**Topic 1.1 Concepts and definitions of the essence of the main categories of logistics. Modern concepts of the object and subject of logistics**

**Logistics** is one of the key disciplines of modern management. It is a comprehensive knowledge system related to the management of material, information and financial flows in the process of movement of goods from the manufacturer to the end consumer. Logistics is of particular importance in the pharmaceutical industry, as it is directly related to providing the population and medical institutions with high-quality, safe and affordable medicines.

To understand the essence of logistics, it is important to consider its key categories.:

**The material flow** is a set of medicines, medical products and related products that move from the manufacturer through distributors and pharmacy chains to the patient.

**Information flow** — data accompanying the material flow: orders, invoices, quality certificates, electronic prescriptions, expiration dates.

**Financial flow** is the flow of funds related to purchase, sale, insurance payments, and government financing.

A logistics chain is a sequence of links (manufacturer → wholesale distributor → pharmacy/hospital → patient) through which a product passes.

A logistics system is a set of elements (organizations, technologies, processes) that ensure the flow of flows.

Inventory management is the most important category that determines the optimal levels of medicines in warehouses and pharmacies in order to avoid shortages and excess stocks.

**The object of logistics** is the flows themselves: material (medicines, medical products), information (data on the movement of goods and orders), financial (payments, investments).

**The subject of logistics** is the patterns, methods and tools of organizing these flows, that is, how exactly to arrange the movement of goods and information in order to achieve maximum efficiency.

In pharmaceutical logistics, the object is the entire path of a medicinal product — from the stage of production and registration to transfer to the patient. The subject is the organization of this path, taking into account safety requirements, shelf life, storage and transportation conditions (temperature regime, protection against counterfeiting, compliance with GDPR standards).

To date, there are several concepts that are actively used, including in pharmaceutical logistics.:

Supply Chain Management (SCM) is the management of the entire supply chain from the manufacturer to the end user. In the pharmaceutical industry, this means integrating manufacturers, distributors, pharmacies, and medical institutions into a single system.

Just-in-Time (JIT) — just-in-time deliveries, minimizing inventory. It is used only to a limited extent in pharmaceuticals, as it is necessary to have insurance stocks of vital drugs.

Lean Logistics — "lean logistics", aimed at reducing costs and eliminating unnecessary operations.

Green Logistics is an environmentally responsible logistics, including the disposal of expired medicines and minimizing the impact on the environment.

Digital Logistics — the use of digital technologies: blockchain to track supply chains, Big Data to predict demand, warehouse automation.

Pharmaceutical logistics has a number of specific features:

the need for strict compliance with storage and transportation conditions;

the importance of controlling expiration dates and serial numbers;

compliance with legal requirements and international standards (GDPR, GSP, GMP);

high social importance — disruptions in the supply of medicines can directly affect the health and lives of patients;

the need to ensure the availability of drugs even in crisis or emergency situations.

Thus, logistics is not just the delivery of goods from point A to point B. This is an integrated flow management system, which is especially important in the pharmaceutical industry, where people's health and lives are at stake. Knowledge of the main categories, understanding of the object and subject of logistics, as well as modern management concepts allows future specialists to effectively build drug supply processes at all levels.

The term **“logistics”** originates from the Greek word *“logistikos”* (the art of calculating) and the Latin *“logistica”* (practical arithmetic). Historically, logistics was closely connected with the **military sphere**: it referred to the supply of troops with weapons, food, ammunition, and other resources.

* In **ancient times**, logistics meant military supply and troop movement.
* In the **Middle Ages**, it expanded to cover the provision of armies during long campaigns.
* In the **20th century**, during the World Wars, logistics became crucial for organizing large-scale transport, storage, and supply operations.
* After WWII, the concept shifted from purely military to **economic and business applications**, focusing on optimizing the movement of goods in civilian markets.
* By the late 20th century, logistics became a part of **supply chain management (SCM)**, integrating production, storage, transportation, and distribution into a single system.

Scholars usually distinguish several **stages** in the development of logistics:

1. **Traditional logistics (up to 1950s)**
   * Fragmented functions: storage, transportation, procurement.
   * Low integration, mostly military use.
2. **Classical logistics (1960s–1970s)**
   * Introduction to business and production.
   * Focus on cost reduction and efficient delivery.
3. **Integrated logistics (1980s)**
   * Emergence of the systems approach.
   * Integration of procurement, production, distribution.
4. **Strategic logistics (1990s)**
   * Logistics becomes part of corporate strategy.
   * Globalization, development of international supply chains.
5. **Digital / modern logistics (2000s–present)**
   * Use of IT, automation, e-commerce.
   * Focus on customer orientation, sustainability, and resilience.

Different authors and schools of thought give slightly different definitions:

* **Classical definition:** Logistics is the science of managing material, information, and financial flows.
* **Council of Supply Chain Management Professionals (CSCMP):** Logistics is the part of supply chain management that plans, implements, and controls the efficient and effective flow and storage of goods, services, and information between the point of origin and the point of consumption.
* **European Logistics Association:** Logistics is the organization, planning, control, and realization of the flow of goods and related information from the supplier to the customer.
* **In the pharmaceutical sector:** Logistics is the process of ensuring that medicines are delivered to patients in the right quantity, at the right time, under proper storage and transportation conditions, and with full regulatory compliance.

The **essence** of the logistics approach is to view the company’s operations not as separate functions, but as a **single interconnected flow system**.

**Features of the logistics approach:**

* **Systemic vision** — all processes (procurement, storage, transport, distribution) are linked in one chain.
* **Customer orientation** — the main goal is to meet customer demand with minimal cost and maximum quality.
* **Flow management** — emphasis on material, information, and financial flows rather than isolated operations.
* **Integration** — close coordination of suppliers, producers, distributors, and consumers.
* **Optimization** — continuous search for balance between cost, service quality, and efficiency.

Logistics can be classified by several criteria:

1. **By type of flows:**
   * Material logistics (goods, raw materials, medicines).
   * Information logistics.
   * Financial logistics.
   * Service logistics.
2. **By functional area:**
   * Procurement logistics.
   * Production logistics.
   * Distribution logistics.
   * Reverse logistics (return, recycling, disposal).
3. **By level of integration:**
   * Micro-logistics (inside one company).
   * Macro-logistics (interactions between companies, regions, countries).
4. **By industry specifics:**
   * Industrial logistics.
   * Agricultural logistics.
   * Pharmaceutical logistics.
   * Transport logistics, etc.
5. **By concept/approach:**
   * Traditional logistics.
   * Lean logistics.
   * Green logistics.
   * Digital logistics.

**The 7R (Seven Rights) Supply Chain** diagram is a basic principle of logistics that shows that the main purpose of supply chain management is to ensure:

Right Product → Right Quantity → Right Condition → Right Place → Right Time → Right Customer → Right Price

That is:

Right Product - delivery of exactly the product that the customer needs.

Right Quantity – in the required amount, without deficit or surplus.

Right Condition (Correct condition/quality) – the product must meet quality standards and be in good condition.

Right Place – delivery to the place where the product is really needed.

Right Time - on time, within the agreed deadline.

Right Customer - specifically to the end user or the company for which the product is intended.

Right Price (The right price/costs) – at the optimal cost for the client and the company.