification on March 12.

April
- The HLA Reference Laboratory of the Foundation obtained the Taiwan Accreditation Foundation (TAF) certification.

May
- The Reference Laboratory of Kaohsiung Blood Center obtained the Taiwan Accreditation Foundation (TAF) certification on May 14.

2013

January
- The Nucleic Acid Amplification Testing (NAT) was implemented on all blood products of the Foundation.
- In accordance with the Personal Information Protection Act, blood usage reports were ceased to protect the confidentiality of the blood users.

February
- Beginning from February 1, NAT negative blood products would be supplied.

September
- In the "Pharmaceutical Inspection Co-operation Scheme (PIC/S) 20th Expert Circle Meeting on Human Blood, Tissues, Cells and ATMPs" organized by the Food and Drug Administration, Ministry of Health and Welfare on September 9~14, 47 participants from 22 countries were invited to visit Taipei Blood Center and engage in inspection simulation.
- On September 13, the umbilical cord blood bank suspended operations, and 2,056 specimens of umbilical cord stem cells were transferred to the College of Life Science, National Taiwan University for use in biomedical research.

2014

July
- A TransAsia aircraft crashed in Magong, Penghu Island on July 23. The Kaohsiung Blood Center activated the contingency response mechanism, ensuring a stable supply of blood for the Penghu regions.
- On July 31, a major gas explosion occurred in Qianzhen and Lingya Districts, Kaohsiung City, causing high fatality and casualty rates. The Kaohsiung Blood Center immediately deployed blood supplies to ensure a reliable supply.

December
- On December 31, the Foundation completed the establishment of WiFi networks for blood donors at the 103 blood donation sites.

2015

February
- A TransAsia aircraft crashed in Taipei City on February 4. Taipei Blood Center immediately deployed personnel and blood supplies to the hospitals.

June
- On June 27, an explosion occurred in Formosa Fun Coast in New Taipei City. The Foundation immediately deployed personnel and blood supplies to offer support to the hospitals.

July
- In order to reduce transfusion reactions, TBSF would adopt two types of measures in donor screening and blood supplies with effect from July 1. 1) Plasma from male donors would be prioritized for clinical transfusions. 2) Leukocyte Antibody Detection (LAD) tests would be conducted on apheresis donations from female donors. Donors with antibodies would be advised to donate whole blood.

November • With effect from November 1, blood donors who have donated blood in the past 2 years and are above 40 years of age would have to undergo additional cholesterol, LDL-C, and HbA1c tests every 3 years, and BMI values would be included in every inspection report.

2016

January • A major earthquake occurred in southern Taiwan on January 6, causing building collapses and heavy casualties. Media reported of blood shortages while internet users forwarded messages of blood shortage on the social media. The Foundation immediately issued a press release on the response measures taken.

July • From July 27~December 22, Technical Specialist Yang Meng-Hua of the Research Department of the Foundation joined Dr. Uchikawa's team in studying the monoclonal antibody production techniques for the Miltenberger blood group at the Kanto Koshin-etsu Block Blood Center, Japanese Red Cross.

August • "BE THE 1—Donor Recruitment Campaign" was a global campaign in which American company Abbott invited the captain of Portugal national football team, Cristiano Ronaldo, to be the representative for the recruitment of blood donation. The Taiwan Blood Services Foundation had obtained the authorization from the headquarters of the global campaign, allowing the portrait of international football star, Cristiano Ronaldo to be displayed in Taiwan, in the hopes of inspiring more people in Taiwan to become donors.

October • The LINE official account ID, "Blood", of the Foundation was formally launched on October 6. The three main functions of the account include "Smart Inquiry", "Personalized Notices", and "Specified Feeds". It is like a mobile assistant for blood donors, and it created a new benchmark in smart inquiries.

2017

February • 1st: Haemovigilance system for adverse transfusion reactions was formally launched online.

March • The 7th-term board of directors of Taiwan Blood Services Foundation (TBSF) convened an extraordinary meeting and elected Sheng-mou Hou to take over the President.

April • 1st: Hualien Blood Center was renamed as Hualien Blood Station and placed together with Yilan Blood Station under the administration of Taipei Blood Center. Meanwhile, Taitung Blood Station was placed under the administration of Kaohsiung Blood Center.

May • From 18th to 20th: The TBSF, the Taiwan Society of Blood Transfusion (TSBT) and the International Haemovigilance Network (IHN) jointly hosted the "International Forum on Blood Transfusion Safety and Haemovigilance," to which Professor Erica Wood, President of the International Haemovigilance Network in Australia; Dr. Masahiro Satake, Director General

On May 20, 2017, the Taiwan Blood Services Foundation (TBSF) and Taiwan Society of Blood Transfusion (TSBT) co-organized the "International Symposium on Blood Transfusion Safety and Haemovigilance." Shown in the photo from left to right were Dr. Lin Dong-Tsamn, CEO Wei Sheng-tang of TBSF, Professor Qian Kai-cheng of China, Deputy Director Liao Kun-fu of Medical Department of Ministry of Health and Welfare, President Chu Fang-Yeh of TSBT. Dr. Erica Wood from Australia, Dr. Masahiro Satake from Japan, Superintendent Chen Yu-ping of Institute of Medicinal Biotechnology from China, and Secretary-General Que Chong-hee of TSBT.

of the Central Blood Institute, Japanese Red Cross Blood Services Headquarters; and Professor Kaicheng Qian, Medical Director of the Shanghai Blood Center in China were invited to give keynote speeches.

July

- Food and Drug Administration (FDA) conducted 2017 GMP auditing on preparation of source plasma at each Blood Center.

September

- From 9th to 13th: On-site audits were conducted on the production and transport processes of those suppliers producing whole-blood blood bags, including the blood-bag manufacturing facilities of Japan Medical System (JMS) in Singapore and the medical device facilities of Kawasumi Laboratories, Thailand (KLT) in Korat, Thailand.
- 27th: FDA of Ministry of Health and Welfare hosted the “2017 Council on Blood Self-sufficiency Policy” at our Taipei Blood Center.
- 28th: Taiwan is well-known for its high national blood donation rate in the world. The Korean Broadcasting System (KBS), the national TV station in South Korea, visited Taiwan from August 28 to October 1, interviewing former president Ma Ying-jeou for his blood

donation experience; TBSF President Sheng-mou Hou for the blood policy in Taiwan; Lan Goa Yu-yun, a volunteer at the TBSF, for the touching story of blood donation for three generations in her family; Pets Tseng, a blood donor ambassador and singer in Taiwan; and some representatives of young blood donors. The show was broadcast on October 23 in Korea.

November

- 1th: Blood donors showing a positive reaction on treponemal test are required to have a RRP test.
- 6th: Commissioned by FDA of Ministry of Health and Welfare, the TSBT held at the TBSF a summary report on its visits to blood donation agencies.
- 21th: TBSF held a meeting to elect its 8th-term directors and supervisors. Sheng-mou Hou was elected as chairman of the board.

December

- 2th: The TSBT held its 30th anniversary symposium, to which the TBSF President Hou was invited to deliver opening remarks and many colleagues were invited to speak and present posters. In addition, the TBSF also contributed to the TSBT Anniversary Issue an article titled "Blood Services in Taiwan in the Past 40 Years".
- Using the theme of "The Pioneer of Safe and Sufficient Blood Supply" to participate in the accreditation for 2017 SNQ (Symbol of National Quality) in the category of "Peripheral Medical - Public Welfare Service Group," the TBSF passed the evaluation to win the certification. On the 26th, the TBSF was again awarded "Silver Award" in the 20th National Biotechnology and Medical Care Quality Award.
- 15th: The TBSF participated in the "APEC Life Sciences Innovation Forum 4th Blood Safety Policy Forum" held in Jakarta, Indonesia. It was also announced by the Forum that TBSF President Sheng-mou Hou will be Chairman for the "2018 APEC Life Sciences Innovation Forum Blood Safety Network" and the 5th Blood Safety Policy Forum. It is expected that the Forum will be held in December 2018 in Taipei.

Program activities

Program activities

1. Recruitment and retention of blood donors

In 1981, when the concept of non-remunerated blood donation was not yet mature, the bloodmibiles had to go back and forth through the streets in order to raise enough amounts of blood for the use by the injured and the sick. In the same year, the Mandarin Daily News launched the "Campaign to Donate a Small Bloodmobile," which successfully raised a fund of NT$2,100,287.30 from various elementary schools in Taipei during the period from the beginning of May to June. As the donation amount far exceeded the target, three vehicles were purchased and named "Children's Love", including the originally planned small bloodmobile, a medium-sized bloodmobile and a small blood refrigerator truck.

For the gifts of the 2017 Blood Donation Month, we selected to make toy cars modeling after the "Children's Love" bloodmobiles, which would be given out as a gift to anyone who donated blood during the period between December 26, 2016 and January 26, 2017. The "Children's Love" bloodmobiles began their service in 1981, were shifted to Hualien in 1991 and were decommissioned at the end of 1995, after having successfully collected approximately 7.5 million milliliters of blood during the 15-year period. It is noteworthy that the "Children's Love" bloodmobiles have been full of the children's love for blood donation and carried out the mission to prolong life for the wounded and the sick. After 35 years, the "Children's Love" toy cars should be able to help the general public recall the stories of "Children's Love" bloodmobiles again.

We believe that the correct and healthy concept of blood donation, rooted in the educational power of the Mandarin Daily News, can arouse the desire of our young people to donate blood in this modern era of declining birthrate. We also hope to spread this message out so as to extend the temperature of blood in the winter.

For the World Donor's Day in 2017, the World Health Organization (WHO) put out the slogan: "Give blood. Give now. Give often." It is meant to stress the importance of blood transfusion for emergency and medical care. In line with the WHO themes for "Disaster, Emergencies" and "Regular Blood Donation", the Taiwan Blood Services Foundation (TBSF) hosted a press conference for the World Donor's Day on June 13, 2017, to which was

invited Miss Ka-yin Zhang, who was wounded in the dust explosion at the Formosa Fun Coast water park, suspended her schooling for 2 years to undertake many surgeries and long-term rehabilitation, and wanted to take this opportunity to express her thanks to those who had offered helping hands to her in the incident and thereafter. In addition, we also invited Yi-jun Wei and Guan-yi Wu of the Anhe Branch, 4th Disaster Relief and Rescue Team, Fire Department, New Taipei City Government and Yuan-jie Wang of the Xindian Branch, 4th Disaster Relief and Rescue Team, Fire Department, New Taipei City Government to share their experience at the disaster site as the front-line rescue professionals. As they are regular blood donors themselves, they also encouraged everyone to develop the habit to donate blood regularly.

It was even more special that former President Ma, a senior blood donor, who originally planned to donate blood by apheresis, changed his schedule to attend this press conference for the World Donor's Day upon hearing this news conference for such a meaningful day. He talked to the audience about his blood donation stories and encouraged young people to donate blood!

On the World Donor's Day this year, Taiwan joined 13 other countries in the "Roll Up Your Sleeves and Give Where You Live" campaign promoted by 3M NexcareTM, for which the 3M Company provided the TBSF with 30,000 packs (2 pieces in each pack) of waterproof breathable band-aid adhesive bandages (limited edition) as a gift to those who donated blood for the occasion.

Affected by declining birthrate and aging population, the number of blood donators in Taiwan has declined in recent years. In 2005, there were 303,595 young blood donors (17 to 20 years

Former President Ma Ying-jiu donated blood and called for blood donation with firefighters on the World Blood Donors Day on June 13,2017.

old), but the number dropped to 185,982 in 2014, a decrease by about 120,000 person trips, or a drop of 39%. Foreseeing that the future blood source would be affected, we launched the Young Blood recruitment campaign in 2015 in a hope to stabilize the blood source. As of December 31, 2017, 165,827 young people aged 17 to 20 responded to this blood donation campaign. Among them, 88,162 (7.5%) were females and 77,665 (6.5%) were males, and the results also showed that the number of blood donors has gradually stopped dropping.

The Young Blood recruitment campaign aims to encourage young people aged 17 to 20 years to donate blood for 10 times within 4 years. As of the end of August 2017, 338 Young Blood donors achieved the goal! At the "Love in Blood Donation" press conference held on October 1, several of the Young Blood donors who had achieved the goal expressed their hope that more people would be able to donate blood. Xin-ping Liu, one of the 338 students who had reached the target, was the female student who donated the most blood by 250 blood units. Currently a senior studying at the Department of Medical Technology of Taipei Medical University, Xin-ping Liu has begun to donate blood since her third year in the senior high school, and blood donation has become one of her regular habits. Yi-hua Lu was the first to enroll himself for this Young Blood recruitment campaign. He has begun to donate blood since the time when he saw his sick grandpa receiving blood transfusion and felt that he could donate blood to help more people. Having hit the target, he felt a great sense of accomplishment and would change to donate blood by apheresis, hoping to influence more people to participate in the campaign. The 18-year-old De-wei Lee was the youngest of the 338 Young Blood donors who had reached the goal. He donated blood for the first time at school and felt that blood donation was great because he could maintain health and help others. Now owning the official account of "Love in Blood Donation", he can make query into the time for the next blood donation so that he will not forget to donate blood; he has now begun to donate blood by apheresis and would like to help more people through blood donation.

To this end, we also invited Pets Tseng, a singer with many young fans, to film an advocacy video by serving as our blood donor ambassador, hoping to remind everyone that blood donation is important in that it will not only save lives but also spread love to more people.

Taiwan enjoys the highest national blood donation rate in the world but has the same population ageing problems as other countries. The Korean Broadcasting System (KBS) visited Taiwan from August 28 to October 1, to make a documentary to arouse the public awareness of Korean people on the importance of blood donation. The reason of KBS visit is mainly because Taiwan has much more enthusiastic middle-aged blood donors than South Korea does and the KBS would like to explore the winning secrets behind the recruitment campaigns in Taiwan. Therefore, the KBS interviewed TBSF president Sheng-Mou Hou for the blood policy and blood donation campaigns in Taiwan. The KBS also filmed the press conference held on October 1 and a number of blood donors, including former president Ma Ying-jiu, blood donor ambassador Pets Tseng, and some representatives of Young Blood donors. Former President Ma was

Press conference for the "Young Blood" event on October 1, 2017. Third from left at front row is the President of Taiwan Blood Services Foundation Dr. Sheng-Mou Hou, Third from right at front row is the Blood Donation Ambassador Miss Pets Tseng.

even filmed and interviewed while making a routine blood donation. The case was translated by Professor Debby, Lung Wen-Chun, Ph.D. of the Department of Korean Language and Culture of National Chengchi University, and the program was already broadcast on the KBS TV on October 25.

The 4th APEC Life Sciences Innovation Forum Blood Safety Policy Forum was held on December 12–16, 2017 in Jakarta, Indonesia. The TBSF not only actively participated in the conference but also strived to host the 2018 session. It was officially announced on December 16 that TBSF Chairman Sheng-mou Hou will serve as chairman for the 2018 APEC Life Sciences Innovation Forum Blood Safety Network and the TBSF will host the 5th Blood Safety Policy Forum. It's scheduled to take place in Taipei in December 2018.

The Taiwan Medical Technology Exhibition was held on December 7-10 at the Taipei Nangang Exhibition Center. The TBSF took part in the Exhibit by presenting two themes: "Pre-storage leukocyte-reduced blood" and "National Blood derivatives", by which we promoted not only the leukocyte-reduced blood products to the professionals of various hospitals but also our own professional image.

The TBSF and the Taiwan Society of Blood Transfusion (TSBT) and the International Haemovigilance Network (IHN) jointly organized the International Seminar on Blood Transfusion Safety and Haemovigilance on May 20, 2017 at Taichung City. The purposes of setting up the system are to strengthen communications among IHN member countries, to speed up the exchange of alert systems, to urge IHN member countries to participate in all kinds of activities, and to promote

education and training for blood monitoring systems. The blood monitoring program has just begun in Taiwan. On October 14, 2014, the TBSF and the TSBT signed Taiwan's Haemovigilance Project Cooperation Agreement to establish the system for transfusion reactions, so as to converge all the messages regarding blood transfusion safety among all the medical institutions in Taiwan. It is hoped that the haemovigilance system can help medical institutions to regularly review the safety of blood transfusion, improve the overall medical environments for blood transfusion, and ensure the safety of patients in blood use.

Invited to give keynote speeches on the Seminar were Professor Erica Wood, President of the International Haemovigilance Network in Australia; Dr. Masahiro Satake, Director General of the Central Blood Institute, Japanese Red Cross Blood Services Headquarters; and Professor Kaicheng Qian, Medical Director of the Shanghai Blood Center in China. The lectures they delivered respectively were "Lessons from international Haemovigilance", "Haemovigilance improving blood safety" and "Viral risks associated with blood transfusion and their countermeasures".

Using the theme of "The Pioneer of Safe and Sufficient Blood Supply" to participate in the accreditation for 2017 SNQ (Symbol of National Quality) in the category of "Peripheral Medical - Public Welfare Service Group," the TBSF passed the evaluation to win the certification, meaning that the TBSF has achieved national recognition for the quality of blood-related services for safe medical use. Following the SNQ certification, the TBSF was again awarded "Silver Award" for the National Biotechnology and Medical Care Quality Award.


SNQ國家品質標章證書

CERTIFICATE OF SYMBOL OF NATIONAL QUALITY

醫療財團法人台灣血液基金會

安全醫療用血來源的領航者－台灣血液基金會

參加 2017 SNQ 國家品質標章 醫療週邊類 / 公益服務組 評鑑活動，

經大會評審委員會評選，決議通過認證，特此證明。

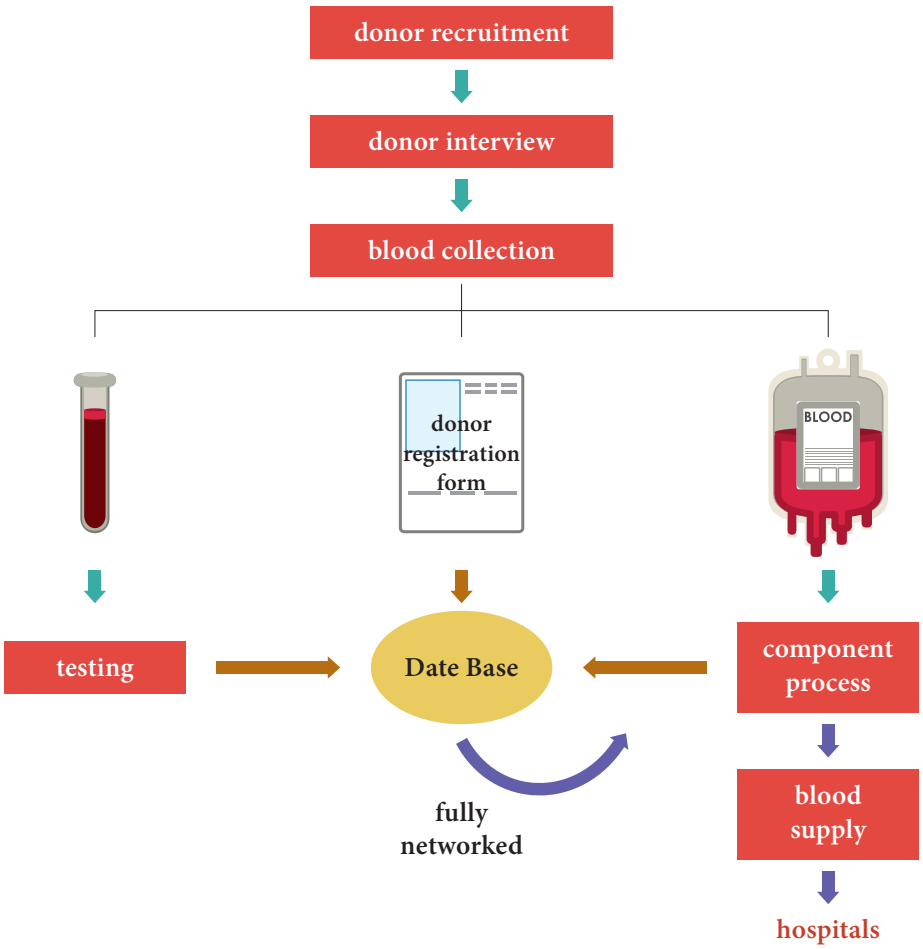
有效期限：中華民國 107 年 12 月 31 日止

This is to certify that **The Pioneer of Safe and Sufficient Blood Supply-Taiwan Blood Services Foundation** of **Taiwan Blood Services Foundation** has been awarded The Symbol of National Quality in the **Public Service Section, Medical Periphery Category** by Institute for Biotechnology and Medicine Industry.

Date of Validity: Until Dec. 31st, 2018

In 2017, we used the theme of "The Pioneer of Safe and Sufficient Blood Supply " to participate in the accreditation for 2018 SNQ (Symbol of National Quality) in the category of "Peripheral Medical - Public Welfare Service Group" and we passed the evaluation to win the certification. Later, we were also awarded "Silver Award" in the National Biotechnology and Medical Care Quality Award. This represents that the jury has rated us as the No. 1 in Asia for our services in providing high-quality blood for safe clinical use.

2. Blood operation process



The production of each bag of blood results from regional blood donation activities held after the evaluation and planning by the Donor Recruitment Section of the Blood Center. The personal information of each blood donor is filed and stored after the blood donor completes the blood donation registration form, the physical examination interview, and the blood collecting process. Then, each tube of collected blood is sent to the Laboratory for viral, biochemical, & blood-type testing. The examination results are automatically delivered to the computer for storage. Each blood bag is sent to the Blood Component Processing Section to be further processed as packed RBCs, platelets, plasma products, and so on. Finally, each qualified blood bag will be sent to the Distribution Section based on the needs of the hospital.

3. Blood donation process

A “Private Interview Space” is arranged in each blood center, blood donation room, and blood donation van so that each blood donor can honestly complete the survey and relevant questions in private surroundings. The following is an introduction to the blood donation process:

A photo ID, such as a Identification Card of Taiwan is needed to verify the identity of a blood donor during the blood donation process.

In 2017, more than one million people donated their blood so the blood supply reached approximately 5.8 billion milliliters.

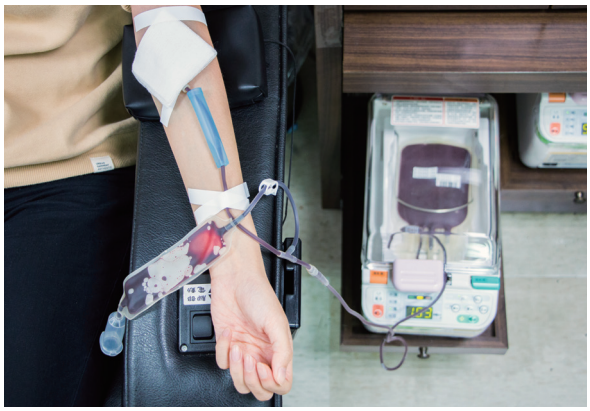
Each person needs to fill in the blood donation registration form, which in addition to basic information, also asks questions concerning recent individual health status and whether there is a high risk of sexual behavior and other issues that need to be answered honestly. Lastly, each person needs to sign the form.

Inside the blood donation van, each seat is equipped with a monitor that plays a health lesson video about blood donation to remind blood donors of the importance of blood safety.

The “Private Interview Space” is arranged to enable blood donors to honestly answer the questionnaire and related questions in private surroundings.

In addition to measuring weight, body temperature, blood pressure and hemoglobin, a nurse will provide health education about blood safety and ensure that the blood donor is qualified. This is the first step for blood safety check.

The “Conscience Call Back” sheet can remind blood donors to call the blood center back via the phone number on the sheet to ensure appropriate follow-up treatment of the blood can be carried out if they have not told health professionals of high-risk behaviors or any issues that they think may affect the safety of the blood.



During the blood collection process, each blood bag is put in the automatic oscillator for weight measurement, and the quantity of collected blood is monitored to protect the safety of blood donors.

Each blood unit will have four tubes reserved for each test.

The collected blood will be temporarily stored in a temperature-controlled container to maintain quality.

In the bright and open blood donation rest area, snacks like cookies and milk are served. Magazines and TVs are also provided in the area so that blood donors can relax after the process.

The collected blood and tubes will be delivered to the blood center by professionals in dedicated incubators and trolleys.

The following table lists relevant criteria and conditions for blood donation:

	Whole blood		Platelet apheresis	
Volume	250 ml	500 ml	1 unit	2 units
Age	17-65	17-65	17-65	17-65
Body weight	male: 50 kg female: 45 kg	60 kg	60 kg	60 kg
Oral Temperature	35.5~37.5°C			
Hemoglobin	male: 13g% female: 12g%			
Platelet count			180,000/uL	Trima: 250,000/uL MCS: 300,000/uL
Interval	2 months	3 months	2 weeks	
Max donations per year	male: 1500 cc female: 1000 cc		24 donations	

4. Inspection Testing

To ensure that the quality of examination is consistent and labor costs are kept low, laboratory testing is mainly performed in two sites. Testing Sections in Taipei Blood Center and Kaohsiung Blood Center are in charge of nationwide blood examination operations. Currently, standard examination items include: ABO blood type, Rh blood type, irregular antibody screen, ALT, HBsAg, anti-HCV, anti-HTLV, anti-HIV, syphilis, and viral nucleic acid testing (HBV, HCV, and HIV-1). The examination operating procedure is as follows:

Daily inspection operations can accommodate up to 6,000 specimens using fully automated testing equipment. Test results are delivered via an exclusive network to each blood donation center to meet the goals of speed, accuracy, and safety.

The specimen will undergo a centrifugal operation process for the convenience of fully automated testing operations.

After tubes are ranked in order, a fast fully automated barcode scan is performed to accurately and safely obtain information.

A variety of automated test equipment

Freedom EVOlyzer:

EIA methods are used to test HBsAg, anti-HCV, anti-HTLV, anti-HIV and so on. To ensure test sensitivity, British working standards are used for each test run.

Beckman AU5800:

Fully automated ALT, Cholesterol, and LDL-C test equipment.

Beckman PK7300:

Fully automated blood type, syphilis test equipment, and irregular antibody screening.

TIGRIS:

Fully automated viral nucleic acid test (HBV, HCV, and HIV-1)

5. Blood donor services

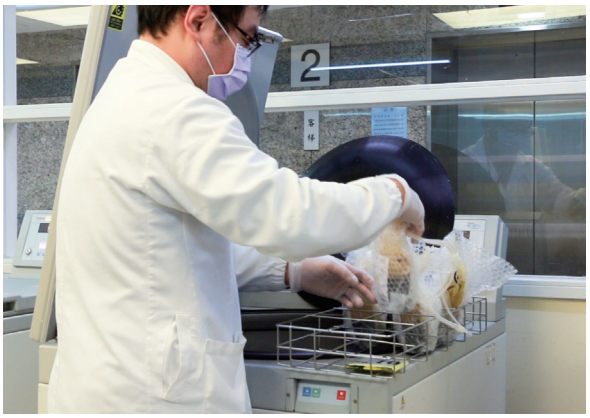
In addition to the routine regular blood donation testing, since November 1st 2015, our Foundation has also performed three tests, namely, Cholesterol, LDL-C, & HbA1c, every three years for consenting blood donors who are older than 40 years old and have donated blood more than once within the past two years. The BMI of a blood donor is shown in the test report. Blood donors who have shown a positive response to hepatitis (HBV and HCV) tests are provided with counseling (referral) messages.Furthermore, for blood donors who are older than 40 years old and have donated blood more than once within the past two years, if they have donated whole blood more than 100 times or apheresis blood more than 500 times, they can receive one free abdominal ultrasonic examination in one of our Foundation's appointed hospitals.

6. Component Processing

After non-remunerated blood donated is returned to the blood donation center, it will go through the counting process, computer input, blood component processing, checking and bacteria testing (Apheresis platelet) to be made into a variety of final blood products. These final products will be supplied to each hospital for patient blood transfusions after undergoing strict blood testing processes.

Generally, blood will be sent to the Component Process Section within 8 hours of blood collection.

The number of blood units is counted and recorded in the computer.



Based on different centrifugal criteria, different final blood products can be produced.

Blood can be separated into plasma in the upper layer and red blood cells in the lower layer based on the principle of different blood composition density. The Automatic Blood Components Extractor can squeeze plasma out into adjunct bags to be sealed.

Using a WBC filtering device, white blood cells triggering an immune response can be removed to make the blood safer for transfusion recipients.

Packed RBC is sealed into four sections for blood group testing and cross matching in the future. Each blood bag tubing has a unique blood section number for further tracing, checking, and testing.

Every blood bag has a unique barcode and blood-type label for further tracing, checking, and testing.

Separated plasma and each final product needs to be carefully placed neatly to avoid stacking for uniform freezing.

Qualified blood items are put in blue baskets while unqualified ones are put in red baskets; while ones with unidentified results are put in green baskets, and ones that have not been examined are in yellow baskets.

Each qualified component needs to be labeled and placed neatly in blue baskets. These items are then managed in the warehouse according to different temperature conditions.

Other matters

Each unit of apheresis platelets is supplied only after passing bacteria testing to ensure the safety of transfusion recipients.

The preservation time, temperature, and material cost for each final product are listed in the table below:

Component	Expiration	Storage temperature	Cost (Dollar/ unit)
Packed RBCs	35 days or 42 days	1~6°C	475
Washed red blood cells	24 hours	1~6°C	675
Deglyceride Frozen RBC	10 years	< -65°C	1,375
PLT Concentrate	5 days	20~24°C	300
White blood cell concentrate	1 day	20~24°C	300
Apheresis platelets	5 days	20~24°C	4,300
Fresh frozen plasma	1 year	< -20°C	300
Frozen plasma	5 years	< -18°C	200
Cryoprecipitates	1 year	< -20°C	150
Whole blood	35 days	1~6°C	575
Leukocyte-Poor RBC	35 days or 42 days	1~6°C	925
Pre-storage Leukocyte-Reduced Apheresis Platelet	5 days	20~24°C	7,300

7. Distribution

The management, allocation, and transportation of blood for medical use are monitored based on the strictest standards in the five blood donation centers. The blood storage warehouse in each blood donation center sets different conditions for preservation temperature, environment, and equipment for different blood products. Blood supplies for hospitals are always available 24 hours. Specific refrigerator vans for blood freezing/storage are responsible for the allocation and transportation of blood for medical use in each hospital blood bank.

Current blood supply channels include five blood centers, 13 blood stations, and several proxy-supply hospitals.

Each blood storage warehouse of a blood center is equipped with a central temperature monitoring system to monitor blood temperature 24 hours/day. In addition to written documents, relevant information about temperature is filed and stored in electronic files so the records are more complete and accurate, and both the blood items and the equipment are safer and more secure. Each blood transportation vehicle of a blood donation center is equipped with the latest cold-storage/freezing system to monitor whether the temperature is stable and maintained within the standardized range so that the quality of each blood item can be ensured.

Blood supplies are currently classified into two categories: individual and group. Individual blood supply refers to the approach for an individual to get blood from the blood center when patients in hospitals that neither have blood banks nor a signed group-supply contract for the need of a blood transfusion. Group blood supply refers to hospitals that have blood banks or have signed a "group-supply contract" with a blood center. With this approach, the blood center will regularly deliver blood products needed to each hospital for storage so that blood is ready for transfusion at any time.

Meanwhile, each blood center has established a list of blood donors filed by red blood cell antigen. If a blood usage emergency occurs, the center will contact blood donors for immediate support.

The blood supplies of each blood donation center are available to hospitals 24 hours/day.

The quantity of stored blood in each blood center needs to be maintained at more than seven days for safety concerns. Four to seven days of storage are a bit lower, while less than four days of storage is considered dangerous. There is a safe storage quantity signal display set up on the official website of Taiwan Blood Services Foundation so that people can check the latest information of each blood donation center.

Each kind of final blood product to be dispatched to hospitals will be checked by computer one-by-one to ensure safety.

Based on the needs of each hospital, final products are put into boxes with clear labels for blood-type and blood item name.

Each packaged box of blood items will be put into a dedicated incubator bags.

They are put in specific transportation vehicles according to the temperature requirement of the blood item with temperature-monitored equipment and are ready to be delivered to each hospital.

In line with the health policy of "National blood used by the nation", our Foundation started to collect source plasma in January 2007 to ease the difficult situation of a lack of blood preparations in Taiwan. The collected blood plasma's original material is delivered by batch to the CSL plasma factory in Australia to be further processed into blood derivatives. Four blood derivatives of the TBSF are made: 20% Human albumin for Intravenous Use, Human Immunoglobulin for Intravenous Use, 250IU Blood Coagulation Factor VIII Concentrate, and 500IU Blood Coagulation Factor IV Concentrate. Among them, TBSF Human Immunoglobulin for Intravenous Use is the main supply in Taiwan and can already achieve the 100% supply-to-demand goal.

8. Reference Laboratory

As medical treatment improves, the demand for each subtype of blood clinically provided to patients receiving long-term blood transfusion also increases. Some blood types are quite rare. We continue to provide red cell testing services, transfusion reactions, and transfusion infection survey services, as well as source red cell to produce the testing reagents for pre-transfusion antibody screening. The clinical safety of blood transfusion is ensured through the following actions,

1. To provide HLA- or HPA-matched platelets.
2. To supply antigen-negative red blood cells (mainly E-, c-, Mia-) .
3. To supply predominately male donor plasma and the screening for leukocyte (HLA & HNA) antibodies among female platelet donors.

9. Research on Quality assurance and blood safety

The Taiwan Blood Services Foundation and each blood center have passed ISO 9001 quality assurance. Our foundation and the laboratories in each blood center have also passed the ISO 15189 medical laboratory certification audit. Operation procedures include blood donor screening, blood collection, blood testing, blood component processing, storage & management, blood transportation and so on, all of which follow standard operating procedures (SOP) and are regularly audited by Taiwan's health authorities (including TFDA, PIC/S GMP audit) and other certified bodies (SGS and TAF).

To produce plasma preparations for medical use in Taiwan from plasma raw material, we are regularly audited by Australian CSL plasma factories (the major plasma-producing factory in the world) and approved by the Australian government (TGA).

Our Foundation and the laboratories at the blood centers continuously participate in proficiency testing both inside and outside of Taiwan, including proficiency tests at CAP, NRL, ASHI, and the Taiwan Society of Laboratory Medicine.

We completed the initial study of the Dengue fever outbreak in Southern Taiwan in 2015, and these reports were presented at the ISBT in 2016.

Regarding blood donor management, we have analyzed the following repeat-donation behavior of blood donors with increasing willingness to

donate from Northern Taiwan due to significant events, namely the relevant factors influencing the quantity of the blood donation group, the corresponding construction for a predictive model of blood donation quantity, the effect analysis of introducing "Encouraging blood donors to donate fixed locations on regular weekdays" to the blood donation forecasting model, and the research of sleep quality and discomfort due to blood donation of blood donors from Eastern Taiwan. Regarding blood quality, the quality of packed RBCs returned and proxy-issued by hospitals has been discussed. With regard to the data bank, we accumulate, plan and organize huge amounts of data of blood donation/supply every year so we hope that such data may benefit relevant research.

To improve blood quality and increase blood safety, we continue our research programs. All research programs have been reviewed by the IRB (Institutional Review Board), and the IRB of our Foundation has passed the audit by the Ministry of Health and Welfare. Our research results are primarily recognized by blood transfusion medical experts and published in academic journals and at medical associations of blood transfusion both internationally and domestically.

10. Blood transfusion safety

To assist the hospitals in seeking possible causes of blood transfusions recations, we worked together with the TSBT to have set up in 2016 the Taiwan Haemovigilance System, which five hospitals (namely National Taiwan University Hospital, Taipei Veterans General Hospital, Far Eastern Memorial Hospital, Linkou Chang Gung Memorial Hospital, and Tri-Service General Hospital) have taken the lead in demonstrating how to send notifications since the beginning of 2017. As of December 31, 2017, they have sent 1,602 case notifications. It is expected that after the system is gradually expanded to all the hospitals in Taiwan, we will be able to collect and analyze blood data from patients, provide better blood transfusion strategies to solve those issues related to blood donation and transfusion, and help to improve blood transfusion safety.

Furthermore, to reduce the risk of transfusion-related acute lung injury (TRALI), the policy of supplying male-donor-only plasma has been implemented since July 11th, 2015. Female blood donors for apheresis donation must pass the leukocyte antibody screening, which has led to the reduction in donations of antibody-positive blood. Therefore, more protection is provided for our blood supply. In addition, medical doctors at our Foundation actively hold medical lectures about blood transfusion in each hospital to advocate the concepts of "Blood transfusion reactions and preventive procedures", "Blood component therapy-usage of pre-storage leukocytes reduced blood components before blood transfusion", and "Proper and effective blood transfusion", "Taiwan Haemovigilance System and Practice". These concepts can help to reduce the possibility of patient injury caused by blood transfusion, improve recovery, and reduce hospitalization costs so that the medical quality of blood transfusions can be promoted even further.

11. International exchange and training plan

Exchanges with other nations through active participation in international conferences and acquiring relevant new knowledge not only provides an important reference for every aspect of improvement but also serve as important channels for better understand of international situations.

The research department of the Foundation has sent staff to Japanese Red Cross Kanto-Koshinetsu Block Blood Center for a training program of production of hybridoma cell line that generate the monoclonal antibody to human red cell antigen. The finished cell lines include those produce antibody to Miltenberger antigen. Since no testing reagents for such blood-group antigens are available on the market, these could be applied to the Miltenberger antigens detection of blood donors and hospital patients and thus reduce the blood transfusion reaction of patients caused by un-matched Miltenberger blood types.

To strengthen the interaction and the mutual learning between Taiwan and mainland China, our Foundation has started the "Health professionals of blood donation & blood supply" training class, which covers topics including recruitment of blood donors, blood collection, testing and blood composition supply since March 2015. We held 2 training sessions in 2017 with 21 people from3 units in China (namely the Changsha Blood Center in Hunan Province, the Changsha City Health Planning Commission in Hunan, and the Qingdao City Center Blood Station) participated in the training course.

12. Information business and network security

Our Foundation has used the current blood donation/supply management information system for more than a decade. Considering the assessment and concern of future blood donation services, the improvement of internal operational processes, blood safety, and quality control, our Foundation will complete the updated blood management information system and formally launch it online at the beginning of 2018. We hope to take advantage of these computer technologies to attain our digitalized, paperless, and automation goals to promote both operation quality and blood donor services.

To strengthen the prevention of malevolent software spread by new blackmail software via webpages or e-mail, we regularly invite professional lecturers to give educational training to all the staff at each blood donation center, in addition to daily updating of computer viral protection software codes. We hope to protect the personal information of blood donors, employees, and internet friends in a highly standardized way through everyone's efforts and the monitoring by the personal information management committee. To increase complete network efficiency and effectiveness and the safety of computer information, we conduct risk assessments of information assets on information facilities and data. The risk classifications are all controlled in the range of low risk. In March 2016, the AD (Active Directory) web domain and virtual platform setup project was launched to establish and integrate the internet service management framework of activity contents at our Foundation and blood donation centers. We have

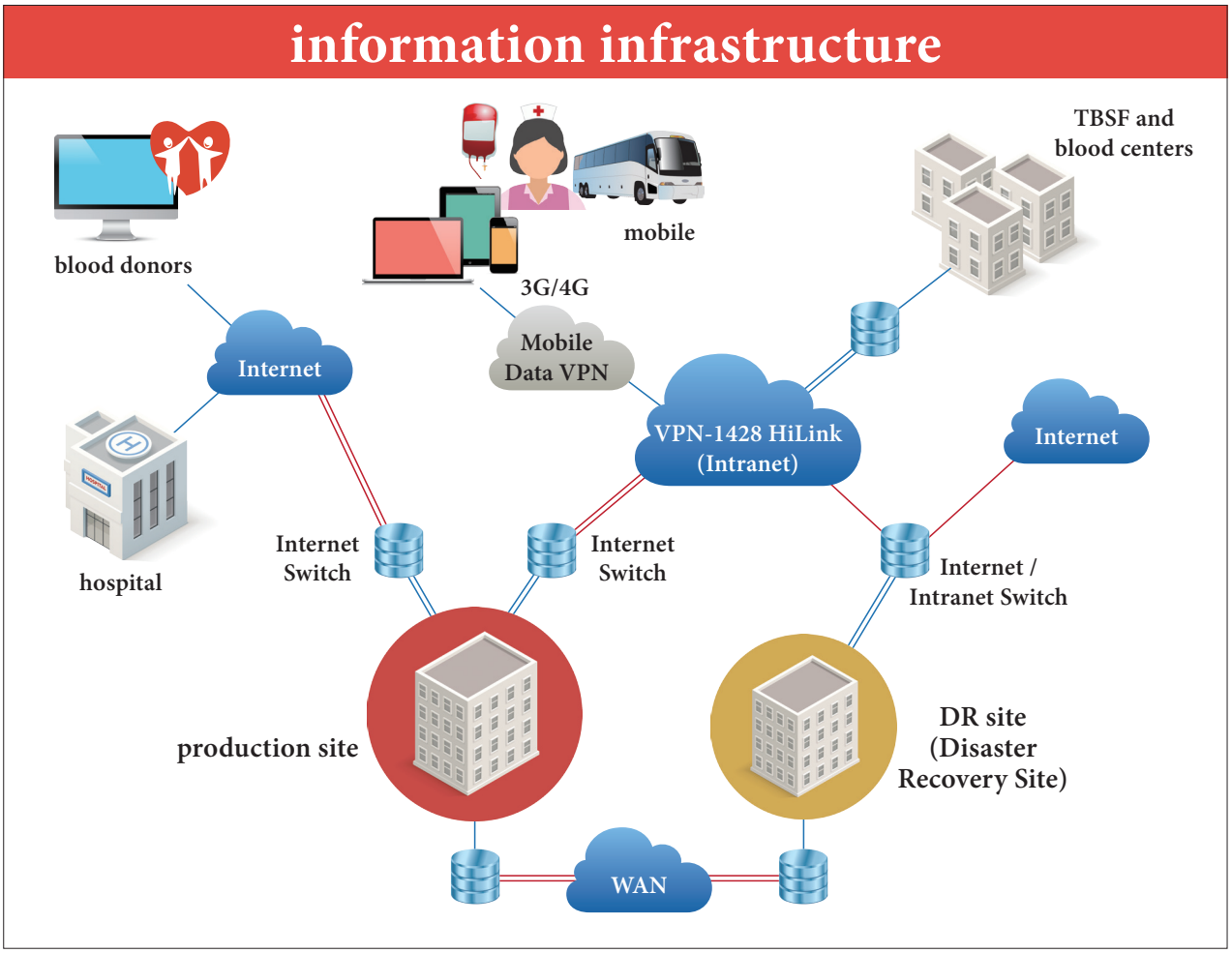


Illustration: Our Foundation provides the internet framework for the blood donation/ supply system. Via a high-speed internet cable and wireless transportation, the information of blood donors can be checked quickly and accurately at each blood donation site.

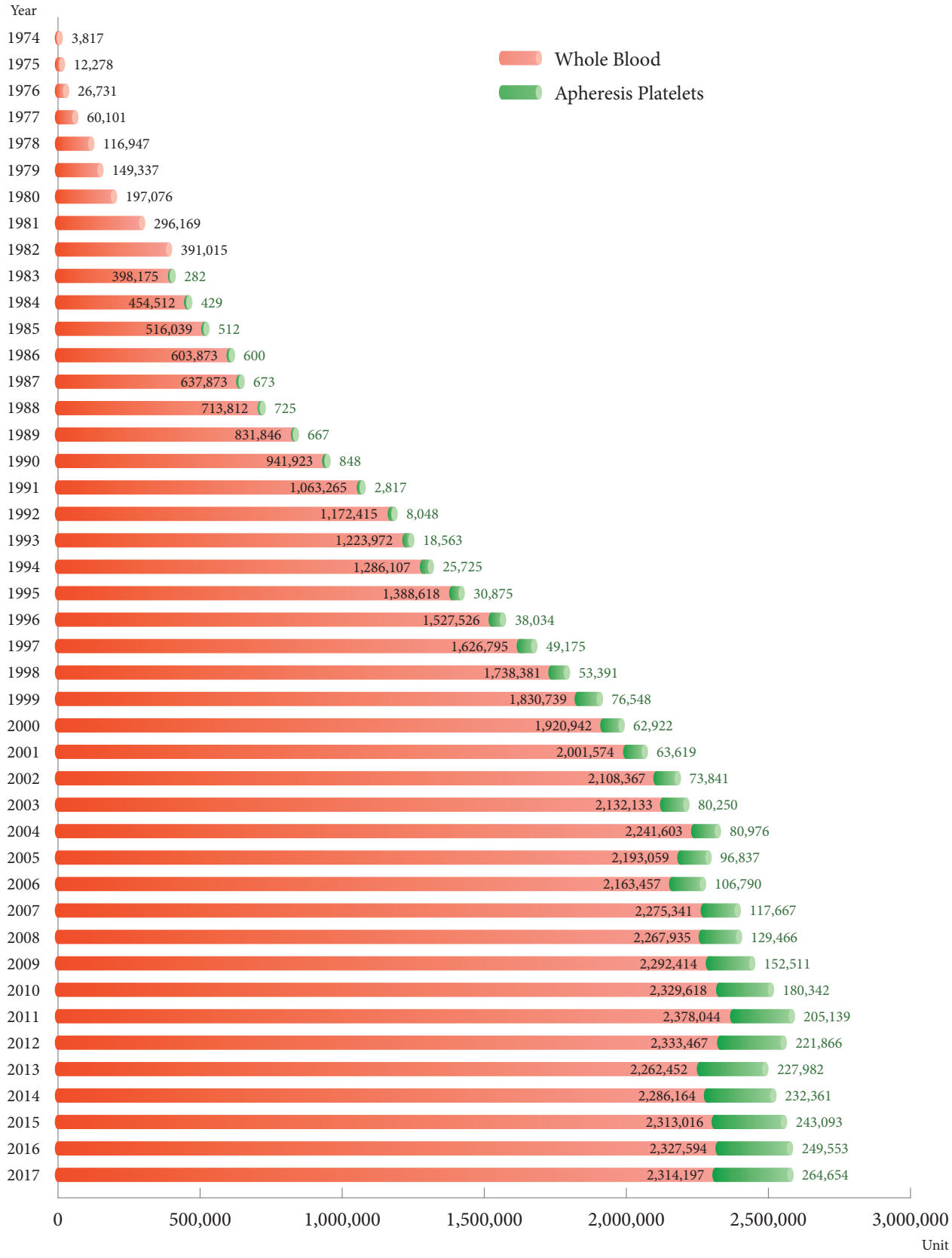
also implemented a highly usable virtual platform framework into the management framework and completed the setup by July of 2017.

The system framework of the LINE interactive application platform adopts Gateway and Firewall to separate the LINE OA server from the backstage management server and database to ensure the safety of blood donor information. The backstage function of the system can execute all automatic displays and accurately display to respective blood donors for blood donation activity broadcasts or individual blood donation invitations. In the future, more functions will be developed for the purpose of promoting blood donations.

To ensure computer information security, the TBSF has not only updated its anti-virus software virus codes this year but also established the Symantec Messaging Gateway (SMG) to strengthen the mail functions in filtering malware, web sites, viruses, and so on. When an attached file is identified by the system as malware, the attachment to the email will be automatically deleted by the system.

Statistics

Annual Blood Collection, 1974-2017



Note: 1. whole blood :250ml/1 unit; 500ml/2 units.

2. Single adult dose per unit for apheresis platelet and double dose counts for 2 units.

Annual Blood Collection by Blood Centers, 1974-2017

Unit

Year \ Blood Centers	Taipei Blood Center	Hsinchu Blood Center	Taichung Blood Center	Tainan Blood Center	Kaohsiung Blood Center	Hualien Blood Center	Total
1974	3,817	0	0	0	0	0	3,817
1975	11,734	0	544	0	0	0	12,278
1976	22,976	0	3,539	0	216	0	26,731
1977	42,277	0	9,004	0	8,820	0	60,101
1978	71,195	0	18,132	0	27,620	0	116,947
1979	92,730	0	24,723	0	31,884	0	149,337
1980	103,070	0	37,941	0	56,065	0	197,076
1981	141,944	0	58,861	22,535	72,829	0	296,169
1982	178,518	0	75,272	54,848	82,377	0	391,015
1983	166,589	0	81,054	49,897	100,917	0	398,457
1984	187,362	0	101,219	60,123	106,237	0	454,941
1985	212,340	0	126,400	66,602	111,209	0	516,551
1986	244,830	0	157,679	75,742	126,222	0	604,473
1987	220,585	0	187,697	88,036	142,228	0	638,546
1988	263,387	0	202,488	92,310	156,352	0	714,537
1989	312,578	0	231,199	119,179	169,557	0	832,513
1990	373,188	0	238,548	139,423	191,612	0	942,771
1991	421,109	0	252,561	156,192	205,905	30,315	1,066,082
1992	370,657	125,164	246,912	160,502	222,832	54,396	1,180,463
1993	388,038	149,011	243,638	161,876	241,022	58,950	1,242,535
1994	406,604	161,765	252,889	173,297	252,897	64,380	1,311,832
1995	428,194	192,614	274,883	183,239	268,862	71,701	1,419,493
1996	459,619	220,519	303,393	209,790	295,052	77,187	1,565,560
1997	471,476	244,527	330,239	224,863	323,066	81,799	1,675,970
1998	510,626	253,910	363,878	239,515	336,566	87,277	1,791,772
1999	553,940	266,497	378,516	257,309	360,060	90,965	1,907,287
2000	557,873	278,782	412,654	275,983	367,373	91,199	1,983,864
2001	579,618	294,690	425,953	285,551	381,998	97,383	2,065,193
2002	624,408	307,553	439,269	301,756	406,502	102,720	2,182,208
2003	618,458	313,214	462,180	305,455	411,132	101,944	2,212,383
2004	642,945	333,898	489,079	321,441	437,362	106,854	2,331,579
2005	650,850	320,732	463,553	322,630	429,914	102,217	2,289,896
2006	659,268	322,197	453,015	326,286	403,243	106,238	2,270,247
2007	694,060	338,614	488,984	348,662	413,210	109,478	2,393,008
2008	684,968	342,069	491,754	358,126	413,348	107,136	2,397,401
2009	718,841	326,619	487,230	382,251	420,616	109,368	2,444,925
2010	738,274	343,531	500,298	389,938	423,333	114,586	2,509,960
2011	753,611	347,807	507,104	405,553	453,274	115,834	2,583,183
2012	752,304	343,225	504,362	405,409	434,767	115,266	2,555,333
2013	737,642	336,853	487,170	401,442	414,876	112,451	2,490,434
2014	743,926	337,408	485,767	409,314	431,181	110,929	2,518,525
2015	744,106	355,943	498,956	418,909	423,721	114,474	2,556,109
2016	771,779	364,244	507,973	421,457	447,145	64,549	2,577,147
2017	841,241	360,146	520,231	420,428	436,805	–	2,578,851

Note: 1. Total blood collection units：calculated by both whole blood and apheresis collection.

2. 250ml per unit for whole blood and 500ml counts for 2 units.

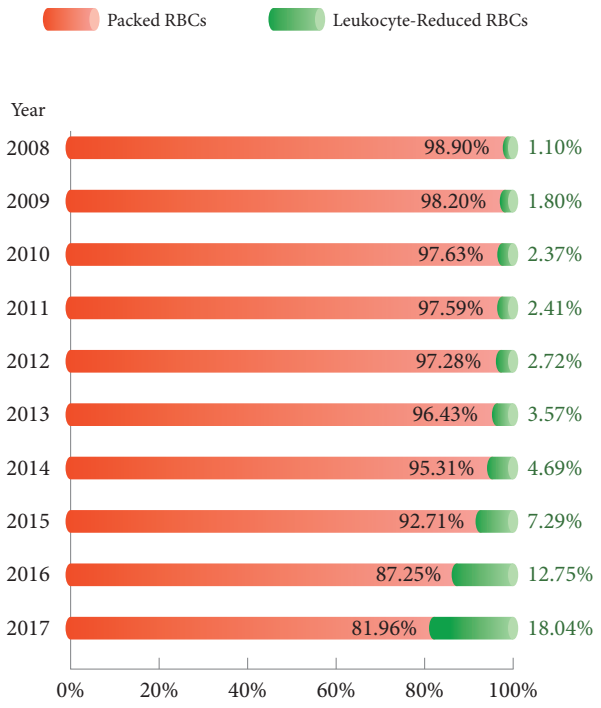
3. Single adult dose per unit for apheresis platelet and double dose counts for 2 units.

4. As of April,2017 Hualin Blood Center had been renamed as Hualien Blood Station and placed under the administration of Taipei Blood Center.

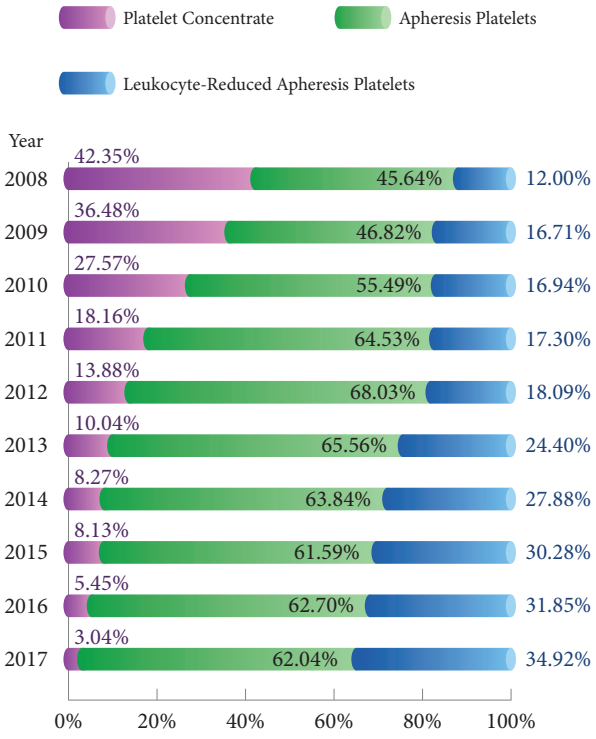
Blood Supply, 2008-2017

Unit

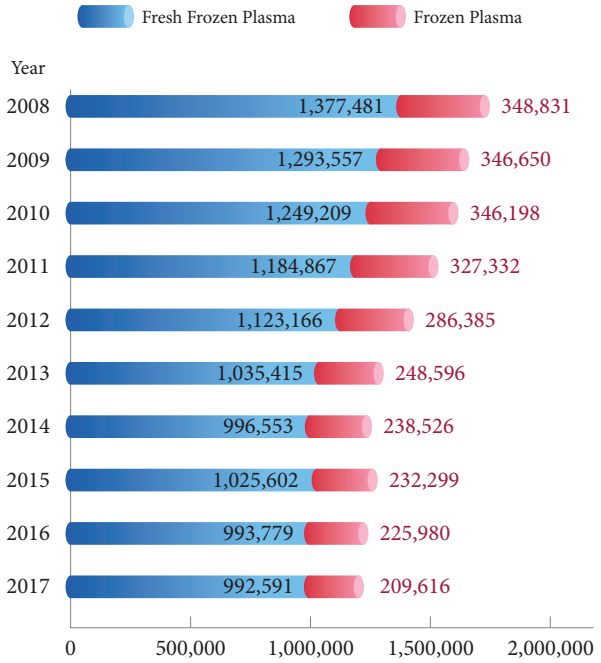
Red Blood Cell Products



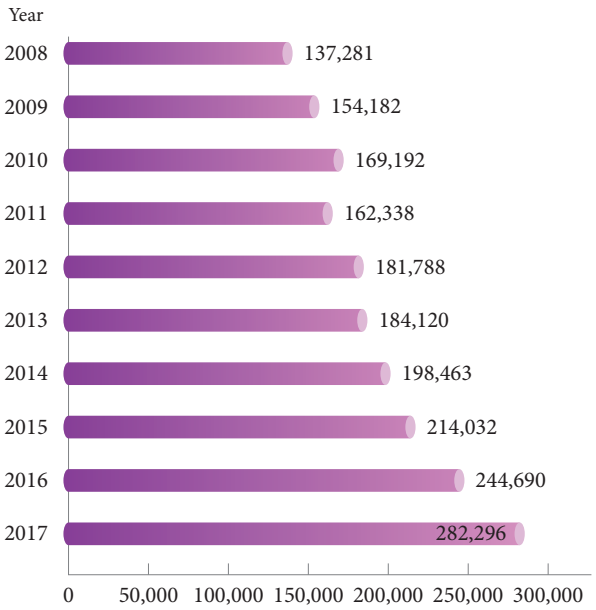
Platelet Products



Plasma Products



Cryoprecipitate



Note: 1. 250ml per unit for whole blood and 500ml counts for 2 units.

2. Single adult dose per unit for apheresis platelet and double dose counts for 2 units.

3 Single adult dose per 12 units for platelet concentrate.

Blood Components supply in 2017

Unit

1. Whole Blood

Blood \ Blood Centers		Taipei Blood Center	Hsinchu Blood Center	Taichung Blood Center	Tainan Blood Center	Kaohsiung Blood Center	Total
RBCs	Whole Blood	9,939	5,479	2,855	5,419	1,316	25,008
	Packed RBCs	568,114	283,986	282,023	314,400	347,445	1,795,968
	Washed RBCs	9,966	2,224	3,000	3,533	4,247	22,970
	Leukocyte-Reduced RBCs	131,563	28,731	173,777	34,492	26,624	395,187
	Frozen Thawed Deglycerolized RBCs	4	0	0	1	0	5
Subtotal		719,586	320,420	461,655	357,845	379,632	2,239,138
Plasma	Fresh Frozen Plasma	294,485	157,263	195,155	176,269	169,419	992,591
	Frozen Plasma	45,133	40,056	35,254	36,303	52,870	209,616
Cryoprecipitate		121,592	36,952	50,746	46,496	26,510	282,296
Platelet Concentrate		22,794	30,868	27,230	17,126	0	98,018
WBC Concentrate		5,020	20	0	40	0	5,080
Total Units Issued		1,208,610	585,579	770,040	634,079	628,431	3,826,739
Rate of Components		99.18	99.06	99.63	99.15	99.79	99.35
Rate of Whole Blood		1.38	1.71	0.62	1.51	0.35	1.12
（PR ratio）		47.20	61.58	49.91	59.40	58.55	53.69

2. Apheresis

Blood \ Blood Centers	Taipei Blood Center	Hsinchu Blood Center	Taichung Blood Center	Tainan Blood Center	Kaohsiung Blood Center	Total
Apheresis Platelets	62,467	20,074	29,185	29,958	25,088	166,772
Leukocyte-Reduced Apheresis Platelets	38,633	12,716	17,921	9,243	15,358	93,871
Total	101,100	32,790	47,106	39,201	40,446	260,643

Note: 1. 250ml per unit for whole blood and 500ml counts for 2 units.

2. Single adult dose per unit for apheresis platelet and double dose counts for 2 units.

3. The plasma numbers issued are for medical usage only, plasma for fractionation not included.

4. the supply of plasma-red cell ratio: total amount of plasma unit/total amount red cell unit.

Whole Blood Collection per 1000 Head of Population, 2008-2017

Liter/1,000 population

Year	Item \ Blood Centers	Taipei Blood Center	Hsinchu Blood Center	Taichung Blood Center	Tainan Blood Center	Kaohsiung Blood Center	Hualien Blood Center	Total
2008	Blood Collection (Liter)	174,271	86,167	123,477	90,291	104,602	27,016	605,824
	Population	6,923,843	3,407,172	4,461,455	3,419,800	3,745,731	1,036,261	22,994,262
	Liter/1,000 population	25.17	25.29	27.68	26.4	27.93	26.07	26.35
2009	Blood Collection (Liter)	162,627	78,084	118,486	90,979	96,972	25,955	573,104
	Population	6,953,984	3,442,631	4,472,795	3,418,467	3,747,033	1,034,435	23,069,345
	Liter/1,000 population	23.39	22.68	26.49	26.61	25.88	25.09	24.84
2010	Blood Collection (Liter)	166,138	81,744	120,517	90,927	96,025	27,055	582,405
	Population	6,974,554	3,499,663	4,477,114	3,409,906	3,745,132	1,032,012	23,138,381
	Liter/1,000 population	23.82	23.36	26.92	26.67	25.64	26.22	25.17
2011	Blood Collection (Liter)	168,680	81,785	120,913	93,291	102,674	27,168	594,511
	Population	7,054,442	3,498,987	4,484,098	3,400,813	3,737,885	1,026,326	23,202,551
	Liter/1,000 population	23.91	23.37	26.96	27.43	27.47	26.47	25.62
2012	Blood Collection (Liter)	167,283	80,345	118,749	92,669	98,441	25,880	583,367
	Population	7,086,152	3,525,575	4,496,195	3,397,242	3,734,579	1,021,830	23,261,573
	Liter/1,000 population	23.61	22.79	26.41	27.28	26.36	25.33	25.08
2013	Blood Collection (Liter)	163,347	78,323	113,190	91,759	93,637	25,359	565,613
	Population	7,131,766	3,555,325	4,510,598	3,394,334	3,733,713	1,018,477	23,344,213
	Liter/1,000 population	22.90	22.03	25.09	27.03	25.08	24.90	24.23
2014	Blood Collection (Liter)	164,463	78,068	112,667	93,876	97,458	25,009	571,541
	Population	7,160,559	3,579,347	4,517,652	3,388,101	3,728,935	1,017,442	23,392,036
	Liter/1,000 population	22.97	21.81	24.94	27.71	26.14	24.58	24.43
2015	Blood Collection (Liter)	164,554	81,996	114,808	95,724	95,492	25,681	578,254
	Population	7,187,196	3,623,818	4,532,292	3,379,761	3,724,569	1,013,926	23,461,562
	Liter/1,000 population	22.90	22.63	25.33	28.32	25.64	25.33	24.65
2016	Blood Collection (Liter)	165,198	83,228	116,315	96,395	101,248	19,516	581,899
	Population	7,192,687	3,687,412	4,557,494	3,366,498	3,940,509	789,180	23,533,780
	Liter/1,000 population	22.97	22.57	25.52	28.63	25.69	24.73	24.73
2017	Blood Collection (Liter)	184,975	81,657	117,976	95,089	98,853	–	578,550
	Population	7,979,516	3,712,819	4,564,263	3,361,871	3,934,001	–	23,552,470
	Liter/1,000 population	23.18	21.99	25.85	28.28	25.13	–	24.56

Note: 1. Mid-year population, data from the ministry of interior.

2. 250ml per unit for whole blood.

3. As of April, 2017 Hualin Blood Center had been renamed as Hualien Blood Station and placed under the administration of Taipei Blood Center.

Blood Donation by Blood Centers, 2008-2017

Donation

Year	Item \ Blood Centers	Taipei Blood Center	Hsinchu Blood Center	Taichung Blood Center	Tainan Blood Center	Kaohsiung Blood Center	Hualien Blood Center	Total
2008	Blood Donation	518,696	253,678	366,167	276,218	311,525	81,473	1,807,757
	Population	6,923,843	3,407,172	4,461,455	3,419,800	3,745,731	1,036,261	22,994,262
	Donation Rate	7.49%	7.45%	8.21%	8.08%	8.32%	7.86%	7.86%
2009	Blood Donation	533,399	243,416	365,843	290,406	313,686	82,434	1,829,184
	Population	6,953,984	3,442,631	4,472,795	3,418,467	3,747,033	1,034,435	23,069,345
	Donation Rate	7.67%	7.07%	8.18%	8.50%	8.37%	7.97%	7.93%
2010	Blood Donation	531,254	255,439	372,360	291,710	313,490	84,989	1849242
	Population	6,974,554	3,499,663	4,477,114	3,409,906	3,745,132	1,032,012	23138381
	Donation Rate	7.62%	7.30%	8.32%	8.55%	8.37%	8.24%	7.99%
2011	Blood Donation	534,349	254,731	377,883	303,895	329,804	85,445	1,886,107
	Population	7,054,442	3,498,987	4,484,098	3,400,813	3,737,885	1,026,326	23,202,551
	Donation Rate	7.57%	7.28%	8.43%	8.94%	8.82%	8.33%	8.13%
2012	Blood Donation	526,216	248,420	371,259	304,184	300,906	83,536	1,834,521
	Population	7,086,152	3,525,575	4,496,195	3,397,242	3,734,579	1,021,830	23,261,573
	Donation Rate	7.43%	7.05%	8.26%	8.95%	8.06%	8.18%	7.89%
2013	Blood Donation	513,907	241,765	351,790	294,771	278,740	79,992	1,760,965
	Population	7,131,766	3,555,325	4,510,598	3,394,334	3,733,713	1,018,477	23,344,213
	Donation Rate	7.21%	6.80%	7.80%	8.68%	7.47%	7.85%	7.54%
2014	Blood Donation	509,548	239,797	345,234	295,028	287,690	76,822	1,754,119
	Population	7,160,559	3,579,347	4,517,652	3,388,101	3,728,935	1,017,442	23,392,036
	Donation Rate	7.12%	6.70%	7.64%	8.71%	7.72%	7.55%	7.50%
2015	Blood Donation	509,230	251,630	349,238	296,569	282,832	78,382	1,767,881
	Population	7,187,196	3,623,818	4,532,292	3,379,761	3,724,569	1,013,926	23,461,562
	Donation Rate	7.09%	6.94%	7.71%	8.77%	7.59%	7.73%	7.54%
2016	Blood Donation	511,032	253,135	349,751	293,792	296,706	58,592	1,763,008
	Population	7,192,687	3,687,412	4,557,494	3,366,498	3,940,509	789,180	23,533,780
	Donation Rate	7.10%	6.86%	7.67%	8.73%	7.53%	7.42%	7.49%
2017	Blood Donation	570,695	248,783	356,189	288,466	288,391	–	1,752,524
	Population	7,979,516	3,712,819	4,564,263	3,361,871	3,934,001	–	23,552,470
	Donation Rate	7.15%	6.70%	7.80%	8.58%	7.33%	–	7.44%

Note: 1. Mid-year population, data from the ministry of interior.

2. Both whole blood and apheresis donations are included

3. As of April,2017 Hualin Blood Center had been renamed as Hualien Blood Station and placed under the administration of Taipei Blood Center.

Types of Blood Donation in 2017

Type / Blood Centers	Whole Blood				Apheresis				Total
	WB 250ml	%	WB 500ml	%	Apheresis 1U	%	Apheresis 2U	%	
Taipei Blood Center	268,613	47.07	235,644	41.29	31,536	5.53	34,902	6.12	570,695
Hsinchu Blood Center	122,062	49.06	102,283	41.11	15,358	6.17	9,080	3.65	248,783
Taichung Blood Center	185,738	52.15	143,082	40.17	6,409	1.80	20,960	5.88	356,189
Tainan Blood Center	144,085	49.95	118,135	40.95	12,419	4.31	13,827	4.79	288,466
Kaohsiung Blood Center	139,977	48.54	127,717	44.29	0	0.00	20,697	7.18	288,391
Subtotal	860,475	49.10	726,861	41.48	65,722	3.75	99,466	5.68	1,752,524

Types of Whole Blood Donation, 2008-2017

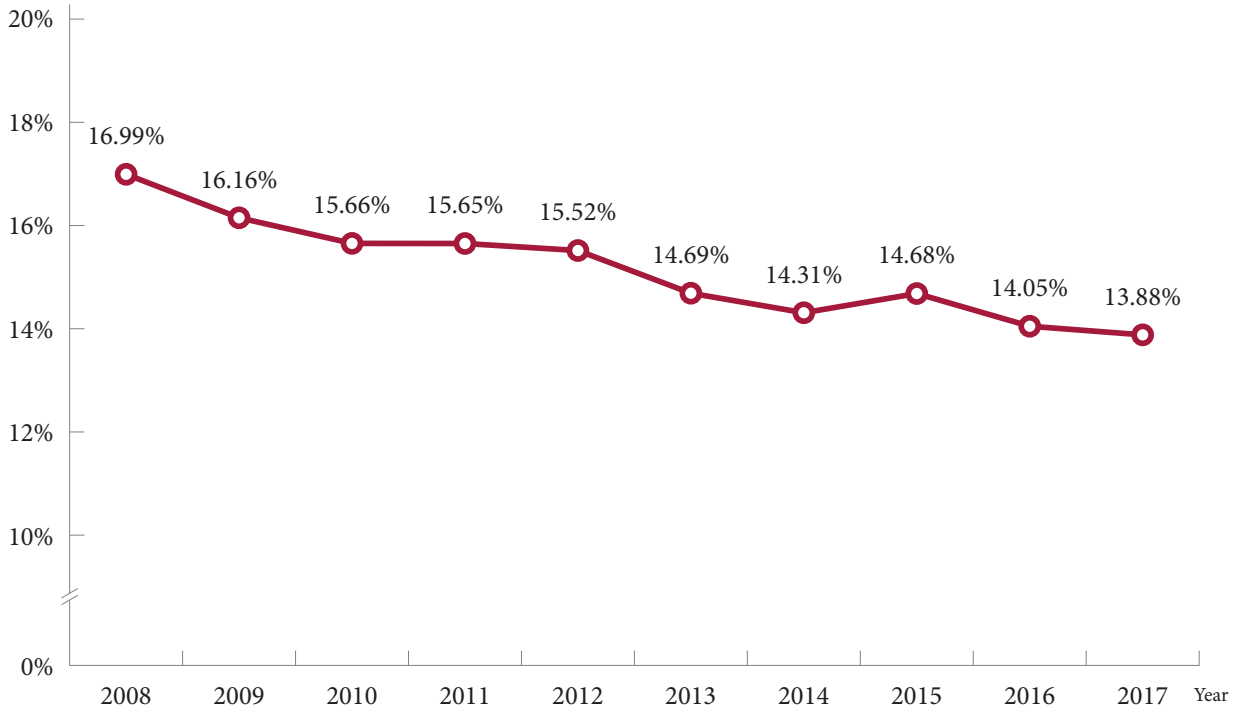
First-time Donors in 2017

Donor

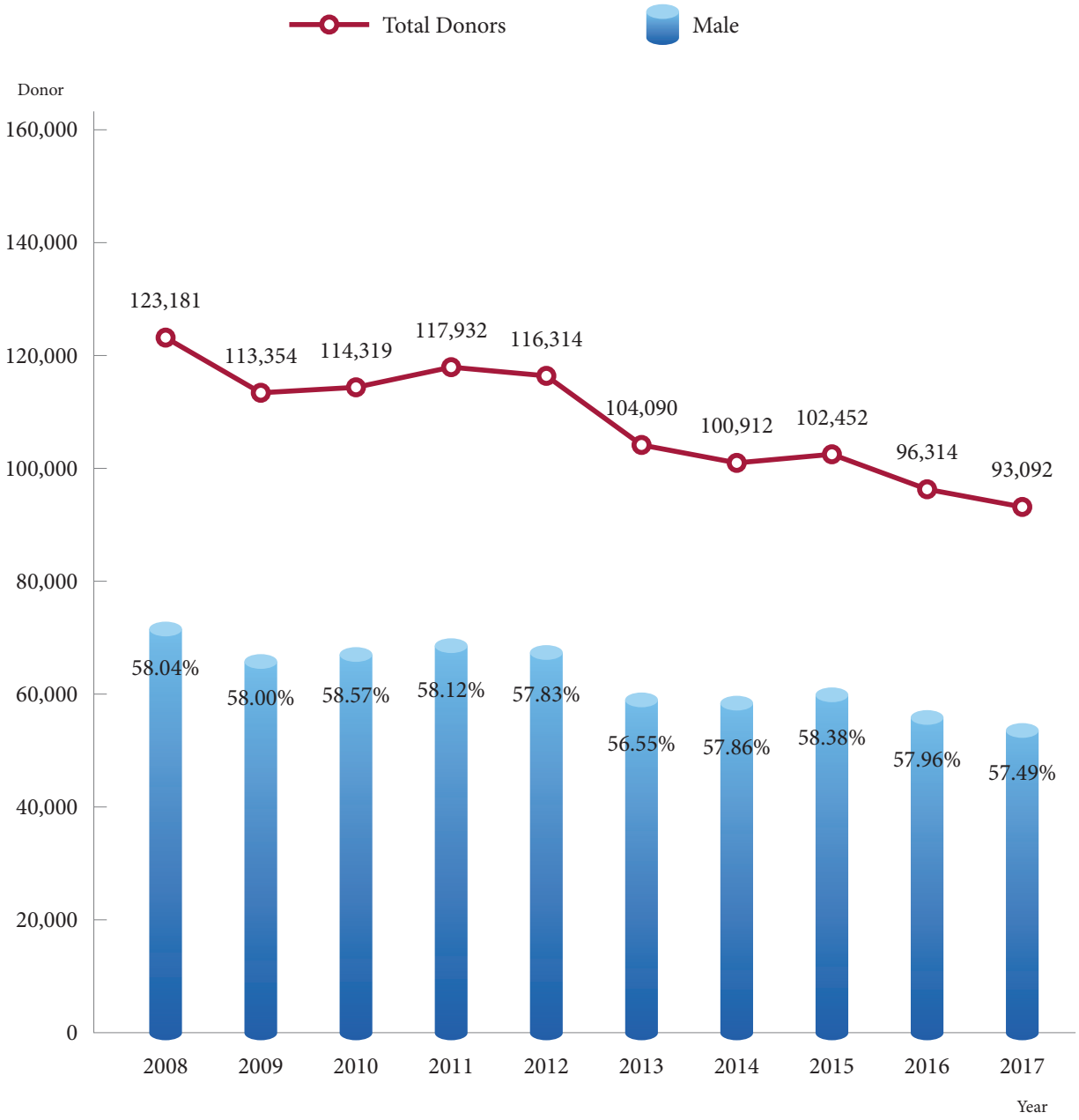
Blood \ Blood Centers		Taipei Blood Center	Hsinchu Blood Center	Taichung Blood Center	Tainan Blood Center	Kaohsiung Blood Center	Total
Total Donors(A)		325,877	142,663	216,147	172,391	168,007	994,342
First-time Donors	No.(B)	41,417	18,006	28,646	28,580	21,378	138,027
	%(B/A)	12.71%	12.62%	13.25%	16.58%	12.72%	13.88%
First-time Donors Age≦24	No.(C)	24,696	11,672	18,673	22,635	15,416	93,092
	%(C/B)	59.63%	64.82%	65.19%	79.20%	72.11%	67.44%

Note: total donors refer to the sum of individuals donating blood one or more times in the year.

Trends in the Rate of First-time Donors, 2008-2017

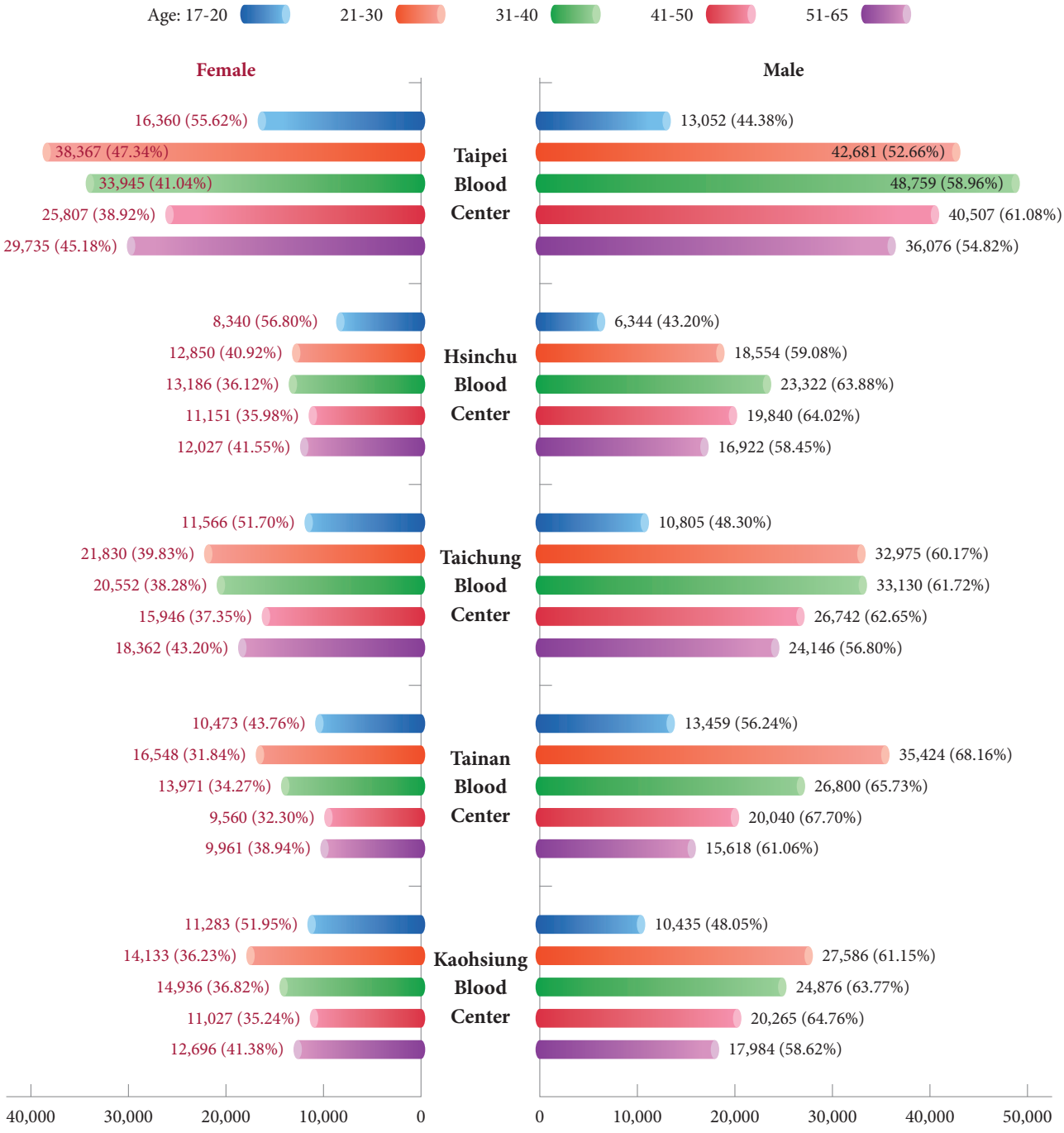


≦24 Age First-time Donors , 2008-2017



Distribution of Donor by Gender and Age in 2017

Donor



Gender \ Age	17-20	21-30	31-40	41-50	51-65	<17	>65	Total
Male	51,927 (8.83%)	149,481 (25.41%)	152,142 (25.86%)	124,592 (21.18%)	109,125 (18.55%)	268 (0.046%)	717 (0.012%)	588,252 (59.16%)
Female	55,099 (13.57%)	102,561 (25.26%)	93,615 (23.05%)	72,362 (17.82%)	81,898 (20.17%)	219 (0.054%)	336 (0.08 %)	406,090 (40.84%)
Total	107,026 (10.76%)	252,042 (25.35%)	245,757 (24.72%)	19,6954 (19.81%)	191,023 (19.21%)	487 (0.049%)	1,053(0.11 %)	994,342

Donation Frequency by Gender and Age in 2017

Donation Frequence

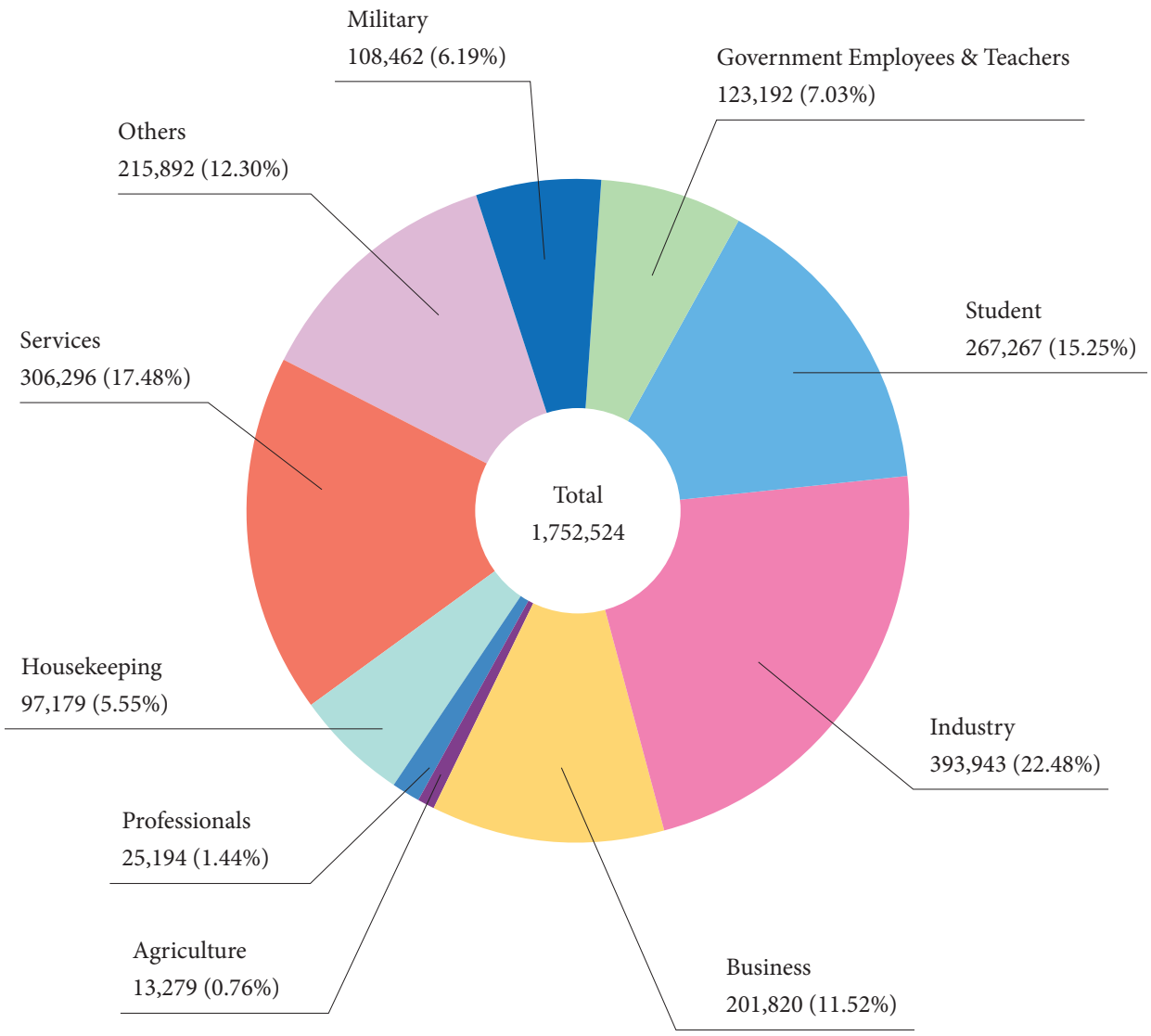
Age / Gender		Donation Times	
17-20	男 Male	1.33	1.38
	女 Female	1.43	
21-30	男 Male	1.56	1.54
	女 Female	1.50	
31-40	男 Male	1.88	1.76
	女 Female	1.55	
41-50	男 Male	2.14	1.96
	女 Female	1.66	
51-65	男 Male	2.27	2.07
	女 Female	1.80	
Total	男 Male	1.88	1.76
	女 Female	1.59	

Blood Donation by Sites in 2017

Donation

Blood Centers / Sites	Taipei Blood Center	Hsinchu Blood Center	Taichung Blood Center	Tainan Blood Center	Kaohsiung Blood Center	Total
Fixed Site	334,144	133,912	156,530	124,186	174,465	923,237
	58.55%	53.83%	43.95%	43.05%	60.50%	52.68%
Mobiles	236,551	114,871	199,659	164,280	113,926	829,287
	41.45%	46.17%	56.05%	56.95%	39.50%	47.32%
Total	570,695	248,783	356,189	288,466	288,391	1,752,524

Occupational Distribution of Donors in 2017



Pre-Donation Donor Deferral in 2017

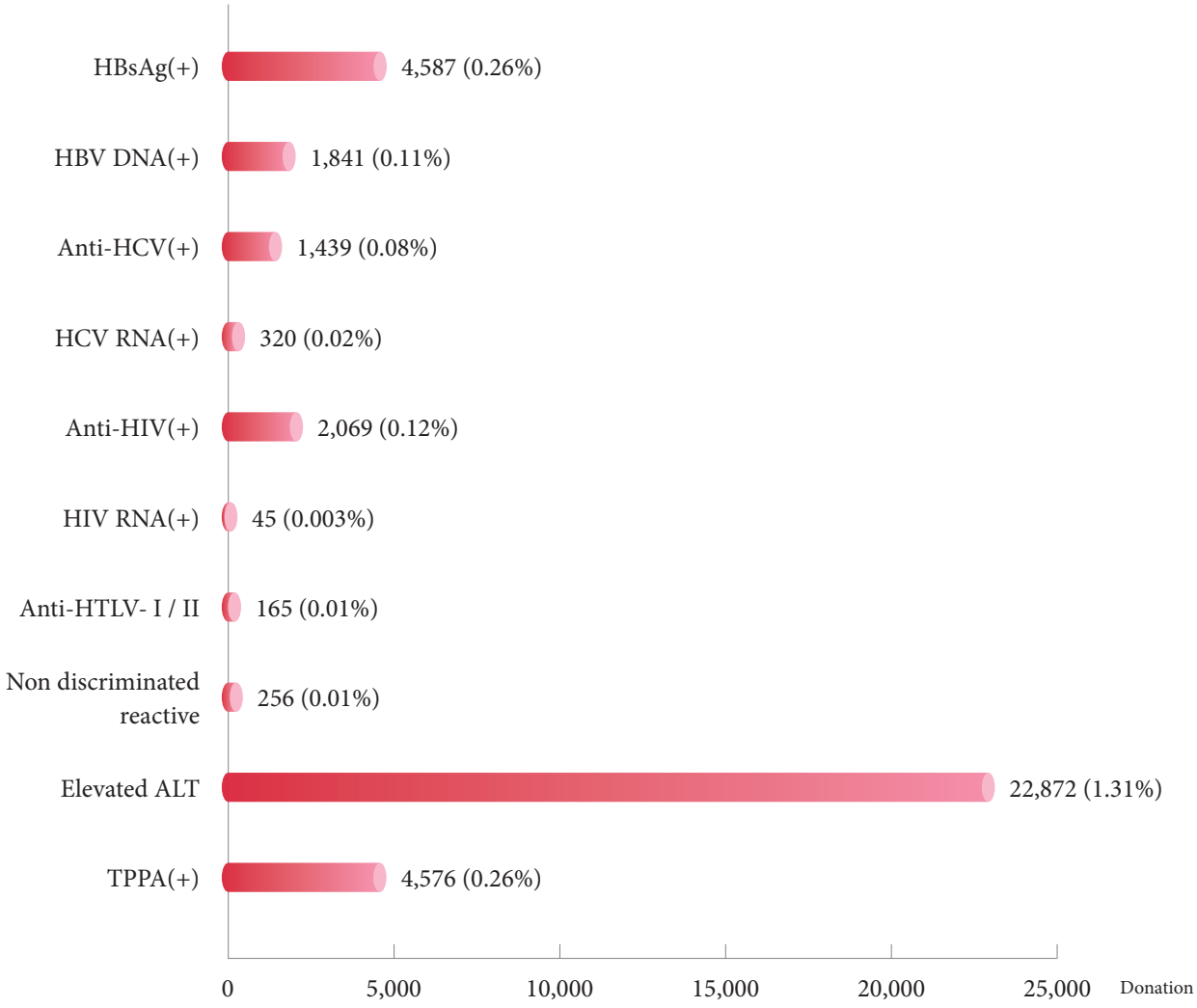
Participants

Reasons of Deferral \ Blood Centers		Taipei Blood Center	Hsinchu Blood Center	Taichung Blood Center	Tainan Blood Center	Kaohsiung Blood Center	Total
1	Low Hemoglobin	41,180	10,545	21,384	15,272	20,636	109,017
2	Blood Pressure too High or too Low	10,293	2,678	5,930	2,307	4,313	25,521
3	Aspirin or other medications	9,206	4,371	3,660	3,271	2,432	22,940
4	Temporary Deferral	5,445	553	6,372	801	4,299	17,470
5	Interval of Donations	4,407	144	4,745	247	3,852	13,395
6	Under Medical Treatment	4,848	267	3,169	1,338	831	10,453
7	Lack of Sleeping	4,718	1,048	1,334	925	447	8,472
8	Abroad Within Past 1 Year	2,453	1,078	1,933	1,160	913	7,537
9	Acupuncture, Dental Extraction	2,615	1,382	1,465	1,289	653	7,404
10	Recipient of Blood or Surgery	1,827	411	1,154	402	553	4,347
11	Low Body Weigh	1,845	638	412	1,292	127	4,314
12	High-Risk Sexual Behaviors	1,124	1,209	523	1,172	244	4,272
13	Menstruation	1,582	577	680	696	499	4,034
14	No Identification	1,856	328	733	406	706	4,029
15	Receiving Injection	921	30	1,262	769	725	3,707
16	Other Abnormalities	15,781	7,104	10,472	4,510	5,171	43,038
Deferred Participants		110,101	32,363	65,228	35,857	46,401	289,950
Total Participants		680,796	281,146	421,417	324,323	334,792	2,042,474
%		16.17%	11.51%	15.48%	11.06%	13.86%	14.20%

Note: total participants: total number of donors who attended to donate but were deferred and those who succeed to donate.

Infection Disease Screening in 2017

Positive Rate：2.05%



Irregular Erythrocyte Antibody Detected in 2017

Irregular erythrocyte antibody reactive: 5,195 donations (0.3%)

Antibody	Number		Antibody	Number	
Anti-C	25	0.43%	Anti-Jk^{a}	3	0.05%
Anti-c	86	1.48%	Anti-Jk^{b}	0	0.00%
Anti-D	51	0.88%	Anti-Mi^{a}	2126	36.61%
Anti-E	921	15.86%	Anti-P1	492	8.47%
Anti-e	29	0.50%	Anti-I/HI	908	15.64%
Anti-Ce	2	0.03%	Anti-Lan	0	0.00%
Anti-Cw	1	0.02%	Anti-Ku	1	0.02%
Anti-G	7	0.12%	Anti-Di^{a}	27	0.46%
Anti-M	283	4.87%	Anti-Di^{b}	1	0.02%
Anti-N	3	0.05%	Anti-Wr^{a}	19	0.33%
Anti-S	41	0.71%	Anti-Jr^{a}	2	0.03%
Anti-s	0	0.00%	Anti-Pr	2	0.03%
Anti-Le^{a}	359	6.18%	Anti-PP1Pk	1	0.02%
Anti-Le^{b}	244	4.20%	Cold Agglutinin	22	0.38%
Anti-Fy^{a}	0	0.00%	Unidentified	18	0.31%
Anti-Fy^{b}	5	0.09%	Warm type autoantibodies	128	2.20%

Statistics of ABO and RhD in 2017

Donation

Blood Group	RhD+	RhD-	Total	%
A	465,610	2,008	467,618	26.68
B	407,156	1,930	409,086	23.34
O	768,733	3,484	772,217	44.06
AB	103,115	489	103,604	5.91
Total	1,744,614	7,911	1,752,525	100.00
%	99.55%	0.45%		

Statistics of ABO subgroups in 2017

Donation

A subgroups		B subgroups		AB subgroups		Para-Bombay	
A_2	28	B_3	676	A_2B	85	O_{Hm}^{A}	94
A_3	6	B_{el}	50	A_3B	4	O_{Hm}^{B}	69
A_{el}	102			$A_{el}B$	17	O_{Hm}	44
A_m	3			AB_3	208	O_{Hm}^{AB}	13
A_x	3			AB_{el}	3		
				AmB	1		
				$_{cis}AB$	1		

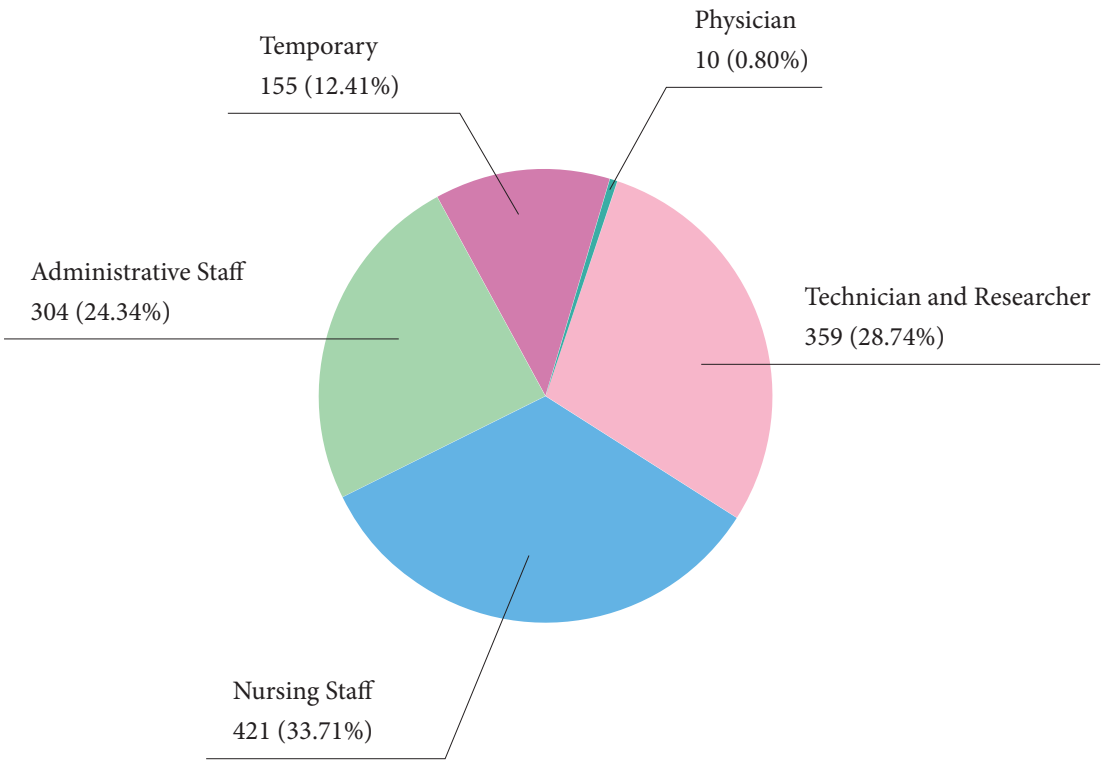
Inventory of Rare RBCs

Blood groups		Unit	Donor
Rare blood groups	ABO blood groups		
para-Bombay	A	10	195
	B	4	203
	O	12	105
	AB	2	41
RzRz	O	16	13
s(-)	O	24	46
Lu(a-b-)	A	18	1
	O	10	3
Ko	A	4	1
Fy(a-)	A	2	55
	B	6	25
	O	24	105
Fy(a-)s(-)	O	14	8
D(-)Fy(a-b-)	O	2	1
Jk(a-b-)	A	20	55
	B	16	54
	O	24	107
	AB	2	11
Di(b-)	A	6	1
	O	10	8
i adult cell	A	2	4
	B	3	4
Jr(a-)	O	3	1
p phenotype	A	4	1
	B	1	1
Lan(-)	AB	3	1
Dc-	O	4	1

Human Resources in 2017

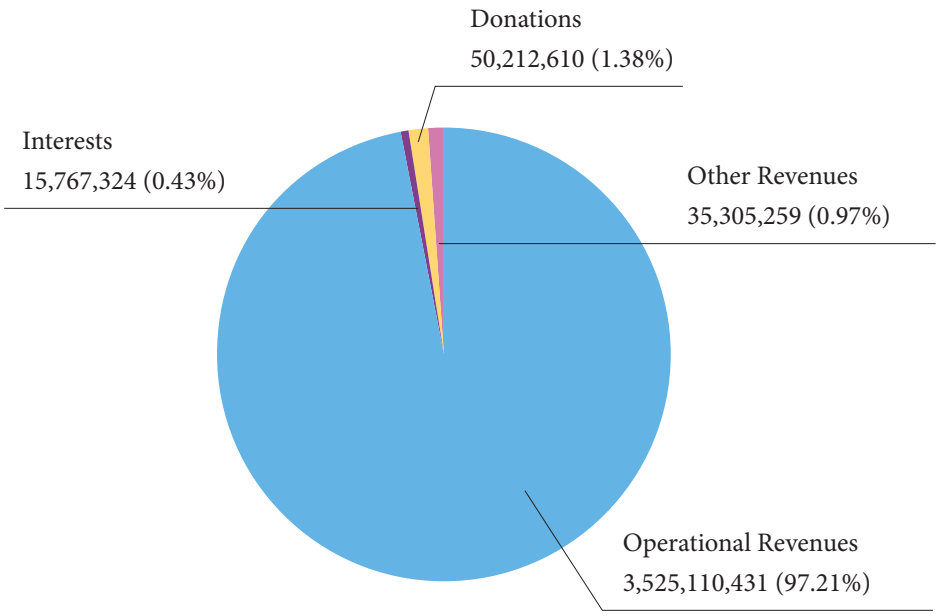
Person

Classufucation / Blood Centers	Physician	Technician and Researcher	Nursing Staff	Administrative Staff	Temporary	Total	%
Head Office	0	12	0	32	2	46	3.68
Taipei Blood Center	2	145	156	98	52	453	36.27
Hsinchu Blood Center	1	46	48	45	6	146	11.69
Taichung Blood Center	1	53	77	55	17	203	16.25
Tainan Blood Center	5	41	79	45	28	198	15.85
Kaohsiung Blood Center	1	62	61	29	50	203	16.25
Total	10	359	421	304	155	1,249	

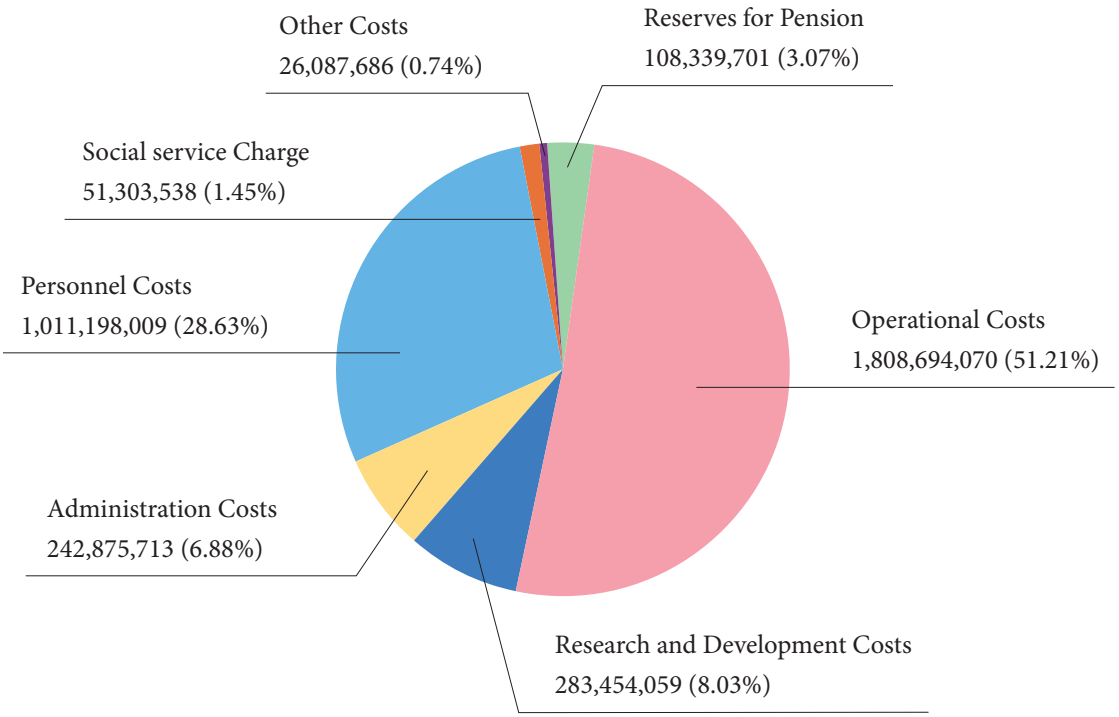


Incomes and Expenditures in 2017

1. Total Incomes: NT$ 3,626,395,624



2. Total Expenditures: NT$ 3,531,952,776



3. Balance after tax: NT$ 94,442,848

4. Capital expenditures: NT$ 49,489,317 （Equipments purchase）

Appendix

Blood Centers in Taiwan

Head Office

Taiwan Blood Services Foundation

3 FL. No. 3, Nan-Hai Road, Taipei 10066, Taiwan, R.O.C.
TEL: 886-2-2351-1600 FAX: 886-2-2395-1002
Website: www.blood.org.tw

Regional Office

Taipei Blood Center

No. 123, Lih-Der Road, Taipei 112, Taiwan, R.O.C.
TEL: 886-2-2897-1600 FAX: 886-2-2897-1601
Executive Region: Taipei City, New Taipei City, Keelung City, Kinmen County, Matsu County, Hualien County, Yilan County.

Hsinchu Blood Center

No. 8, Lane 215, Guangming 11th Road, Jhubie City, Hsinchu County 302, Taiwan, R.O.C.
TEL: 886-3-555-6111 FAX: 886-3-555-0305
Executive Region: Taoyuan County, Hsinchu County, Miaoli County

Taichung Blood Center

No. 1176, Sec. 4, Taiwan Boulevard, Xitun Dist., Taichung City 407, Taiwan, R.O.C.
TEL: 886-4-2461-2345 FAX: 886-4-2461-3939
Executive Region: Taichung City, Changhwa County, Nantou County

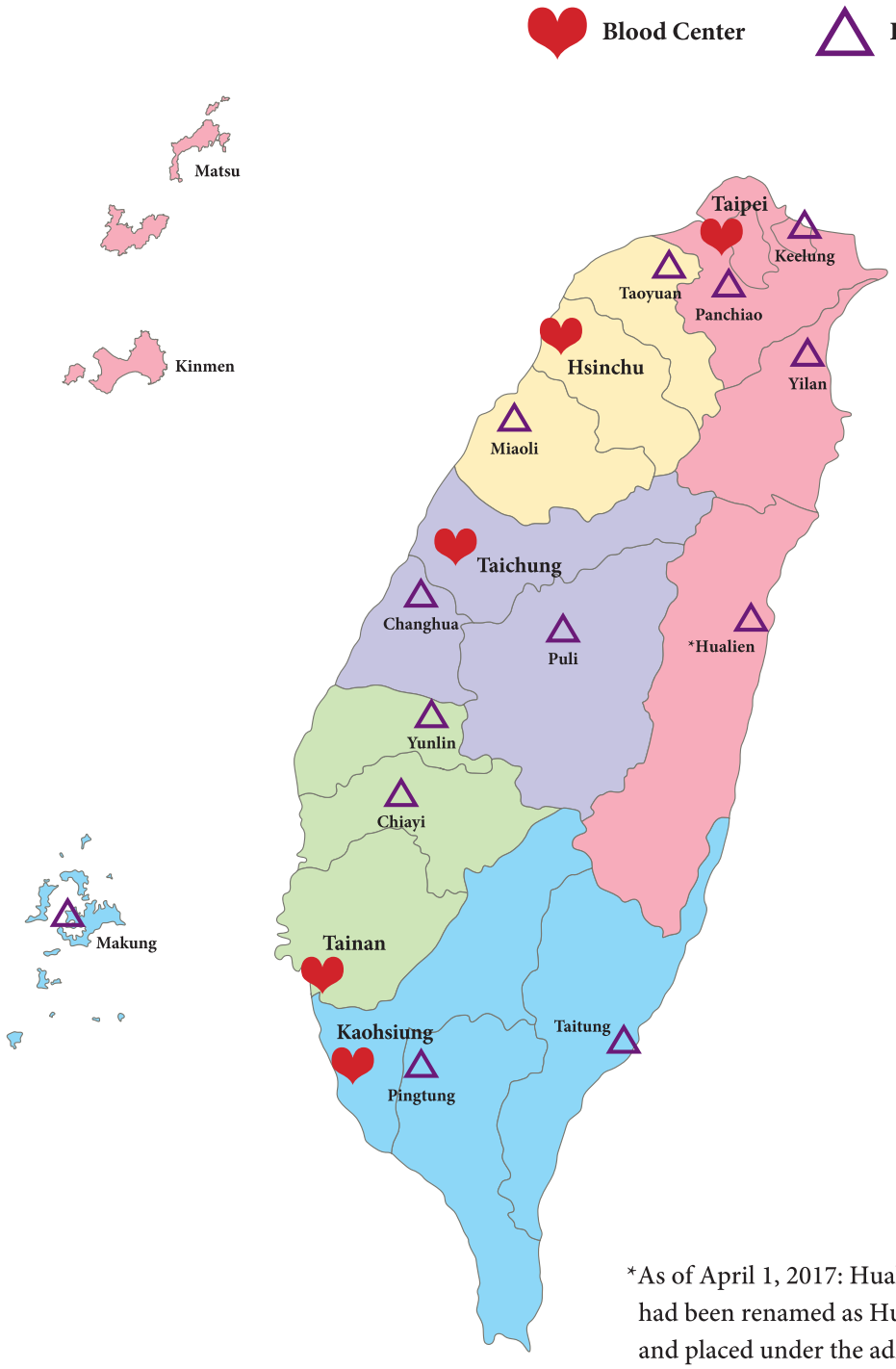
Tainan Blood Center

No. 85, Sec. 1, Yongfu Road, West Central Dist., Tainan City 700, Taiwan, R.O.C.
TEL: 886-6-213-1212 FAX: 886-6-213-3201
Executive Region: Tainan City, Chiayi City, Chiayi County, Yuenlin County

Kaohsiung Blood Center

No. 1837, Gaonan Highway, Nanzi Dist., Kaohsiung City 811, Taiwan, R.O.C.
TEL: 886-7-366-0999 FAX: 886-7-364-1556
Executive Region: Kaohsiung City, Pingtung County, Penghus County, Taitung County

Blood Centers and Stations



*As of April 1, 2017: Hualien Blood Center had been renamed as Hualien Blood Station and placed under the administration of Taipei Blood Center.

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3F,3, Nanhai Road, Taipei ,Taiwan 10066
Tel: +886-2-23511600
Fax:+886-2-23951002
E-mail:blood@blood.org.tw
http://www.blood.org.tw

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醫療財團法人
台灣血液基金會
捐血救人 Taiwan Blood Services Foundation

Taiwan Blood Services Foundation
3F., No.3, Nanhai Rd., Zhongzheng Dist., Taipei City 10066, Taiwan
Tel：886-2-2351-1600 FAX：886-2-2395-1002
http://www.blood.org.tw