Plasma Protein Therapies: Uniquely Saving Lives

Treating Rare Diseases

Plasma is the straw-colored liquid portion of blood. It contains hundreds of proteins which carry out critical functions in the human body, such as antibodies to fight diseases and clotting factors to regulate bleeding. If a person has insufficient levels of any one plasma protein, his or her body cannot carry out these vital functions, causing a variety of chronic and life-threatening medical conditions.

Plasma protein therapies are unique biologic medicines that treat plasma protein deficiencies by replacing a person's missing or functionally damaged proteins. In the United States, a disease is considered rare if it affects fewer than 200,000 individuals. Plasma protein deficiencies have very small patient populations and can be considered extremely rare.

Your blood is:

55% PLASMA

44% RED BLOOD CELLS

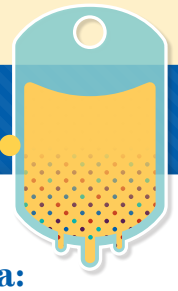
1% WHITE BLOOD CELLS & PLATELETS

Your plasma is:

92% WATER

7% PROTEINS

1% OTHER SOLUTIONS



Proteins in your plasma:

- IMMUNOGLOBULINS (ANTIBODIES)
- CLOTTING FACTORS
- C1 ESTERASE INHIBITOR
- ALPHA-1 PROTEINASE INHIBITOR

Patients Treated with Plasma Protein Therapies in the U.S.

CAUSES & SYMPTOMS	U.S. PATIENTS TREATED ANNUALLY (ESTIMATES)
PRIMARY IMMUNODEFICIENCY DISEASES	
- Caused by missing immunoglobins (antibodies) - Antibodies control the immune system and prevent illness - Patients are chronically ill from severe, persistent, recurrent infections	40,000
CHRONIC INFLAMMATORY DEMYELINATING POLYNEUROPATHY	
- Cause not certain; immune system attacks nerve coating - Messages from the brain aren't delivered to the body if nerve coating is damaged - Patients experience progressive weakness, loss of limb function, and disability	14,000
BLEEDING DISORDERS (E.G. HEMOPHILIA)	
- Caused by missing clotting factor protein - Clotting factors control bleeding - Patients cannot regulate bleeding - Can be fatal if bleeding occurs in brain or vital organs	30,000[1] includes recombinant therapies
HEREDITARY ANGIOEDEMA	
- Caused by missing C1 esterase inhibitor protein (C1-INH) - C1-INH helps regulate inflammation - Patients have edema (severe swelling) - Can be fatal if airway obstructed	5,000
ALPHA-1 ANTITRYPSIN DEFICIENCY	
- Caused by missing Alpha-1 Proteinase Inhibitor - Alpha-1 Proteinase Inhibitor protects the lungs - Patients have chronic emphysema and liver damage	7,500

1. American Thrombosis & Hemostasis Network

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Made From Plasma

Donated Plasma Is A Finite Starting Material

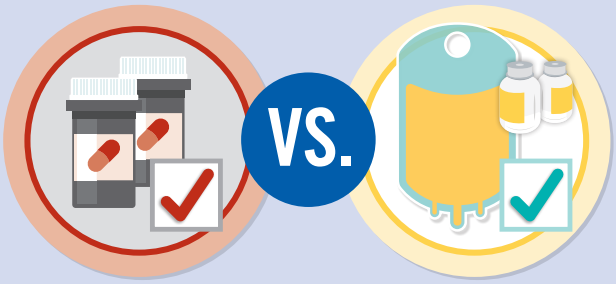
The starting material for plasma protein therapies is not an infinite resource. Rather than using synthetic or chemical ingredients, plasma protein therapies are made using human plasma. ***Plasma cannot be made in a laboratory.*** Plasma and its lifesaving proteins can only be obtained from donors who so generously give their time to donate.

PHARMACEUTICALS
Production starts with synthetic or chemical ingredients.

PLASMA PROTEINS
Production starts with a biological starting material, human plasma.

Licensure

The Food & Drug Administration (FDA) approves medicines for safety & efficacy before they can be sold in the U.S. ***Plasma protein therapies are the only medicines for which the starting material must also be licensed.*** In addition to the final products, the FDA qualifies and approves plasma before it can be used for manufacturing.



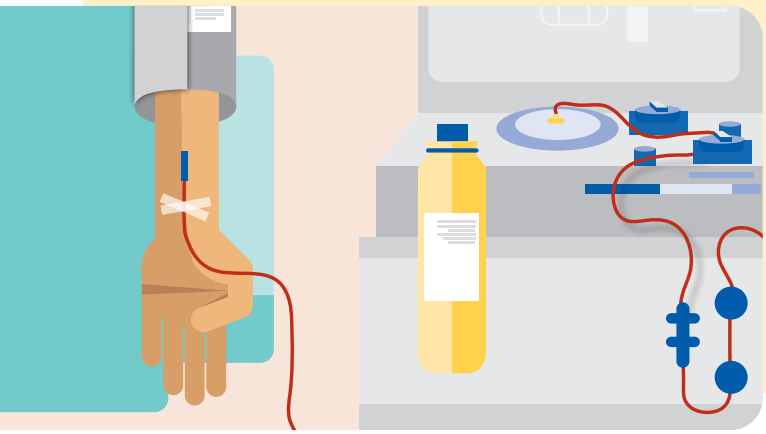
PHARMACEUTICALS
Only the final product must be approved by the FDA.

PLASMA PROTEINS
53 million plasma donations as well as the final products must be qualified each year.

Plasma Collection

Plasma is collected from healthy, compensated donors through a process called plasmapheresis. Plasmapheresis removes a donor's plasma and returns the remaining blood components.

Plasma is collected at 860+ plasma donation centers in the U.S. After collection, the plasma donation is frozen and shipped to a state-of-the-art facility for manufacture into lifesaving plasma protein therapies.



EVERY YEAR IT TAKES APPROXIMATELY:

130: Plasma donations to treat ONE PATIENT with a PRIMARY IMMUNODEFICIENCY DISEASE.

900: Plasma donations to treat ONE PATIENT with an ALPHA-1 ANTITRYPSIN DEFICIENCY.

1200: Plasma donations to treat ONE PATIENT with HEMOPHILIA.

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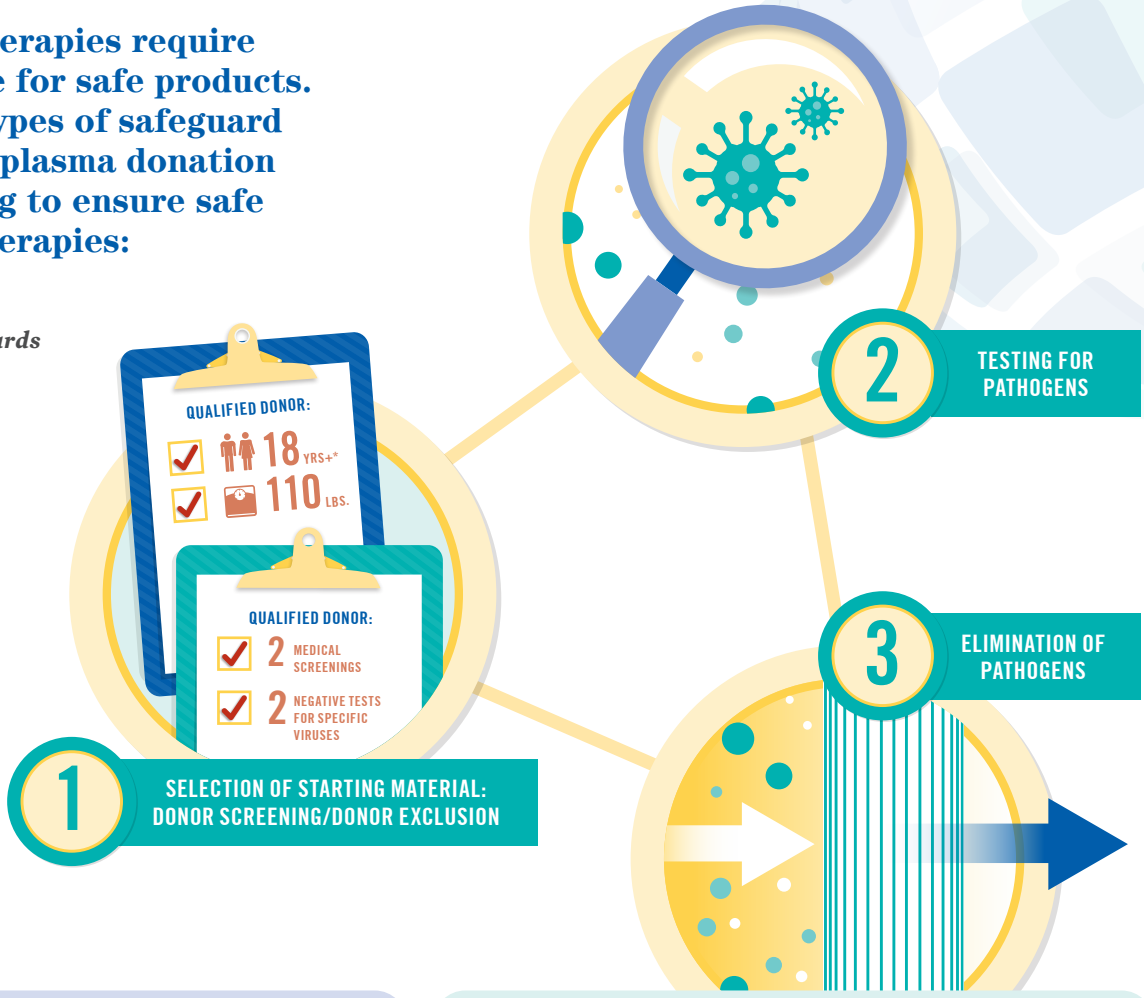
Constant Vigilance for Safe Products

Plasma protein therapies require constant vigilance for safe products. There are three types of safeguard measures used in plasma donation and manufacturing to ensure safe plasma protein therapies:

Voluntary industry standards often exceed regulatory requirements.

IQPP
INTERNATIONAL QUALITY PLASMA PROGRAM

QSEAL
QUALITY STANDARDS OF EXCELLENCE, ASSURANCE & LEADERSHIP



Current manufacturing protocols are extremely effective against pathogens.

The industry has a record of safety from pathogens for more than 20 years.

Evolving Protocols

Unlike traditional pharmaceuticals or other biologics where standard quality assurance practices are sufficient, ***plasma protein therapies' safety protocols are constantly evolving due to new and emerging pathogens.***

Companies must continuously perform tests to demonstrate that their viral inactivation and removal steps work on new pathogens. For example, through the years companies invested significant time and resources into researching coronaviruses to ensure they do not threaten the safety of plasma protein therapies.

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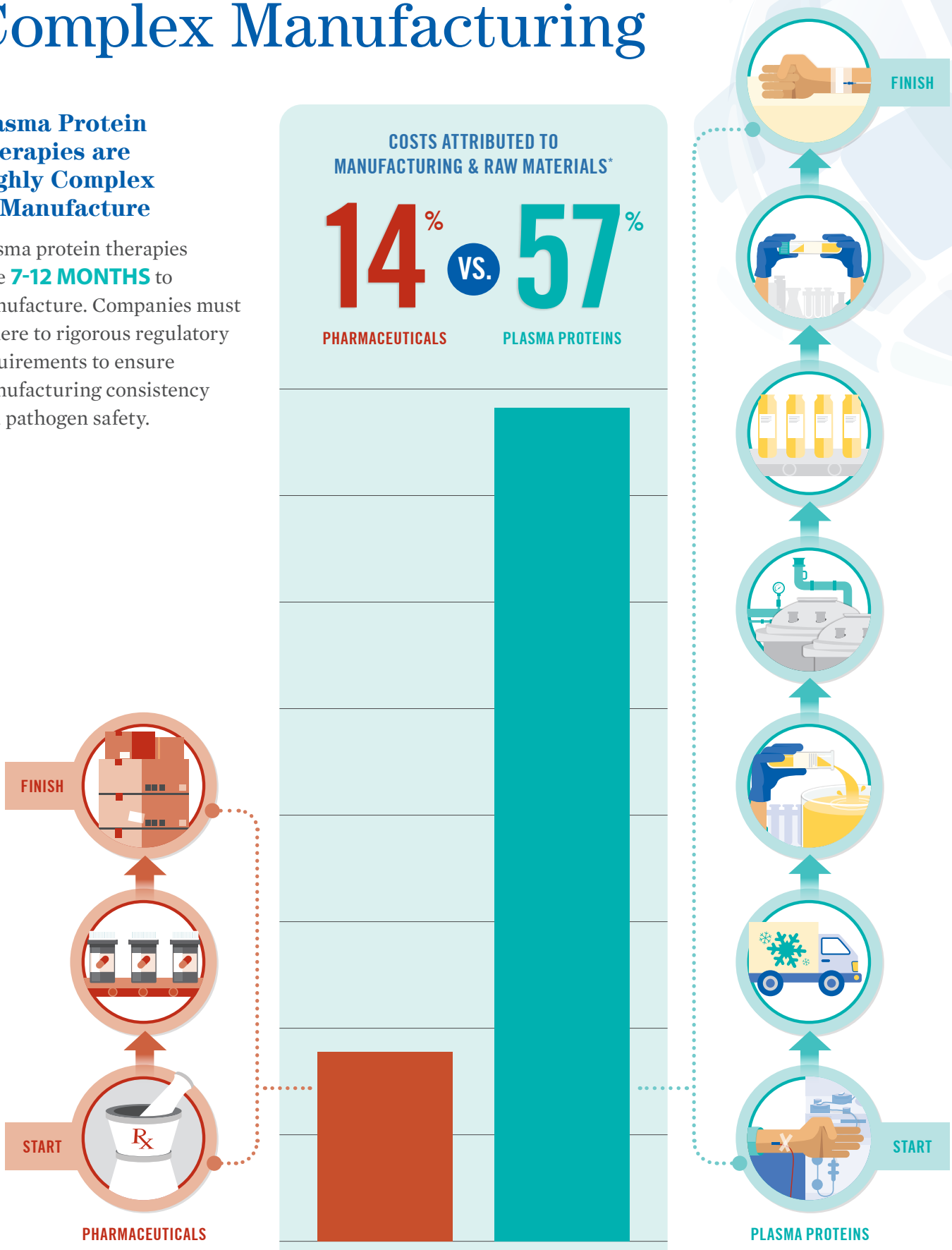
Complex Manufacturing

Plasma Protein Therapies are Highly Complex to Manufacture

Plasma protein therapies take **7-12 MONTHS** to manufacture. Companies must adhere to rigorous regulatory requirements to ensure manufacturing consistency and pathogen safety.



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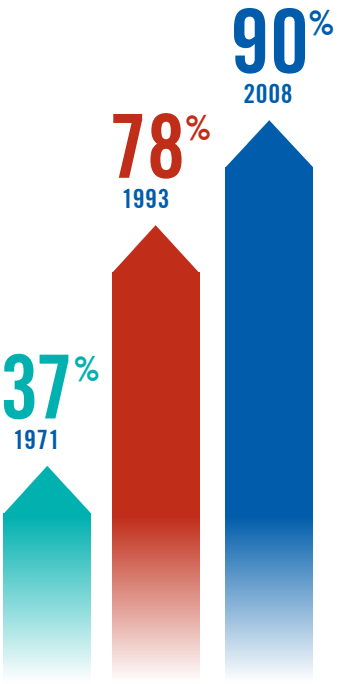
Value to Patients

As different policies to slow health spending are debated, it is critical to maintain access to lifesaving treatments for rare disease patients. Although some value-based frameworks work for generic, interchangeable pharmaceuticals—a one-size-fits-all policy does not work for plasma protein therapies as these biologics are not interchangeable.

Plasma protein therapies are high-impact pharmaceuticals because they increase life expectancy, improve quality of life, and reduce life-threatening complications for individuals with plasma protein deficiencies.

Plasma protein therapies provide immeasurable, lifelong benefits to the patients who use them.

10-year survival rate of patients with COMMON VARIABLE IMMUNE DEFICIENCY, by year

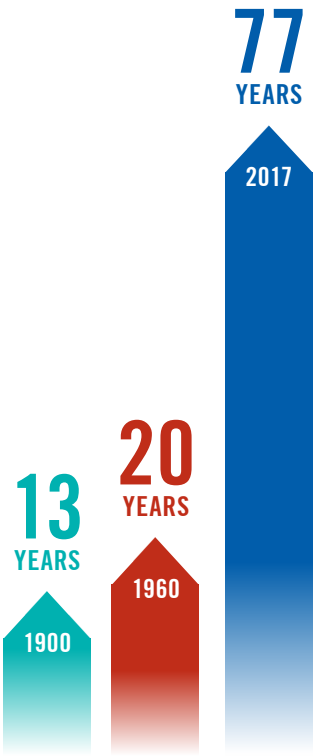


Source: Chapel H, Lucas M, Lee M, et al. Common variable immunodeficiency disorders: division into distinct clinical phenotypes. Blood. 2008; 112(2):277–286.

"To think about having to go back long term without my IVIG infusions, I would rather not be alive. I started to receive the plasma therapy and within a couple of months from being near death...I became very vital. These are lifesaving therapies for which there is no alternative for many patients. To take away the plasma therapy from a PI patient such as myself—what you're doing is condemning those people to a life of sickness and possibly death."
-Terry, *individual with a Primary Immunodeficiency Disease*

"Plasma-derived therapies saved my children's lives, literally. The first thing that would happen if we didn't have access to them would be that we would not be able to stop bleeding inside their bodies, they would first be in a lot of pain, then they would become crippled and eventually they would die."
- Kerry, *mother of sons with hemophilia*

Life expectancy of a patient born with HEMOPHILIA, by year



Source: Aledort, L. The evolution of comprehensive haemophilia care in the United States: perspectives from the frontline. Haemophilia. 2016; 22(2):676-683.

VALUE TO THE SYSTEM The economic impact of diagnosing a Primary Immunodeficiency Disease and treating an individual with immunoglobulin therapy represents an average savings of $55,882 per year.

Source: Modell, V., Quinn, J., Ginsberg, G., Gladue, R., Orange, J., & Modell, F. (2017). Modeling strategy to identify patients with primary immunodeficiency utilizing risk management and outcome measurement. *Immunologic Research.*

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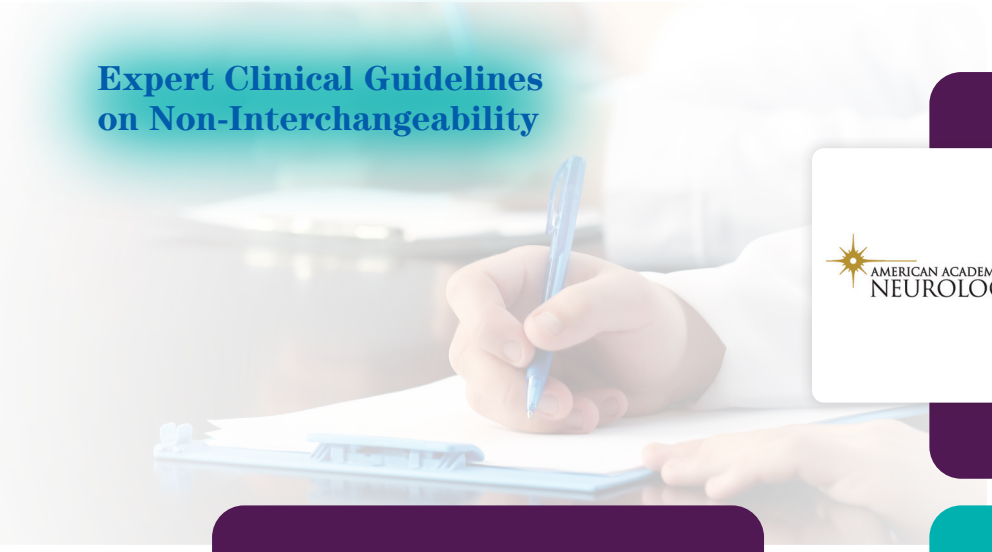
Non-Interchangeable & Unique

One-size-fits-all policies are unsuitable for plasma protein therapies and endanger patient health. Each therapy is unique due to the pharmacologic and manufacturing differences that exist across different brands and patients' unique response to the treatments. Plasma protein therapies are non-interchangeable, sole-source biologics, therefore it is essential that patients have access to their medically justifiable therapy.

Expert Clinical Guidelines on Non-Interchangeability



American Academy of Neurology®

"Given the variable nature of these diseases, individualized treatments depending on patient need and physician judgment are important." [3]

ALPHA-1 FOUNDATION

"It is unacceptable to limit availability of augmentation therapy in any way and especially to a single product."[1]

haea
US Hereditary Angioedema Association

"Because not all patients respond the same to each medication, it is the responsibility of the coordinating expert physician to work with each patient to define the optimal medication(s) for that particular patient." [4]

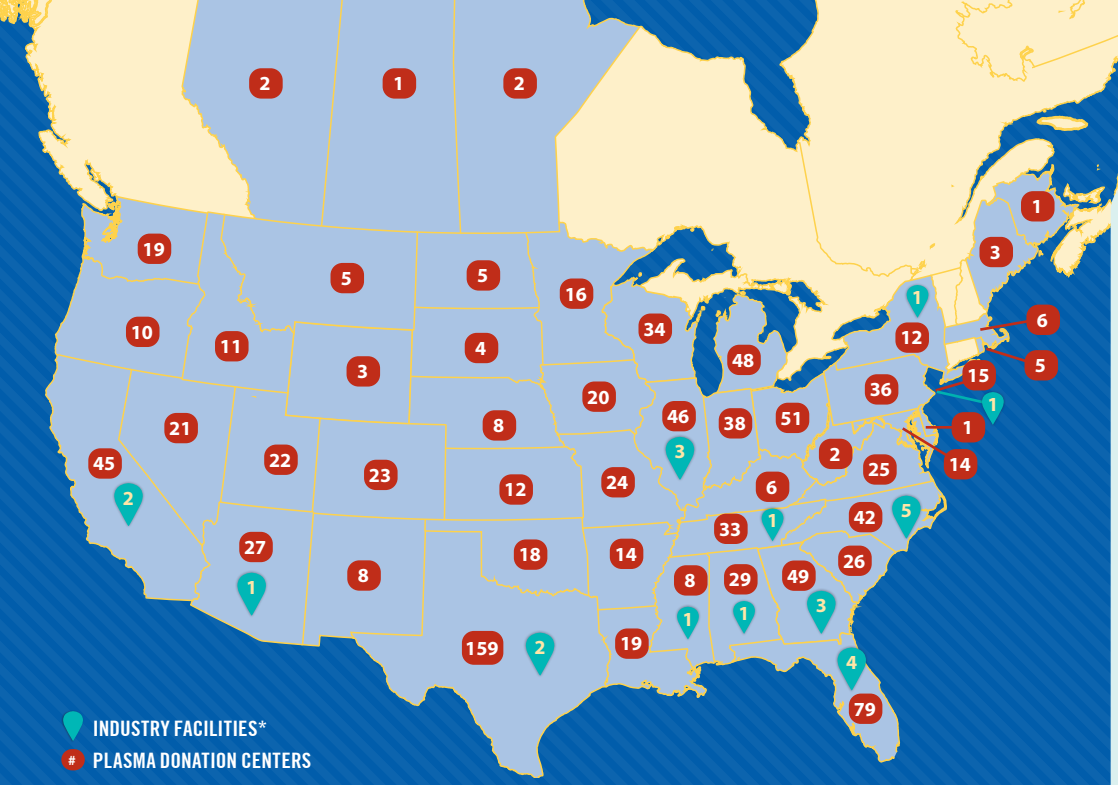
American Academy of Allergy Asthma & Immunology

"IVIG is not a generic drug and IVIG products are not interchangeable. A specific IVIG product needs to be matched to patient characteristics to insure patient safety." [2]

National Hemophilia Foundation
for all bleeding and clotting disorders

"It is critical that the bleeding disorder community has access to a diverse range of therapies and that prescriptions for specific clotting factor concentrates are respected and reimbursed." [5]

1. Alpha-1 Foundation Medical and Scientific Advisory Committee Clinical Practice Guidelines **2.** American Academy of Allergy Asthma & Immunology Principle #8
3. American Academy of Neurology Therapeutics & Technology Assessment Subcommittee Evidence-based Guidelines **4.** US HAEA Medical Advisory Board Recommendations
5. NHF Medical and Scientific Advisory Council Recommendation #159

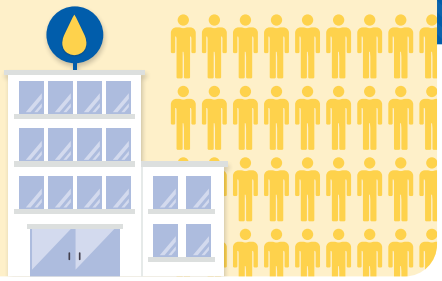


1,000 AND COUNTING!

There are more than 1,000 plasma donation centers in North America.

Employment

Each plasma donation center employs between 50 - 100 people.

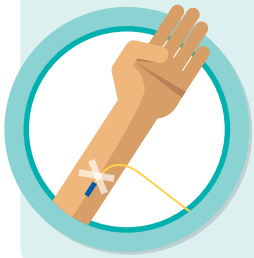


Local Economies

On average, each plasma donation center puts $2 million into the community in donor compensation.

Strength in Numbers

There are more than 53 million plasma donations annually in the U.S.



53 MILLION

Repeat Engagement

The average donor donates 21 times per year.

PPTA
Plasma Protein Therapeutics Association

Plasma Members in North America

ABO Plasma
Access Plasma LLC
ADMA BioCenters
B Positive Plasma LLC
BioLife Plasma Services LP/Takeda
Biomat USA/Grifols
BPL Plasma Inc.
Canadian Plasma Resources
Freedom Plasma/BioTek America
Hemarus LLC
Immunotek Bio Centers LLC
Kamada Plasma
KEDPLASMA, LLC
Octapharma Plasma
ProMetic Plasma |Grifols
Scantibodies Biologics
Southern Blood Services

North America Members

ADMA BIOLOGICS

bpl Bio Products Laboratory

GRIFOLS

KEDRION BIOPHARMA

Takeda

*Includes manufacturing plants, testing laboratories, research facilities, logistics and distribution centers, and corporate offices.

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