

## **INFORMATION PROVISION MANAGEMENT OF STREAM PROCESSES IN PHARMACEUTICAL INDUSTRY**

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### **1. Introduction**

World experience of developed countries has proved that the use of logistics management significantly increases the competitiveness of the industry, reducing the cost of goods movement, promotes the rational use of resources, etc. But the logistics activities trend directly dependent on condition and character of changes occurring in the economy, state policy, improved regulatory and legal framework and timeliness business entities provision of all necessary reliable information.

Priority direction of the pharmaceutical industry optimization according to the Concept of Pharmaceutical Sector of Health of Ukraine for 2011–2020 is to improve systems of information support in sale and consumption of medicines [1].

Complete and timely provision of pharmaceutical businesses stakeholders (PhIS) with necessary information concerning streaming processes is a factor of the optimal mesologic pharmaceutical system functioning (mesoLPhS), and decision-making by management bodies at different levels regarding support and strategic management of PhIS activity required full volume of accurate and timely information, while these participants also act as sources of necessary information for implementation of the PhIS activities.

### **2. Analysis of the latest research**

Nowadays, the Ministry of Health of Ukraine (MHU) has a unified information system, which includes public registries of drugs (with all the characteristics: name, dosage forms, prescription, release forms, prices (wholesale, retail, customs), expiration dates, etc.), medical equipment and medical products (MP) dangerous factors of chemical and biological origin, disinfectants, foods for special dietary supplements, functional foods and dietary additives; National List of Essential drugs and medicinal goods; interagency database, etc. [2].

Databases development of medicines was studied by such scientists as O. P. Shmatenko, B. P. Hromovyk, L. P. Smirnova, M. G. Chigrinova, M. V. Slabiy, A. I. Boiko, O. V. Paramosh etc. Thus, L. P. Smirnova proposed experimental modeling of a computer system on an example of some antispasmodic and hypotensive medicines [3, p.46]. M. G. Chigrinova considered the automated information retrieval system on an example of neuropsychiatric patients [3, p.47]. M. V. Slabiy developed approaches to modeling information support expert systems to control the correctness prescription and dispensing of medicines from pharmacies [4, p.25]. A. I. Boyko processed database structure for optimization of consumption medicines for diabetes [5, p.77]. A. V. Paramosh proposed computer information system of circulation of psychotropic medicines in pharmacies with the possibility of forming computer reports [6, p.15]. O. B. Boretska developed a computer system to support clinical decision-making based on MYSQL [7, p.180]. Foreign researchers are paying attention to the information aspects of hospitals provision of medicines [8, p.2108; 9, p.72].

Due to a large number of information users in the pharmaceutical industry there is a need to build modern logistics information systems (LIS), including at the regional level, which will provide necessary information to all mesoLPhS participants and pharmaceutical logistic chains (PhLC) and provide the Ministry of Health of Ukraine with the necessary information.

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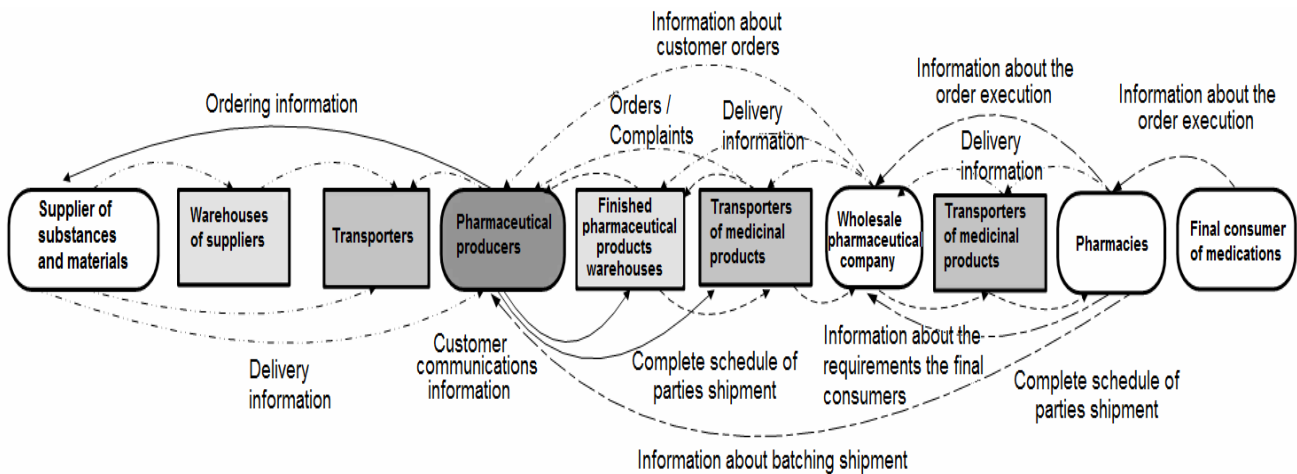
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Pharmaceutical businesses functioning is related to the formation and transmission of large amounts of information that require effective management and continuous improvement of information provision order to timely satisfy the needs of the population in quality medicines at affordable prices. The purpose of the paper is the optimization of information transfer process to pharmaceutical businesses stakeholders according to the traditional methods of pharmaceutical informatics.

### 3. Presentation of the basic material

Logistics Information System in Pharmacy is an interactive structure, including staff, equipment and procedures (technologies) combined in information flows, used by logistic management for planning, regulation, monitoring and analysis of pharmaceutical logistics system functioning (LPhS). It consists of interrelated subsystems that implement information and computer software of all logistics management functions and communication with the external environment.

Suppliers and consumers of information are PhIS, authorities of the Ministry of Health of Ukraine, Ministry of Infrastructure of Ukraine, the Ministry of Regional Development, Construction and Housing and Communal Services of Ukraine, Ministry of Finance of Ukraine, Ministry of Foreign Affairs of Ukraine, Ministry of Social Policy of Ukraine, the Ministry of Ecology and Natural Resources of Ukraine, Ministry of Economic Development and Trade of Ukraine, Ministry of Finance of Ukraine, State Statistics Service of Ukraine, State Service of Ukraine on Drug Control, the State sanitary and epidemiological Service of Ukraine, State Service of Ukraine on Medicinal Products, State Administration of Ukraine for Regulatory policy and Entrepreneurship Development, the State Service for Financial Monitoring of Ukraine, State Service of export Control of Ukraine, regional and local authorities, banking, brokerage, transportation, storage, insurance and other organizations, sector of higher education institutions (HEIs) and research institutes. The structure of information flows in the goods movement of medications and their interrelation is shown in Fig. 1.



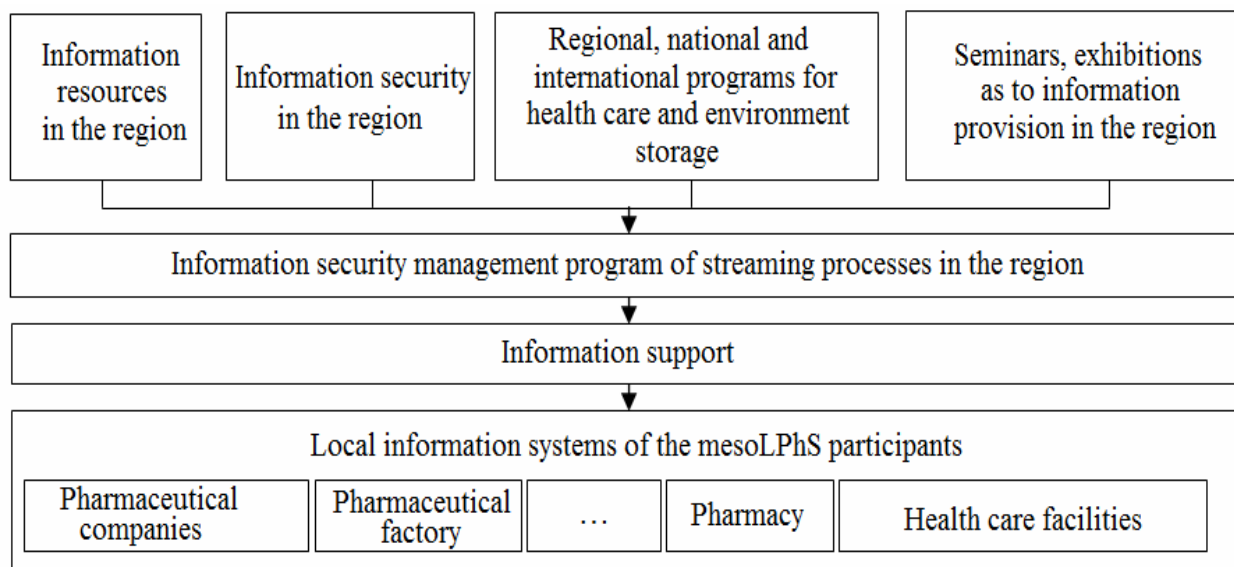
**Fig. 1. Information flows in pharmaceutical logistics chain**

—▶ communication with suppliers; —▶ communication with manufacturers; - -▶ communication with warehouses; - -▶ communication with transporters; .....▶ communication with consumers; - -▶ communication with final consumers

The variety of information flows associated with the development, manufacture, promotion and sale of medicines and management of pharmaceutical waste necessitates the creation of a common information space in the region that extends the capabilities of operational efficiency and solve industry challenges, interconnected with international and state programs and projects (Fig. 2).

Logistics Information Center is intended to provide service to obtain operational information, continuous monitoring of the status and position of objects LPhS and support information exchange between stakeholders in the transportation of goods, its preservation etc. The creation of a single

regional information space requires a coordination of work on creation and development of information streaming processes systems, participants and mesoLPhS their information compatibility and interoperability with national and international projects and programs in logistics, the interaction with regional informatization programs relative to information supply authorities on the status and functioning of mesoLPhS participants, infrastructure improvements, both of mesoLPhS and single PhIS; improve the quality and volume of information; provide the required protection level of information, the reliability of its storage and treatment access. It provides LPhS workers, consumers of drugs, substances and materials suppliers, partners, scientific and pedagogical workers and governments with objective, operative, complete, reasonable, evidential and available information aimed at quality medical services for the population.



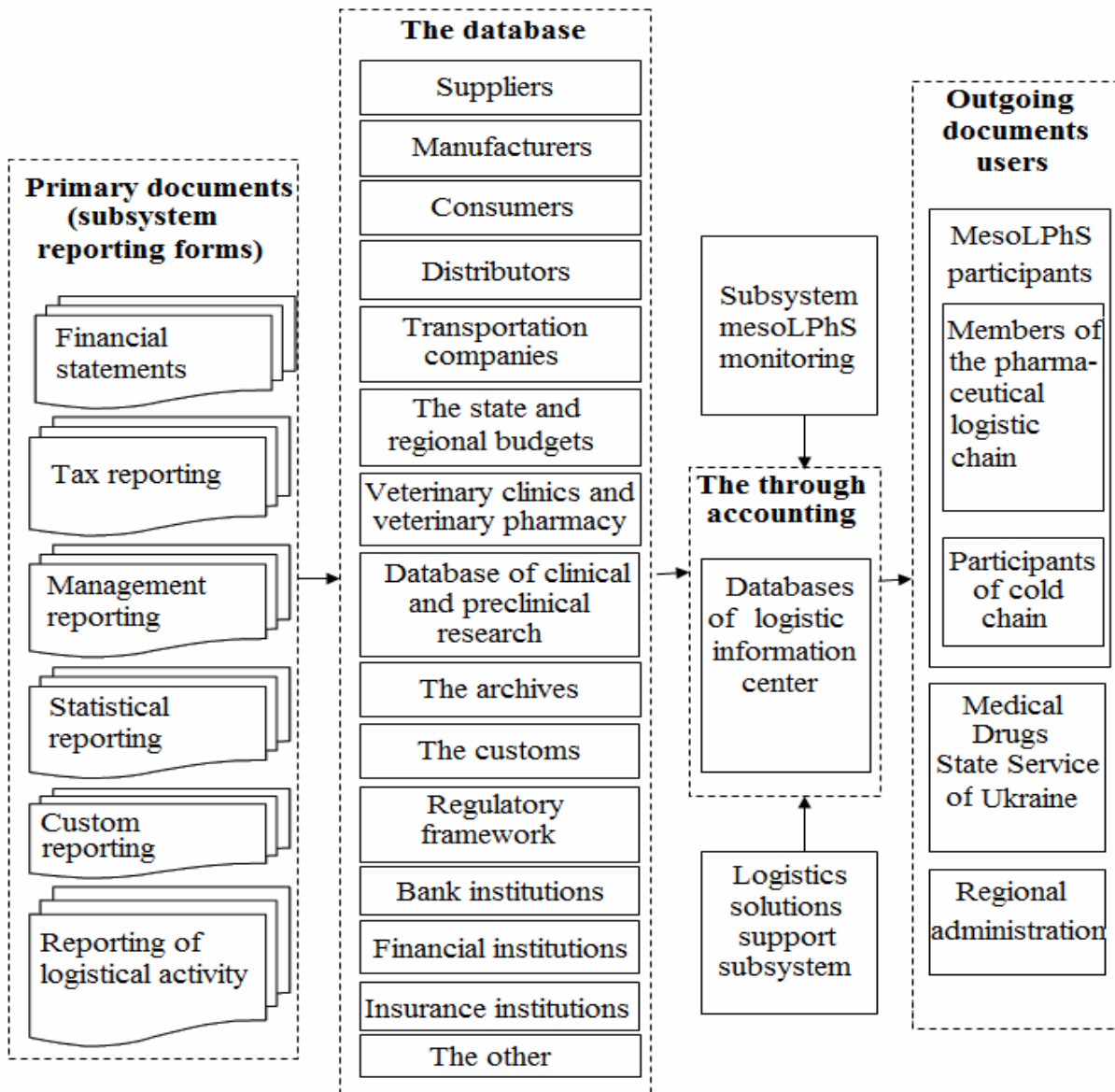
**Fig. 2. Conceptual forming diagram of informative support management of streaming processes in the region**

Regional logistics information center should also contain a database of suppliers of substances and materials; consumers of pharmaceutical products (health care institutions, veterinary pharmacy, veterinary hospitals); PhIS; specialized transportation, insurance, brokerage, banking and financial institutions; institutions of pharmaceutical and medical wastes; pharmaceutical, medical, educational, scientific and logistical staff, etc. The information will flow from the center to all mesoLPhS stakeholders. The structure of the LIS infological model is shown in Fig. 3.

Regional logistics information center shall provide the following services:

- 1) in access services regulatory and of reference information (access to documents regulating the activities of participants pharmaceutical regional clusters, cold chains, PhIS, reference products, packaging, vehicles, geographic information, etc.);
- 2) in order management (order service, selection and calculation of possible routes, complex customs clearance services, custom statistical and analytical information);
- 3) in management of resources (services for analysis and resource costs carriers, warehouses and other mesoLPhS stakeholders);
- 4) in logistics processes management (a lot of systems support logistics processes in remote access);
- 5) communication (providing information communication between participants logistic processes in different standards);
- 6) consulting (services for the development of regulations, procedures and technologies, consulting services, training services, etc.);
- 7) of information and referral services on request;

- 8) in control the passage of logistics processes (tracking freight forwarder under existing schema (RFID), etc.);
- 9) expert and analytical (assessment of logistics activities in the region; mathematical and statistical data analysis of logistics development in the region, predicting a possible course of events and changes in the environment, forecasting possible consequences of management decisions, providing recommendations for achieving the desired results of logistic activities in the region, finding compromises between projects in logistic area and other local development projects);
- 10) in training personnel.



**Fig. 3. Infological model LIS on the mesolevel**

Advantages of mesoLIS creation are continuous information monitoring of mesoLPhS participants logistics activities in real time; operative provision of information; improving the efficiency of goods delivery by vehicles and cargo delivered through satellite communication and navigation systems; facilitation of customs procedures; providing information and analytical sustention in logistics operations, including operations related to disposal of waste.

#### 4. Conclusions

The necessity of improving information provision management of streaming processes in the

pharmaceutical mesologic system is defined. Modern information systems, which operate in the Ministry of Health of Ukraine, are analyzed. The essence of logistics information system, its structure and composition, suppliers and users, contacts with the environment, are defined in the article. The conceptual scheme of information support formation of management streaming processes in the region is suggested.

The infological model of logistic information system at the meso level is developed. The creation a single regional information space in the region and logistics information center, which is intended to provide services to obtain operational information, continuous monitoring of the status and position of mesologic pharmaceutical system objects, is substantiated. The set of information services that provides a single information center, is defined.

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## Summary

The article deals with the relevance of management and improving information provision in pharmaceutical industry. Establishment of a regional logistics information center is proposed. The structure infological model of the logistics information system at the meso level for the pharmacy conditions is substantiated.

**Keywords:** management; information provision; regional logistics information center.

**JEL classification:** L650

**UD classification:** 615.1:65:658.7

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