Seminar No. 3

TOPIC: "Factors influencing the formation and preservation of consumer properties of medical and pharmaceutical products. Classification of goods. Basic definitions, concepts. The purpose of the classification. Characteristics of signs of classification.

Purpose of the lesson:

1. Deepening, consolidating and systematizing the theoretical knowledge gained in lectures and during independent work with the recommended literature.
2. Formation of professional knowledge and skills to determine the factors that affect the use value and quality of medical and pharmaceutical products when conducting commodity analysis

Questions to be discussed at the seminar:

1. Factors influencing the formation and preservation of consumer properties of medical and pharmaceutical products.
2. Factors that form the consumer properties of medical and pharmaceutical products.
3. Factors that preserve the consumer properties of medical and pharmaceutical products
4. Factors that preserve consumer properties and quality of medical products from metals and alloys, polymeric materials.
5. Methods of protection against environmental factors to preserve consumer properties and quality of medical and pharmaceutical products.
6. Classification of goods. Basic definitions, concepts. The purpose of the classification.
7. Characteristics of signs of classification.

Consumer properties and quality of goods depend on many factors. In commodity science, they are divided into two groups: factors that form consumer properties and quality of goods, and factors that preserve consumer properties and quality of goods.

Factors that shape consumer properties and quality of goods include:

► consumer properties and quality of raw materials, materials and components;

► formulation (composition and ratio of components);

► product shape (for medical products - product design, for medicinal products - dosage form);

► the quality of the technological process (including the quality of regulatory and technical documentation, equipment, the quality of work of employees, quality control, etc.);

► quality of disinfection and sterilization.

In addition to the factors that shape the quality of medical and pharmaceutical products, there are factors that preserve the consumer properties and quality of goods. These factors include: packaging, labeling, conditions of transportation, storage, sale and operation of goods.

The study of the factors that act and determine consumer properties and the quality of finished products is an important task of commodity science and is essential for the training of qualified specialists in the field of commodity analysis.

A specialist who understands the formation of consumer properties and the quality of finished products can better understand the features of the properties of the product, its positive aspects and disadvantages, reasonably approach the choice of a supplier and type of product, develop requirements for a product, identify defective and counterfeit goods, make claims to a supplier of poor quality products, the choice of methods of disinfection and sterilization, the control of their implementation.

The main consumer properties that determine the quality of medical products: social, functional, safety, reliability, ergonomics, environmental friendliness, aesthetics, perfection of production performance and stability of the presentation, resource consumption, compatibility.

Social properties include demand, the possibility of an additional social effect, the freedom to move goods from producer to consumer. These properties characterize the compliance of a given product with the total needs of society, which determines the economic and social expediency of its production. A distinctive feature of the social properties of medical and pharmaceutical products is that these properties have a clearly defined focus on the part of the population that needs medical care. And therefore, along with a social orientation, these goods should also have a nosological orientation.

Functional properties, which include therapeutic efficacy, breadth, depth, speed of onset of a therapeutic effect, characterize the main purpose of the goods, contribute to the successful use of goods in the consumption process.

When grouping functional properties, the ability of the product to fulfill its main purpose is of decisive importance, for example, for a drug - the quality of treatment of this nosology.

The performance of the main function of the product depends on the quality of the raw materials, the technology of its manufacture, quality control methods. An important characteristic of the functional properties of medical products is the versatility of application, characterized by the breadth of the range of conditions and possibilities for using the device for its intended purpose.

The versatility of application is determined by the possibility performing a number of auxiliary functions. In some cases, auxiliary functions allow you to reduce the number of products used.

An important role is played by safety - the state of the goods under normal conditions of its use, storage, transportation and disposal, in which the risk of harm to the life, health and property of the consumer is limited to an acceptable level. Safety is one of the fundamental properties of medical technology. Medical devices must be safe not only for the patient, but also for medical and attendant personnel, surrounding objects. Medical products are subject to certification for the following main safety indicators: electrical safety, fire safety, electromagnetic radiation, acoustic noise and vibration.

All possible types of risk arising during the operation and maintenance of medical equipment, the requirements and means of ensuring it must be indicated in the operating instructions. Warning labels must be placed in prominent places on the product. The safety properties of medicines include, for example, side effects, contraindications.

In many cases, the safety of a product is determined by its reliability, that is, the property of maintaining its original characteristics for a long time within certain limits during operation. The range of reliability indicators is represented by a number of indicators, of which the main ones include the reliability and durability of the product, service life and resource.

Reliability is the property of a product to perform the required function under given conditions for a given time interval. The reliability of non-repairable products is characterized by such an indicator as the mean time to failure. The failure-free operation of products for which repair work is envisaged during operation is evaluated by the average time to failure.

Durability - the property of the product to remain operational until the limit state occurs with the established system of maintenance and repair. The durability of products is evaluated by the value of the average service life (resource) before decommissioning or repair.

Service life - the calendar duration of operation from the beginning of the operation of the product or its renewal after repair until the transition to the limit state.

Resource - the total operating time of the object from the beginning of its operation or its resumption after repair until the transition to the limit state.

Reliability control of products is carried out in the process of independent tests or other types of tests. Requirements for the reliability of products are established in the standards of the type of general technical conditions (technical requirements), medical and technical requirements and technical specifications.

In addition to the above, really high-quality medical products must have a number of properties, which include the following.

► *Ergonomic properties* characterize the convenience and comfort of using the product and are determined by complex indicators: anthropometric, physiological (hygienic), psychophysiological, psychological, etc.

► *Anthropometric properties* characterize the conformity of the size and shape of the product with the size and shape of the human body.

► *Hygienic properties* characterize the ability of the product to become dirty and cleaned, are of great importance for patient care items.

► *Psychophysiological properties* characterize the compliance of the product with the power, auditory, visual, gustatory, olfactory capabilities of a person.

► *Environmental friendliness* characterizes the degree of harmful impact of medical products on the environment that occurs at the stage of the entire life of the product. Environmental indicators: the level of hazardous chemical emissions, radiation, the concentration of harmful substances, as well as the ability to recycle.

►*Aesthetics* is an indicator of the qualitative and quantitative assessment of the aesthetic value of products, depending on the consumer group, specific conditions of consumption and the purpose of the product. Aesthetic indicators do not affect the utilitarian properties of the product, but help to attract potential buyers, for example, aesthetic indicators of packaging and labeling.

► *The perfection of the production performance and the stability of the presentation are* determined by the cleanliness of the contours, roundings and connections of individual elements, the absence of visible manufacturing defects and the thoroughness of the surface finish, the preservation of the elements of the form and surface with external impact during operation, clarity of execution of brand names and signs, accompanying documentation and information materials.

► *Resource consumption* is characterized by the consumer's costs for the purchase, operation and maintenance of the product during the period of the average technical resource, that is, until the product is taken out of service. Resource consumption indicators characterize the costs of direct use of products for their intended purpose. They are subdivided into indicators of the economical use of raw materials and materials, fuel and energy resources, and labor resources.

► *Compatibility* - the suitability of products, processes and services for joint, non-interaction-free use under specified conditions while meeting specified requirements. Medical equipment is subject to mandatory certification for electromagnetic compatibility, that is, the ability to function normally in a certain electromagnetic environment without creating magnetic fields that are dangerous for other technical equipment or humans. In case of violation of electromagnetic compatibility, malfunctions of electronic computing systems, registration or filing of false signals are possible.

Factors affecting the formation and preservation of consumer properties of the product

In order to ensure the quality and quantity of consumer properties of a product, it is necessary to know and take into account a set of factors that affect their formation and preservation.

The factors that form the quality and quantity of consumer properties of the goods include a complex of objects and operations inherent in certain stages of the production cycle:

product design and development, raw materials, construction, production technology.

The decisive (main) factor among them **is the factor** of product design and development, which establishes the basic requirements for it based on the study of consumer preferences (determined in the course of market research). You should know the requirements of consumers for the level of quality and acceptable quantitative characteristics.

The factors that preserve the consumer properties of the goods include: packaging, storage, commodity processing, sales, after-sales service and consumption.

Commodity processing is a set of operations for preparing goods for sale, including sorting by quality, calibration, washing, packing, packaging (these issues are considered in the study of pharmaceutical chemistry, pharmaceutical technology, pharmacognosy and private commodity science).

The sale of goods is the activity of selling goods to consumers, accompanied by a number of services that form consumer preferences (for example, advising on the use of goods, their advantages over other goods, on storage methods, operation, etc.).

sales service is a complex of trading services that ensure the preservation of goods by consumers in the process of their delivery, storage, operation and consumption. These services have a significant impact on ensuring the quantity and quality of consumer properties of the goods (delivery, installation, assembly, maintenance, warranty repair).

Consumption is a set of operations **(**complex of operations), that ensure the use of goods for their functional and social purpose.

There are two types of consumption of goods:

- ✓ short-term with complete or partial loss of goods (JIC, medical devices);
- ✓ prolonged and repeated consumption without visible signs of loss of goods (MD, medical equipment); this kind of consumption is usually called exploitation.

It is important for ensuring the quality and quantity of goods at the stage of consumption that the consumer observes the rules for its storage and the conditions for using the goods for their intended purpose, about which he must be informed.

Basic definitions, concepts and purposes of classification

Classification (from lat. *classis* - category and lat. *facere* - to do) in general terms is the distribution of a set of objects, such as pharmaceutical products, into classes, groups and other structures according to a certain characteristic common to each of them. At the same time, all structures of the distributed set constitute a single system in which all parts are interconnected in a certain way, and each part of this system is a collection of similar objects that have at least one common feature.

Object of classification - element of the classified set. In merchandising, this element is the commodity. From the set of all goods on the basis of destination, consumer goods are distinguished for individual consumers, and for product manufacturers and / or service providers - industrial goods and goods for management activities (office equipment).

A sign of classification is a property or characteristic of an object by which classification is made.

Classification signs (Classification features) are divided into **teleological** (purpose and application), **genetic** (source materials, raw materials, main components of the chemical composition) and **technological** (design, recipe, production processes, methods of finishing or design

The most common sign in merchandising used to characterize the enlarged product groups is the purpose. Features can have a qualitative or quantitative expression, called **the value of the classification feature.**

Of the features listed above, technological and genetic are most often expressed qualitatively. When it comes to components and chemical composition, they are expressed both qualitatively and quantitatively.

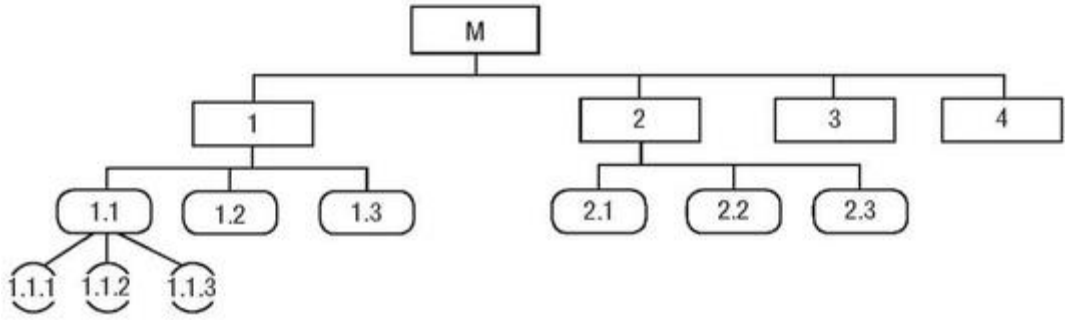
The purpose of the classification is the systematization, as well as the identification and prediction of the properties of goods. Systematization is achieved by establishing the sequence and relationships of certain classification groups obtained by a specific classification method. Identification as the establishment of the identity of the most significant features is possible only when these features are identified, characteristic of groupings or objects of classification. As a result of dividing the set into subsets, classification groupings are created that may have common and different features, and may also be interdependent or independent. There are two types of classification method: **hierarchical and faceted.**

Hierarchical classification method - sequential division of a set of objects into subordinate classification groups. Schematically, the essence of the method is shown in fig.

A feature of the hierarchical classification method is the close connection between individual classification groups, revealed through the commonality and differences in fundamental features. The basis for dividing the set into subsets according to the feature fundamental for this stage is the stage of classification.

Classification stage - the stage of classification in the hierarchical method, which results in a set of classification groups.

Each stage and grouping is distinguished by its fundamental feature. The differences between the groupings are in different signs. That is why the choice of fundamental features is a responsible operation of dividing the set, on which the final result largely depends. This choice should be based on the intended purpose of the classification. The number of signs and steps determines the depth of classification. On fig. the depth of classification by the hierarchical method is 4.



Rice. Hierarchical classification method

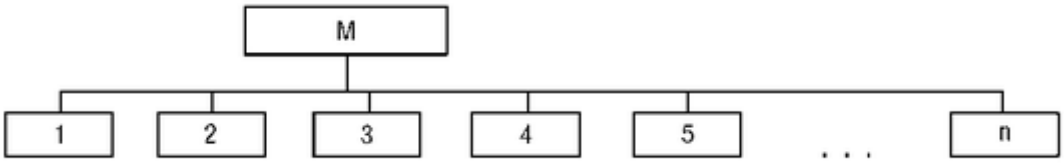
For example, according to the field of application, medical instruments are divided into general surgical and special ones. General surgical, in turn, according to their purpose, are divided into cutting, clamping, pushing, etc. Among the cutting tools are knives, scalpels, medical scissors, chisels, etc. Medical knives are divided into amputation knives, resection knives, cartilaginous knives, brain knives.

It is easy to determine that the most common feature "medical instruments" is present at all levels of the classification, the "branches" of the classification are also connected according to this feature, and each step specifies this feature along the "horizontal" and "vertical", that is, the two basic principles of hierarchical classification are observed. .

Theoretically, the depth of classification is infinite, but in practice such a classification is too cumbersome and confusing, many of the lower levels duplicate each other. All this complicates the practical application of the classification. For this reason, in practice, the classification depth usually does not exceed 10. It is this depth that is used in many classifiers.

However, with an increase in the completeness of the assortment due to species and varieties, the depth of classification can be more than 10, which allows subdividing subsets of goods to the final unit - the trade name. If it is necessary to increase the number of features, the faceted method is used.

Faceted classification method - parallel division of a set of objects into independent classification groups. A feature of the faceted method is that different features are not related to each other. The name of the method comes from the French word facette - the edge of a polished stone. Indeed, just as each facet of a stone exists independently of other faces, so different classification groups in the facet method are independent and do not obey each other (Fig.).



Rice. Faceted classification method

Due to this, the **faceted system is** highly flexible, the ability to limit the number of features and groupings, which provides significant advantages when using it. At the same time, its information capacity can be increased by highlighting general and particular classification groups.

For example, the same medical instruments can be classified by the faceted method, using features independent of each other: by scope (general surgical, special), by purpose (cutting, clamping, pushing back, probing and bougie, stabbing, etc.), by the frequency of use (single, multiple use), according to the conditions of use (main, auxiliary).

It should be noted that each type of classification methods is characterized by certain advantages and disadvantages, the characteristics of which are presented in Table.

Thus, the advantages of one classification method act as disadvantages of the other, that is, both varieties complement each other, so in some cases they are used together.

For example, the above classification of medical instruments by the facet method can always be supplemented by a hierarchical method of classifying them according to technological features, and at different stages, certain operations that form the quality of instruments and determine their features act as classification features. So, general surgical instruments, depending on the material used, can be divided into metal and non-metal. At the next stage, metal tools are subdivided into tools made of ferrous and non-ferrous metals, etc. Knowledge of the advantages and disadvantages of classification methods allows you to rationally apply them, taking into account the goals and objectives.

When classifying by different methods, general and specific rules are used. In this case, we can talk about *the classification system* as a set of methods, rules and classification results.

Classification rules are designed to select varieties of the method and features by which the division of the set into subsets is carried out. The general rule for hierarchical and faceted methods is the choice of a type of classification method depending on its intended purpose. The specific classification rules for the hierarchical method include:

1) the priority of the most common features when dividing the set into subsets;
2) the use at each stage of only one feature that is of fundamental importance for this stage;
3) division of objects sequentially - from larger to smaller, from general to particular;
4) selection from a set of features of the same degree of generality of the most significant;
5) the need to establish the optimal number of signs and steps, as well as depth.

The specific rules of the faceted method are:

1) approximately the same significance and independence of the used classification features;
2) lack of commonality of classification features;
3) the possibility of supplementing the number of features. The considered classification methods are widely used

in commodity science when dividing many goods into system categories: genera, classes, groups, etc. The above methods and rules can be applied both independently of each other and jointly.

Table. Advantages and disadvantages of hierarchical and faceted classification methods

Method	**Advantages**	**Flaws**
Hierarchical	The possibility of highlighting the commonality and similarity of features of objects at the same and different levels. High information saturation	With great depth: excessive bulkiness, high costs, sometimes unreasonable, difficult to use. At a shallow depth: information insufficiency, incomplete coverage of objects and features
Faceted	Flexibility and mobility of the system, ease of use, the ability to limit the number of features without losing the sufficiency of coverage of objects	The impossibility of highlighting the commonality and differences between objects in different classification groups