Abbreviations and Important Terms

AA: *Aplastic anemia.* A condition that occurs when the bone marrow fails to produce the proper amount and type of blood cells.

Adencocarcinoma: Cancers that form from cells that line the internal organs.

ALP: *Alkaline phosphatase*. An enzyme used to detect liver and bone disease.

ALT: *Alanine aminotransferase*. An enzyme used to assess liver function.

AML: *Acute myelogenous leukemia.* A cancer of the blood and bone marrow.

Anal cytology: Sometimes called an anal Pap test, this is a screening test used to detect anal cancers and precancerous lesions. During the test, cells are collected from the anus and examined under a microscope to identify abnormalities.

ANC: *Absolute neutrophil count.* The number of neutrophils in the blood. Neutrophils are immune cells that fight off infections.

Androgens: Hormones produced in the body that stimulate the development of male sex characteristics, such as testes formation and sperm production.

Anorectal malformations: A spectrum of disorders involving the rectum and anus. These malformations may include a blockage of the anus, a failure of the rectum to connect to the anus, or an abnormal passage between the rectum and another part of the body, such as the urinary tract or reproductive system.

Anoscopy: A medical procedure in which the doctor uses a tube-shaped instrument called an anoscope to search inside the anus and rectum for abnormalities.

Antibodies: Proteins produced by the blood to attack foreign material—such as bacteria, viruses, or transplants—that the body does not recognize as part of its self.

Aseptic necrosis of bone: Loss of bone primarily in the hip, knee and shoulder joints.

AST: *Aspartate aminotransferase.* Levels of this enzyme are measured to detect liver damage.

ATG: *Antithymocyte globulins.* Animal-derived antibodies that attack a patient's immune cells. Treatment with ATG helps prevent the patient's immune system from rejecting a transplant. ATG is also used as a therapy for aplastic anemia.

Autosomal recessive condition: A genetic condition that is passed on when an individual inherits two copies of an abnormal gene: one copy from the mother and another from the father. It's called "recessive" because the person must inherit *both* copies of the gene to develop the condition. This gene is located on one of the chromosomes numbered 1-22, which are called autosomes.

Autosomal dominant condition: A genetic condition that can be passed on when an individual inherits only one copy of an abnormal gene. It's called "dominant" because just one copy of the gene is sufficient to pass on the disease.

B cells: Type of white blood cell, lymphocyte, that is responsible for antibody production.

BCC: *Basal cell carcinoma*. The most common type of skin cancer in the general public.

Basophil: Type of white blood cell that is involved in allergic reactions.

Biallelic mutations: Genetic changes that are found in both copies (alleles) of the same gene.

Biopsy: A medical procedure in which the doctor removes a small piece of tissue, which is then examined under a microscope to determine whether dysplasia (pre-cancer) or cancer is present.

BMI: *Body mass index.* A measure of physical fitness that accounts for height and body weight.

BMT: *Bone marrow transplant.* A medical procedure in which a patient's bone marrow is replaced with bone marrow from a suitable donor. In most cases,

a patient's bone marrow will be destroyed by medication or radiation therapy before the transplant is performed.

Bone marrow: The spongy material inside bones where blood cells are made.

BU: *Busulfan.* A drug used to treat chronic myelocytic leukemia.

Café au lait spots: Flat, light brown birthmarks.

Carrier: An individual who inherits a single copy of an abnormal gene for an autosomal recessive disorder. Carriers usually do not develop the disorder, but can pass a copy of the abnormal gene onto their children.

Carrier frequency: The proportion of carriers in a population.

CBC: *Complete blood count*. Gives the number, and/or percentage, and/or characteristics of certain blood cells, primary white cells, red cells, and platelets.

Centralization: A surgical procedure that moves and centers the wrist over the end of the ulna (a large bone in the forearm).

Chelation: The use of a chelator (an organic chemical that bonds with and removes free metal ions) to bind with a metal (such as iron) in the body. Chelation may inactivate and/or facilitate excretion of a toxic metal. In FA patients, most often refers to a method for getting rid of excess iron.

Chromosomes: Strands of DNA that are passed down from parents to children. Most humans have 23 pairs of chromosomes, including 1 pair of sex chromosomes (females have two 'x' sex chromosomes; males have one 'x' and one 'y' sex chromosome).

Chromosome breakage (fragility) test: Often the first test to diagnose a patient with FA, this test measures the types and rates of breakages and rearrangements found in the chromosomes of cells. It also reveals how well the chromosomes can repair themselves after injury.

CIBMTR: *Center for International Blood and Marrow Transplant Research.* An organization that supports research to discover, apply, and improve therapies for bone marrow failure. Read more at http://www.cibmtr.org.

Clastogen: An agent that induces breaks in chromosomes.

Clone: A population of cells.

Clonal abnormalities: Changes in the structure or number of chromosomes in certain cells of the bone marrow.

Clonal evolution: A process by which cells acquire new abnormalities.

Clonal expansion: An increase in the percentage of cells with identical abnormalities.

CMV: *Cytomegalovirus.* A relatively common virus in the herpes family that causes mild symptoms in healthy people but can pose a serious health risk to immune-compromised individuals.

Colposcopy: A medical procedure in which a doctor uses an illuminated magnifying device called a colposcope to examine the vulva, vagina, and cervix. The procedure allows the doctor to find abnormal tissues that may be missed by the naked eye.

Complementation Group: A group of genes that works together to produce a person's physical characteristics. Prior to the identification of the genes and genetic mutations that cause FA, patients with the disease were classified into sub-categories known as complementation groups based on the patient's cellular features. These complementation groups correspond to the various FA genes (e.g., individuals who belong to complementation group A have mutations in the *FANCA* gene, whereas individuals who belong to complementation group B have mutations in the *FANCB* gene).

Cortisol: A steroid produced by the body that plays important roles in the stress response, immunity, metabolism of nutrients, and other processes.

CSA: *Cyclosporine.* A drug that suppresses the immune system and is used to prevent transplant rejection.

CY: *Cyclophosphamide.* A drug capable of killing specific types of cells. This drug is used to suppress the immune system and is also used to treat cancer.

Cytogenetic evaluation: A laboratory test that examines parts of the patient's cells, including chromosomes.

Cytopenia: An abnormally low number of blood cells.

DEB: *Diepoxybutane*. A chemical used in the chromosome breakage test.

DNA Crosslinks: Refers to two types of crosslinks. *Interstrand*: when a molecule binds to two positions on the same DNA molecule; *Interstrand*: when a molecule binds to two different DNA molecules.

Duodenal Atresia: A condition in which the entrance to the small intestine, known as the duodenum, is incomplete or blocked and does not allow the contents of the stomach to enter the intestines.

DXA: *Dual energy absorptiometry*. The primary test used to identify osteoporosis and low bone mass. It uses a low energy x-ray to evaluate bone density in the hip and/or spine and sometimes the wrist.

Dyslipidemia: Unhealthy levels of cholesterol and triglycerides.

EA: *Esophageal atresia.* A condition in which the lower end of the esophagus—the tube that connects the mouth to the stomach—is incomplete or blocked and does not allow food to pass from the esophagus into the stomach.

EBV: *Epstein-Barr virus*. A herpes virus that can be reactivated after bone marrow transplant, resulting in post-transplant lympho-proliferative disease (PTLD) or lymphoma.

Endocrine: The endocrine system produces hormones that allow the body to develop and function.

Erythrocytes: Also known as red blood cells. They carry oxygen to the body's tissues.

Erythroplakia: Also known as erythroplasia. A reddened patch in the oral or genital mucosa that is considered to be a precancerous lesion.

Esophagoscopy: Examination of the esophagus by means of a flexible endoscope, a thin, tube-like instrument with a light and a lens for viewing.

Exons: Segments of DNA that contain information needed to make proteins.

Extracorporeal photopheresis: A procedure used to treat chronic GvHD, in which the patient's blood is treated with drugs that become active when they are exposed to ultraviolet (UV) light.

FA: *Fanconi anemia.* An inherited disease that affects the bone marrow's ability to produce blood cells.

Ferritin: A protein that binds and stores iron. The levels of ferritin in the blood increase as the amount of iron in the body increases.

FISH: *Fluorescence in situ hybridization.* A laboratory technique that allows visualization of the chromosomal abnormalities in cells.

Flow cytometry: A laboratory technique used to diagnose blood cancers and other conditions that can separate, count, and evaluate cells with distinct characteristics.

FLU: *Fludarabine*. A drug capable of suppressing the immune system before transplant to prevent rejection of the new blood-forming stem cells, and is also used to treat some cancers.

FSH: *Follicle stimulating hormone*. A hormone produced by the pituitary gland that stimulates the growth of ovarian follicles in women and sperm-producing cells in men.

Gastrointestinal system: This system digests food and absorbs the nutrients the human body needs to function properly.

G-Banding: A laboratory technique used to visualize chromosomes.

Gene therapy: A novel treatment strategy that attempts to 'correct' a patient's genetic information, or DNA, by replacing a disease-associated gene with a healthy version of the gene.

Glucose: A sugar that provides fuel for human cells to function.

Granulocyte: Type of white blood cell. It is also called neutrophil or polymorphonuclear leukocyte (poly), which is the infection-fighting cell.

Growth curves: Charts that allow physicians to monitor a child's growth over time in comparison with other children of the same age and gender.

GvHD: *Graft-versus-host disease.* This is a complication that can occur after a transplantation if immune cells in the transplanted material identify the patient as "foreign" and mistakenly attack the patient's body.

Hepatic transaminases: Enzymes measured on a liver function test. Elevated levels may indicate liver damage.

Hematopoietic stem cells: Rare blood cells found in the bone marrow and umbilical cord. These cells are unique because they have the potential to

develop into any of the various types of blood cells found in the body. Stem cells from umbilical cord can be extracted at birth and either donated to a public bank or stored at a private bank for the family's future use.

Heterozygotes: Everyone has two copies of nearly all genes. Heterozygous means that one of the copies of a gene is slightly different from the other copy of the gene. One gene may have an FA mutation and the other may not (i.e., a carrier is heterozygous). An individual with FA may be heterozygous if he or she has two different mutations in FA genes.

HgB: *Hemoglobin.* A red blood cell protein that is responsible for transporting oxygen to various parts of the body through the bloodstream.

HLA: *Human leukocyte antigen.* A protein found on the surface of cells in the body; this protein helps the body determine what is "self" and what is "foreign." An HLA-matched donor increases the chances that the patient's body will accept the transplant as "self."

Homozygous: Both copies of a gene are exactly the same. An individual with FA is homozygous if he or she has the same gene mutation in both copies of the FA gene.

HPV: *Human papillomavirus.* The most common sexually transmitted infection.

HSCT: *Hematopoietic cell transplantation.* A medical procedure that destroys the stem cells in a patient's bone marrow and replaces them with stem cells from a donor's bone marrow.

Hydronephrosis: Swelling of the kidneys; occurs when urine accumulates and is unable to make its way out of the kidneys.

Hypoplasia: Underdevelopment or incomplete development of an organ or tissue in the body.

Hypothyroidism: A condition caused by low levels of the thyroid hormone. This condition can contribute to reproductive issues, including irregular periods and difficulty becoming pregnant.

Impaired glucose tolerance: People with impaired glucose tolerance have trouble breaking down the sugars found in their diets, but they do not yet have diabetes.

IVF: *In vitro fertilization.* A treatment for infertility, in which eggs are removed from a woman's ovary and are fertilized by male sperm in a laboratory setting. The fertilized eggs are then prodded to implant in the woman's uterus.

"Late" effects: Health conditions that manifest later in life. For example, health problems associated with bone marrow transplant that develop months or years after the procedure.

Leukemia: Leukemia is a group of bone marrow diseases involving an uncontrolled increase in white blood cells (leukocytes).

Leukoplakia: White patches of epithelium that may occur in the oral cavity. May lead to cancer.

Lymphocyte: Type of white blood cell that fights infection by producing antibodies and other protective substances. There are two types: B-cells and T-cells.

Macrophage: A white blood cell that helps to destroy invading micro-organisms and is involved in the immune response.

MDS: *Myelodysplastic syndrome.* This syndrome encompasses a group of health conditions that develop when a certain type of blood cells (known as the myeloid class of blood cells) are not present in sufficient numbers in the bone marrow. This syndrome was formerly known as "preleukemia."

Melanoma: An aggressive form of skin cancer.

miRNA: *microRNAs.* Short segments of ribonucleic acid that bind to and turn off specific products of the genetic code (i.e., transcribed genes, known as RNA transcripts).

MMC: *Mitomycin C.* A chemical used in the chromosome breakage test.

MMF: *Mycophenolate mofetil.* A drug used to suppress the immune system in patients who receive transplants.

Mosaicism: Cells in the blood system that are genetically different from others. In FA, mosaicism is mainly used to describe cells where a spontaneous mutation reverts the defective FA gene back to the normal DNA sequence, either in stem cells or in T-lymphocytes.

MTX: *Methotrexate.* A drug that prevents the growth of certain types of cells. This drug is used to treat leukemia and other types of cancer.

Neutropenia: A health condition characterized by abnormally low levels of neutrophils in the blood. Neutrophils are immune cells that fight off infections. Therefore, neutropenia can lead to more frequent or severe infections.

Neutrophils: Immune cells that fight off infection.

NMDP: *National Marrow Donor Program.* This United States-based program operates the Be the Match Registry® of volunteer bone marrow, hematopoietic cell, and umbilical cord blood donors.

Opportunistic infection: This type of infection is common in immune-compromised patients who are unable to fight off microbes that do not normally cause disease in humans.

Osteopenia: Lower-than-normal bone density. Osteopenia often leads to osteoporosis.

Osteoporosis: Brittle bones that break easily. This occurs when minerals and protein are depleted from the bones.

Oxidative stress: Occurs when the levels of oxygen and its breakdown products, reactive oxygen species, are too high in cells. Oxidative stress may lead to DNA and other cellular damage.

Pap test: A gynecological test used to detect cervical cancer and precancerous lesions. Also known as cervical cytology testing.

PGD: *Preimplantation genetic diagnosis.* A technology for examining the genetic profiles of *in vitro*-derived embryos before they are implanted in a woman's uterus.

PH: *Peliosis hepatis.* A condition that occurs when blood vessels in the liver called sinusoids become excessively dilated and form large blood-filled spaces, like cysts, that are scattered throughout the liver.

PLT: *Platelets.* Disc-like fragments of cells that circulate in the bloodstream and help promote clotting at the site of a cut or injury.

Pluripotent stem cells: Cells capable of developing into almost any type of cell in the body. Stem cells can be found in embryos, in umbilical cord blood, and in the blood and bone marrow of adults.

Pollicization: A surgical procedure that creates a functional thumb by moving the index finger and its nerves, arteries, tendons, and muscles to the thumb position.

Polypharmacy: The administration of many different medicines during the treatment for the same disease.

Pouce flottant: A so-called "floating" thumb that lacks bones and is composed of skin and soft tissue.

Pre-axial polydactyly: A hand with more than one thumb. The thumbs may be fused together or they may be separate digits.

Radius: Of the two long bones in the forearm, the radius is the shorter and thicker one.

Radialization: A surgical procedure that realigns the patient's wrist.

Recessive: A mutation is said to be recessive if an individual must inherit two copies of the mutant gene, to have the disease. Individuals with one mutant and one normal gene appear normal. They are called "heterozygotes" or "carriers."

Renal dysplasia: Abnormal formation of the kidney, along with irregular cysts.

SCC: *Squamous cell carcinoma*. Type of cancer that is derived from squamous cells. Commonly found on the skin and in the oral cavity.

Short bowel syndrome: This condition occurs when nutrients from food are not properly absorbed because a large segment of the small intestine is non-functional or has been surgically removed.

Stem cells: Cells that can develop into one of many types of specialized cells in the body.

Stem cell gene therapy: A novel treatment that combines gene therapy and stem cell therapy in an effort to correct a faulty gene in the stem cells of the recipient. Stem cells are obtained from the patient, grown and "corrected" in a laboratory, and then returned to the patient.

Stem cell therapy: A novel treatment strategy that introduces new, healthy stem cells into a patient's body to help replace, repair or regenerate diseased tissues.

Sweet's syndrome: Is also called acute neutrophilic dermatosis. A rare skin condition which presents as painful red plaques or nodules.

T cells: White blood cells that play a key role in the immune response by searching out and destroying material that is considered "foreign."

TBI: *Total body irradiation*: Radiation therapy to the entire body, usually followed by umbilical cord blood, bone marrow or peripheral stem cell transplantation.

TEF: *Tracheoesophageal fistula.* An abnormal passage between the esophagus and the trachea, or windpipe, that may result in food from the esophagus crossing into the airways or air entering the esophagus.

Transferrin: A protein in the body that binds and transports iron in the blood.

Thrombocytopenia: Low platelet count.

Transferrin saturation: The amount of iron carried by the transferrin protein in the blood. Saturation increases as the amount of iron in the body increases.

Triglycerides: The building blocks of fats and oils.

Triphalangeal thumb: A thumb that has an extra bone (called a phalanx) that can vary in size and shape.

UCB: *Umbilical cord blood; also known as 'cord blood.'* Blood present in the placenta and umbilical cord of an infant after birth. This blood contains high numbers of stem cells that can be used in transplants.

Unsaturated iron binding capacity test: A test that reveals the amount of transferrin that is not being used to transport iron. Binding capacity decreases as the amount of iron in the body increases.

UV: *Ultraviolet light*.

VACTERL: A group of birth anomalies that are not necessarily related to each other, but tend to occur together. These include vertebral defects, anorectal malformations, cardiac abnormalities, tracheo-esophageal abnormalities, renal defects, and limb defects such as extra fingers or toes, or abnormally formed forearms.

Western blot: A laboratory technique that examines the different types of proteins in a patient's cells.

Wildtype: The form of the gene that occurs in nature. It refers to the non-mutated or "normal" copy of a gene.

X-Linked recessive inheritance: Genes that are inherited on the X sex chromosome. Males have one X chromosome; females have two. If a disorder is X-linked recessive, it means that females must inherit two copies of an abnormal gene for the disease to develop, whereas males need only inherit one.

Definitions are reprinted from previous versions of the Guidelines or come from different chapters in this edition.