Glossary

Accuracy—A measure of the volume or weight of an ingredient to determine that the correct quantities of nutrients, electrolytes, or other components are delivered.[1]

Action limit—An established microbial or airborne particle limit that, when exceeded, should trigger appropriate investigation and corrective action based on the investigation.[2]

Active pharmaceutical ingredient (API)—Any substance or mixture of substances intended to be used in the compounding of a drug preparation, thereby becoming the active ingredient in the preparation and furnishing of pharmacological activity or other direct effect in the diagnosis, cure, mitigation, treatment, or prevention of disease in humans and animals or affecting the structure and function of the body.[3]

Added substances—Suitable substances added to preparations intended for injection to increase stability or usefulness, unless proscribed in the individual *USP–NF* monograph, provided they are harmless in the amounts administered and do not interfere with the therapeutic efficacy or with the responses to the specified assays and tests.[4]

Air changes—The frequency per unit of time (minutes, hours, etc.) that the air within a controlled environment is replaced. The air can be recirculated partially or totally replaced.[5]

Air sampler—Device or equipment used to sample a measured amount of air in a specified time to quantitate the particulate or microbiological status of air in the controlled environment.[5]

Airborne particulate count (also referred to as total particulate count)—The total number of particles of a given size per unit volume of air.[5]

Airborne viable particulate count (also referred to as total airborne aerobic microbial count)—The recovered number of colony-forming units (CFUs) per unit volume of air.[5]

Alert level—An established microbial or airborne particulate count giving early warning of potential drift from normal operating conditions and triggering appropriate scrutiny and follow-up to address the potential problem. Alert levels are always lower than action levels.[6]

Alternative duty—Performance of other tasks that do not include the direct handling of hazardous drugs.[3]

Ampul—Single-use container composed entirely of glass.

Ante-area—An ISO Class 8 or better area where personnel hand hygiene and garbing procedures, staging of components, order entry, labeling of compounded sterile preparations, and other high-particulate-generating activities are performed. It is also a transition area that (1) provides assurance that pressure relationships are constantly maintained so that air flows from clean to dirty areas, and (2) reduces the need for the heating, ventilation, and air conditioning (HVAC) control system to respond to large disturbances.[1]

Ante-room for HD handling—An ISO Class 7 or cleaner room where personnel hand hygiene, garbing procedures, and other activities that generate high particulate levels are performed. The ante-room is the transition room between the unclassified area of the facility and the buffer room.[3]

Antibody—Specific immunoglobulin produced by specialized blood cells (plasma cells) as a reaction to an antigen for the purpose of host defense. Antibodies are blood proteins that are produced in response to a foreign substance or antigen.

Antigen—Macromolecule that elicits an immune response in the body. The most common antigens are proteins (e.g., natural rubber latex) and polysaccharides (e.g., starch). Antigens may be either exogenous or endogenous to the body.

Antineoplastic drug—Chemotherapeutic agent that controls or kills cancer cells. Drugs used in the treatment of cancer are cytotoxic but are generally more damaging to dividing cells than to resting cells.[7]

Antiseptic (germicide)—Agents used to prevent infection and decay by inhibiting the growth

of microorganisms. Because these products are used in or on living humans or animals, they are considered drugs and thus are approved and regulated by the FDA.

Aseptic—Free of living pathogenic organisms or infected materials.[7]

Aseptic processing—Mode of processing pharmaceutical and medical products that involves the separate sterilization of the product and of the package (containers/closures or packaging material for medical devices) and the transfer of the product into the container and its closure under at least ISO Class 5 conditions.[1]

Aseptic technique—Methods used to manipulate sterile products so that they remain sterile.

Assessment of risk—Evaluation of risk to determine alternative containment strategies and/or work practices.[3]

Batch compounding—Compounding of multiple sterile preparation units, in a single discrete process, by the same individuals, carried out during one limited time period.

Beyond-use date (BUD)—For the purpose of USP Chapter <797>, the date or time after which a compounded sterile preparation must not be stored or transported. The date is determined from the date or time the preparation is compounded.[1]

Bioburden—Total number of microorganisms associated with a specific item prior to sterilization.[8]

Biohazard—Infectious agent or hazardous biological material that presents a risk to the health of humans or the environment. Biohazards include tissue, blood or body fluids, and materials such as needles or other equipment contaminated with these infectious agents or hazardous biological materials.[7]

Biological indicator (BI)—A population of microorganisms inoculated onto a suitable medium (e.g., solution, container or closure) and placed within appropriate sterilizer load locations to determine the sterilization cycle efficacy of a physical or chemical process. The challenge microorganism is selected based on its resistance to the given process. Incoming lot D-value and microbiological count define the quality of the BI.[2]

Biological safety cabinet (BSC)—A ventilated cabinet often used for preparation of hazardous drugs. These cabinets are divided into three general classes (Class I, Class II, and Class III). Class II BSCs are further divided into types (Type A1, Type A2, Type B1, and Type B2).[3] (See Chapter 9 for a detailed description of BSCs.)

Biomarker—Biological, biochemical, or structural change that serves as an indicator of potential damage to cellular components, whole cells, tissues, or organs.[7]

Bubble diagram—Schematic drawing of a floor plan that shows which functional areas need to be next to each other. For example, the buffer area must be adjacent to the ante-area. The "bubbles" can be rectangular or oblong shapes that indicate the relative size of the functional areas.

Buffer area—Area where the primary engineering control (PEC) is physically located. Activities that occur in this area include the preparation and staging of components and supplies used when compounding sterile preparations.[1]

Buffer room—As pertains to handling hazardous drugs, a type of containment secondary engineering control (C-SEC) under negative pressure that meets ISO Class 7 or better air quality where the containment primary engineering control (C-PEC) that generates and maintains an ISO Class 5 environment is physically located. Activities that occur in this area are limited to the preparation and staging of components and supplies used when compounding HDs.[3]

Buffer zone—Space designated for compounding sterile preparations (see also *Cleanroom*).[1]

Calibration—The demonstration that a particular instrument or measuring device produces results within specified limits by comparison with those produced by a reference or traceable standard over an appropriate range of measurements.[9]

Certificate of analysis (COA)—A document that reports the results of a test of a representative sample drawn from the batch of material that will be delivered.[9]

Certification—Process by which a nongovernmental agency or organization grants recognition to an individual who has met certain predetermined qualifications specified by that agency or organization. Certification is usually voluntary and usually involves passing a validated, standardized examination.

Chelating agent—A chemical that bonds to trace amounts of metals to prevent the metals from catalyzing an oxidation process.

Chemical disinfectant—A chemical agent used on inanimate surfaces and objects to destroy infectious fungi, viruses, and bacteria, but not necessarily their spores. Sporicidal and antiviral agents may be considered a special class of disinfectants. Disinfectants are often categorized as high-level, intermediate-level, and low-level by medically oriented groups based on their efficacy against various microorganisms.[10]

Chemical stability—Extent to which a product retains, within specified limits and throughout its period of storage and use, the same properties and characteristics that it possessed at the time of preparation.

Chemotherapy drug—Chemical agent used to treat diseases. The term usually refers to a drug used to treat cancer.[7]

Chemotherapy glove—A medical glove that meets the ASTM Standard Practice for Assessment of Resistance of Medical Gloves to Permeation by Chemotherapy Drugs (D6978) or its successor.[3]

Chemotherapy waste—Discarded items such as gowns, gloves, masks, IV tubing, empty bags, empty drug vials, needles and syringes, and other items generated while preparing and administering antineoplastic agents.[7]

Classified space—An area that maintains an air cleanliness classification based on the International Organization for Standardization (ISO).[3]

Cleaning—The process of removing soil (e.g., organic and inorganic material) from objects and surfaces, normally accomplished by manually or mechanically using water with detergents or enzymatic products.[3]

Cleanroom—Room in which the concentration of airborne particles is controlled to meet a specified airborne particulate cleanliness class. Microorganisms in the environment are monitored so that a microbial level for air, surface, and personnel gear are not exceeded for a specified cleanliness class.[1]

Closed-system drug transfer device (CSTD)—A drug-transfer device that mechanically prohibits the transfer of environmental contaminants into the system and the escape of hazardous drugs (HDs) or vapor concentrations outside the system.[3]

Closed system—A device that does not exchange unfiltered air or contaminants with the adjacent environment.[7]

Closure—Seal on a sterile container that prevents leakage, tampering, or entry of contaminants. A closure is part of a container.

Cold temperatures—Temperature not exceeding 8 °C (46 °F).[11]

Colony-forming unit (CFU)—A microbiological term that describes the formation of a single macroscopic colony after the introduction of one or more microorganisms to microbiological growth media. One colony-forming unit is expressed as 1 CFU.[6]

Commissioning of a controlled environment—Certification by engineering and quality control that an environment has been built according to the specifications of the desired cleanliness Class and that, under conditions likely to be encountered under normal operating conditions (or worst-case conditions), it is capable of delivering an aseptic process. Commissioning includes media fill runs and results of the environmental monitoring program.[5]

Component—Any ingredient used in the compounding of a drug preparation, including any active ingredient or added substance that is used in its preparation.[12]

Compounded preparation—A nonsterile or sterile drug or nutrient preparation that is compounded in a licensed pharmacy or other healthcare-related facility in response to or anticipation of a prescription or a medication order from a licensed prescriber.[3]

Compounding—The preparation, mixing, assembling, altering, packaging, and labeling of a drug, drug-delivery device, or device in accordance with a licensed practitioner's prescription, medication order, or initiative based on the practitioner/patient/pharmacist/compounder relationship in the course of professional practice. Compounding includes the following:

- Preparation of drug dosage forms for both human and animal patients
- Preparation of drugs or devices in anticipation of prescription drug orders based on routine, regularly observed prescribing patterns
- Reconstitution or manipulation of commercial products that may require the addition of one or more ingredients
- Preparation of drugs or devices for the purposes of, or as an incident to, research (clinical or academic), teaching, or chemical analysis
- Preparation of drugs and devices for prescriber's office use where permitted by federal and state law[1]

Compounding aseptic containment isolator (CACI)—A specific type of CAI that is designed for the compounding of sterile hazardous drugs (HDs). The CACI is designed to provide worker protection from exposure to undesirable levels of airborne drugs throughout the compounding and material transfer processes and to provide an aseptic environment with unidirectional airflow for compounding sterile preparations.[3]

Compounding aseptic isolator (CAI)—An isolator specifically designed for compounding sterile, nonhazardous pharmaceutical ingredients or preparations. The CAI is designed to maintain an aseptic compounding environment throughout the compounding and material transfer processes.[3]

Compounding personnel—Individuals who participate in the compounding process.[3]

Compounding supervisor—Individual(s) responsible for developing and implementing appropriate procedures; overseeing facility compliance with USP chapters and other applicable laws, regulations, and standards; ensuring the competency of personnel; and maintaining environmental control of the compounding areas.[3]

Container—That which holds the preparation and is or may be in direct contact with the preparation. The closure is part of the container.

Containment primary engineering control (C-PEC)—A ventilated device designed and operated to minimize worker environmental exposures to hazardous drugs by controlling emissions of airborne contaminants through the following:

- The full or partial enclosure of a potential contaminant source
- The use of airflow capture velocities to trap and remove airborne contaminants near their point of generation
- The use of air pressure relationships that define the direction of airflow into the cabinet
- The use of HEPA filtration on all potentially contaminated exhaust streams[3]

Containment secondary engineering control (C-SEC)—The room with fixed walls in which the containment primary engineering control (C-PEC) is placed. It incorporates specific design and operational parameters required to contain the potential hazard within the compounding room.[3]

Containment segregated compounding area (C-SCA)—A type of containment secondary engineering control (C-SEC) with nominal requirements for airflow and room pressurization as they pertain to hazardous drug compounding.[3]

Contamination—The undesired introduction of impurities of a chemical or microbiological nature or foreign matter into or onto a raw material, intermediate, or compounded prepa-

ration during production, sampling, packaging or repackaging, storage, or transport.[9]

Continuing education—Teaching and learning usually approved by an accrediting organization. Continuing education is designed to update the knowledge of a competent practitioner.

Controlled area—Space designated for compounding sterile preparations. This is referred to as the buffer area (e.g., the cleanroom in which the laminar-airflow workbench is located).

Cool temperatures—Temperature between 8 °C and 15 °C (46 °F and 59 °F).[11]

Corrective action—Actions to be performed that are according to standard operating procedures and that are triggered when certain conditions are exceeded.[5]

Critical area—An ISO Class 5 environment.[1]

Critical site—Location that includes any component or fluid pathway surface (e.g., vial septa, injection ports, beakers) or openings (e.g., opened ampuls, needle hubs) exposed and at risk of direct contact with air (e.g., ambient room or HEPA-filtered), moisture (e.g., oral and mucosal secretions), or touch contamination. Risk of microbial particulate contamination of the critical site increases with the size of the openings and exposure time.[1]

Cytotoxic—Pharmacologic compound that is detrimental or destructive to cells within the body.[3]

Deactivation—Treatment of a hazardous drug (HD) contaminant on surfaces with a chemical, heat, ultraviolet light, or another agent to transform the HD into a less hazardous agent.[3]

Decibel—A unit used to measure the intensity of a sound by comparing it with a standard level on a logarithmic scale, thereby indicating the degree of loudness. The A scale is commonly used when measuring decibels, because it most closely represents what the human ear perceives in terms of loudness.[13]

Decontamination—Inactivation, neutralization, or removal of hazardous drug contaminants on surfaces, usually by chemical means.[3]

Demarcation line—The boundary of a specific area.

Direct compounding area (DCA)—Critical area within the ISO Class 5 primary engineering control (PEC) where critical sites are exposed to unidirectional HEPA-filtered air, also known as first air.[1]

Disinfectant—A chemical or physical agent that destroys or removes vegetative forms of harmful microorganisms when applied to a surface.[10]

Disinfection—The process of inhibiting or destroying microorganisms.[3]

Documentation—Record of how a drug was processed and what quality attributes it possesses.

Doff—To remove personal protective equipment (PPE).[3]

Don—To put on personal protective equipment (PPE).[3]

Dynamic—Conditions relating to clean area classification under conditions of normal production.[6] For example, dynamic operating conditions for environmental monitoring means during normal levels of sterile compounding not worst case or simulated compounding conditions.

Engineering controls—Devices designed to eliminate or reduce worker exposures to chemical, biological, radiological, ergonomic, or physical hazards. Examples include laboratory fume hoods, glove bags, retracting syringe needles, safety interlocks, and radiation shielding.[7]

Engineering control for handling hazardous drugs (HDs)—Primary, secondary, and supplemental devices designed to eliminate or reduce worker exposure to HDs.[3]

Environmental monitoring program—Documented program implemented via standard operating procedures that describes in detail the methods and acceptance criteria for monitoring particulates and microorganisms in controlled environments (air, surface, personnel gear). The program includes sampling sites, frequency of sampling, and investigative and corrective actions.[5]

EPA-registered disinfectant—Antimicrobial products registered with the Environmental Protection Agency (EPA) for healthcare use against pathogens specified in the product labeling.[3]

Ergonomic design—Arrangement of a workspace to accommodate each individual's capacities and limitations, allowing them to work safely and efficiently. This includes an optimum ambient environment and adjustable furniture.[13]

Expiration date (expiry date, shelf life)—The date designating the time during which a commercial product is expected to remain within specifications and after which it should not be used.[9]

Extemporaneous compounding—Preparation of drugs or solutions that have no commercially available equivalents.

Externally vented—Exhausted to the outside.[3]

First air—Air exiting the HEPA filter in a unidirectional air stream that is essentially particle free.[1]

Freezer—Cold place in which the temperature is maintained thermostatically between –20°C and –10°C (–4°F and –14°F).[11]

Gap analysis—Resource assessment tool enabling an organization to compare its actual performance with its expected performance. At its core are two questions: Where are we? Where do we want to be?

Genotoxic—Capable of damaging the DNA and leading to mutations.[7]

Globally Harmonized System of Classification and Labeling of Chemicals (GHS)—A system for standardizing and harmonizing the classification and labeling of chemicals.[3]

Goggles—Tight-fitting eye protection that completely covers the eyes, eye sockets, and facial area that immediately surrounds the eyes. Goggles provide protection from impact, dust, and splashes. Some goggles fit over corrective lenses.[3]

Hard-stop—Command that is placed in automated compounding device software, which does not allow parenteral nutrition to be compounded when certain conditions are met or not met.

Hazard analysis and critical control points (HACCP)—Analyzing the compounding process and flow charting it to ensure that it reflects the actual procedure that is performed. Once the procedure has been clearly identified, the hazards within the procedures are identified.

Hazardous drug (HD)—Any drug identified by at least one of the following criteria:

- Carcinogenicity, teratogenicity, or developmental toxicity
- Reproductive toxicity in humans
- Organ toxicity at low dose in humans or animals
- Genotoxicity or new drugs that mimic existing HDs in structure or toxicity[3]

Hazardous waste—Waste that is a Resource Conservation and Recovery Act (RCRA) Subtitle C (RCRA) listed as hazardous waste [40 CFR 261.30–33] or that meets a RCRA characteristic of ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR 261.21–24.[7]

Health Level-7, HL7—A set of international standards for transfer of clinical and administrative data between software applications used by various healthcare providers. These standards focus on the application layer, which is "layer 7" in the OSI model. The HL7 standards are produced by the Health Level Seven International, an international standards organization, and are adopted by other standards issuing bodies such as American National Standards Institute and International Organization for Standardization.[14]

High-efficiency particulate air (HEPA) filtration—An extended-medium, dry-type filter in a rigid frame, having a minimum particle collection efficiency of 99.97% for particles with a mass median diameter of 0.3 μm when tested at a rated airflow in accordance with MIL STD 282 using IEST Recommended Standard RP-CC001.5.[3]

Horizontal laminar flow workbench (HLF)— Device that protects the work product and the work area by supplying HEPA-filtered air to the rear of the cabinet and producing a horizontal flow across the work area and out toward the worker.[7]

Human factors—The scientific discipline concerned with interactions among humans and other elements of a system, and the profession that applies the theory, principles, data, and methods to design systems that optimize human well-being and overall system performance.[13]

Hydrolysis—Attack of labile bonds in dissolved drug molecules by water with resultant molecular changes.

Illumination level—The quantity of light energy reaching an area as measured (in lux or foot-candles) by a photometer with an illuminance sensor; this indicates brightness. A lux is a unit of illuminance, measured in lumens per square meter. A foot-candle (fc) is lumens/square foot, and is also commonly measured by light meters. The term candela replaced fc as the International System (SI) measure of luminous intensity and represents 1 lumen/steradian (lm/st).[13]

Incompatibility—Physical or chemical phenomenon that reduces the concentration of the active ingredient(s).

In-process testing—Method to verify that the compounding environment and the actual preparation meet established criteria.

Instability—Chemical processes that result in degradation or change in the active ingredients, including hydrolysis, oxidation, reduction, and photo-degradation reactions.

Isolator—Device that is sealed or is supplied with air through a microbially retentive filtration system (HEPA minimum) and may be reproducibly decontaminated. When closed, an isolator uses only decontaminated interfaces or rapid transfer ports (RTPs) for materials transfer. When open, it allows for the ingress and/or egress of materials through defined openings that have been designed and validated to preclude the transfer of contaminants or unfiltered air to adjacent environments. An isolator can be used for aseptic processing, for containment of potent compounds, or for simultaneous asepsis and containment.[7]

Labeling—Term that designates all labels and other written, printed, or graphic matter on an immediate container of an article or preparation or on, or in, any package or wrapper in which it is enclosed, except any outer shipping container. The term label designates that part of the labeling on the immediate container.[1]

Laminar airflow workbenches (LAFWs)—A controlled environment created by a HEPA filter to retain airborne particles and microorganisms, and its use decreases the chance of contamination of compounded preparations.

Licensure—Process by which a government agency or board grants permission to an individual to engage in a given occupation or professional practice. Licensure is contingent on an applicant's successful completion of certain specified minimal levels of competency necessary to ensure the public's health, safety, and welfare.

Manufacturing—The production, propagation, conversion, or processing of a drug or device, either directly or indirectly, by extraction of the drug from substances of natural origin or by means of chemical or biological synthesis. Manufacturing may also include any packaging or repackaging of the substance(s) or labeling or relabeling of containers for resale by pharmacies, practitioners, or other persons.[1]

Mass reconstitution—Reconstitution of parenteral drugs in bulk and then refrigerating or freezing them for later use.

Master facilities plan—Floor plan based on the strategic plan of the organization in terms of the facilities needed to accommodate all planned activities, along with a timeline to show when facility needs will occur. A department master facilities plan should be congruent with the master facilities plan for the parent organization.[15]

Master formulation record—Documentation, written or electronic, that enables a

compounder to systematically trace, evaluate, and replicate the steps included throughout the preparation process of a compounded preparation. The master formulation record includes (1) official or assigned name, strength, and dosage form of the preparation; (2) calculations needed to determine and verify quantities of components and doses of active pharmaceutical ingredients; (3) description of all ingredients and their quantities; (4) compatibility and stability information, including references when available; (5) equipment needed to prepare the preparation, when appropriate; (6) mixing instructions; (7) sample labeling information; (8) container used in dispensing; (9) packaging and storage requirements; (10) description of final preparation; and (11) quality control procedures and expected results.[1] (See Chapter 22.)

Media fill test—Test used to qualify aseptic technique of compounding personnel or processes and to ensure that the processes used are able to produce sterile product without microbial contamination. During this test, a microbiological growth medium such as soybean–casein digest medium is substituted for the actual drug product to simulate admixture compounding.[1]

Multiple-dose container (or multidose container)—A packaging system that permits withdrawal of successive portions of an article for parenteral administration without changing the safety, strength, quality, or purity of the remaining portion.[11]

Mutagenic—Capable of increasing the spontaneous mutation rate by causing changes in the DNA.[7]

Negative-pressure room—A room that is maintained at a lower pressure than the adjacent areas; therefore the net flow of air is into the room.[3]

Occupational exposure limit (OEL)—Industry or other nongovernment exposure limit usually based on scientific calculations of airborne concentrations of a substance that are considered to be acceptable for healthy workers.[7]

Open reservoir mixing—Combining either sterile or nonsterile ingredients using an open-system transfer or an open reservoir before terminal sterilization or subdivision into units.

Orientation—On-the-job training necessary for an individual to understand the policies and procedures used at a specific practice site.

Outsourcing facility—Compounding pharmacy at one geographic location or address that (1) is engaged in the compounding of sterile drugs; (2) has elected to register with the FDA as an outsourcing facility; and (3) complies with all of the requirements of Section 503B. Major requirements include registration with FDA, reporting of adverse events and products compounded to FDA, and payment of fees to FDA. Outsourcing facilities are permitted to compound and distribute drugs without receiving individual patient prescriptions, but they are not exempt from current good manufacturing practices.[16]

Parenteral—General route of administration which is characterized by injection through the skin or other external boundary tissue or implantation within the body. Specific parenteral routes include intravenous, intraventricular, intra-arterial, intra-articular, subcutaneous, intramuscular, intrathecal, intracisternal, and intraocular.[17]

Particulates—Airborne particles found in the environment are pollen, dust, bacteria, miscellaneous living and dead organisms, skin flakes, hair, clothing lint, cosmetics, respiratory gases, and bacteria from perspiration.

Pass-through—An enclosure with interlocking doors that is positioned between two spaces for the purpose of reducing particulate transfer while moving materials from one space to another. A pass-through serving negative-pressure rooms needs to be equipped with sealed doors.[3]

Permissible exposure limit (PEL)—Time-weighted average concentration of a substance to which nearly all workers may be exposed for up to 8 hours per day, 40 hours per week for 30 years without adverse effects. A PEL may also include a skin designation.[7]

Personal protective equipment (PPE)—Items such as gloves, gowns, respirators, goggles, face shields that protect individual workers from hazardous physical or chemical exposures.[3]

Pharmacy bulk package—A container of a sterile preparation for parenteral use that contains many single doses. The contents are intended for use in a pharmacy admixture program and are restricted to the preparation of admixtures for infusion or, through a sterile transfer device, for the filling of empty sterile syringes. The closure shall be penetrated only one time after constitution with a suitable sterile transfer device or dispensing set, which allows measured dispensing of the contents. The pharmacy bulk package is to be used only in a suitable work area such as a laminar flow hood (or an equivalent clean air compounding area).[1]

Photodegradation—Catalysis of degradation reactions by light.

Photolysis—Catalysis of degradation reactions by light.

Physical incompatibility—Visible changes in a preparation, such as precipitation, cloudiness or haziness, color change, viscosity change, cracking, and effervescence. (See also *Visual Incompatibility*.)

Plenum—Space in a ventilation system or device that receives air for distribution.

Policy—General statement that provides a basis for decision-making. It addresses what must be done and, sometimes, why and when. Policies are written statements that provide guidance on the position and values of an organization. They are often considered broad operational guidelines, but they should clearly define the direction and activities of an organization or department.

Pooling—Preparations are made by combining sterile ingredients in a sterile closed system, by aseptic transfer, before subdivision into patient units.

Positive-pressure room—A room that is maintained at a higher pressure than the adjacent areas; therefore, the net flow of air is out of the room.[3]

Precision—A measure or trend of the day-to-day variations in performance of the accuracy measures.[1]

Preparation—A preparation, or a compounded sterile preparation (CSP), that is a sterile drug or nutrient compounded in a licensed pharmacy or other healthcare-related facility pursuant to the order of a licensed prescriber; the article may or may not contain sterile products.[1]

Preparation traceability—Essential element of any sterile preparation compounding program, that includes complete documentation for a compounded sterile preparation (CSP), such as drug name, manufacturer, lot number and expiration date, name or initials of pharmacist or technician who compounded the CSP and unique identifier (batch number or lot number) that allows the final preparation to be traced back to source providing the necessary assurance as to the formulation, characteristics, and integrity of the preparation.

Pressure differential—Measurement of air pressures between two adjoining areas where the air pressure in the more stringently classified area is higher than the pressure of the next classified area.

Primary engineering control (PEC)—Device or room that provides an ISO Class 5 environment for the exposure of critical sites when compounding sterile preparations. Such devices include, but may not be limited to, laminar airflow workbenches (LAFWs), biological safety cabinets (BSCs), compounding aseptic isolators (CAIs), and compounding aseptic containment isolators (CACIs).[1]

Probability of a nonsterile unit (PNSU)—Probability of a compounded sterile preparation being nonsterile after it has been exposed to a validated sterilization process (e.g., filtration, moist heat, ionizing radiation, ethylene oxide) or to aseptic compounding techniques.

Procedure—A "how to" document that provides methods for carrying out a policy. Procedures outline the complete cycle of a task, step by step, and assign responsibility to specific personnel. Procedures are written instructions

that describe the recommended methods of sequential steps to follow to perform a task or activity. Procedures define the process for completing a task. (See *Standard Operating Procedures*.)

Process validation—Test that mimics an actual and entire compounding procedure using a suitable growth medium such as tryptic soy broth (TSB) instead of using ingredients to prepare a finished compounded preparation. USP Chapter <797> does not recognize process validation or process simulation as a means to extend beyond-use dates of a product or a batch of products.[18] (See *Media Fill Test*.)

Product—Commercially manufactured sterile drug or nutrient that has been evaluated for safety and efficacy by the FDA. Products are accompanied by full prescribing information, which is commonly known as the FDA-approved manufacturer's labeling or product package insert.[1]

Product quality and characteristics—Product attributes like sterility, potency, identity, strength, quality, and purity associated with environmental quality, preparation activities, and checks and tests.[8]

Quality assurance (QA)—The total of the organized arrangements made to ensure that all compounded sterile preparations are of the quality required for their intended use and that quality systems are maintained.[9]

Quality control (QC)—Checking or testing that specifications are met.[9]

Quarantine—The status of materials isolated physically or by other effective means pending a decision about their subsequent approval or rejection.[9]

Radionuclide—Atom with an unstable nucleus, which is a nucleus characterized by excess energy that is available to be imparted either to a newly-created radiation particle within the nucleus, or else to an atomic electron. The radionuclide undergoes radioactive decay and emits gamma rays and/or subatomic particles. These particles constitute ionizing radiation. Radionuclides may occur naturally, but they can also be artificially produced.

Recommended exposure limit (REL)—Occupational exposure limit recommended by the National Institute of Occupational Safety and Health (NIOSH) as being protective of worker health and safety over a working lifetime. The REL is frequently expressed as a time-weighted average exposure to a substance for up to a 10-hour workday during a 40-hour work week.[7]

Refrigerator—Cold place in which the temperature is maintained thermostatically between 2°C and 8°C (36°F to 46°F).[11]

Registration—Process of including a person's name on a registry with a state agency or regulatory board. Registration is the lowest form of "regulating" a group of individuals. Registration enables the agency or board to track where those individuals are employed to practice.

Regulations—Rules promulgated by a state or federal agency as needed to apply the concepts encompased in a law or statute.

Relative humidity (RH)—Ratio of the amount of water vapor present in the air relative to the greatest amount possible of water vapor at the same temperature.

Repackaging—The act of removing a product from its original primary container and placing it into another primary container, usually of smaller size.[3]

Repetitive motion injury—An injury that is temporary or permanent to muscles, nerves, ligaments, and tendons caused by doing the same motion over and over again. A common repetitive motion injury is carpal tunnel syndrome.[19]Also called repetitive stress injury.

Respirator—Type of personal protective equipment (PPE) that prevents harmful materials from entering the respiratory tract, usually by filtering hazardous agents from workplace air. A surgical mask does not offer respiratory protection.[7]

Risk assessment—Characterization of potentially adverse health effects from human exposure to environmental or occupational hazards. Risk assessment can be divided into five major steps: hazard identification, dose-response assessment, exposure assessment, risk characterization, and risk communication.[7]

Safety data sheet (SDS)—An informational document that provides written or printed material concerning a hazardous chemical. The SDS is prepared in accordance with the Health Communication Standard (previously known as a material safety data sheet (MSDS).[3]

Sampling plan—A documented plan that describes the procedures and methods for sampling a controlled environment; identifies the sampling sites, the sampling frequency, and number of samples; and describes the method of analysis and how to interpret the results.[5]

Sampling sites—Documented geographical location, within a controlled environment, where sampling for microbiological evaluation is taken. In general, sampling sites are selected because of their potential for product/container—closure contacts.[5]

Sanitizing agent—Agent for reducing, on inanimate surfaces, the number of all forms of microbial life including fungi, viruses, and bacteria.[10]

Secondary engineering control—Term that refers to cleanrooms, buffer areas, or ante-areas in which air quality meets cleanliness standards of the International Organization for Standardization (ISO) and which serve as a core for the location of the primary engineering control.[1]

Segregated compounding area—Designated space, either a demarcated area or room, that is restricted to preparing low-risk level compounded sterile preparations (CSPs) with 12-hour or less beyond-use dates. Such an area must contain a device that provides unidirectional airflow of ISO Class 5 air quality for preparation of CSPs and shall be void of activities and materials that are extraneous to sterile compounding.[1]

Shelf life—Longest time period during which 90 percent or more of the labeled active ingredient is available for delivery. (See also *Expiration Date*.)

Single-dose container (or single-use container)—Single-unit container for articles or preparations intended for parenteral administration only. It is intended for a single use. A single-dose container is labeled as such. Examples of single-dose containers include prefilled syringes, cartridges, fusion-sealed containers, and closure-sealed containers when so labeled.[1]

Sorption—Situation in which drug is lost (from the solution to be administered) by adsorption to the surface or absorption into the matrix of the container material, administration set, or filter.

Spill kit—A container of supplies, warning signage, and related materials used to contain the spill of a hazardous drug.[3]

Sporicidal agent—An agent that destroys bacterial and fungal spores when used in sufficient concentration for a specified contact time. It is expected to kill all vegetative microorganisms.[10]

Stability—Extent to which a preparation retains, within specified limits, and throughout its period of storage and use, the same properties and characteristics that it possessed at the time of compounding.

Standard operating procedure (SOP)—Written procedures describing operations, testing, sampling, interpretation results, and corrective actions that relate to the operations that are taking place.[3]

Standard precautions (formerly universal precautions)—Practice in healthcare of treating all patients as if they were infected with HIV or other similar diseases by using barriers to avoid known means of transmitting infectious agents (Centers for Disease Control; 1987, 1988). Barriers can include nonporous gloves, goggles, and face shields. Careful handling and disposal of sharps or the use of needleless systems are also important.[7]

Sterility assurance level (SAL)—A term used in microbiology to describe the probability of a single unit being nonsterile after it has been subjected to the sterilization process. SAL is also used to describe the killing efficacy of a sterilization process, where a very effective sterilization process has a very high SAL.

Sterilization—Vailidated process used to render a preparation free of viable organisms.

Sterilization by filtration—Passage of a fluid or solution through a sterilizing grade membrane to produce a sterile effluent.[1]

Sterilizing grade membranes—Membranes that are documented to retain 100% of a culture of 10^7 microorganisms of a strain of *Brevundimonas* (Pseudomonas) *diminuta* per square centimeter of membrane surface under a pressure of not less than 30 pounds per square inch (2.0 bar). Such filter membranes are nominally at 0.22-mm or 0.2-mm nominal pore size, depending on the manufacturer's practice.[1]

Supplemental engineering control—An adjunct control [e.g., closed-system drug transfer device (CSTD)] that may be used concurrently with primary and secondary engineering controls. Supplemental engineering controls offer additional levels of protection and may facilitate enhanced occupational protection, especially when handling hazardous drugs outside of primary and secondary engineering controls (e.g., during administering).[3]

Swabs (for microbiological sampling)—Devices used to remove microorganisms from irregular or regular surfaces for cultivation to identify the microbial population of the surface. A swab is generally composed of a stick with an absorbent tip that is moistened before sampling and is rubbed across a specified area of the sample surface. The swab is then rinsed in a sterile solution to suspend the microorganisms, and the solution is transferred to growth medium for cultivation of the microbial population.[5]

Temperature—Degree of hotness or coldness measured on a definite scale. Units of measure are either in Fahrenheit (U.S.) or Celsius (metric).

Terminal sterilization—Application of a lethal process (e.g., steam under pressure or autoclaving) to sealed containers for the purpose of achieving a predetermined sterility assurance level of usually less than 10^{-6} or a probability of less than one in one million of a nonsterile unit.[1]

Threshold limit values (TLVs)—Values are exposure limits of airborne concentrations of chemical substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, over a working lifetime, without adverse health effects.[7]

Total nutrient admixture (TNA)—Dextrose, amino acids, and fat emulsions/lipids combined in one container.

Training—Process of making or becoming prepared to perform a skill.

Trend analysis—Data from a routine microbial environmental monitoring program that can be related to time, shift, facility, etc. This information is periodically evaluated to establish the status or pattern of that program to ascertain whether it is under adequate control. A trend analysis is used to facilitate decision-making for requalification of a controlled environment or for maintenance and sanitization schedules.[5]

Unclassified space—A space not required to meet any air cleanliness classification based on the International Organization for Standardization (ISO).[3]

Unidirectional flow—Airflow moving in a single direction in a robust and uniform manner and at sufficient speed to reproducibly sweep particles away from the critical processing or testing area.[1]

Validation—A documented program that provides a high degree of assurance that a specific process, method, or system will consistently produce a result meeting predetermined acceptance criteria.[9]

Ventilated cabinet—Type of engineering control designed for purposes of worker protection. These devices are designed to minimize worker exposures by controlling emissions of airborne contaminants through the following:

- Full or partial enclosure of a potential contaminant source
- Use of airflow capture velocities to capture and remove airborne contaminants near their point of generation
- Use of air pressure relationships that define the direction of airflow into the cabinet
- Examples of ventilated cabinets include biological safety cabinets, containment isolators, and laboratory fume hoods.[7]

Ventilated control—A device such as a biological safety cabinet or isolator that vents exhaust away from the critical area.

Verification—Authoritatively signed assurance and documentation that a process, procedure, or piece of equipment is functioning properly and producing the expected results. The act of verification of a compounding procedure involves checking to ensure the calculations, weighing and measuring, order of mixing, and compounding techniques and equipment were appropriate and accurately performed.[20]

Vial—A plastic or glass container with a rubber closure secured to its top by a metal ring.

Visual incompatibility—Visible changes in a preparation, such as precipitation, cloudiness or haziness, color change, viscosity change, cracking, and effervescence. (See also *Physical Incompatibility*.)

Workflow system—In the context of sterile compounding, a workflow system is software that accepts CSP orders from the pharmacy system, populates a workflow queue, generates a compounding label, allows verification via either barcode scan or gravimetric check, and captures images of relevant steps in the compounding process. When doses are ready to be verified, a pharmacist accesses the system reviewing each step the technician took to prepare the CSP and verifies the images associated with each dose for accuracy. The pharmacist is able to complete this verification process remotely from any workstation with access to the workflow system. As the pharmacist verifies a dose as correct, the workload system produces a single barcode label to be applied to that dose indicating the dose is ready for delivery. Verified doses then can be scanned during subsequent steps of the delivery process, which creates an audit trail and allows pharmacy staff to view status and/or location of the dose during the compounding and delivery processes.[21] (See details in Chapter 26.)

Workplace environmental exposure level (WEEL)—Occupational exposure limits developed by the American Industrial Hygiene Association as a chemical concentration to which nearly all workers may be repeatedly exposed for a working lifetime without adverse health effects.[7]

Worst-case scenarios—Situations that occur when compounding operations are at their greatest risk of introducing contamination into sterile preparations (e.g., late in a work shift when personnel are tired, volume is high, and cleaning/disinfecting has yet to be done).

Zone of turbulence—Pattern of flow of air from the HEPA filter created behind an object placed within the laminar airflow workbench pulling or allowing contaminated room air into the aseptic environment.

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