

New York *Blood Center Enterprises*



innovation • experience • expertise

New York Blood Center Enterprises (NYBCe) has cultivated a culture of caring for patients across our diverse communities for over five decades. Our founders were challenged with the monumental task of realizing their vision to provide a safe and reliable community blood supply, and they succeeded thanks to the cooperation and partnership of dedicated community and corporate leaders, employees, blood donors, volunteers, and contributors. Their bold ideas, innovative spirit, and focus on service excellence created lasting impact on the lives of countless patients locally, nationally, and around the world. Today, we proudly serve as a vital community lifeline dedicated to serving patients and advancing global public health.

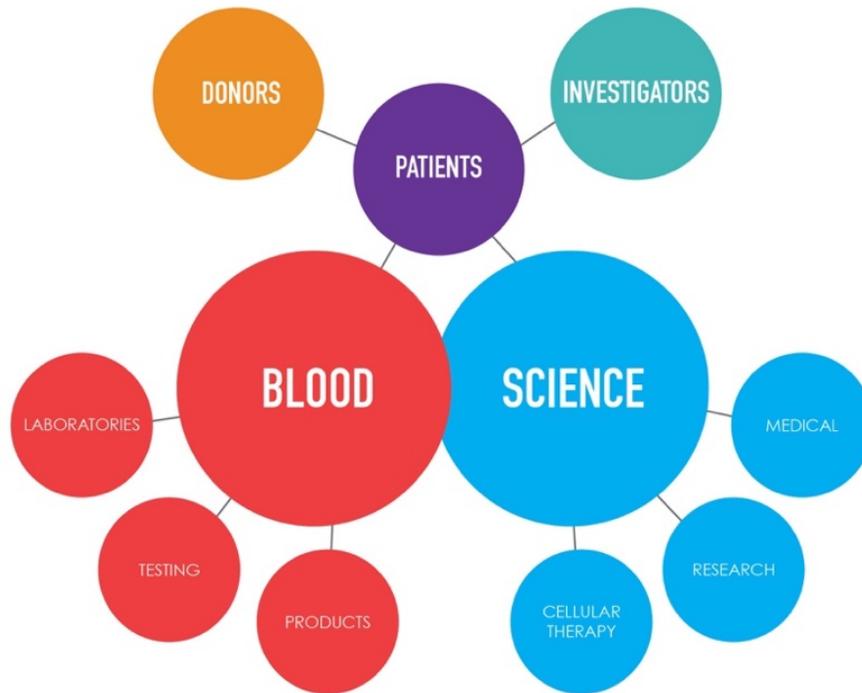
In 1964, New York Blood Center was born in the heart of New York City, and today, New York Blood Center Enterprises (NYBCe) continues to fulfill its four-part mission to: 1) provide the highest quality blood and stem cell services, and related medical and consultative services, to hospitals and patients in the greater New York area and beyond; 2) conduct the highest quality, innovative research in the fields of hematology, transfusion medicine, and cellular therapies, thus advancing these fields and positively impacting public health; 3) develop products, technologies, and services in the fields of hematology, transfusion medicine, and cellular therapies, with the potential to have worldwide humanitarian impact; and 4) train the next generation of leaders in these fields.

Our cutting-edge innovation, decades of experience, and world-renowned expertise make us one of the largest independent, community-based blood centers in the world. Along with partner organizations Community Blood Center of Kansas City, Missouri, Innovative Blood Resources, and Rhode Island Blood Center, and Blood Bank of Delmarva, we collect approximately 4,000 units of blood products each day and serve a population approaching 50 million people in the Tri-State area (NY, NJ, CT), Mid-Atlantic area (PA, DE, MD), Kansas City metropolitan area, Minnesota, Nebraska, Rhode Island, and Southern New England. NYBCe is internationally recognized for its high humanitarian impact, research and development, and

commercial collaboration. We deliver lifesaving blood products, pharmaceuticals, and a myriad of high-quality clinical, technical, testing, and consultative services to care providers and patients both in our communities and globally, including more than 600 hospitals and dozens of research organizations, academic institutions, and biomedical companies each year.

The lifesaving efforts of our donors, investigators, and employees ensure we continue to combine top-notch blood processing and scientific expertise to the direct benefit of patients. From organ transplants to heart surgeries, today's advanced medical care relies on blood transfusions. When one person donates a unit of blood, it can be separated into individual components to save multiple lives. NYBC and its affiliates meet the daily transfusion needs of cancer and surgery patients, accident and burn victims, newborns and mothers delivering babies, AIDS and sickle cell anemia patients, and many more.

New York *Blood Center Enterprises*



BLOOD AND MEDICAL SERVICES

NYBC and its affiliates serve communities nationwide through the collection, manufacturing, testing, and distribution of millions of units of blood products every year. In the New York City region, these manufacturing and logistics activities are based at our location in Long Island City with a secondary facility in Nassau County, Long Island. These locations serve as launching points for the collection and distribution of blood products. Blood and Medical Services also provides pharmacy services via its NYBC Specialized Pharmaceuticals Program as well as a range of perioperative, clinical, and specialized testing and laboratory services in diverse fields including genomics, molecular modeling, immunogenetics, and others. Annually, we provide more than 450,000 laboratory and multi-assay infectious disease tests and over 12,500 specialty clinical procedures to hospitals nationwide.

A LEGACY OF SCIENTIFIC ACHIEVEMENT

Lindsay F. Kimball *Research Institute*

Lindsay F. Kimball Research Institute (LFKRI) is the research branch of NYBCe and since its establishment in 1964, its research efforts have paved the way for new products, techniques, and therapies.

The Institute is credited with breakthroughs in basic and translational medicine and science resulting in innovative and patented processes adopted throughout the industry, and our investigators collaborate with colleagues at world-renowned institutions, shaping the landscape of global healthcare and scientific discovery. The work of LFKRI's principal investigators is made possible by support from NYBCe, together with approximately \$12 million a year in grant funding and contracts from the National Institutes of Health

New York *Blood Center Enterprises*

(NIH), Defense Advanced Research Projects Agency (DARPA), National Science Foundation, National Blood Foundation, and others. Among its most recent accomplishments, in 2017 LFKRI was a driving force behind organizing the TOVA Initiative, a consortium of 14 US, European, and African academic institutions who have joined forces to develop a vaccine for river blindness. Our commitment to groundbreaking blood-related research has resulted in numerous landmark patents and licenses within areas of transfusion medicine, hematology, infectious disease, epidemiology, and cellular therapy.

LFKRI FIRSTS

Transfusion Medicine

- Developed and patented first solvent detergent viral inactivation process to increase safety of over 20 billion units of plasma and blood-derived products distributed globally
- Cloned Kell and Duffy blood group antigens and used genetic testing to improve matching of blood to patients
- First U.S. blood center licensed to fractionate transfusable products from plasma
- Developed first bar coding system for blood bank operations, now a worldwide standard
- First fluorescence activated cell sorter to separate, classify, and study blood lymphocytes

Infectious Disease

- Discovered original test for hepatitis
- Tested and licensed first low-cost hepatitis B vaccine, preventing an estimated one million cases of liver cancer
- Identified hepatitis C virus
- Established one of the first HIV/AIDS natural history studies
- Participated in first HIV vaccine efficacy trial
- Developed first anti-HIV fusion inhibitor, licensed to Trimeris

Cellular Therapy

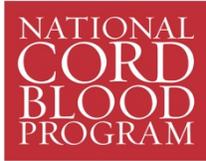
- First public cord blood bank in the world
- First human stem cell product licensed by the FDA, HEMCORD™ (hematopoietic progenitor cells, cord blood)
- Landmark *New England Journal of Medicine* article documents world's largest clinical experience and patient outcomes with umbilical cord blood versus bone marrow
- First stem cell bill facilitated by NYBC's efforts to build national cord blood inventory targeted to racial/ethnic minorities



National Center for Blood Group Genomics (NCBGG) was launched in 2016 to apply precise medicine through the use of genomics for the treatment of hematological malignancies, inherited and acquired anemias, autoimmune diseases, and transplantation. We combine the scientific and research expertise of New York Blood Center and Community Blood Center of Kansas City, specializing in applying precision medicine to blood transfusion to increase safety and minimize complications. Based in Kansas City, NCBGG's mission is to provide the highest quality testing services for extended blood typing at lower cost for donor centers and the patients they serve; its goal is to improve the practice of transfusion medicine, develop the next generation of testing, and train the next generation of leaders. Genomics testing of blood donors and patients for blood groups (i.e., extended blood type) is dramatically change the industry by enabling patients to receive a 'precise matched'

New York *Blood Center Enterprises*

product, beyond conventional ABO and Rh type. This concept supports the move to personalized medicine based on genomics, which is revolutionizing all aspects of healthcare. Our goal is to enable a higher level of medical care to the patients and hospitals we serve.



National Cord Blood Program (NCBP) was founded in 1992 to investigate cord blood as a possible solution to a critical public health need: finding appropriate hematopoietic progenitor cells for transplantation in patients who have no matched bone marrow donors. NCBP is the first and largest public cord blood bank in the world and has provided over 5,800 stem cell doses to patients for bone marrow transplants in 41 countries. NCBP collects, processes, and stores cord blood units in liquid nitrogen freezers, ready for shipping whenever needed. We are the first cord blood bank to have an FDA-licensed cord blood product (HEMACORD®), winner of the 2014 Prix Galien Award for the "Best Biotechnology Product." NCBP is committed to providing high quality cord blood units and promoting the highest standards in cord blood banking. The four lines of business outlined above comprise NYBCe's Scientific Operations and collectively represent:

- 19 principal investigators, 38 PhDs and MDs, and 68 additional staff
- 60 research projects in pre-clinical and clinical development
- Major collaborations with leading academic organizations including Memorial Sloan-Kettering, Weill-Cornell Medical College, Columbia University, Montefiore Medical Center, Baylor College of Medicine, Ohio University, University of California San Francisco, University of Pennsylvania, Children's Hospital of Philadelphia, and others
- Commercial relationships and collaborations with life sciences companies including: Juno Therapeutics (Celgene), Orgenesis (Israel), Erytech (France), Rocket Pharmaceuticals, Atara Biotherapeutics, Collectis, Neon Therapeutics, Pluristem Therapeutics, and others
- Funders including the American Heart Association, Bill & Melinda Gates Foundation, Doris Duke Foundation, Starr Foundation, the F.M. Kirby Foundation, and others
- 34 current NIH grants and subcontracts
- A portfolio of nearly 50 patents available for licensing
- 150+ scholarly articles published in scientific journals annually
- 14 NYBC physicians/scientists serving as editors or on the editorial boards of major

scientific journals appointed as members of grant awarding foundations, federal agencies and institutions review and advisory panels

- More than 20 textbooks published to date

COMMUNITY OUTREACH PROGRAMS



Project ACHIEVE was established in 1993 as part of the NYBCe Laboratory of Infectious Disease Prevention. We are part of the largest clinical trials program devoted to the development and testing of preventive HIV vaccines worldwide. We conduct intervention trials to develop innovative ways to help participants reduce their risk of HIV infection and studies spanning all phases of HIV vaccine research as part of an international effort to find a preventive HIV vaccine. In addition to our research, we continue to: educate

New York *Blood Center Enterprises*

the community to build awareness of the need for a vaccine and other prevention interventions; build acceptance and support for research; and encourage advocacy for new trials. We work with many populations in New York City, including men who have sex with men, transgender persons, and heterosexual women and men.

Project ACHIEVE also works in collaboration with Columbia University Medical Center to conduct trials of preventive HIV vaccines. We partner with multiple community-based organizations in the New York City metro area to develop and test innovative behavioral interventions. Our Community Education and Recruitment staff is frequently found in the streets engaging participants for new studies and distributing HIV prevention materials. We organize and participate in community events to commemorate special days of the year such as HIV Vaccine Awareness Day, National Black HIV/AIDS Awareness Day, National Latino AIDS Awareness Day, and New York City Gay Prides. Some of our trial participants and other volunteers from the community form our Community Advisory Board which meets throughout the year to discuss the interests and concerns of target communities for HIV prevention.

 **Precise Match** **PreciseMatch**® is a nationally recognized program devoted to optimizing transfusion therapy delivered to sickle cell and thalassemia patients. Since 2006, the program has focused on ensuring patients have access to the most precisely matched blood products with the mission to secure blood from more multicultural donors and maintain an inventory of antigen negative blood for patients in our diverse communities.

 **New York Blood Center** **NYBC Marrow Registry Program** serves as a regional arm of the Be The Match-National Marrow Donor Program. Since its establishment in 1989, the program has enrolled almost 10 million potential donors nationwide and registered over 230,000 potential marrow and blood stem cell donors. Two types of donation are bone marrow or peripheral blood stem cells—each can work to save someone’s life. NYBCe bone marrow sites include: Memorial Sloan Kettering Hospital, New York Hospital, John Theurer Cancer Center-Hackensack Medical Center, North Well University Hospital, Stony Brook University Hospital and Westchester Medical Center. Peripheral blood stem cells are collected at: New York Blood Center, Memorial Sloan Kettering Hospital, New York Hospital, Mt. Sinai Hospital, Hackensack Medical Center, Stony Brook University Hospital and Robert Wood Johnson Hospital.

EDUCATIONAL EVENTS, SEMINARS AND PROGRAMS

NYBCe takes full advantage of its conferencing facilities for programs of its own like the Alexander S. Weiner Lecture Series and the Transfusion Medicine Program, attracting hundreds of research scientists, pathologists, laboratory technicians, and academics to attend in-person and online via webinar each year. We also support educational opportunities for medical technologists, high school internship programs, and participation in the LifeSci NYC Internship Program for undergraduate and graduate students.