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## CHRONIC DIFFUSE LIVER DISEASES, PATIENT REGISTRATION AND ACCOUNTING, THE IMPORTANCE OF REGISTRIES

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*Introduction.* Chronic diffuse liver diseases (CDLD), including non-alcoholic and metabolically associated fatty liver disease (MAFLD), remain the leading cause of liver failure, cirrhosis, and hepatocellular carcinoma. The increasing incidence of these diseases requires not only effective clinical approaches but also systematic patient monitoring.

*Aim.* To study the role of medical registries in monitoring, diagnosing, and treating patients with chronic diffuse liver diseases, and to evaluate international experience in this area.

*Materials and methods.* A review of domestic and international sources was conducted, including clinical guidelines (AASLD, EASL, KASL), epidemiological studies, and descriptions of the functioning of large registries (TARGET-LD, Global Liver Registry, DELIVER, MAFLD Registry, PBC Registry). A literature search was conducted for the period from 2018 to 2025 in international scientific databases: PubMed/MEDLINE, Cochrane Library, ScienceDirect, as well as in the Wiley, Springer, Elsevier, and Karger online libraries and on the official websites of relevant organizations (EASL, AASLD, KASL, WHO).

*Results and discussion.* Registers provide centralized data collection on patients with chronic kidney disease, facilitate standardized diagnostics, assess treatment effectiveness, stratify risks, and generate an evidence base for clinical decisions. International experience demonstrates the significant importance of such systems for developing national healthcare strategies. However, the lack of uniform standards and funding are particularly acute in resource-limited countries, leading to data fragmentation and the impossibility of conducting comparable studies.

*Conclusion.* The creation of national registries of patients with chronic diffuse liver disease in Kazakhstan and other CIS countries will significantly improve the quality of medical care, ensure a multidisciplinary approach, and increase the effectiveness of diagnosis and treatment at all stages.

*Key words:* chronic diffuse liver disease; chronic hepatitis; MAFLD; cirrhosis; liver disease registries

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### INTRODUCTION.

Chronic diffuse liver diseases (CDLD) are a growing global health problem. Their pathogenesis involves persistent inflammation, destruction, and regeneration of the liver parenchyma, leading to fibrosis, cirrhosis, and, ultimately, liver failure. These diseases encompass a wide range of pathologies, from chronic viral hepatitis, alcoholic and metabolically associated fatty liver disease, to autoimmune and metabolic disorders [1, 21].

The liver performs key metabolic, detoxifying, and immune functions. Its parenchymal cells (hepatocytes) as well as nonparenchymal elements (stellate cells, sinusoidal endothelial cells, Kupffer cells, etc.) interact in a complex cellular network, ensuring the body's homeostasis [2]. Damage to

these systems leads to systemic consequences, including cardiovascular, endocrine, and oncological complications.

The epidemiological significance of CDLD is confirmed by global mortality data: approximately 2 million people die annually from liver diseases, including cirrhosis, liver cancer, and complicated forms of hepatitis. For example, in 2019, cirrhosis and other liver diseases caused 1.26 million deaths, and liver cancer caused 830,000 cases [2, 10, 20]. The main causes of disease progression remain alcohol abuse, chronic viral infections (HBV, HCV), and metabolic disorders, especially metabolically associated fatty liver disease (MAFLD) and its advanced form, steatohepatitis [1].

Metabolically associated fatty liver disease (MAFLD) has acquired particular significance as a

clinical and social phenomenon. Current research shows that its prevalence reaches 25-30% among the adult population worldwide, and in some countries exceeds 40% [3]. This disease is closely associated with epidemics of obesity, type 2 diabetes mellitus, metabolic syndrome, as well as a sedentary lifestyle and a high-calorie diet [4, 21]. Despite the scale of the problem, patient awareness of the disease is extremely low: less than 5% of patients are aware of their diagnosis, which contrasts sharply with the level of awareness for viral hepatitis [3].

In addition to epidemiological issues, diagnosis and assessment of the severity of chronic liver disease pose significant challenges. Although liver biopsy remains the «gold standard», its invasiveness, cost, and lack of repeatability limit its practical use. Therefore, noninvasive methods for assessing fibrosis are being actively developed, including elastography, serological indices (FIB-4, NFS, ELF), and MR elastography imaging [5]. However, even these methods have limitations in sensitivity, particularly when differentiating fibrosis stages and the presence of inflammatory processes.

In addition to diagnostics, maintaining registries and systematically recording patients is becoming an important approach to combating chronic kidney disease. Registries are databases containing standardized patient information, including clinical, laboratory, imaging, and demographic parameters. They play a key role in studying epidemiology, prognostication, monitoring the course of the disease, assessing treatment effectiveness, planning medical care, and shaping health policy [2, 20].

Examples of international initiatives include large registries such as TARGET-Liver Disease (USA), the Global Liver Registry, the MAFLD Registry, and the R-LIVER Registry. These systems collect data from hundreds of thousands of patients, enabling long-term monitoring, forecasting, and informed adjustments to clinical guidelines [3, 4].

In Kazakhstan and other post-Soviet countries, similar registration systems either do not exist or operate with limited coverage and resources. This significantly complicates the objective assessment of disease prevalence and severity, the identification of risk factors, and timely intervention. Furthermore, the lack of registries hinders scientific research, the development of national guidelines, and the implementation of modern treatment standards. For example, patients with chronic liver disease (CDLD) often suffer from nutritional deficiencies, including both underweight and latent sarcopenia associated with obesity, which is only detected through comprehensive anthropometric and laboratory assessment [6].

An additional argument in favor of maintaining registries is the fact that the effectiveness of non-pharmacological interventions, including lifestyle

modification, has been confirmed by numerous international societies (AASLD, EASL, KASL, AACE). These include weight loss of  $\geq 10\%$ , limiting sugars and saturated fats, and increasing physical activity to 150 – 300 minutes per week, which can reverse steatohepatitis and even fibrosis [7].

The need for an interdisciplinary approach should also be noted. Given the multisystem nature of CDLD and its close association with metabolic and cardiovascular pathologies, the participation of general practitioners, gastroenterologists, endocrinologists, nutritionists, and physical rehabilitation specialists should be coordinated. Registries allow for the development of a system of interaction in which each case is accompanied by comprehensive information, ensuring a personalized and evidence-based approach to therapy [3].

Thus, chronic diffuse liver diseases are not only a medical problem but also an organizational and social one, requiring a systematic approach based on data, innovative diagnostic methods, and effective interdisciplinary coordination. The creation and development of chronic diffuse liver diseases registries in Kazakhstan is a strategic direction for improving the quality and longevity of life for patients.

### MATERIALS AND METHODS

A review of domestic and international sources was conducted, including clinical guidelines (AASLD, EASL, KASL), epidemiological studies, and descriptions of the functioning of large registries (TARGET-LD, Global Liver Registry, DELIVER, MAFLD Registry, PBC Registry). A literature search was conducted for the period from 2018 to 2025 in international scientific databases: PubMed/MEDLINE, Cochrane Library, ScienceDirect, as well as in the Wiley, Springer, Elsevier, and Karger online libraries and on the official websites of relevant organizations (EASL, AASLD, KASL, WHO).

### RESULTS

Today, patient registries are one of the key tools for systematizing data on chronic diffuse liver diseases (CDLD). They not only accumulate clinical and epidemiological data but also evaluate treatment effectiveness, predict outcomes, and develop personalized approaches to patient care. Below are the most significant international and local CDLD registries, with an emphasis on their structure, scope, objectives, and potential clinical significance.

#### TARGET-Liver Disease (TARGET-LD)

TARGET-LD is a prospective, multicenter, observational registry of patients with various forms of fatty liver disease, including metabolically associated fatty liver disease (MAFLD), autoimmune diseases, and viral diseases. The project collects real-world data from outpatients and inpatients, spanning more than 80 institutions in the United States [8]. The

registry model allows for the analysis of long-term outcomes, risk stratification, and the study of the effects of medications, including new molecules and treatment regimens.

A key feature of TARGET-LD is the integration of biological samples and electronic medical record data. This enables the combination of clinical and molecular biological data, forming the basis for precision medicine in fatty liver disease.

#### **European MAFLD Registry**

The European MAFLD Registry is a large-scale international study involving more than 20 countries and dozens of clinical centers, aimed at studying the natural history of non-alcoholic fatty liver disease and validating biomarkers [9]. Patients are enrolled as part of LITMUS (Liver Investigation: Testing Marker Utility in Steatohepatitis), an initiative funded by the European Union.

ENR includes bioresources, clinical data, laboratory and morphological parameters, and lifestyle information. This allows for the analysis of the transition from simple steatosis to steatohepatitis (MASH) and further to fibrosis and cirrhosis. This database has become the foundation for numerous studies in the fields of biomarkers, therapy, and risk stratification.

#### **DELIVER (Sweden)**

The DELIVER (Decoding the Epidemiology of Liver Disease in Sweden) cohort project was created based on national Swedish registries, combining data from over 300,000 patients diagnosed with chronic liver disease between 1964 and 2016 [16]. Using a unique personal identification number (PIN), Swedish researchers were able to link data from various national sources: mortality registries, hospitalizations, medication prescriptions, and laboratory tests.

DELIVER provides a unique opportunity to evaluate outcomes, risk factors for progression, treatment effectiveness, and study morbidity and mortality dynamics. The inclusion of a large number of patients with viral hepatitis, alcoholic liver disease, and MAFLD allows for cross-disease comparative analysis.

#### **PBC Registry (UK)**

The local registry for patients with primary biliary cholangitis (PBC), run by the NHS (National Health Service) at St. Mark's Hospital in London, exemplifies a comprehensive approach to monitoring rare forms of CDLD [11]. The registry covers diagnosis, quality of life (HRQoL), complications, treatment use, and survival. Plans are underway to expand to other clinics in the UK.

An important element is the implementation of validated questionnaires, such as the PBC-10, to assess patients' symptoms and quality of life. Registry data is used both for research purposes and to assess the quality of medical care, thereby contributing to the development of treatment standards for PBC.

#### **Registries in Central and Eastern Europe**

A literature review shows that the development of CDLD registries in Eastern European countries is in the early stages. However, certain initiatives—for example, the construction of a MAFLD patient registry in Romania — aim to develop a unified approach to collecting data on disease prevalence, phenotypes, and treatment response [9].

There are proposals to include patients' nutritional status in such registries, given its significant impact on outcomes in CDLD [6]. Furthermore, lifestyle factors, including diet and physical activity, are considered as key modifiers of MAFLD progression [7].

Registering patients with chronic diffuse liver disease is a crucial tool in the healthcare system, enabling the integration of clinical, laboratory, behavioral, and prognostic parameters. International examples such as TARGET-LD, ENR, and DELIVER demonstrate the high effectiveness of such systems for scientific, diagnostic, and management purposes. Their adaptation and development at the national level, including in the CIS countries, is a pressing issue for improving the quality of care for patients with chronic liver disease. Barriers to the creation and development of chronic diffuse liver disease registries include the lack of existing registries, incomplete and heterogeneous data, insufficient funding, and a lack of standards. Overcoming these challenges requires coordinated efforts at the national and international levels, the implementation of new technologies, and consideration of sociodemographic characteristics.

#### **DISCUSSION**

Many countries lack national or regional registries of CVD, which complicates the collection of data on prevalence, outcomes, and risk factors [12, 16]. Even in countries with developed health systems, establishing registries requires the integration of disparate data sources and significant organizational efforts [16].

#### **Incomplete data**

Even when registries exist, data are often incomplete, with a lack of standardized clinical and laboratory parameters, as well as differences in diagnosis coding [14, 15, 17]. This complicates the conduct of comparable studies and meta-analyses.

#### **Funding and resources**

Creating and maintaining registries requires significant financial and human resources. Lack of funding limits the scale, quality, and sustainability of registries, particularly in resource-limited countries [14, 16].

#### **Data standardization**

The lack of uniform standards for collecting, classifying, and analyzing data on chronic kidney disease hinders the exchange of information between countries and regions and complicates the conduct of multicenter studies [14, 15, 17].

**Table 1** – Comparison of key studies on barriers to CDLD registries

Paper	Country/Region	Registry Description	Key Barriers
(Hagström et al., 2022)	Sweden	DELIVER: National CDLD Registry	Data Integration, Standardization, Resources
(Kardashian et al., 2022)	USA	Review of Disparities in CDLD	Lack of data on minorities, lack of registries
(Ba-Ssalamah et al., 2017)	International	International Role of MRI in CDLD Assessment	No consensus on parameters, standardization
(Taouli & Alves, 2020)	International	Biomarkers and Imaging	Limitations of methods, standardization
(Ghadimi et al., 2020)	International	Current Visualization Methods	Limitations of noninvasive methods, standardization

The lack of registries, incomplete and heterogeneous data, and a lack of funding and standardization significantly limit opportunities for epidemiological research and improvement of clinical practice in CDH [12, 14, 15, 16, 17]. Even in countries with successful examples (e.g., DELIVER in Sweden), the establishment of registries requires significant efforts to integrate data and standardize processes [16]. The lack of uniform standards and lack of funding are particularly acute in countries with limited resources, leading to data fragmentation and the impossibility of conducting comparable studies [12, 14].

At the same time, the development of new technologies (e.g., machine learning, automation of data collection) and international collaboration can help overcome these barriers [13, 14]. It is also important to consider social and ethnic aspects, as the lack of data on certain population groups exacerbates inequalities in health care [12].

## CONCLUSIONS

Chronic diffuse liver diseases (CDLD), including non-alcoholic and metabolically associated fatty liver disease (MAFLD), chronic hepatitis, fibrosis and cirrhosis, are a significant medical and social problem worldwide, characterized by a steady increase in morbidity, high mortality and high healthcare costs [1, 2].

Epidemiological trends indicate that the prevalence of CDLD, particularly MAFLD, continues to increase, with advanced stages of the disease, including cirrhosis and hepatocellular carcinoma, frequently being diagnosed. The main risk factors remain obesity, insulin resistance, type 2 diabetes mellitus, low physical activity, and poor nutritional status [6, 7].

Despite the development of guidelines (EASL, AASLD, KASL), the implementation of modern non-invasive fibrosis diagnostic methods and a systematic approach to treating patients with CDLD remains limited in most countries [3, 4]. A large proportion of patients remain outside the scope of specialized

follow-up, especially in the early stages, leading to missed opportunities for early intervention.

An analysis of international experience in creating registries for chronic liver disease (CLD) demonstrates the high clinical and scientific effectiveness of such systems. The TARGET-LD (USA), European MAFLD Registry (EU), and DELIVER (Sweden), as well as local initiatives for PBC (UK) and MAFLD (Romania), demonstrate that centralized collection of standardized data allows not only for monitoring disease progression but also for optimizing treatment, predicting outcomes, and guiding clinical decisions based on real-world data [8, 9, 10, 11].

An additional value of registries is the ability to include parameters characterizing quality of life (HRQoL), nutritional status, physical activity, and behavioral factors, which is particularly important for MAFLD and other metabolic forms of liver disease [7, 11, 19]. This approach facilitates the implementation of personalized medicine principles.

Given the above, the implementation of national registries for hepatitis C in the CIS countries, including Kazakhstan, is a priority. This will allow for the systematization of patient data, the establishment of multidisciplinary collaboration, the standardization of treatment routes, improved treatment effectiveness, and the informed development of national hepatology strategies.

### Author contributions:

A. E. Oshibaeva, E. D. Iskandirova, G. O. Nuskabayeva – literature review.

Z. I. Annaorazova, B. O. Sakhova – writing.

M. U. Kistaubaev – concept, collection and analysis of sources, formatting of references, and bibliography.

Zh. M. Rsalieva, G. B. Ayazbaeva – text editing; formatting according to the journal's requirements.

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This material has not previously been published and is not under consideration for publication in other scientific journals.

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### ХРОНИЧЕСКИЕ ДИФFUЗНЫЕ ЗАБОЛЕВАНИЯ ПЕЧЕНИ. РЕГИСТРАЦИЯ И УЧЕТ БОЛЬНЫХ, ЗНАЧИМОСТЬ РЕГИСТРОВ

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**Введение.** Хронические диффузные заболевания печени (ХДЗП), включая неалкогольную жировую болезнь печени и метаболически ассоциированная жировая болезнь печени (МАЖБП), остаются ведущей причиной печеночной недостаточности, сахарного диабета и цирроза печени. Растущая распространенность заболевания требует не только эффективных клинических подходов, но и систематического ведения пациентов.

*Цель.* Изучить роль медицинских регистров в мониторинге, диагностике и лечении пациентов с хроническими заболеваниями печени, а также оценить международный опыт в этой области.

*Материалы и методы.* Был проведен обзор отечественных и зарубежных источников, включая клинические рекомендации (AASLD, EASL, KASL), эпидемиологические исследования и данные о работе крупных регистров (TARGET-LD, Global Liver Registry, DELIVER, MAFLD Registry, PBC Registry). Поиск литературы проводился за период с 2018 по 2025 год в международных научных базах данных: PUBMED/MEDLINE, Cochrane Library, ScienceDirect, а также в электронных библиотеках Wiley, Springer, Elsevier, Karger и на официальных сайтах профильных организаций (EASL, AASLD, KASL, ВОЗ).

*Результаты и обсуждение.* Регистры обеспечивают централизованный сбор данных о пациентах с ХДЗП, способствуя стандартизации диагностики, оценке эффективности лечения, стратификации риска и формированию доказательной базы для принятия клинических решений. Международный опыт показывает большую важность таких систем для разработки национальных стратегий здравоохранения. Однако отсутствие единых стандартов и недостаточное финансирование особенно остро ощущается в странах с ограниченными ресурсами, что приводит к фрагментации данных и невозможности проведения аналогичных исследований.

*Выводы.* Создание национальных регистров пациентов с ХБП в Казахстане и других странах СНГ позволит значительно улучшить качество медицинской помощи, обеспечить профессиональный подход и повысить эффективность диагностики и лечения на всех этапах.

*Ключевые слова:* хронические диффузные заболевания печени; хронический гепатит; метаболически ассоциированная жировая болезнь печени; цирроз; регистры заболеваний печени

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### **БАУЫРДЫҢ ДИФФУЗДЫ СОЗЫЛМАЛЫ АУРУЛАРЫ. ПАЦИЕНТТЕРДІ ТІРКЕУ ЖӘНЕ ЕСЕПКЕ АЛУ, РЕГИСТРЛЕРДІҢ МАҢЫЗДЫЛЫҒЫ**

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*Кіріспе.* Бауырдың созылмалы диффузды аурулары (БДСА), соның ішінде алкогольсіз және метаболизммен ассоцирленген майлы бауыр ауруы бауыр жеткіліксіздігінің, цирроздың және гепатоцеллюлярлық карциноманың жетекші себебі болып қала береді. Аурудың өсуі тиімді клиникалық тәсілдерді ғана емес, сонымен қатар пациенттерді жүйелі түрде есепке алуды қажет етеді.

*Зерттеудің мақсаты.* Бауырдың созылмалы диффузды аурулары бар науқастарды бақылау, диагностикалау және емдеудегі медициналық регистрлердің рөлін зерттеу, сондай-ақ осы саладағы халықаралық тәжірибені бағалау.

*Материалдар және әдістер.* Клиникалық гайдлайндарды (AASLD, EASL, KASL), эпидемиологиялық зерттеулерді және ірі регистрлердің (TARGET-LD, Global Liver Registry, DELIVER, MAFLD Registry, PBC Registry) жұмыс істеу сипаттамасын қоса алғанда, отандық және халықаралық дереккөздерге шолу жүргізілді. Әдебиеттерді іздеу 2018-2025 жылдар аралығында PubMed/MEDLINE, Cochrane Library, ScienceDirect халықаралық ғылыми дерекқорларында, сондай-ақ Wiley, Springer, Elsevier, Karger электрондық кітапханаларында және бейіндік ұйымдардың (EASL, AASLD, KASL, WHO) ресми сайттарында жүзеге асырылды.

*Нәтижелер және талқылау.* Регистрлер БДСА бар пациенттер туралы деректерді орталықтандырылған жинауды қамтамасыз етеді, диагностиканы стандарттауға, емдеу тиімділігін бағалауға, тәуекелдерді стратификациялауға және клиникалық шешімдер үшін дәлелді базаны қалыптастыруға ықпал етеді. Халықаралық тәжірибе ұлттық денсаулық сақтау стратегияларын әзірлеу үшін осындай жүйелердің жоғары маңыздылығын көрсетеді. Алайда, бірыңғай стандарттардың болмауы және қаржыландырудың жетіспеушілігі әсіресе ресурстары шектеулі елдерде қатты сезіледі, бұл деректердің бөлшектенуіне және салыстырмалы зерттеулер жүргізудің мүмкін еместігіне әкеледі.

*Қорытынды.* Қазақстанда және ТМД-ның елдерінде БДСА бар пациенттердің ұлттық тіркелімдерін құру медициналық көмектің сапасын едәуір жақсартуға, көпсалалы тәсілді қамтамасыз етуге және барлық кезеңдерде диагностика мен емдеудің тиімділігін арттыруға мүмкіндік береді.

*Кілт сөздер:* бауырдың созылмалы диффузды аурулары; созылмалы гепатиттер; метаболизммен ассоцирленген майлы бауыр ауруы; цирроз; бауыр аурулары бойынша регистрлер