GLOSSARY OF HELPFUL MEDICAL TERMS
NEHA Consumer Medical Symposium
Groton, CT | March 15-16, 2025

This glossary was created to help you understand key terms used during our Consumer Medical Symposium. This list was created by the Consumer Medical Symposium Committee and edited by Hemophilia Treatment Center (HTC) providers.

Common Bleeding Disorder-Related Terms:

Adeno-Associated Virus (AAV): A non-pathogenic virus that is commonly used as a vector in gene therapy that can be engineered to deliver a gene (e.g. for factor VIII or IX) to target cells of interest (e.g. liver cells) for various therapeutic applications.

Antibody: A protein secreted into the bloodstream to neutralize pathogens, including bacteria, viruses, or foreign proteins. Antibodies may be designed to interact with specific proteins for therapeutic purposes such as the response to a vaccine. Sometimes, the immune system recognizes a protein as foreign, such as infused factor VIII, and produces an antibody (inhibitor) against that.

Antigen: A type of molecule that can initiate an immune response.

Antithrombin: A protein that regulates clotting and helps to prevent over-clotting by inhibiting thrombin (activated Factor II) as well as several other clotting factors, which are necessary for the formation of fibrin in the clotting process.

Biologics: A drug that is made from or by a living organism and is used to treat certain chronic conditions. Biologics are often referred to as “reference products” or “innovator drugs.” Factor products are biologics.

Biosimilars: Medicine that is highly similar, but not identical, to a biologic medicine. They are also known as “follow-on biologics.” Biosimilars cost less than their biologic counterparts. This is because, while both biologics and biosimilars are made from living organisms, biosimilars are likely to have a less expensive and burdensome FDA approval process than the biologic on which a biosimilar is based.

Bispecific Antibody: An antibody that can simultaneously bind to two different antigens (example: emicizumab, which binds both factor IXa and X).

Bone-Mineral Density (BMD): A bone mineral density test measures how much calcium and other minerals are in an area of bone. This test helps your health care provider detect osteoporosis and predict your risk for bone fractures.

Chromogenic Assay: In general, a chromogenic assay is one that uses color or fluorescence to quantify enzymatic activity. In bleeding disorders, chromogenic assays are used to determine the factor activity in a patient’s plasma.

Clotting Cascade: The chain or sequence of biochemical reactions in which the various blood clotting proteins become activated to ultimately generate fibrin (activated Factor I), the protein from which clots are formed.

Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR): A genetic engineering tool that is used to edit genes. Studies using this tool to attempt to treat genetic diseases in animals are ongoing.

Comorbidity: the simultaneous presence of two or more diseases or medical conditions in a patient

DNA: Deoxyribonucleic acid; the molecules inside cells that carry genetic information and pass it from one generation to the next.

Diversity, Equity and Inclusion (DEI): DEI encompasses the symbiotic relationship, philosophy and culture of acknowledging, embracing, supporting, and accepting those of all racial, sexual, gender, religious and socioeconomic backgrounds, among other differentiators.

Factor Deficiencies: Bleeding disorders identified by the missing clotting factor. They include factors I, II, V, VII, VIII, IX, X, XI, XII and XIII. (See below for disorder definitions.)

Factor I Deficiency: A rare bleeding disorder caused by deficient or defective fibrinogen.

Factor II Deficiency: An extremely rare bleeding disorder caused by a deficiency of prothrombin.

Factor V Deficiency: A rare bleeding disorder caused by a deficiency of factor V protein.

Factor VII Deficiency: Also called Alexander's disease, which is caused by a deficiency of factor VII protein. This is the most common rare bleeding disorder and it can be mild to severe.

Factor VIII Deficiency: Also called hemophilia A, caused by a deficiency of factor VIII protein.

Factor IX Deficiency: Also called hemophilia B, caused by a deficiency of factor IX protein.

Factor X Deficiency: A rare bleeding disorder caused by a deficiency of factor X protein, which activates enzymes that help form a clot.

Factor XI Deficiency: Also called hemophilia C, caused by a deficiency of factor XI protein.

Factor XII Deficiency: A rare factor deficiency. People do not bleed, even if their levels are 0%.

Factor XIII Deficiency: The rarest bleeding disorder caused by a deficiency of factor XIII protein which is needed to stabilize a clot.

Fc Fusion: Fusion of an active protein (for example, clotting factor) to a protein with a long half-life (for example, the Fc, or “fragment crystallizable,” portion of an antibody) to extend the half-life of the active protein.

Fibrinogen: Also known as Factor I, it is a soluble protein made by the liver and present in blood plasma. It is converted during tissue injury to fibrin and subsequently to a fibrin-based blood clot.

Gene: The functional and physical part of DNA that is passed from parent to offspring. Genes are pieces of DNA, and most genes contain the information for making a specific protein.

Gene Therapy or Editing: Inserting a functional copy of a gene or DNA segment into a patient to treat a disease.

Genome: All the genetic information of a cell or organism. In humans, almost every cell in the body contains a complete copy of the genome. The genome contains all of the information needed for a person to develop and grow.

Genotype: This refers to the particular variants of genes in your DNA. It is often contrasted with "phenotype," which refers to the particular physical characteristics (for example, height, lactose intolerance, or extended bleeding time) that results from the genotype. See "Phenotype" below.

Hemostasis: Stoppage of bleeding through clot formation.

Hemostatic Agent: A drug or other agent designed to promote rapid blood clotting.

Immune Tolerance Therapy (ITT): A treatment of repeated infusions of factor concentrate over a period of time. The goal is to train the body to tolerate the factor concentrate and not react to the protein by creating antibodies. This treatment is often used with inhibitor patients.

Immunogenic: The tendency of a foreign substance to provoke an immune response.

Intravenous (IV): Administration of a drug directly into a vein.

Lyophilization: Also known as freeze-drying, a water removal process where a mixture is frozen and placed under reduced pressure to allow ice removal by sublimation. This process is used to preserve perishable materials and extend their shelf-life.

Medical Science Liaison (MSL): A specific role within a pharmaceutical or biotechnology company where experts focus on a specific therapeutic area (e.g. hematology) and disease state (e.g. bleeding disorders). Their role as scientific experts includes ensuring that products are used effectively, serving as scientific peers and resources within the medical community and internally at companies, and establishing relationships with leading physicians.

Microbleeds: Also known as "subclinical" or "silent" bleeds, these are chronic, small bleeds which can occur even during ongoing prophylaxis treatment for bleeding disorders.

Mimetic: A synthesized molecule that mimics the function of a naturally occurring protein. For example, emicizumab is a mimetic for factor VIII.

Mucosa: Also known as the mucous membrane, this is the inner lining of some organs and body cavities (nose, mouth, stomach, uterus, vagina etc.). It lubricates and protects these organs and cavities from abrasive particles and bodily fluids, as well as invasive pathogens. It has a significant blood supply and bleeds easily with trauma or inflammation.

Off-Label Usage: Use of an FDA-approved drug for an indication, or in a group, not approved on the prescription label.

Osteopenia: A condition where a person's bone density is lower than normal for a given age group. Often considered the first step toward osteoporosis, osteopenia isn't as serious as osteoporosis because the bones aren't as porous.

Osteoporosis: A disease that causes bones to become weak and brittle, resulting in an increased risk of fracture. Osteoporosis is a more serious progression of osteopenia.

Phenotype: A description of your actual physical characteristics resulting from both your environment and your genotype.

Pegylation: Attachment of polyethylene glycol (PEG), a non-toxic and non-immunogenic polymer, to a biomolecule in order to prolong the biomolecule's half-life.

Plasma: The liquid part of blood. It has water, sugar, fat, protein, and salts. Plasma is the yellow-colored, protein-rich portion of the blood that transports red and white blood cells, and platelets, nutrients, waste products, antibodies, clotting factors and other clotting proteins, and chemical messengers (like hormones) throughout your body.

Plasma Derived Factor: Factor products produced from blood donors' plasma.

Platelets: Tiny disc shaped components (blood cells) of blood that help seal injured blood vessels and stop bleeding.

Platelet-Rich Plasma (PRP): A type of therapy that uses injections of a concentration of a patient's own platelets to accelerate the healing of injured tendons, ligaments, muscles and joints.

Prophylaxis: Measures taken to preserve health or prevent disease.

Recombinant Factor: Clotting factor that is produced in a lab rather than derived from plasma.

Red Blood Cells (RBCs): RBCs are also called erythrocytes. They are red and make up about 45% of your blood's volume, which is why blood is red. RBCs are red because of a special protein called hemoglobin, which carries oxygen from your lungs to your body and returns carbon dioxide to your lungs to be exhaled.

RNA Interference (RNAi): A process in which the production of a specific protein is decreased by an RNA molecule. RNA (or ribonucleic acid) is a chemical "cousin" of DNA.

Subcutaneous (Sub-Q): Administration of a drug under the skin.

Therapeutic Dataset: de-identified real-world data for researchers to translate into actionable insights about topics like the patient journey, provider prescribing patterns, disease progression, procedure volumes, and the overall delivery of care.

Thrombosis: Formation or presence of a blood clot in the body.

Titer: A measurement of the amount (concentration) of something in a solution. It commonly refers to the amount of antibodies found in a person's blood.

Tolerize: To induce immunologic tolerance, for example when the patient's inhibitors are reduced or eradicated with treatment.

Vector: The term refers to the transport system used to deliver a product, such as DNA, into cells. A product could be a virus (often an adeno-associated virus, or AAV), as well as synthetic, or natural compounds, which are used in gene therapy to deliver a functional gene to cells in the body in order for those cells to begin manufacturing copies of the gene.

von Willebrand Disease (VWD): A bleeding disorder in which von Willebrand factor (VWF), a blood protein, is either deficient or defective.

von Willebrand factor (VWF): A blood protein that helps platelets plug injured blood vessel walls by causing them to stick together. It is also a carrier for factor VIII.

White Blood Cells (WBCs): WBCs are also called leukocytes. Their primary job is to protect your body from infection. They only make up about 1% of your blood volume. There are three types of WBCs: granulocytes (which include neutrophils, your immediate response cells which live less than a day), monocytes, and lymphocytes (which can live in tissue indefinitely). The two main types of lymphocytes are T lymphocytes, which help regulate immune cell function and attack infected cells and tumors, and B lymphocytes, which make antibodies (proteins that attach to bacteria, viruses, and other foreign materials).

<u>Drug Metabolism Terminology:</u>

Drug Metabolism: Describes the biotransformation of a drug in the body to facilitate its elimination from the body.

Half-Life: The amount of time it takes for the concentration of a drug (or factor activity levels) to decrease by half.

Peak Level: Maximum concentration of a drug in the bloodstream of a patient after administration of one dose.

Pharmacodynamics (PD): The study of the biochemical and physiologic effects of a drug on organisms, that is, how a drug affects the organism.

Pharmacokinetics (PK): The study of what happens to a drug or compound once it is administered to a living organism, that is, how an organism affects a drug. PK refers to the

absorption, distribution, metabolism, and excretion of a drug. A Pharmacokinetics Study (or PK Study) can be used, for example, to determine the half-life of a drug or clotting factor in the blood and can be used by a physician to help optimize and/or personalize treatment.

Other common terms associated with pharmacokinetics and their definitions:

Area Under the Curve (AUC): The variation of drug concentration in blood plasma over time. AUC represents the total exposure of drug over time.

Clearance: The parameter that describes the efficiency of elimination of a drug from the body. It's essential to know a drug's clearance to determine the dosing of a medication.

Drug Disposition: A broad term that covers all of the processes by which the body handles drugs. The processes include absorption, distribution, metabolism, and excretion (often abbreviated ADME).

- Absorption: The movement of drug into the bloodstream following administration.
- Distribution: The disbursement of unmetabolized drug as it moves through the body's blood and tissues.
- Metabolism: The chemical alteration of a drug by the body.
- Excretion: The removal of drugs from the body either as metabolites or unchanged drug.

Elimination: The removal of drugs from the body. Drugs may be eliminated after being chemically altered (metabolized), or they may be eliminated intact. Most drugs and their metabolites are eliminated by the kidneys in urine.

Exposure: Refers to drug levels achieved in the body for a given dose, and is typically represented as AUC. Understanding the relationship between drug exposure and response is critical to finding a dose that optimally strikes a balance between drug efficacy and adverse events.

Metabolism: The chemical alteration of a drug by the body. The primary site for drug metabolism is the liver, where special enzymes convert drugs to metabolites to allow the body to more easily eliminate them. The study of drug metabolism is called pharmacokinetics.

Toxicity: Damage or harmful side effects of a drug on animals or humans.

Trough Level: Minimum concentration of a drug in a patient's blood stream prior to the next planned dose.

<u>Clinical Trial Terminology:</u>

Adverse Event (AE): Any negative change in the health of a clinical trial participant that occurs during a clinical trial or for a specified period after the trial.

Clinical Trial: A systematically designed and implemented experiment for testing the safety and efficacy of a new drug in humans. Trials are categorized into three or four sequenced "phases" that differ in their purpose and size. See "Phase I Trial," "Phase II Trial," "Phase III Trial," and "Phase IV Testing" below.

Cohort: A group of clinical trial research participants who share a characteristic of interest.

Control: Standard treatment that is given in a clinical trial and compared against the investigational treatment in order to determine whether the investigational treatment makes a statistically significant difference.

Double-Blind: This describes clinical trials in which, by design, neither the research participants nor the investigators know whether the participants are receiving the experimental intervention that is being studied (for example, an investigational drug) or a non-experimental intervention (for example, a placebo or already approved medication). A third party reveals which group received which intervention after the outcome of the trial has been assessed. The purpose of "double-blinding" a clinical trial is to prevent bias from affecting how the study is carried out or how the results are recorded or interpreted.

Efficacy: The property that enables drugs to produce a beneficial response. Efficacy refers to whether a drug demonstrates a health benefit compared to a placebo or other intervention.

Inclusion/Exclusion Criteria: Clinical and laboratory data that define who is appropriate (eligible) to participate in a specific clinical trial or study, for example, diagnosis, prior treatment history, inhibitor status, organ dysfunction, etc.

Investigational New Drug (IND): A substance under development for potential use as a medication. The term "IND" is often also used as shorthand for the application that must be submitted to the FDA for permission to begin testing a drug in human clinical trials. Such an application contains results of toxicity studies and protocols for manufacturing the drug and carrying out clinical trials.

Institutional Review Board (IRB): A panel or body composed of individuals with relevant scientific, legal, ethical, lay community, and other expertise responsible for reviewing proposed studies involving human subjects before the studies can be undertaken. IRBs can be internal bodies established by the medical center (or other study site) or external commercial bodies under contract to the study site.

Label: The FDA-approved written materials that come with a drug (also called "package insert" or "prescribing information"). The label contains extensive information about the drug, including its approved uses, possible side effects, contraindications, general pharmacokinetic data, results of clinical trials in which the drug was tested, instructions for drug administration, etc.

Maximum Tolerated Dose (MTD): The highest dose of a drug or treatment that does not cause unacceptable side effects. The maximum tolerated dose is determined in clinical trials by testing increasing doses on different groups of people until the highest dose with acceptable side effects are found.

New Drug Application (NDA): The vehicle through which a drug manufacturer submits data about a new drug to the FDA for review and approval for sale and marketing in the U.S. The data gathered during the animal studies and human clinical trials of an investigational new drug (IND) become part of the NDA.

Open-Label: Both research participants and investigators know the drug or intervention being administered to a patient participating in a clinical trial. (Compare with "Double-Blind" above.)

Phase I Trial: A clinical trial in which a drug is tested on a small group of research participants to determine safety and often the maximum tolerated dose of a drug.

Phase II Trial: A clinical trial in which a drug is tested on a small group of patients to establish whether a drug has any potential efficacy and further test the safety of the drug. This phase can only begin after a phase I trial has been completed successfully, although trials are sometimes carried out jointly as phase I/II trials.

Phase III Trial: The phase of testing before a drug can be approved. In a phase III trial a drug is tested on a large group of patients to further establish the efficacy of a drug in treating a disease. The data from this trial is reviewed by the FDA in hopes of approval. This phase can only begin after a phase I/II or phase II trial has been completed successfully.

Phase IV Testing: A clinical study to evaluate a drug for safety or efficacy after it has been approved by the FDA. It is also known as post-marketing surveillance. It does NOT evaluate the drug for new indications.

Previously Untreated Patients (PUPs): An individual or group of individuals that have not been exposed to a certain drug.

Primary Endpoint: The outcome that a study is designed to investigate; this is determined before the trial begins. For example, an endpoint of a study of a new clotting product might be the average number of bleeds experienced by study participants.

Real-world Evidence (RWE): Real-world evidence in medicine is the clinical evidence regarding the usage and potential benefits or risks of a medical product derived from analysis of real-world data.

Serious Adverse Effect (SAE): Reportable events by medical professionals and researchers during the conduct of studies and medical care which include: death, life threatening events, hospitalization, disability or permanent damage or any event requiring intervention to prevent permanent damage or impairment.

Single Blind: This describes clinical trials in which, by design, the research participants do not know whether they are receiving a study drug or device or a placebo intervention, whereas the study investigators do.

Study Arm: A group of research participants that receives a specific type of treatment or has specific characteristics while being studied in the same clinical trial. Clinical trials usually have

two or more arms (for example, one arm of patients who receive a high dose of the study drug, one arm of low-dosed patients, and one arm of patients who receive a placebo).

Top Line Results: The results of statistical analysis indicate if the primary endpoints have been met for the clinical trial. Topline data is the highest quality data with respect to a clinical trial as it includes statistically analyzed summaries of all demographic, safety and endpoint data and not just portions of it. Examples may include showing an experimental drug is statistically superior to another already approved drug or that an experimental drug shows no statistical difference with a placebo.

Trial Sponsor: The person or organization who initiates a clinical trial and holds the investigational new drug application. This is usually but not always the entity that pays the costs of the clinical trial. It may be a governmental organization, a corporation, or an individual investigator.

Artificial Intelligence (AI) Terminology:

Artificial Intelligence: The ability to everage computers and machines to mimic the problem-solving and decision-making capabilities of the human mind.

Data Science: The study of data to extract meaningful insights for business. It is a multidisciplinary approach that combines principles and practices from the fields of mathematics, statistics, artificial intelligence, and computer engineering to analyze large amounts of data.

Deep Learning: A type of machine learning based on artificial neural networks in which multiple layers of processing are used to extract progressively higher level features from data.

Machine Learning: The use and development of computer systems that are able to learn and adapt without following explicit instructions, by using algorithms and statistical models to analyze and draw inferences from patterns in data.

Large Language Model (LLM): A large language model is a type of machine learning model designed for natural language processing tasks such as language generation.

Generative Pre-trained Transformer (GPT): A type of large language model and a prominent framework for generative artificial intelligence.

Mental Health Terminology:

Anxiety: Anxiety is a feeling of fear, tension, or worry that occurs as a response to real or perceived threats.

Bipolar disorder: is an illness characterized by extreme swings in mood, energy and activity level.

Cognitive Behavioral Therapy: a type of psychotherapy in which negative patterns of thought about the self and the world are challenged in order to alter unwanted behavior patterns or treat mood disorders.

Coping Skill: a strategy to help you deal with difficult situations and lessen unpleasant emotions, thoughts, or behaviors

Depression: is sad or low mood which persists for at least two weeks.

Eating disorders: disturbances in eating behaviors and distorted thoughts and emotions about how their body looks or feels.

Mental health: Mental health includes our emotional, psychological, and social well-being. It affects how we think, feel, and act. It also helps determine how we handle stress, relate to others, and make choices.

Mental health challenge: A mental health challenge is a major change in a person's thinking, feeling or behavior which interferes with a person's ability to live their life and to relate to others and to their surroundings.

Post traumatic stress disorder (PTSD): is a disorder that can occur after a person has experienced a traumatic event.

Psychiatrist: a licensed medical doctor who has completed additional psychiatric training; can diagnose mental health conditions, prescribe and manage medication, and provide therapy

Psychotherapy: The treatment of mental conditions by verbal communication and interaction.

Psychotic disorders: Psychosis is a condition in which a person has lost contact with reality.

Social Worker: Provides mental health services for the prevention, diagnosis, and treatment of mental, emotional, and behavioral disorders in individuals, families, and groups.

Stigma: negative, judgmental, and/or discriminatory attitudes toward mental health challenges and those who live with them

Substance use disorder (SUD): is a pattern of using alcohol or another substance that results in impairment in daily life or noticeable distress.

Therapist: A mental health professional trained to help individuals understand and cope with their thoughts, feelings, and behaviors; may assess and/or diagnose mental health conditions

COVID-19 and Vaccination Terminology:

Coronavirus: A large family of viruses that cause respiratory illness. Some produce mild, cold-like symptoms while others can produce severe symptoms (i.e. SARS-CoV-2).

COVID-19: The respiratory disease caused by a novel coronavirus known as SARS-CoV-2. COVID-19 stands for coronavirus disease 2019.

mRNA (messenger RNA): A single-stranded molecule that is complementary to one of the DNA strands of a gene. mRNA is 'read' by a ribosome inside a cell in the process of protein synthesis. mRNA can be thought of as instructions for the cell on how to make a protein.

mRNA Vaccine: A vaccine that uses mRNA to produce an immune response. For COVID-19, the mRNA in the vaccine provides instructions to make COVID-19's spike protein. Once absorbed, the body makes the harmless protein and displays it on the cell surface. The spike protein is then recognized as foreign, eliciting the immune system to produce antibodies to fight off this perceived infection. The immune system is then primed to protect against future infection.

SARS-CoV-2: The scientific name of the new strain of coronavirus that causes the respiratory disease COVID-19. SARS stands for severe acute respiratory syndrome.

Vaccine: A product that stimulates a person's immune system to produce protection from an infectious disease without inducing the disease.

Sources:
Hemophilia Federation of America: www.hemophiliafed.org
National Bleeding Disorders Foundation: www.hemophilia.org