



VHPB Regional meeting

Elimination of Viral Hepatitis in the Czech Republic, Hungary, Poland and Slovakia: Lessons Learnt and the Way Forward

PRAGUE, CZECH REPUBLIC

29-30 October 2024

BACKGROUND DOCUMENT



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Meeting information

Meeting objectives

- provide an overview of the current viral hepatitis situation in the **Czech Republic, Hungary, Poland and Slovakia**: surveillance systems, epidemiology, screening, burden, prevention, treatment and the cascade of care
- discuss achievements and challenges in the prevention and control of viral hepatitis, the possible implementation of new prevention strategies, control measures and monitoring system in the **Czech Republic, Hungary, Poland and Slovakia**
- discuss the development and the implementation of national hepatitis plans
- assess the needs to achieve the goal of eliminating viral hepatitis as a major public health threat by 2030 as set out in the renewed WHO Global Strategy and WHO Europe Action Plan, building on the UN Sustainable Development Goals' (SDG) commitments
- discuss successes, issues and barriers to overcome and the way forward.

Target audience

- Viral hepatitis representatives in first instance, opinion leaders, representatives of the ministries of health, policymakers, public health and health care professionals, experts responsible for national hepatitis plans & civil society in the Czech Republic, Hungary, Poland and Slovakia.
- VHPB advisors
- Some selected observers

Intended Impact

Create a platform to discuss the elimination of viral hepatitis as a public health problem in the Czech Republic, Hungary, Poland and Slovakia by 2030 by listing the most important challenges, opportunities, best practices and by discussing the way forward.

Meeting venue

Hotel OREA

Belohorska 24

169 00 Prague 6

Czech Republic



NOTE: This pre-meeting document contains general background information on the topic(s) of the VHPB meeting. It contains a list of recent selected abstracts/references from a Pubmed MEDLINE search of May 2024 on the topic of viral hepatitis in the region (2016-now).

The references are sorted by publication year. This document should guide you in the preparation of the meeting, it should not be considered as complete literature review, but hopefully, it will give an overview of what has been published on the topics of the meeting.



Background document

General information

Web search

Coalition for global hepatitis elimination (accessed 22/04/2024)

- Czech Republic: [Czech Republic | Coalition for Global Hepatitis Elimination](#)
- Hungary: [Hungary | Coalition for Global Hepatitis Elimination](#)
- Poland: [Poland | Coalition for Global Hepatitis Elimination](#)
- Slovakia: [Slovakia | Coalition for Global Hepatitis Elimination](#)

ECDC technical report (2019): [Monitoring the responses to the hepatitis B and C epidemics in the EU EEA Member States, 2019 \(europa.eu\)](#)

WHO meeting report (2022): [Consultation on the global health sector strategies on HIV, viral hepatitis and sexually transmitted infections \(STIs\), 2022–2030](#). Virtual meeting report: Copenhagen, Denmark and online, 16–17 June 2021. Copenhagen: WHO Regional Office for Europe.

Literature

Falla, AM, AA Ahmad, E Duffell, T Noori and IK Veldhuijzen (2018). "[Estimating the scale of chronic hepatitis C virus infection in the EU/EEA: a focus on migrants from anti-HCV endemic countries.](#)" BMC Infect Dis **18**(1): 42.

BACKGROUND: Increasing the proportion diagnosed with and on treatment for chronic hepatitis C (CHC) is key to the elimination of hepatitis C in Europe. This study contributes to secondary prevention planning in the European Union/European Economic Area (EU/EEA) by estimating the number of CHC (anti-HCV positive and viraemic) cases among migrants living in the EU/EEA and born in endemic countries, defining the most affected migrant populations, and assessing whether country of birth prevalence is a reliable proxy for migrant prevalence. **METHODS:** Migrant country of birth and population size extracted from statistical databases and anti-HCV prevalence in countries of birth and in EU/EEA countries derived from a systematic literature search were used to estimate caseload among and most affected migrants. Reliability of country of birth prevalence as a proxy for migrant prevalence was assessed via a systematic literature search. **RESULTS:** Approximately 11% of the EU/EEA adult population is foreign-born, 79% of whom were born in endemic (anti-HCV prevalence $\geq 1\%$) countries. Anti-HCV/CHC prevalence in migrants from endemic countries residing in the EU/EEA is estimated at 2.3%/1.6%, corresponding to ~580,000 CHC infections or 14% of the CHC disease burden in the EU/EEA. The highest number of cases is found among migrants from Romania and Russia (50–60,000 cases each) and migrants from Italy, Morocco, Pakistan, Poland and Ukraine (25–35,000 cases each). Ten studies reporting prevalence in migrants in Europe were identified; in seven of these estimates, prevalence was comparable with the country of birth prevalence and in three estimates it was lower. **DISCUSSION:** Migrants are disproportionately affected by CHC, account for a considerable number of CHC infections in EU/EEA countries, and are an important population for targeted case finding and treatment. Limited data suggest that country of birth prevalence can be used as a proxy for the prevalence in migrants.

Fraser, H, NK Martin, H Brummer-Korvenkontio, P Carrieri, O Dalgard, J Dillon, D Goldberg, S Hutchinson, M Jauffret-Roustide, M Kåberg, AA Matser, M Matičič, H Midgard, V Mravcik, A Øvrehus,



M Prins, J Reimer, G Robaey, B Schulte, DK van Santen, R Zimmermann, P Vickerman and M Hickman (2018). "[Model projections on the impact of HCV treatment in the prevention of HCV transmission among people who inject drugs in Europe.](#)" *J Hepatol* **68**(3): 402-411.

BACKGROUND & AIMS: Prevention of hepatitis C virus (HCV) transmission among people who inject drugs (PWID) is critical for eliminating HCV in Europe. We estimated the impact of current and scaled-up HCV treatment with and without scaling up opioid substitution therapy (OST) and needle and syringe programmes (NSPs) across Europe over the next 10 years. **METHODS:** We collected data on PWID HCV treatment rates, PWID prevalence, HCV prevalence, OST, and NSP coverage from 11 European settings. We parameterised an HCV transmission model to setting-specific data that project chronic HCV prevalence and incidence among PWID. **RESULTS:** At baseline, chronic HCV prevalence varied from <25% (Slovenia/Czech Republic) to >55% (Finland/Sweden), and <2% (Amsterdam/Hamburg/Norway/Denmark/Sweden) to 5% (Slovenia/Czech Republic) of chronically infected PWID were treated annually. The current treatment rates using new direct-acting antivirals (DAAs) may achieve observable reductions in chronic prevalence (38-63%) in 10 years in Czech Republic, Slovenia, and Amsterdam. Doubling the HCV treatment rates will reduce prevalence in other sites (12-24%; Belgium/Denmark/Hamburg/Norway/Scotland), but is unlikely to reduce prevalence in Sweden and Finland. Scaling-up OST and NSP to 80% coverage with current treatment rates using DAAs could achieve observable reductions in HCV prevalence (18-79%) in all sites. Using DAAs, Slovenia and Amsterdam are projected to reduce incidence to 2 per 100 person years or less in 10 years. Moderate to substantial increases in the current treatment rates are required to achieve the same impact elsewhere, from 1.4 to 3 times (Czech Republic and France), 5-17 times (France, Scotland, Hamburg, Norway, Denmark, Belgium, and Sweden), to 200 times (Finland). Scaling-up OST and NSP coverage to 80% in all sites reduces treatment scale-up needed by 20-80%. **CONCLUSIONS:** The scale-up of HCV treatment and other interventions is needed in most settings to minimise HCV transmission among PWID in Europe. **LAY SUMMARY:** Measuring the amount of HCV in the population of PWID is uncertain. To reduce HCV infection to minimal levels in Europe will require scale-up of both HCV treatment and other interventions that reduce injecting risk (especially OST and provision of sterile injecting equipment).

Leblebicioglu, H, JE Arends, R Ozaras, G Corti, L Santos, C Boesecke, A Ustianowski, AS Duberg, S Ruta, NN Salkic, P Husa, I Lazarevic, JA Pineda, NY Pshenichnaya, T Tsertswadze, M Matičić, E Puca, G Abuova, J Gervain, R Bayramli, S Ahmeti, M Koulentaki, B Kilani, A Vince, F Negro, M Sunbul and D Salmon (2018). "[Availability of hepatitis C diagnostics and therapeutics in European and Eurasia countries.](#)" *Antiviral Res* **150**: 9-14.

BACKGROUND: Treatment with direct acting antiviral agents (DAAs) has provided sustained virological response rates in >95% of patients with chronic hepatitis C virus (HCV) infection. However treatment is costly and market access, reimbursement and governmental restrictions differ among countries. We aimed to analyze these differences among European and Eurasian countries. **METHODS:** A survey including 20-item questionnaire was sent to experts in viral hepatitis. Countries were evaluated according to their income categories by the World Bank stratification. **RESULTS:** Experts from 26 countries responded to the survey. As of May 2016, HCV prevalence was reported as low ($\leq 1\%$) in Croatia, Czech Republic, Denmark, France, Germany, Hungary, the Netherlands, Portugal, Slovenia, Spain, Sweden, UK; intermediate (1-4%) in Azerbaijan, Bosnia and Herzegovina, Italy, Kosovo, Greece, Kazakhstan, Romania, Russia, Serbia and high in Georgia (6.7%). All countries had national guidelines except Albania, Kosovo, Serbia, Tunisia, and UK. Transient elastography was available in all countries, but reimbursed in 61%. HCV-RNA was reimbursed in 81%. PegIFN/RBV was reimbursed in 54% of the countries. No DAAs were available in four countries: Kazakhstan, Kosovo, Serbia, and Tunisia. In others, at least one DAA combination



with either PegIFN/RBV or another DAA was available. In Germany and the Netherlands all DAAs were reimbursed without restrictions: Sofosbuvir and sofosbuvir/ledipasvir were free of charge in Georgia. CONCLUSION: Prevalence of HCV is relatively higher in lower-middle and upper-middle income countries. DAAs are not available or reimbursed in many Eurasia and European countries. Effective screening and access to care are essential for reducing liver-related morbidity and mortality.

Adlhoch, C, Z Mandáková, S Ethelberg, J Epštein, R Rimhanen-Finne, J Figoni, SA Baylis, M Faber, K Mellou, N Murphy, J O'Gorman, ME Tosti, AR Ciccaglione, A Hofhuis, H Zaaijer, H Lange, R de Sousa, A Avellón, L Sundqvist, B Said and S Ijaz (2019). "[Standardising surveillance of hepatitis E virus infection in the EU/EEA: A review of national practices and suggestions for the way forward.](#)" *J Clin Virol* **120**: 63-67.

BACKGROUND: Hepatitis E virus (HEV) infection is not notifiable at EU/EEA level, therefore surveillance relies on national policies only. Between 2005 and 2015, more than 20,000 cases were reported in EU/EEA countries. HEV testing is established in 26 countries and 19 countries sequence HEV viruses. OBJECTIVE AND STUDY DESIGN: WHO's European Action plan for viral hepatitis recommends harmonised surveillance objectives and case definitions. ECDC's HEV expert group developed minimal and optimal criteria for national hepatitis E surveillance to support EU/EEA countries in enhancing their capacity and to harmonise methods. RESULTS: The experts agreed that the primary objectives of national surveillance for HEV infections should focus on the basic epidemiology of the disease: to monitor the incidence of acute cases and chronic infections. The secondary objectives should be to describe viral phylotypes or subtypes and to identify potential clusters/outbreaks and possible routes of transmission. Seventeen of 20 countries with existing surveillance systems collect the minimal data set required to describe the epidemiology of acute cases. Eleven countries test for chronic infections. Twelve countries collect data to identify potential clusters/outbreaks and information on possible routes of transmission. DISCUSSION: Overall, the majority of EU/EEA countries collect the suggested data and meet the outlined requirements to confirm an acute case.

Dara, M, S Ehsani, A Mozalevskis, E Vovc, D Simões, A Avellon Calvo, IBJ Casabona, O Chokoshvili, I Felker, S Hoffner, G Kalmambetova, E Noroc, N Shublazde, A Skrahina, R Tahirli, T Tsertsvadze and F Drobniowski (2020). "[Tuberculosis, HIV, and viral hepatitis diagnostics in eastern Europe and central Asia: high time for integrated and people-centred services.](#)" *Lancet Infect Dis* **20**(2): e47-e53.

Globally, high rates (and in the WHO European region an increasing prevalence) of co-infection with tuberculosis and HIV and HIV and hepatitis C virus exist. In eastern European and central Asian countries, the tuberculosis, HIV, and viral hepatitis programmes, including diagnostic services, are separate vertical structures. In this Personal View, we consider underlying reasons for the poor integration for these diseases, particularly in the WHO European region, and how to address this with an initial focus on diagnostic services. In part, this low integration has reflected different diagnostic development histories, global funding sources, and sample types used for diagnosis (eg, typically sputum for tuberculosis and blood for HIV and hepatitis C). Cooperation between services improved as patients with tuberculosis needed routine testing for HIV and vice versa, but financial, infection control, and logistical barriers remain. Multidisease diagnostic platforms exist, but to be used optimally, appropriate staff training and sensible understanding of different laboratory and infection control risks needs rapid implementation. Technically these ideas are all feasible. Poor coordination between these vertical systems remains unhelpful. There is a need to increase political and operational integration of diagnostic and treatment services and bring them closer to patients.



Flisiak, R, S Frankova, I Grgurevic, B Hunyady, P Jarcuska, L Kupčinskas, M Makara, M Simonova, J Sperl, I Tolmane, A Vince and D Zarębska-Michaluk (2020). "[How close are we to hepatitis C virus elimination in Central Europe?](#)" *Clin Exp Hepatol* **6**(1): 1-8.

AIM OF THE STUDY: To collect and analyse data obtained from HCV opinion leaders/experts from central European countries, on factors which can affect the WHO target of HCV elimination by 2030. MATERIAL AND METHODS: Data were collected from opinion leaders/experts involved in management of HCV infections in Central European countries which participated in 9(th) Conference of the Central European Hepatologic Collaboration (Warsaw, 10-11 October 2019). A dedicated questionnaire collected current information related to HCV elimination in Bulgaria, Croatia, the Czech Republic, Hungary, Latvia, Lithuania, Poland and Slovakia. RESULTS: The HCV prevalence rate in particular countries varied from 0.2% to 1.7%. In most central European countries all the HCV infected population is eligible for reimbursement of treatment. However, in some countries there are still some limitations related to the stage of the disease and people who inject drugs. All countries have access to at least one pangenotypic regimen. The most common barrier to HCV elimination in all countries is insufficient political will to establish priority for HCV. None of the reporting countries has established a national screening programme. CONCLUSIONS: Access to therapy for HCV is similar and the majority of patients in Central Europe can be treated according to the current guidelines. Unfortunately there are still some limitations and a lack of political will to implement national screening programmes. According to collected data HCV elimination will not be possible in the region by 2030.

Hatzakis, A, JV Lazarus, E Cholongitas, R Baptista-Leite, C Boucher, CS Busoi, S Deuffic-Burban, J Chhatwal, G Esmat, S Hutchinson, MM Malliori, M Maticic, A Mozalevskis, F Negro, GA Papandreou, GV Papatheodoridis, M Peck-Radosavljevic, H Razavi, T Reic, E Schatz, N Tozun, Z Younossi and MP Manns (2020). "[Securing sustainable funding for viral hepatitis elimination plans.](#)" *Liver Int* **40**(2): 260-270.

The majority of people infected with chronic hepatitis C virus (HCV) in the European Union (EU) remain undiagnosed and untreated. During recent years, immigration to EU has further increased HCV prevalence. It has been estimated that, out of the 4.2 million adults affected by HCV infection in the 31 EU/ European Economic Area (EEA) countries, as many as 580 000 are migrants. Additionally, HCV is highly prevalent and under addressed in Eastern Europe. In 2013, the introduction of highly effective treatments for HCV with direct-acting antivirals created an unprecedented opportunity to cure almost all patients, reduce HCV transmission and eliminate the disease. However, in many settings, HCV elimination poses a serious challenge for countries' health spending. On 6 June 2018, the Hepatitis B and C Public Policy Association held the 2nd EU HCV Policy summit. It was emphasized that key stakeholders should work collaboratively since only a few countries in the EU are on track to achieve HCV elimination by 2030. In particular, more effort is needed for universal screening. The micro-elimination approach in specific populations is less complex and less costly than country-wide elimination programmes and is an important first step in many settings. Preliminary data suggest that implementation of the World Health Organization (WHO) Global Health Sector Strategy on Viral Hepatitis can be cost saving. However, innovative financing mechanisms are needed to raise funds upfront for scaling up screening, treatment and harm reduction interventions that can lead to HCV elimination by 2030, the stated goal of the WHO.

Flisiak, R, D Zarębska-Michaluk, S Frankova, I Grgurevic, B Hunyady, P Jarcuska, L Kupčinskas, M Makara, M Simonova, J Sperl, I Tolmane, A Vince. (2021) [Is elimination of HCV in 2030 realistic in Central Europe?](#) *Liver Int*. Jun;41 Suppl 1:56-60. doi: 10.1111/liv.14834.

According to the recent data presented by Central-European HCV experts, the estimated prevalence of HCV is between 0.2% and 1.7% in certain countries in this region. There are no



financial limitations to access to treatment in most countries. Patients in these countries have access to at least one pangenotypic regimen. The most common barriers to the elimination of HCV in Central Europe are a lack of established national screening programmes and limited political commitment to the elimination of HCV. Covid-19 has significantly affected the number of patients who have been diagnosed and treated, thus, delaying the potential elimination of HCV. These data suggest that the elimination of HCV elimination projected by WHO before 2030 will not be possible in the Central Europe.

Flisiak, R, D Zarębska-Michaluk, E Ciupkeviciene, S Drazilova, S Frankova, I Grgurevic, B Hunyady, P Jarcuska, L Kupčinskas, M Makara, G Saulite-Vanaga, M Simonova, J Sperl, I Tolmane and A Vince (2022). "[HCV Elimination in Central Europe with Particular Emphasis on Microelimination in Prisons.](#)" *Viruses* **14**(3).

In 2016, the WHO announced a plan to eliminate viral hepatitis as a public health threat by 2030. In this narrative review, experts from Bulgaria, Croatia, the Czech Republic, Hungary, Latvia, Lithuania, Poland and Slovakia assessed the feasibility of achieving the WHO 2030 target for HCV infections in Central Europe. They focused mainly on HCV micro-elimination in prisons, where the highest incidence of HCV infections is usually observed, and the impact of the COVID-19 pandemic on the detection and treatment of HCV infections. According to the presented estimates, almost 400,000 people remain infected with HCV in the analyzed countries. Interferon-free therapies are available ad libitum, but the number of patients treated annually in the last two years has halved compared to 2017-2019, mainly due to the COVID-19 pandemic. None of the countries analyzed had implemented a national HCV screening program or a prison screening program. The main reason is a lack of will at governmental and prison levels. None of the countries analyzed see any chance of meeting the WHO targets for removing viral hepatitis from the public threat list by 2030, unless barriers such as a lack of political will and a lack of screening programs are removed quickly.

Fursa, O, A Mcroft, JV Lazarus, S Amele, J Lundgren, R Matulionyte, LD Rasmussen, JK Rockstroh, M Parczewski, D Jilich, S Moreno, A Vassilenko, K Lacombe, G Wandeler, E Borodulina, J Brännström, L Wiese, C Orkin, GMN Behrens, K Mansinho, JJ Portu and L Peters (2022). "[The hepatitis C cascade of care in HIV/hepatitis C virus coinfecting individuals in Europe: regional and intra-regional differences.](#)" *Aids* **36**(3): 423-435.

BACKGROUND: Following the introduction of direct-acting antiviral therapy in 2013, WHO launched the first Global Health Sector Strategy on Viral Hepatitis. We describe a hepatitis C virus (HCV) cascade of care in people with HIV (PWH) across Europe in terms of reaching the WHO elimination targets of diagnosing 90% and treating 80% of HCV-infected individuals. **METHODS:** HIV/HCV-coinfecting participants in the EuroSIDA cohort under prospective follow-up at October 1, 2019, were described using a nine-stage cascade of care. Care cascades were constructed across Europe, on a regional (n=5) and country (n=21) level. **RESULTS:** Of 4773 anti-HCV positive PWH, 4446 [93.1%, 95% confidence interval (CI) 92.4-93.9] were ever tested for HCV RNA, and 19.0% (95% CI 16.4-21.6) were currently HCV RNA positive, with the highest prevalence in Eastern and Central-Eastern Europe (33.7 and 29.6%, respectively). In Eastern Europe, 78.1% of the estimated number of chronic infections have been diagnosed, whereas this proportion was above 95% in the other four regions. Overall, 3116 persons have ever started treatment (72.5% of the ever chronically infected, 95% CI 70.9-74.0) and 2404 individuals (55.9% of the ever chronically infected, 95% CI 53.9-57.9) were cured. Cure proportion ranged from 11.2% in Belarus to 87.2% in Austria. **CONCLUSION:** In all regions except Eastern Europe, more than 90% of the study participants have been tested for HCV-RNA. In Southern and Central-Western regions, more than 80% ever chronically HCV-infected PWH received treatment. The proportion with cured HCV infection did not exceed 80% in any region, with significant heterogeneity between countries. **SUMMARY:** In a pan-European cohort of PWH, all regions except Eastern Europe achieved



the WHO target of diagnosing 90% of chronic HCV infections, while the target of treating 80% of eligible persons was achieved in none of the five regions.

Singh, J, S Stoitsova, K Zakrzewska, L Henszel, M Rosińska and E Duffell (2022). "[Healthcare-associated hepatitis B and C transmission to patients in the EU/EEA and UK: a systematic review of reported outbreaks between 2006 and 2021.](#)" *BMC Public Health* **22**(1): 2260.

Healthcare-associated transmission was the second most common hepatitis B (HBV) and hepatitis C (HCV) transmission route according to 2006-2012 European surveillance data, but data quality and completeness issues hinder comprehensive characterisation of this important issue. We carried out a systematic review of published literature on healthcare-associated transmission of HBV or HCV in European Union (EU) and European Economic Area (EEA) countries and the United Kingdom to complement surveillance data and identify higher-risk settings. We searched the PubMed and Embase databases and grey literature over the period January 2006 to September 2021, for publications reporting transmission events after 2000 in the EU/EEA and UK related to a healthcare setting or procedure. We collected data on the country, number of patients, setting type and route of transmission. In 65 publications from 16 countries, 43 HBV and 48 HCV events were identified resulting in 442 newly infected patients. Most events were reported from Italy (7 HBV and 12 HCV), Germany (8 HBV and 5 HCV) and the United Kingdom (8 HBV and 5 HCV). The number of patients infected from a single source within an event ranged from 1 to 53. Five large outbreaks of over 20 cases were identified, including two in Poland and one each in Belgium, Hungary and Slovakia. The majority of transmission events occurred through blood transfusions or in dialysis units. However, there were a number of outbreaks in seemingly low risk settings such as CT/MRI scanning units. A failure to adequately follow infection prevention control (IPC) precautions was reported in 30% of included studies. Healthcare-associated transmission of hepatitis B and C continues to occur in a range of community and hospital settings across EU/EEA countries and often results in large outbreaks, although the true extent of the situation cannot be fully determined due to under-reporting. Strict IPC precautions should be implemented across all healthcare settings and regularly audited, and surveillance systems strengthened and standardised to allow for comprehensive and consistent reporting of nosocomial transmission of hepatitis across the EU.

Stone, J, A Artenie, M Hickman, NK Martin, L Degenhardt, H Fraser and P Vickerman (2022). "[The contribution of unstable housing to HIV and hepatitis C virus transmission among people who inject drugs globally, regionally, and at country level: a modelling study.](#)" *Lancet Public Health* **7**(2): e136-e145.

BACKGROUND: A considerable proportion of people who inject drugs are unstably housed. Although unstable housing is associated with HIV and HCV infection among people who inject drugs, its contribution to transmission is unknown. We estimated the global and national proportions of incident HIV and HCV infections among people who inject drugs attributed to housing instability from 2020 to 2029. **METHODS:** In this modelling study, we developed country-level models of unstable housing and HIV and HCV transmission among people who inject drugs in 58 countries globally, calibrated to country-specific data on the prevalences of HIV and HCV and unstable housing. Based on a recently published systematic review, unstably housed people who inject drugs were assumed to have a 39% (95% CI 6-84) increased risk of HIV transmission and a 64% (95% CI 43-89%) increased risk of HCV transmission. We used pooled country-level estimates from systematic reviews on HCV and HIV prevalence in people who inject drugs. Our models estimated the transmission population attributable fraction (tPAF) of unstable housing to HIV and HCV transmission among people who inject drugs, defined as the percentage of infections prevented from 2020 to 2029 if the additional risk due to unstable housing was removed. **FINDINGS:** Our models were produced for 58 countries with sufficient data (accounting for >66% of the



global people who inject drugs population). Globally, we project unstable housing contributes 7.9% (95% credibility interval [CrI] 2.3-15.7) of new HIV infections and 11.2% (7.7-15.5) of new HCV infections among people who inject drugs from 2020 to 2029. Country-level tPAFs were strongly associated with the prevalence of unstable housing. tPAFs were greater in high-income countries (HIV 17.2% [95% CrI 5.1-30.0]; HCV 19.4% [95% CrI 13.8-26.0]) than in low-income or middle-income countries (HIV 6.6% [95% CrI 1.8-13.1]; HCV 8.3% [95% CrI 5.5-11.7]). tPAFs for HIV and HCV were highest in Afghanistan, Czech Republic, India, USA, England, and Wales where unstable housing contributed more than 20% of new HIV and HCV infections. INTERPRETATION: Unstable housing is an important modifiable risk factor for HIV and HCV transmission among people who inject drugs in many countries. The study emphasises the importance of implementing initiatives to mitigate these risks and reduce housing instability. FUNDING: National Institute for Health Research and National Institute of Allergy and Infectious Diseases and National Institute for Drug Abuse.

Aimla, K, JD Kowalska, R Matulionyte, V Mulabdic, A Vassilenko, N Bolokadze, D Jilich, S Antoniak, C Oprea, T Balayan, A Harxhi, A Papadopoulos, B Lakatos, M Vasylyev, J Begovac, N Yancheva, A Streinu-Cercel, A Verhaz, D Gokengin, G Dragovic, L Sojak and A Skrzat-Klapaczyńska (2023).

["Vaccination against HBV and HAV as Mode of Hepatitis Prevention among People Living with HIV-Data from ECEE Network Group."](#) *Vaccines (Basel)* **11**(5).

(1) Background: Viral hepatitis C (HCV) and viral hepatitis B (HBV) are common co-infections in people living with HIV (PLWH). All PLWH should be vaccinated against HBV and hepatitis A (HAV) and treated for HBV and HCV. We aimed to compare testing, prophylaxis and treatment of viral hepatitis in PLWH in Central and Eastern Europe (CEE) in 2019 and 2022. (2) Methods: Data was collected through two on-line surveys conducted in 2019 and 2022 among 18 countries of the Euroguidelines in CEE (ECEE) Network Group. (3) Results: In all 18 countries the standard of care was to screen all PLWH for HBV and HCV both years; screening of HAV was routine in 2019 in 54.5% and in 2022 47.4% of clinics. Vaccination of PLWH against HAV was available in 2019 in 16.7%, in 2022 in 22.2% countries. Vaccination against HBV was available routinely and free of charge in 50% of clinics both in 2019 and 2022. In HIV/HBV co-infected the choice of NRTI was tenofovir-based in 94.4% of countries in both years. All clinics that responded had access to direct-acting antivirals (DAAs) but 50% still had limitations for treatment. (4) Conclusions: Although testing for HBV and HCV was good, testing for HAV is insufficient. Vaccination against HBV and especially against HAV has room for improvement; furthermore, HCV treatment access needs to overcome restrictions.



Czech Republic

Dáňová, J, J Šálek, A Kocourková and AM Čelko (2015). "[Factors Associated with Parental Refusal of Routine Vaccination in the Czech Republic.](#)" *Cent Eur J Public Health* **23**(4): 321-323.

AIM: Routine vaccination is one of the most important preventive methods which is responsible for the decreasing trend of morbidity and mortality of vaccine preventable infectious diseases, their complications and sequelae. The impact of vaccination on declining trend of these diseases is well known and confirmed by a large number of epidemiological studies. In the Czech Republic, there is high vaccination coverage in regards to most vaccine preventable diseases. However, during the last decade proportion of parents refusing routine vaccination of their children due to different factors is increasing. The presented study evaluates current situation in the Czech Republic and describes the most significant factors in parents decision making. METHODS: The study was conducted between 1 July 2013 and 31 March 2014 as a questionnaire based survey (cross-sectional study). The questionnaire was created with multiple choice answers. Questions were addressed to parents or legal representatives of children aged 0-18 years. Types of questions were divided into several subgroups. The study was performed in the Czech Republic in two different districts of Prague and Zlín. RESULTS: In the sample size (n=480) we detected 11 parents who refused vaccination of 11 children (2.29%). The most often refused vaccines in the prevalence study were hexavaccine (1st dose) and measles, mumps and rubella vaccine (1st dose). The hexavaccine includes tetanic anatoxin, diphtheric anatoxin, acellular pertussis vaccine, conjugate vaccine against Haemophilus influenzae b, inactivated polio vaccine, and recombinant vaccine against viral hepatitis B. The measles, mumps, rubella vaccine contains live attenuated viruses of measles, mumps, rubella. CONCLUSION: We observed increasing trend of routine vaccination refusal in children during the last ten years (compared to situation in the year 2004, p<0.001). The most important factors associated with this progression were distrust to vaccination, fear of some vaccine components and fear of adverse reactions.

2016 - [Study: Czech incidence of hepatitis C eight times higher than previously believed | Radio Prague International](#)

Husová, L (2016). "[\[Real data o viral hepatitis C therapy in the Czech Republic\]](#)." *Vnitr Lek* **62**(9 Suppl 2): 6-9.

We reported the first real data about efficacy of interferon-free therapy of chronic hepatitis C in the Czech Republic. Patients were treated with combined therapy of paritaprevir/ritonavir + ombitasvir + dasabuvir with or without ribavirin. There were 109 patients, predominantly men - 62 (57 %), most of them infected by genotype 1b - 101 patients (93 %), minority infected by genotypes 1a (6/109, 5 %) and 4 (2/109, 2 %). Both treatment-naive (43/109, 39 %), and treatment-experienced patients (66/109, 61 %) were treated. Sustained virological response 12 weeks after therapy termination (SVR12) was 100 %, with exclusion of patients with other reason than virological treatment failure. Key words: dasabuvir - chronic hepatitis C - ombitasvir - paritaprevir/rinonavir - ribavirin.

Šošovičková, R, J Smetana, E Beranová, K Kučerová and R Chlábek (2016). "[\[The incidence of viral hepatitis A in the Hradec Králové Region in the Czech Republic in the last decade\]](#)." *Epidemiol Mikrobiol Imunol* **65**(3): 164-170.

OBJECTIVE: Viral hepatitis A continues to occur in the Czech Republic due to the high susceptibility of the population and existing opportunities for the transmission of the disease. The aim was to describe and analyse the incidence of viral hepatitis A in the Hradec Králové Region in the Czech Republic in 2005-2014, including the study of two outbreaks that



required a different approach of field epidemiologists. MATERIAL AND METHODS: In 2015, a retrospective analysis was carried out of the data on the incidence of viral hepatitis A in Hradec Králové Region in 2005-2014. The EPIDAT system where cases of infectious diseases and data from epidemiological investigations are reported was used as a data source for the purposes of the present analysis. In addition, two final reports on epidemic outbreaks of viral hepatitis A from 2014 were assessed. RESULTS: The incidence of viral hepatitis A at the regional level follows, to a certain extent, the pattern of the incidence of this disease at the national level. The highest number of cases was reported in 2010 due to a country-wide epidemic. The most affected age groups were children, adolescents, and young adults. The incidence of viral hepatitis A in individual years has a significant effect on the emergence of local outbreaks. CONCLUSION: The incidence of viral hepatitis A in the Czech Republic has a fluctuating trend, at both the national and regional levels. The highest incidence of viral hepatitis A was observed in the younger and middle-age categories. The high susceptibility of these population groups suggests the importance of vaccination against viral hepatitis A that confers specific personal protection.

Key words: viral hepatitis A - incidence - outbreak - Czech Republic.

Husa, P and L Husová (2017). "[\[First experience with elbasvir/grazoprevir fixed-dose combination in real-life practice in the Czech Republic\]](#)." *Klin Mikrobiol Infekc Lek* **23**(4): 137-141.

Hepatitis C virus infection (HCV) is one of the leading causes of chronic liver disease worldwide. The new fixed-dose combination of the highly potent second wave first generation NS5A inhibitor elbasvir (50 mg) and the second generation protease inhibitor grazoprevir (100 mg) is contained in the drug Zepatier. This combination is indicated for the treatment of patients chronically infected with HCV genotypes 1 or 4. Between June and August 2017, the treatment was initiated in 22 patients with chronic viral hepatitis C, with 17 patients being treated in the Department of Infectious Diseases University Hospital Brno and five patients in the Center of Cardiovascular and Transplant Surgery in Brno. All patients were infected with HCV subtype 1b. In all cases, the duration of Zepatier monotherapy (without simultaneous ribavirin administration) was 12 weeks. At the moment, only preliminary results are available. All 22 patients achieved end-of-treatment virologic response. In nine patients, it was already possible to evaluate the virologic response at four weeks after the end of treatment, with sustained virological response (SVR12) was observed in all these patients. The most common complaints were fatigue (3 patients, 14 %) and headache (2.9 %). These problems were not serious and did not interfere with normal daily activities of treated persons.

Husa, P, J Šperl, P Urbánek, S Fraňková, S Plíšek, P Kümpel and L Rožnovský (2017). "[\[Diagnosis and therapy of hepatitis B virus infection: Czech national guidelines\]](#)." *Klin Mikrobiol Infekc Lek* **23**(4): 148-164.

The new recommendations reflect the increase in knowledge that has been reported since the release of previous Czech guidelines in September 2014. The basis for these guidelines were the European Association for the Study of the Liver guidelines from April 2017. According to qualified estimates, there are 240 million people with chronic hepatitis B (HBV) infection worldwide. The Czech Republic is among the countries with a low prevalence of HBV infection. According to the latest seroprevalence study, 0.56 % of the Czech citizens were chronically infected with HBV in 2001. A similar study conducted in only two regions of the Czech Republic in 2013 showed a prevalence of only 0.064 %. HBV infection can lead to serious life-threatening liver damage - fulminant hepatitis, liver cirrhosis and hepatocellular carcinoma (HCC). The main goals of treatment are to prolong the length of life and improve its quality by preventing the progression of chronic hepatitis to cirrhosis, cirrhosis decompensation and development of HCC. The goals may be achieved if HBV replication is



suppressed in a sustained manner. Additional goals are prevention of vertical transmission from mother to newborn, inhibition of HBV reactivation and therapy of HBV-related extrahepatic manifestations. Generally, there are two different strategies of chronic hepatitis B therapy available - treatment with nucleoside or nucleotide inhibitors (NIs) or with pegylated interferon alfa. Currently, the vast majority of Czech and European patients are treated with NIs. The NIs that have been approved for HBV treatment in the European Union include lamivudine, adefovir dipivoxil, entecavir (ETV), telbivudin (TBV), tenofovir disoproxil fumarate (TDF) and tenofovir alafenamide (TAF). TAF and TBV have not yet been marketed in the Czech Republic. The main advantages of treatment with potent NIs with a high barrier to resistance (ETV, TDF, TAF) are their predictable high long-term antiviral efficacy leading to undetectable HBV DNA levels in the vast majority of compliant patients as well as their favorable safety profiles. These drugs can be used in any HBV infected patient and represent the only treatment option for patients with decompensated liver cirrhosis, liver transplants, extrahepatic HBV-related manifestations, severe acute hepatitis B or chronic HBV reactivation.

Prymula, R, D Kieninger, E Feroldi, E Jordanov, S B'Chir and X DaCosta (2018). "[Immunogenicity and Safety of Primary and Booster Vaccinations of a Fully Liquid DTaP-IPV-HB-PRP-T Hexavalent Vaccine in Healthy Infants and Toddlers in Germany and the Czech Republic.](#)" *Pediatr Infect Dis J* **37**(8): 823-830.

To support a fully liquid, diphtheria (D)-tetanus (T)-acellular pertussis (aP)-inactivated poliovirus (IPV)-hepatitis B (HB)-Haemophilus influenzae b (PRP-T) vaccine in Europe using a 2, 3, 4 month primary series and a booster at 11-15 months of age. Phase III, randomized, observer-blind studies in Germany and the Czech Republic. Participants who had not received HB vaccine were randomized to a 2, 3, 4 month primary series of DTaP-IPV-HB-PRP-T (group 1; N = 266) or a reconstituted DTaP-HB-IPV//PRP-T comparator (group 2; N = 263) and a booster of the same vaccine. Pneumococcal vaccine (PCV13) and rotavirus vaccine were coadministered at 2, 3, 4 months, and the booster was coadministered with PCV13. Noninferiority (group 1 versus group 2) was tested postprimary series for seroprotection rates (anti-HB and anti-PRP) and vaccine response rates (anti-pertussis toxin and anti-filamentous hemagglutinin). Safety was assessed by parental reports. Noninferiority was demonstrated with the lower bound of the 95% confidence interval for the difference (group 1 to group 2) being > -10% for each comparison. Primary series immune responses were high for all antigens and similar in each group. Prebooster antibody persistence was good, and there was a strong anamnestic response, both being similar for the investigational and control vaccines. Responses to PCV13 and rotavirus vaccine were similar in each group. There were no safety concerns. These data support the use of the DTaP-IPV-HB-PRP-T vaccine in a 2, 3, 4 month schedule without a birth dose of HB vaccine, with a booster dose in the second year of life administered with routine childhood vaccines.

Frankova, S, P Urbanek, P Husa, V Nemecek, H Razavi, D Razavi-Shearer, R Chlibek and J Sperl (2019). "[Chronic hepatitis C in the Czech Republic: Forecasting the disease burden.](#)" *Cent Eur J Public Health* **27**(2): 93-98. (<https://www.ncbi.nlm.nih.gov/pubmed/31241282>)

OBJECTIVE: Chronic HCV infection is associated with cirrhosis of the liver, hepatocellular carcinoma (HCC), and liver transplantation. HCV disease burden and the impact of new potent direct acting antivirals (DAAs) in the Czech Republic are unknown. METHODS: Using a modelling framework, HCV disease progression in the Czech Republic was predicted to 2030 under the current standard of care treatment structure. In addition, two strategies to reduce the future burden of HCV infection were modelled: an incremental increase in treatment annually and WHO targets. RESULTS: The number of viremic infected individuals in the Czech Republic is estimated to peak in 2026 (n = 55,130) and to decline by 0.5% by 2030 (n = 54,840). The number of individuals with compensated cirrhosis (n = 1,400), decompensated



cirrhosis (n = 80), HCC (n = 70), and liver-related deaths (n = 60) is estimated to more than double by 2030. Through aggressive increases in diagnosis and treatment, HCV related mortality may decrease by 70% by 2030. CONCLUSIONS: Disease burden associated with chronic HCV infection is projected to peak in the Czech Republic in 30-40 years. Assuming that the current portion of DAAs used remains constant, a significant reduction in HCV disease burden is possible through increased diagnosis and treatment through 2030. This analysis provides evidence in order to facilitate the development of national strategies for HCV care and management in the Czech Republic.

Jilich, D, M Malý, L Fleischhans, V Kulířová and L Machala (2019). "[Cross-sectional study on vaccination coverage in newly diagnosed HIV-infected persons in the Czech Republic.](#)" *Cent Eur J Public Health* **27**(3): 217-222.

OBJECTIVES: Individuals with HIV infection are at an increased risk for a number of infectious diseases, some of which are preventable by vaccination. Unfortunately, little is known about the attitudes of this population group to vaccination, therefore, we decided to find out vaccination coverage against 5 infections among newly diagnosed HIV-infected patients in the Czech Republic. METHODS: This cross-sectional study was conducted on newly diagnosed patients who started their follow-up care at the HIV Clinic of Na Bulovce Hospital during the two following years. Vaccination history data and results of serological tests were collected from all participants. RESULTS: Enrolled were 269 HIV-positive subjects (94.1% males) with a mean age of 34.4 years, 64 subjects (23.8%) had tertiary education, 229 (85.1%) were men having sex with men, 32 (11.9%) were heterosexual, and 8 (3.0%) were injection drug users. The mean CD4+ T-lymphocyte count was 556.2/ μL , with 149 persons (55.4%) who had a CD4+ T-lymphocyte count \geq 500/ μL , and 68 (25.3%) individuals were late presenters with CD4+ T-lymphocyte count \leq 350/ μL . A vaccination against tetanus was reported by 262 subjects (97.4%), against influenza by 18 subjects (6.7%), against tick-borne encephalitis by 18 subjects (6.7%), against viral hepatitis A by 78 persons (29.0%), and against hepatitis B by 104 subjects (38.7%). For influenza, tick-borne encephalitis and hepatitis A, a significant positive impact of tertiary education was found (p -values \leq 0.001-0.044). Vaccination coverage against both types of hepatitis was significantly lower in late presenters ($p = 0.044$ and $p = 0.004$, respectively). CONCLUSIONS: Vaccination rates found in our cohort were except tetanus and hepatitis B in young people low, especially for influenza and tick-borne encephalitis. Higher level of education and less advanced HIV infection were associated with higher vaccination rates. To improve this unsatisfactory situation, more attention should be paid to vaccination.

Věchetová, S, L Krekulová, Z Oktábec and V Řehák (2019). "[A high prevalence of viral hepatitis C in a socially excluded Roma community in Brno.](#)" *Epidemiol Mikrobiol Imunol* **68**(3): 115-121.

OBJECTIVES: To conduct a pilot study to assess the prevalence of blood-borne and sexually transmitted diseases (STDs) in a socially excluded Roma community engaging in risky behaviours in Brno, Czech Republic. METHODS: Fifty subjects engaging in risky behaviours, of whom 35 self-reported to belong to the Roma ethnicity, were recruited while receiving treatment in a newly established addiction centre in Brno between March and December 2017. All subjects were tested for blood-borne diseases and STDs. Epidemiological and demographic data were collected by means of assisted interview at the time of the first contact. RESULTS: Forty-three (86%) of 50 participants were anti-HCV positive. Of 35 subjects from the Roma subgroup, 32 (91.5%) tested anti-HCV positive. Among the 43 anti-HCV positive subjects, 35 (81.4%) also showed HCV RNA positivity. Of the 32 anti-HCV positive in the Roma subgroup, 26 (81.3%) were HCV RNA PCR positive. Only HCV (hepatitis C virus) genotypes 1 (a,b) and 3 were detected in the study group. Nine Roma subjects (25.9%) were newly diagnosed with syphilis of which none of them was aware. All study patients were negative for anti-HIV 1,2. CONCLUSION: As a proof of concept, this pilot study showed the



importance of targeting epidemiological research and preventive care at excluded communities engaging in risky behaviours. The high anti-HCV seroprevalence in the Roma population in Brno who self-admitted intravenous drug use as well as the nine newly diagnosed cases of syphilis illustrate not only a high prevalence of risky behaviours in this excluded community but also the absence of systematic health care coverage in this population. A positive point is that when an appropriate model of care is used, even the Roma clients are willing and able to comply with the therapy. This is true of both viral hepatitis C and syphilis: thanks to close cooperation with addictology services and opiate substitution treatment, all nine patients successfully completed 2 weeks of anti-treponemal antibiotic treatment. More systematic work with socially excluded communities including specific models of care tailored to the needs of poorly compliant patients is an essential prerequisite for controlling HCV epidemics in the Czech Republic. An additional effect in the surveillance of other infectious diseases linked to risky behaviours can be considered as an added value.

Rožnovský, L, J Mrázek, L Petroušová, I Orságová, L Kabieszová, M Konečná and A Kloudová (2020). "[Two case reports of chronic hepatitis C retreatment](#)." *Klin Mikrobiol Infekc Lek* **26**(3): 96-98.

In a group of 211 patients with chronic hepatitis C treated with direct-acting antivirals, four experienced therapy failure. Two patients, one originally treated with dasabuvir/ombitasvir/paritaprevir/ritonavir and the other with glecaprevir/pibrentasvir, received a triple combination of sofosbuvir, velpatasvir and voxilaprevir for 12 weeks. Following the retreatment, both patients were permanently virus-free.

Šálek, J, AM Čelko and J Dáňová (2020). "[Vaccination Perception and Attitude among Undergraduate Medical and Teacher Education Students at Charles University, Prague, Czech Republic](#)." *Vaccines (Basel)* **8**(1).

This cross-sectional comparative study was designed to evaluate different opinions and their impact on vaccine confidence, as perceived by students of two different university programs (medicine and teacher education), as both of them play important roles in patient education, with the latter major shaping the skills of critical thinking. Multi-item, opinion-based, paper-and-pencil anonymous questionnaires were distributed among students of medicine and teacher education. Data were sorted and divided into two sets to be analyzed using logistic regression. Out of a total of 722 respondents, 386 were medical students and 336 were teacher education students. While most respondents said they were not in favor of alternative medicine, a significantly higher number of alternative medicine followers were teacher education students. The positive vaccination perception rate (PVPR) is not dependent on the behavioral factors of student respondents (irrespective of their major) but is largely affected by their attitude to alternative medicine. Fear of infection dramatically increased the PVPR (up to 6.7 times) in those who were versus were not afraid of getting infected or were not quite sure whether to fear it. Fear of side effects of vaccination clearly decreased the PVPR, by at least 84%.

Skladaný, L, M Oltman, S Fraňková, S Dražilová, P Husa, J Šperl, V Hejda, P Urbánek, S Adamcová-Selčanová, M Janičko, P Kristian, V Kupčová, M Rác, I Schréter, L Virág, A Liptáková, M Ondrášová and P Jarčuška (2020). "[Chronic hepatitis C virus infection in the Czech Republic and Slovakia: an analysis of patient and virus characteristics](#)." *Int J Public Health* **65**(9): 1723-1735.

OBJECTIVES: The MOSAIC study gathered data on chronic hepatitis C virus (HCV) infection and its treatment in various countries worldwide. Here we summarise patient and HCV characteristics in the Czech Republic and Slovakia. METHODS: MOSAIC was an observational study that included patients with chronic HCV infection untreated at the time of enrolment. Study collected and descriptively analysed patient demographics, disease stage and viral characteristics. Data were collected between February 2014 to October 2014. RESULTS:



Among 220 patients enrolled, 51.4% were treatment-naïve. The most prevalent HCV genotype was G1 (78.4%), followed by G3 (19.7%). Higher prevalence of G1 was found in treatment-experienced patients (94.3%) compared to treatment-naïve (63.4%). Most participants (67.7%) presented viral RNA load of $\geq 800,000$ IU/mL. Liver cirrhosis was reported in 24.5% of patients. Higher HCV RNA load and duration of HCV infection correlated with the degree of liver fibrosis. Anti-HCV interferon-based treatments were initiated in 88.2% of participants. CONCLUSIONS: The study confirmed significant changes in the HCV genotypes partition with G3 genotype rapidly increasing in both countries, with possible impact on the WHO eradication initiative and treatment selection.

Frankova, S, Z Jandova, G Jinochova, M Kreidlova, D Merta and J Sperl (2021). "[Therapy of chronic hepatitis C in people who inject drugs: focus on adherence.](#)" *Harm Reduct J* **18**(1): 69.

BACKGROUND: Intravenous drug use (IVDU) represents the major factor of HCV transmission, but the treatment uptake among people who inject drugs (PWID) remains low owing to a false presumption of low efficacy. The aim of our study was to assess treatment efficacy in PWID and factors determining adherence to therapy. METHODS: A total of 278 consecutive patients starting DAA (direct-acting antivirals) therapy were included, divided into two groups: individuals with a history of IVDU, PWID group (N = 101) and the control group (N = 177) without a history of IVDU. RESULTS: Sustained virological response 12 weeks after the end of therapy (SVR12) was achieved by 99/101 (98%) and 172/177 (98%) patients in the PWID and control group, respectively; in PWID group, two patients were lost to follow-up, and in the control group, four patients relapsed and one was lost to follow-up. PWID patients postponed appointments significantly more often, 29 (28.7%) in PWID versus 7 (4%) in the control group, $p = 0.001$. Thirteen of 101 (12.9%) and six of 177 (3.4%) patients in the PWID and in the control group, respectively, missed at least one visit ($p < 0.01$). However, postponing visits led to a lack of medication in only one PWID. In the PWID group, older age ($p < 0.05$; OR 1.07, 95% CI 1.00-1.20) and stable housing ($p < 0.01$; OR 9.70, 95% CI 2.10-56.20) were factors positively contributing to adherence. Contrarily, a stable job was a factor negatively influencing adherence ($p < 0.05$; OR 0.24, 95% CI 0.06-0.81). In the control group, none of the analyzed social and demographic factors had an impact on adherence to therapy. CONCLUSIONS: In PWID, treatment efficacy was excellent and was comparable with SVR of the control group. Stable housing and older age contributed to a better adherence to therapy.

Husa, P and P Husa, Jr. (2021). "[Impact of outreach testing on elimination of hepatitis C.](#)" *Klin Mikrobiol Infekc Lek* **27**(1): 13-17.

OBJECTIVES: Analysis of changes in a group of patients with chronic hepatitis C (CHC) treated with direct-acting antivirals (DAAs) with a special focus on risk factors for transmission. Evaluation of cooperation with organizations working with people who inject drugs (PWID) including the impact of outreach testing. METHODS: A retrospective analysis and interannual comparison of CHC patients treated with DAAs at the Department of Infectious Diseases, University Hospital Brno, Czech Republic between 2018 and 2020. RESULTS: A total of 291 (101 in the year 2018, 111 in 2019 and 79 in 2020) patients with CHC have been treated. Comparison of results from the years 2018, 2019 and 2020 demonstrated a significant rise in the proportion of PWID (46.5 %, 64.9 % and 65.8 %, respectively). Also the proportion of genotype 3a infection (23.8 %, 30.6 % and 35.4 %) increased at the expense of genotype 1b infection (52.5 %, 46.9 % and 38.0 %). By contrast, the median age (43, 40 and 38 years) and the proportion of patients with liver cirrhosis decreased (20.8 %, 15.3 % and 12.7 %). The percentage of patients started on DAA therapy within one year of diagnosis increased (47.5 %, 53.2 % and 62.0 %). And so did the proportion of patients receiving therapy as a result of cooperation with organizations and facilities working with PWID (5.9 %, 25.2 % and 25.3 %). The downside was high numbers of patients lost to follow-up (19.8 %, 23.4 % and 22.3 %).



Those were mostly patients who completed their therapy as planned and were only lost to after receiving the final dose of DAAs. CONCLUSIONS: The fact that PWID have gradually become the dominant group of CHC patients is accompanied by a younger age of treated patients, a higher proportion of those with genotype 3a and less advanced liver damage. The changing spectrum of CHC patients makes medical professionals change their approach. Outreach testing and cooperation with organizations working with PWID have proved an effective way of improving the diagnosis and treatment of CHC.

Husa, P, S Snopková and P Husa, Jr. (2021). "[Hepatitis D screening is important in the Czech Republic as well](#)." *Klin Mikrobiol Infekc Lek* **27**(3): 98-103.

Only patients infected with hepatitis B virus (HBV) can contract hepatitis D virus (HDV) infection, either simultaneously (co-infection) or as a superinfection in those already infected with HBV. The routes of HDV transmission are contaminated needles or transfusion; sexual and vertical transmissions are relatively rare. Chronic hepatitis D is the most serious form of chronic viral hepatitis due to more rapid progression to decompensated cirrhosis and hepatocellular carcinoma (HCC). Liver cirrhosis may develop within five years and HCC within 10 years of dual infection. In the vast majority of cases, HDV replication suppresses HBV replication. Therefore, most patients are positive for HDV RNA in plasma while showing no or low levels of HBV DNA. At present, there is no routine screening for HDV in persons with chronic HBV infection in the Czech Republic. One of the reasons the absence of approved treatment options, with the only possibility being administration of pegylated interferon alpha for 48 weeks or even longer. This approach does not provide long-term efficacy in most cases. Therapy with bulevirtide seems to be promising according to available data.

Krekulová, L and L Vavrinčíková (2021). "[Experience with viral hepatitis C treatment among people who inject drugs and participate in a methadone substitution treatment program](#)." *Epidemiol Mikrobiol Imunol* **70**(1): 18-25.

OBJECTIVES: Long-term monitoring of the mutual effects of chronic viral hepatitis C (VHC) treatment and tailored addiction treatment. In 2016, the World Health Organization (WHO) published an action plan to eliminate viral hepatitis C globally by 2030. People who inject drugs (PWID) are a key population that needs increased attention and care. Two decades before the announcement of the WHO plan for the global elimination of HCV (hepatitis C virus), the Remedis Medical Facility, where the study was conducted, established a Comprehensive Care Program for patients with substance use disorders and addictive behaviour. METHODS: We evaluated all patients who were in the methadone program as of 1 March 2020, regardless of OST duration, OST dosage, age or gender. Their epidemiological and demographic data obtained during a structured clinical interview and laboratory test results were analysed. RESULTS: Of 24 patients on methadone substitution therapy, 12 (50%) were anti-HCV negative before starting OST. None of them became newly infected with hepatitis C virus (HCV) during OST. The remaining 12 of the study patients were anti-HCV positive. Ten of them have already undergone successful treatment for viral hepatitis. Two patients were re-infected with HCV. CONCLUSION: The presented work confirms the high efficacy of chronic VHC treatment among PWID in inducing suitable conditions. We consider combination of HCV infection treatment and targeted tailored addiction treatment as a starting point for achieving control over the HCV epidemic in the Czech Republic, with a possible positive impact on other blood-borne infections related to risky behaviour.

Hříbek, P, J Klasová, T Tůma, T Kupsa and P Urbánek (2022). "[Etiopathogenetic Factors of Hepatocellular Carcinoma, Overall Survival, and Their Evolution over Time-Czech Tertiary Center Overview](#)." *Medicina (Kaunas)* **58**(8).

Background and Objectives: Hepatocellular carcinoma (HCC) is the most common form of primary liver cancer with a highly unfavorable prognosis. Aims: Retrospective statistical



analysis of patients with HCC in the field of liver cirrhosis treated at our center from the perspective of demography, and the effects of key changes in diagnostic and therapeutic procedures in the last 10 years on overall survival (OS) and earlier diagnosis. **Materials and Methods:** This study included 170 cirrhotic patients with HCC (136 men, 80%). Demographic and etiological factors and OS were analyzed based on distribution into three groups according to the period and key changes in diagnostic and therapeutic approaches (BCLC classification staging; standardization of protocol for transarterial chemoembolization (TACE) and the introduction of direct-acting antivirals (DAA) for the treatment of chronic viral hepatitis C (HCV); expansion of systemic oncological therapy). **Results:** The mean age at the time of diagnosis was 69.3 years (SD = 8.1), and etiology was as follows: non-alcoholic steatohepatitis (NASH) 39%, alcoholic liver disease (ALD) 36%, HCV 18%, cryptogenic liver cirrhosis 3%, chronic hepatitis B infection (HBV) 2%, and other etiology 2%. Distribution of stages according to the BCLC: 0 + A 36%, B 31%, C 22%, and D 11%. However, the distribution in the first studied period was as follows: 0 + A 15%, B 34%, C 36%, and D 15%; and in the last period: 0 + A 45%, B 27%, C 17%, and D 11%, and difference was statistically significant ($p < 0.05$). The median OS for stages 0 + A, B, C, and D was 58, 19, 6, and 2 months, respectively. During the monitored period, there was a visible increase in the etiology of ALD from 30% to 47% and a decrease in HCV from 22% to 11%. In patients treated with TACE (stage B), the median OS grew from 10 to 24 months ($p < 0.0001$) between the marginal monitored periods. **Conclusions:** We described a decreasing number of patients with HCV-related HCC during follow-up possibly linked with the introduction of DAA. In our cohort, an improvement in early-stage diagnosis was found, which we mainly concluded as a result of proper ultrasound surveillance, the institution of a HCV treatment center, and increased experience of our sonographers with an examination of cirrhotic patients. Lastly, we described significantly improved overall survival in patients with intermediate HCC treated by TACE, due to the increased experience of interventional radiologists with the method at our facility and an earlier switch to systemic therapy in case of non-response to TACE.

Krekulová, L, T Damajka, Z Krumphanslová and V Řehák (2022). "[Pilot Outreach Program in Remediation: The Promising Step toward HCV Elimination among People Who Inject Drugs.](#)" *Int J Environ Res Public Health* **20**(1).

The global effort to eliminate HCV infection requires new approaches to accessing and testing the affected population in a setting with as low of a threshold as possible. The focus should be on socially marginalized people who inject drugs (PWIDs) and who are not willing or able to visit standard medical services. With this vision, we established an outreach service—a testing point in an ambulance in the park in front of the Main Railway Station of the capital city of Prague—to provide bloodborne disease testing and treatment. The service was available every week on Wednesday afternoon. Over the initial two years of our experience, 168 unique people were tested. Of them, 82 (49%) were diagnosed with chronic HCV infection and were eligible for treatment with antivirals. Of these, 24 (29%) initiated antiviral treatment over the study period, and 17 (71%) of these individuals achieved a documented sustained virological response. Offering medical services in PWIDs' neighborhoods helps overcome barriers and increase the chances that they will become patients and begin HCV treatment. The described outcomes appear promising for reaching the vision of linkage to the care of such a hard-to-reach population and can serve as a feasible model of care for further expansion.

Krekulova, L, Oktavec Z, Riley LW (2022). "[Key Role of Multidisciplinary Collaboration towards Global Elimination of HCV Infection.](#)" *Int J Environ Res Public Health* Mar 31;19(7):4158. doi: 10.3390/ijerph19074158.

The elimination of HCV (hepatitis C virus) infection is, according to WHO (World Health Organization), of international interest. With new diagnostic tools and treatment



possibilities, one major challenge for the elimination is to involve infected patients, especially those from socially excluded subpopulations, into HCV infection-treatment programs. The key question is how to help people who inject drugs (PWID) to engage in HCV infection-treatment programs and improve communication between PWID and hepatologists or other medical professionals involved in the treatment of chronic HCV infection. Furthermore, the medical professionals have to accept the changing spectrum of patients with chronic viral hepatitis. Without close interdisciplinary cooperation, it would be extremely difficult to achieve the WHO goal of global viral hepatitis C elimination. Here, we try to encourage our colleagues as well as addictologists and social workers to play their crucial part in the viral hepatitis C eradication process. It is extremely important for the healthcare providers to be able to communicate with addicted clients, inform PWID about the latest developments in the diagnosis and HCV infection treatment, and get them motivated to engage with specialized treatment programs

Mihalčin, M, L Husova, P Vasickova, M Bena and P Husa (2022). "[Hepatitis E - epidemiology and clinical course in the largest cohort in the Czech Republic.](#)" *Arch Med Sci* **18**(5): 1395-1398.

INTRODUCTION: The majority of hepatitis E (HE) reports come from Western Europe. The aim of the study was to describe the typical epidemiological and clinical characteristics of HE in the Czech Republic. METHODS: A retrospective analysis of 173 patients with HE. RESULTS: At least 90% of cases were autochthonous (HEV-3 genotype). Seventeen patients were treated with ribavirin. Five underwent liver transplants because of fulminant HE. We noted neurological symptomatology in 9 cases. Six patients developed chronic HE. CONCLUSIONS: There is a possibility of severe health complications caused by the hepatitis E virus in the Czech Republic.

Sekera, JC and J Frýbert (2022). "[Analysis of drug-related infectious diseases in people who inject drugs - Pilsen Region, 2003-2018.](#)" *Cent Eur J Public Health* **30**(1): 13-19.

OBJECTIVES: The aim of the study is to analyse drug-related infectious diseases (DRID) rates for people who inject drugs (PWID) in the Pilsen Region in order to identify the main determiners of infection risk and also to provide a foundation for comparison between this region and the others in the Czech Republic. METHODS: In a descriptive cross-sectional study, we analysed the Pilsen Region's data on PWID. The data was transcribed from the 2003 to 2018 internal database of the Ulice Outreach Programme. In addition to the data regarding the testing of DRID, we analysed commercial sex work (CSW) and the PWID's duration of drug use, age and current address. The statistical analysis was performed using SPSS, primarily employing logistic regression (i.e., backward elimination method) to explore predictors of seropositivity. Moreover, we calculated its prevalence from an epidemiological perspective. RESULTS: In total, 384 PWID were tested, from which 54.7% were males, and 84.1% were from Pilsen. The average age for initiation of using drug was 19.37 years. The most used drug was methamphetamine (64.8%), 77 women (20.1%) were reported to be CSW. The prevalence of DRID was as follows: hepatitis C virus (HCV) 37.24%, syphilis 1.82%, hepatitis B virus (HBV) 0.78%, and HIV infection 0.26%. The analysis showed that men had a lower risk of syphilis than women. Individuals who started their drug use via injection had a 1.365-times higher risk of DRID in comparison to those who initiated intravenous drug use later in their drug-using lives. We identified a significant association between the drug type and the risk of HCV infection: the main predictor of seropositivity was the use of fentanyl, which posed a 1.930-times higher risk than in the case of methamphetamine. CONCLUSIONS: This study is the first descriptive cross-sectional study implemented in the Pilsen Region in the Czech Republic with a focus on the subpopulation of PWID with individual data. A high prevalence of HCV infection still persists but the prevalence of HBV and HIV infections in this study (and generally in the Czech Republic) is relatively low compared to foreign studies. Syphilis is not closely associated with injecting-drug use, but rather with the sexual behaviour



of the people who use drugs intravenously. The most important predictor of seropositivity for syphilis was CSW. We also found the duration of being a CSW to be significant influence. The women who had been CSWs for less than 5 years had a significantly lower risk of syphilis than those who had prostituted for more than 5 years.

Frankova, S, N Uzlova, D Merta, V Pitova and J Sperl (2023). "[Predictors of Significant Liver Fibrosis in People with Chronic Hepatitis C Who Inject Drugs in the Czech Republic.](#)" *Life (Basel)* **13**(4).

BACKGROUND AND OBJECTIVES: HCV infection often remains untreated in people who inject drugs (PWID), albeit they may present with advanced liver fibrosis at a young age. We aimed to assess the rate of patients with significant fibrosis in PWID starting anti-HCV therapy and identify the factors associated with severe fibrosis. **METHODS:** The cohort of 200 patients was divided into two groups: F0-F2 (N = 154, 77%), patients with liver stiffness measurement (LSM) < 10.0 kPa, and F3-F4 (N = 46, 23%), with LSM ≥ 10.0 kPa, indicating significant liver fibrosis. **RESULTS:** In group F3-F4, there were significantly more males, and the patients were older, with a higher BMI. The number of long-term abstaining patients was significantly higher in group F3-F4 compared with group F0-F2, as well as the proportion of patients reporting harmful drinking. Obesity (OR 4.77), long-term abstinence from illicit drugs (OR 4.06), harmful drinking (OR 2.83), and older age (OR 1.17) were significant predictors of advanced fibrosis in PWID starting anti-HCV therapy. **CONCLUSIONS:** A quarter of PWID presented with significant liver fibrosis at treatment initiation. Obesity, long-term drug abstinence, harmful drinking, and older age contributed to significant liver fibrosis.

George, M, J Pérez Martin, M AbdelGhany, F Gkalapi, N Jamet, RC Kosse, Y Ruiz García, E Turriani and V Berlaimont (2023). "[Reduced reactogenicity of primary vaccination with DT3aP-HBV-IPV/Hib compared with DT2aP-HBV-IPV-Hib among infants: Mathematical projections in six countries.](#)" *Hum Vaccin Immunother* **19**(1): 2202124.

Vaccination of infants against diphtheria, tetanus, pertussis, hepatitis B, poliomyelitis, and Haemophilus influenzae type b is often performed with combined vaccines against these six diseases. In many countries, these are the first vaccinations received by infants, and potential adverse reactions could affect compliance with future vaccinations. A previous study examined two of the combined vaccines, DT3aP-HBV-IPV/Hib and DT2aP-HBV-IPV-Hib, and showed that local adverse reactions at the injection site (pain, redness, and swelling) and general adverse reactions (fever, drowsiness, irritability, persistent crying, and lack of appetite) were less common after vaccination with DT3aP-HBV-IPV/Hib than with DT2aP-HBV-IPV-Hib. To understand the impact of this finding at a population level, we compared the adverse reactions caused by the hypothetical administration of the two vaccines under similar conditions. We simulated the vaccination of infants with both vaccines in six countries: Austria, the Czech Republic, France, Jordan, Spain, and the Netherlands. The simulation showed that the DT3aP-HBV-IPV/Hib vaccine could reduce cases of swelling at the injection site by 3% and fever by 10%. For the year 2020, the resulting reduction in the estimated number of fever occurrences would have ranged from over 7,000 in Austria to over 62,000 in France. In total, adverse reactions avoided could hypothetically have ranged from 30,781 in Austria to 269,025 in France. Over 5 years, this could have avoided an estimated number of adverse reactions of over 150,000 in Austria to over 1.4 million in France. In conclusion, such a switch of vaccine could substantially reduce adverse reactions.

Green, MS, N Schwartz and V Peer (2023). "[Sex differences in hepatitis A incidence rates-a multi-year pooled-analysis based on national data from nine high-income countries.](#)" *PLoS One* **18**(6): e0287008.

BACKGROUND: Possible sex differences in hepatitis A virus (HAV) incidence rates in different age groups are not well documented. We aimed to obtain stable pooled estimates of such differences based on data from a number of high-income countries. **METHODS:** We obtained



data on incident cases of HAV by sex and age group over a period of 6-25 years from nine countries: Australia, Canada, Czech Republic, Finland, Germany, Israel, Netherland, New Zealand and Spain. Male to female incidence rate ratios (IRR) were computed for each year, by country and age group. For each age group, we used meta-analytic methods to combine the IRRs. Meta-regression was conducted to estimate the effects of age, country, and time period on the IRR. RESULTS: A male excess in incidence rates was consistently observed in all age groups, although in the youngest and oldest age groups, where the numbers tended to be lower, the lower bounds of the 95% confidence intervals for the IRRs were less than one. In the age groups <1, 1-4, 5-9, 10-14, 15-44, 45-64 and 65+, the pooled IRRs (with 95% CI) over countries and time periods were 1.18 (0.94,1.48), 1.22 (1.16,1.29), 1.07 (1.03,1.11), 1.09 (1.04,1.14), 1.46 (1.30,1.64), 1.32 (1.15,1.51) and 1.10 (0.99,1.23) respectively. CONCLUSIONS: The excess HAV incidence rates in young males, pooled over a number of countries, suggest that the sex differences are likely to be due at least in part to physiological and biological differences and not just behavioral factors. At older ages, differential exposure plays an important role. These findings, seen in the context of the excess incidence rates in young males for many other infectious diseases, can provide further keys to the mechanisms of the infection.

Massmann, R, T Groh, D Jilich, D Bartková, Z Bartovská, J Chmelař, A Chrdle, P Dlouhý, Š Cimrman, S Guimaraes da Silva, J Kapla, M Kubiska, S Snopková, R Svačina, M Zlámal, O Samsonová and D Sedláček (2023). "[HIV-positive Ukrainian refugees in the Czech Republic.](#)" *Aids* **37**(12): 1811-1818.

OBJECTIVE: Over 480 000 Ukrainian refugees have arrived in the Czech Republic since the Russian invasion of Ukraine in 2022, including over 500 people with HIV. This study describes the demographics, characteristics, and management of Ukrainian refugees with HIV in the Czech Republic. DESIGN: Retrospective, observational, noninterventional study. METHODS: Ukrainian nationals registering at HIV centers in the Czech Republic with war refugee status were included. Data were collected from medical records between 1 March and 31 July 2022. The study was registered with the Czech State Institute for Drug Control, ID number 2301200000. RESULTS: Four hundred and eighty-two patients were included in the study. Most patients were female (69.5%; n = 335/482) with well-controlled HIV. The median [interquartile range] CD4 + cell count was 597 [397] cells/ μ l of blood, and 79.3% (n = 361/455) of patients had HIV RNA <40 copies/ml. Coinfections of hepatitis C virus, hepatitis B virus, and/or tuberculosis were reported for 17.4% (n = 78/449), 9% (n = 40/446) and 1.3% (n = 6/446) of patients, respectively. In Ukraine, 85.7% (n = 384/448) of patients had been receiving an integrase strand transfer inhibitor-based regimen and most (69.7%; n = 310/445) did not switch therapy upon arrival in the Czech Republic. CONCLUSION: Migration from Ukraine is changing the characteristics of HIV epidemiology in the Czech Republic. Ukrainian refugees with HIV have been provided with a high standard of medical care in the Czech Republic. Improved coordination between medical services within the Czech Republic and between countries in the European Union is necessary to optimize patient care.



Hungary

Bechini, A, M Levi, A Falla, A Ahmad, I Veldhuijzen, E Tiscione and P Bonanni (2016). "[The role of the general practitioner in the screening and clinical management of chronic viral hepatitis in six EU countries.](#)" *J Prev Med Hyg* **57**(2): E51-60.

INTRODUCTION: Chronic viral hepatitis is still a major public health concern in the EU. In order to halt the progression of the disease and to prevent onward transmission, timely recognition and accurate clinical management are crucial. The aim of the present study was to investigate the role of the general practitioner (GP) in the screening of persons at risk and in the clinical management of chronic viral hepatitis patients in six EU countries. **METHODS:** An online survey among GPs and secondary-care specialists was conducted in the UK, Germany, the Netherlands, Hungary, Italy and Spain. In the GP survey, we used a four-point Likert scale to find out how commonly risk groups are screened. In both surveys, we measured GPs involvement in monitoring clinical indicators in patients undergoing antiviral treatment, and explored whether patients in four clinical scenarios are referred back to primary care. **RESULTS:** Between five and 10 experts per professional group were surveyed, except for Spain (GPs: n = 2; Specialists: n = 4) and, in the case of the GP survey, Hungary (GPs: n = 1) and Germany (GPs: n = 4). Migrants are variably or not routinely screened for hepatitis B/C in the majority of cases. The majority of GPs reported that hepatitis B/C screening was routinely offered to people who inject drugs. In Hungary, Italy and in the Netherlands, screening sex workers is not a regular practice. As to whether GPs offer screening to men who have sex with men, responses varied; in Germany, the Netherlands and Italy, screening was "variably" or "commonly" implemented, while in Hungary the practice seems to be sporadic. In the UK, screening for hepatitis B seems to be common practice among GPs, while hepatitis C testing is only occasionally offered to this risk group. Most GPs (> 44%) in all countries except Hungary reported that hepatitis B/C screening was very commonly offered to HIV patients. The role of GPs in monitoring hepatitis cases and the referral of cases back to GPs by specialists varied both within and between countries. GPs are unlikely to monitor clinical outcomes other than side effects in patients undergoing treatment. Patients who have had a sustained virological response are usually referred back to GPs, whereas patients undergoing antiviral treatment and those who do not respond to treatment are rarely referred back. **CONCLUSIONS:** The GP's decision to offer screening to risk groups often seems to be an individual choice of the healthcare professional. Raising GPs' awareness of the disease, for example through the adoption of effective strategies for the dissemination and implementation of the existing guidelines for general practice, is strongly needed. The role of GPs and specialists involved in the management of chronically infected patients should also be clarified, as opinions sometimes differ markedly even within each professional group.

Hunyady, B, M Abonyi, K Csefkó, J Gervain, A Haragh, G Horváth, V Jancsik, E Makkai, Z Müller, P Ribiczey, B Sipos, O Szabó, F Szalay, L Szentgyörgyi, I Tornai, E Újhelyi, M Varga, G Weisz and M Makara (2016). "[\[Efficacy and safety of boceprevir based triple therapy in Hungarian patients with hepatitis C genotype 1 infection, advanced stage fibrosis and prior treatment failure\]](#)." *Orv Hetil* **157**(34): 1366-1374.

INTRODUCTION: During 2011 and 2013, 155 Hungarian hepatitis C genotype 1 infected patients, mostly with advanced liver fibrosis, who did not respond to prior peginterferon + ribavirin dual therapy, started boceprevir based triple therapy in an early access program. **AIM AND METHOD:** Efficacy and safety of the therapy was retrospectively assessed based on sustained virologic responses, as well as on frequency and type of serious adverse events and of those leading to therapy discontinuation. **RESULTS:** In an intent-to-treat analysis 39.4% patients (61/155) reached sustained virologic response. Amongst previous relapsers, partial responders and null-responders 59.5%, 41.4 % and 22.9% (p<0.05 compared to the other two



categories) reached sustained virologic response, respectively, while amongst non-cirrhotics and cirrhotics 52.5% and 31.3% ($p < 0.05$ compared to the non-cirrhotics) achieved sustained virologic response, respectively. Six out of the 33 most difficult to cure patients (previous null responder and cirrhotic) have reached sustained virologic response (18.2%). Frequency of early discontinuations due to insufficient virologic response was 31.1%, while due to adverse event 10.3%. Reported frequency of serious adverse event was 9.8%. These events represented anemia, diarrhoea, depression, agranulocytosis, elevated aminotransferases, generalized dermatitis and severe gingivitis with loss of teeth, prolonged QT interval on ECG, generalized oedema and severe dyspnoea, uroinfection, exacerbation of Crohn's disease, *Campylobacter pylori* infection and unacceptable weakness and fatigue. Eight patients received transfusion, 4 patients erythropoietin and 1 granulocyte colony stimulating factor during therapy. No death has been reported. CONCLUSIONS: With boceprevir based triple therapy, one of the bests available in 2011-2013 in Hungary, a relevant proportion of hepatitis C infected patients with advanced liver fibrosis achieved sustained viral response. In this cohort, side-effects resembled those reported in registration studies, and resulted in therapy discontinuation with consequent treatment failure in a relevant number of patients. Efficacy and tolerability of boceprevir-based triple therapy are suboptimal, particularly in the most difficult to cure patient population. *Orv. Hetil.*, 2016, 157(34), 1366-1374.

Levi, M, A Falla, C Taddei, A Ahmad, I Veldhuijzen, G Niccolai and A Bechini (2016). "[Referral of newly diagnosed chronic hepatitis B and C patients in six EU countries: results of the HEPscreen Project.](#)" *Eur J Public Health* **26**(4): 561-569.

BACKGROUND: Effective linkage to specialist care following screening is crucial for secondary prevention of chronic viral hepatitis-related consequences. METHODS: To explore the frequency of referral of patients to secondary care from the health services involved in screening and to gather information on the services responsible for the provision of post-test counselling and contact tracing, four online surveys were conducted among general practitioners (GP), and experts working in sexual health services (SHS), antenatal care (ANC) and specialist secondary care in Germany, Hungary, Italy, The Netherlands, Spain and the UK. RESULTS: Overall, 60% of GPs report referring all patients to specialist care. Although 67% of specialists commonly receive patients referred by GPs, specialists in Germany rarely or never receive patients from ANC or from centres testing injecting drug users; and specialists in the Netherlands, Hungary and Germany rarely receive patients from SHS.

Gastroenterologists/hepatologists are the professionals mainly responsible for the provision of counselling following a positive diagnosis of viral hepatitis according to two-thirds of specialists, 14% of SHS providers and 11% of ANC providers. Almost half of ANC providers (45%) stated that gynaecologists are the professionals responsible for the provision of counselling to positive pregnant women; among SHS providers, only 14% identified SHS as the services responsible. CONCLUSION: Our findings suggest the existence of complex/ineffective referral practices or that opportunities to screen risk groups are missed. Recommendations clarifying the services responsible at each step of the referral pathway are needed in order to increase the success of screening programmes.

Papp, R, M Papp, I Tornai and Z Vitális (2016). "[\[Incidence of hepatocellular carcinoma and consequent lessons for its management in Northeastern Hungary\]](#)." *Orv Hetil* **157**(45): 1793-1801.

INTRODUCTION: The increasing incidence and poor prognosis of hepatocellular carcinoma places huge burden on healthcare. AIM: After reviewing literature on epidemiological trends, risk factors, diagnosis and management options for hepatocellular carcinoma, the authors investigated results of treatment and survival data of patients in Northeastern Hungary. METHOD: In a retrospective study, the authors analyzed medical records of 187 patients with hepatocellular carcinoma (etiology, presence of cirrhosis, stage of the tumor, treatment and disease outcome). RESULTS: Seventy-one patients (38%) had known cirrhosis at the diagnosis



of hepatocellular carcinoma, while in 52 patients (28%) the presence of cirrhosis was established at the time of the diagnosis of hepatocellular carcinoma. Fifteen patients (8%) had no cirrhosis and in 49 patients (26%) no data were available regarding cirrhosis. Etiological factors were alcohol consumption (52%), viral hepatitis (41%) and metabolic syndrome (44%). In cases of metabolic syndrome, hepatocellular carcinoma frequently occurred without cirrhosis. In 83% of the cases, the tumor was discovered in an advanced stage. Median survival time was significantly associated with tumor stage (Barcelona A stage vs. B/C vs. D: 829 vs. 387 vs. 137 days, respectively $p < 0.001$) but not with disease etiology (viral 282 days, metabolic syndrome 335 days and alcohol 423 days, $p = 0.65$). CONCLUSIONS: High mortality of hepatocellular carcinoma was mainly attributed to the delayed diagnosis of the disease. Screening of patients with cirrhosis could only result in a partial improvement since in a great proportion cirrhosis was diagnosed simultaneously with the tumor. Screening of diabetic and obese patients by ultrasonography should be considered. Management of baseline liver disease is of importance in the care of hepatocellular carcinoma. *Orv. Hetil.*, 2016, 157(45), 1793-1801.

Falla, AM, IK Veldhuijzen, AA Ahmad, M Levi and J Hendrik Richardus (2017). "[Limited access to hepatitis B/C treatment among vulnerable risk populations: an expert survey in six European countries.](#)" *Eur J Public Health* **27**(2): 302-306.

BACKGROUND: To investigate access to treatment for chronic hepatitis B/C among six vulnerable patient/population groups at-risk of infection: undocumented migrants, asylum seekers, people without health insurance, people with state insurance, people who inject drugs (PWID) and people abusing alcohol. METHODS: An online survey among experts in gastroenterology, hepatology and infectious diseases in 2012 in six EU countries: Germany, Hungary, Italy, the Netherlands, Spain and the UK. A four-point ordinal scale measured access to treatment (no, some, significant or complete restriction). RESULTS: From 235 recipients, 64 responses were received (27%). Differences in access between and within countries were reported for all groups except people with state insurance. Most professionals, other than in Spain and Hungary, reported no or few restrictions for PWID. Significant/complete treatment restriction was reported for all groups by the majority in Hungary and Spain, while Italian respondents reported no/few restrictions. Significant/complete restriction was reported for undocumented migrants and people without health insurance in the UK and Spain. Opinion about undocumented migrants in Germany and the Netherlands was divergent. CONCLUSIONS: Although effective chronic hepatitis B/C treatment exists, limited access among vulnerable patient populations was seen in all study countries. Discordance of opinion about restrictions within countries is seen, especially for groups for whom the health care system determines treatment access, such as undocumented migrants, asylum seekers and people without health insurance. This suggests low awareness, or lack, of entitlement guidance among clinicians. Expanding treatment access among risk groups will contribute to reducing chronic viral hepatitis-associated avoidable morbidity and mortality.

Falla, AM, IK Veldhuijzen, AA Ahmad, M Levi and JH Richardus (2017). "[Language support for linguistic minority chronic hepatitis B/C patients: an exploratory study of availability and clinicians' perceptions of language barriers in six European countries.](#)" *BMC Health Serv Res* **17**(1): 150.

BACKGROUND: Language support for linguistic minorities can improve patient safety, clinical outcomes and the quality of health care. Most chronic hepatitis B/C infections in Europe are detected among people born in endemic countries mostly in Africa, Asia and Central/Eastern Europe, groups that may experience language barriers when accessing health care services in their host countries. We investigated availability of interpreters and translated materials for linguistic minority hepatitis B/C patients. We also investigated clinicians' agreement that language barriers are explanations of three scenarios: the low screening uptake of hepatitis



B/C screening, the lack of screening in primary care, and why cases do not reach specialist care. METHODS: An online survey was developed, translated and sent to experts in five health care services involved in screening or treating viral hepatitis in six European countries: Germany, Hungary, Italy, the Netherlands, Spain and the United Kingdom (UK). The five areas of health care were: general practice/family medicine, antenatal care, health care for asylum seekers, sexual health and specialist secondary care. We measured availability using a three-point ordinal scale ('very common', 'variable or not routine' and 'rarely or never'). We measured agreement using a five-point Likert scale. RESULTS: We received 238 responses (23% response rate, N = 1026) from representatives in each health care field in each country. Interpreters are common in the UK, the Netherlands and Spain but variable or rare in Germany, Hungary and Italy. Translated materials are rarely/never available in Hungary, Italy and Spain but commonly or variably available in the Netherlands, Germany and the UK. Differing levels of agreement that language barriers explain the three scenarios are seen across the countries. Professionals in countries with most infrequent availability (Hungary and Italy) disagree strongest that language barriers are explanations. CONCLUSIONS: Our findings show pronounced differences between countries in availability of interpreters, differences that mirror socio-cultural value systems of 'difference-sensitive' and 'difference-blindness'. Improved language support is needed given the complex natural history of hepatitis B/C, the recognised barriers to screening and care, and the large undiagnosed burden among (potentially) linguistic minority migrant groups.

Horváth, G, Z Gerlei, J Gervain, G Lengyel, M Makara, A Pár, L Rókus, F Szalay, I Tornai, K Werling and B Hunyady (2017). "[\[Diagnosis and treatment of chronic hepatitis B and D. National consensus guideline in Hungary from 15 October 2016\]](#)." *Orv Hetil* **158**(Suppl 1): 23-35.

Diagnosis and treatment of HBV/HDV infection means for the patient to be able to maintain working capacity, to increase quality of life, to prevent cancer, and to prolong life expectancy, while society benefits from eliminating the chances of further transmission of the viruses, and decreasing the overall costs of serious complications. The guideline delineates the treatment algorithms for 2017 set by a consensus meeting of physicians involved in the treatment of these diseases. The prevalence of HBV infection in the Hungarian general population is 0.5-0.7%. The indications of treatment is based upon viral examinations (including viral nucleic acid determination), determinations of disease activity and stage (including biochemical, pathologic, and/or non-invasive methods), and excluding contraindications. To avoid unnecessary side effects and for cost-effective approach the guideline stresses the importance of quick and detailed virologic evaluations, the applicability of elastography as an acceptable alternative of liver biopsy in this regard, as well as the relevance of appropriate consistent follow up schedule for viral response during therapy. The first choice of therapy in chronic hepatitis B infection can be pegylated interferon for 48 weeks or continuous entecavir or tenofovir therapy. The latter two must be continued for at least 12 months after hepatitis B surface antigen seroconversion. Adefovir dipivoxil is recommended mainly in combination therapy. Lamivudine is no longer a first choice; patients currently taking lamivudine must switch if response is inadequate. Appropriate treatment of patients taking immunosuppressive medications is highly recommended. Pegylated interferon based therapy is recommended for the treatment of concomitant hepatitis D infection. *Orv. Hetil.*, 2017, 158(Suppl. 1) 23-35.

Hunyady, B, Z Gerlei, J Gervain, G Horváth, G Lengyel, A Pár, Z Péter, L Rókus, F Schneider, F Szalay, I Tornai, K Werling and M Makara (2017). "[\[Screening, diagnosis, treatment, and follow up of hepatitis C virus related liver disease. National consensus guideline in Hungary from 15 October 2016\]](#)." *Orv Hetil* **158**(Suppl 1): 3-22.

Treatment of hepatitis C is based on a national consensus guideline updated six-monthly according to local availability and affordability of approved therapies through a transparent



allocation system in Hungary. This updated guideline incorporates some special new aspects, including recommendations for screening, diagnostics, use and allocation of novel direct acting antiviral agents. Indication of therapy in patients with no contraindication is based on demonstration of viral replication with consequent inflammation and/or fibrosis in the liver. Non-invasive methods (elastographies and biochemical methods) are preferred for liver fibrosis staging. The budget allocated for these patients is limited. Therefore, expensive novel direct acting antiviral combinations as first line treatment are reimbursed only, if the freely available, but less effective and more toxic pegylated interferon plus ribavirin dual therapy deemed to prone high chance of adverse events and/or low chance of cure. Priority is given to those with urgent need based on a pre-defined scoring system reflecting mainly the stage of the liver disease, but considering also additional factors, i.e., hepatic decompensation, other complications, activity and progression of liver disease, risk of transmission and other special issues. Approved treatments are restricted to the most cost-effective combinations based on the cost per sustained virological response value in different patient categories with consensus amongst treating physicians, the National Health Insurance Fund and patient's organizations. Interferon-free treatments and shorter therapy durations are preferred. *Orv. Hetil.*, 2017, 158(Suppl. 1), 3-22.

Horváth, G, Z Gerlei, J Gervain, G Lengyel, M Makara, A Pár, L Rókusz, F Szalay, I Tornai, K Werling and B Hunyady (2018). "[\[Diagnosis and treatment of chronic hepatitis B and D. National consensus guideline in Hungary from 22 September 2017\].](#)" *Orv Hetil* 159(Suppl 1): 24-37.

Diagnosis and treatment of hepatitis B virus (HBV) and hepatitis D virus infection mean for the patient to be able to maintain working capacity, to increase quality of life, to prevent cancer, and to prolong life expectancy, while the society benefits from eliminating the chances of further transmission of the viruses, and decreasing the overall costs of serious complications. The guideline delineates the treatment algorithms from 22 September 2017 set by a consensus meeting of physicians involved in the treatment of these diseases. The prevalence of HBV infection in the Hungarian general population is 0,5-0,7%. The indications of treatment are based upon viral examinations (including viral nucleic acid determination), determinations of disease activity and stage (including biochemical, pathologic, and/or non-invasive methods), and excluding contraindications. To avoid unnecessary side effects and for a cost-effective approach, the guideline stresses the importance of quick and detailed virologic evaluations, the applicability of transient elastography as an acceptable alternative of liver biopsy in this regard as well as the relevance of appropriate consistent follow-up schedule for viral response during therapy. The first choice of therapy in chronic HBV infection can be pegylated interferon for 48 weeks or continuous entecavir or tenofovir therapy. The latter two must be continued for at least 12 months after hepatitis B surface antigen seroconversion. Lamivudine is no longer the first choice; patients currently taking lamivudine must switch if the response is inadequate. Appropriate treatment of patients taking immunosuppressive medications is highly recommended. Pegylated interferon based therapy is recommended for the treatment of concomitant hepatitis D infection. *Orv Hetil.* 2018; 159(Suppl 1): 24-37.

Hunyady, B, Z Gerlei, J Gervain, G Horváth, G Lengyel, A Pár, Z Péter, L Rókusz, F Schneider, F Szalay, I Tornai, K Werling and M Makara (2018). "[\[Screening, diagnosis, treatment, and follow up of hepatitis C virus related liver disease. National consensus guideline in Hungary from 22 September 2017\].](#)" *Orv Hetil* 159(Suppl 1): 3-23.

The treatment of hepatitis C is based on a national consensus guideline updated six-monthly according to local availability and affordability of approved therapies through a transparent allocation system in Hungary. This updated guideline incorporates some special new aspects, including recommendations for screening, diagnostics, use and allocation of novel direct acting antiviral agents. The indication of therapy in patients with no contraindication is based



on the demonstration of viral replication with consequent inflammation and/or fibrosis in the liver. Non-invasive methods (elastographies and biochemical methods) are preferred for liver fibrosis staging. The budget allocated for these patients is limited. Interferon-based or interferon-free therapies are available for the treatment. Due to their limited success rate as well as to their (sometimes severe) side-effects, the mandatory use of interferon-based therapies as first line treatment can not be accepted from the professional point of view. However, they can be used as optional therapy in treatment-naïve patients with mild disease. As of interferon-free therapies, priority is given to those with urgent need based on a pre-defined scoring system reflecting mainly the stage of the liver disease, but considering also additional factors, i.e., hepatic decompensation, other complications, activity and progression of liver disease, risk of transmission and other special issues. Approved treatments are restricted to the most cost-effective combinations based on the cost per sustained virological response value in different patient categories with consensus amongst treating physicians, the National Health Insurance Fund of Hungary and patients' organizations. Interferon-free treatments and shorter therapy durations are preferred. *Orv Hetil.* 2018; 159(Suppl 1): 3-23.

Pankovics, P, O Némethy, Á Boros, G Pár, P Szakály and G Reuter (2020). "[Four-year long \(2014-2017\) clinical and laboratory surveillance of hepatitis E virus infections using combined antibody, molecular, antigen and avidity detection methods: Increasing incidence and chronic HEV case in Hungary.](#)" *J Clin Virol* **124**: 104284.

BACKGROUND: Hepatitis E virus (HEV) is a pathogen of viral hepatitis. Since 2006, the number of reported HEV cases has ten-fold increase in Hungary. OBJECTIVES: The aim of this clinical and laboratory surveillance study was to analyse and confirm HEV IgM-positive sera with different methods in four consecutive years (2014-2017) in Hungary. STUDY DESIGN: Between 2014 and 2017, a total of 1439 sera samples were tested for HEV from in/out-patients with unknown hepatitis from university and county hospitals and general practitioners from three counties in Southwest Hungary (covered population: 894.000 persons) using combined antibody (serology), various molecular (RT-PCR and RT-qPCR), novel antigen (Ag) and avidity detection methods. RESULTS: Total of 162 (11.3%) of the 1439 sera were HEV IgM-positive including 13 (8%) HEV RT-PCR-positive (confirmed as HEV genotype 3 sub-genotypes 3a/c/e/f/i in genus Orthohepevirus A) with up to 1.1383×10^8 RNA copy/ml, 30 (18.5%) HEV Ag-positive and 16 with low avidity index for HEV, respectively. Total of 6 samples were positive simultaneously with the combined four methods and 31 with three methods. If the quotient of serum sample's OD/cut-off of anti-HEV ELISA IgM and IgG scores is higher than ≥ 1 it predisposes for acute HEV infection. No rat or ferret HEV RNA (genus Orthohepevirus C) were identified from these specimens by RT-PCR. During our surveillance period a 68-year-old professional (meat-packing) hunter with kidney transplantation and immunosuppressive therapy was confirmed and treated as the first documented case of chronic HEV infection in Hungary. CONCLUSION: This four-year-long clinical and laboratory surveillance highlights the increasing importance of acute and chronic HEV infections in Hungary and supports the use of confirmatory assays for laboratory diagnosis of HEV in human.

Görög, D, Z Gerlei, J Schuller, A Dezsőfi, E Hartmann, L Piros, A Sandil, J Szabó, I Fehérvári, J Fazakas, A Doros and L Kóbori (2022). "[Evolution of liver transplant waiting list in Hungary between 1995 and 2019.](#)" *Orv Hetil* **163**(8): 301-311.

INTRODUCTION: The Hungarian liver transplant program including waiting list started in 1995. OBJECTIVE: Evaluation of the wait-list parameters and comparing them with those in the literature. METHOD: Data of patients listed for primary liver transplantation between 1995 and 2019 were analyzed. RESULTS: A total of 1722 recipient candidates were registered on the liver transplant waiting list: 1608 adults (51.2% men) with mean age of 45.6 year and



114 patients aged <18 year. Virus-induced cirrhosis was the leading indication of listing (n = 451) and cholestatic liver diseases (n = 314) and alcoholic cirrhosis (n = 264) thereafter. The mean Model for End-Stage Liver Disease score was 13.5 for those with chronic disease. 61% of 1618 patients listed before December 31, 2018 underwent liver transplantation and 31% were removed from the wait-list for death or clinical deterioration. After joining Eurotransplant (period of 01. 07. 2013-31. 12. 2018), the transplant rate was 67%, the waiting list removal due to death/too sick for operation decreased to 24%. The median waiting time till transplantation was 248 days for those on elective and 2 days on acute list. Patients grafted with malignancy (n = 132) waited significantly shorter time than those with chronic non-malignant liver disease (median 115.5 versus 282 days). DISCUSSION: The composition of our waiting list by primary liver disease was similar to that of countries with large burden of hepatitis C. Transplant rate was average, wait-list mortality and waiting time were in line with those observed in low-donation countries or in the case of large volume waiting list. CONCLUSION: Listing of increasing the number of patients contributed to evolution of our liver transplant program. To improve our parameters, increasing transplant activity is warranted. *Orv Hetil.* 2022; 163(8): 301-311.

Reuter, G, Á Boros and P Pankovics (2022). "[Seroprevalence and genotype distribution of hepatitis A virus in the pre-vaccine era in South Transdanubia, Hungary \(2010-2020\)](#)." *Acta Microbiol Immunol Hung* 69(3): 228-232.

In this study, the age-related seroprevalence of hepatitis A virus (HAV) infection was investigated in the population in South-Transdanubia, Southwest Hungary (Central Europe) between years 2010 and 2020. Up to the age of 40, the HAV seropositivity was less than 18% in all age groups indicating a low level of HAV endemicity in this part of the country in the covered study period. The HAV seropositivity started to increase at the age group 41-45 years, reaching the ~50% at age group 56-60, and 75-80% at age group 66-70, respectively. A total of 43 (0.2%) of the 21,106 tested sera were HAV IgM-positive (the annual percentage range of HAV IgM-positivity was 0.046-0.6%). Total of 24 (55.8%) of the 43 HAV IgM-positive samples tested RT-PCR-positive confirmed as HAV sub-genotypes IA (N = 17; 70.8%) and IB (N = 7; 29.2%), respectively. Imported HAV infections (three cases from Romania, and one-one case from Austria and Italy), two small outbreaks and 11 cases of a genetically identical sub-genotype IA strain (GenBank number of the prototype strain: KM657825) from 2012 to 2014 were identified later connected directly to the enormous HAV outbreak initiated among men who have sex with men (MSM) at the end of 2011 in the capital Budapest. In summary, low endemicity but high and increased susceptibility for HAV infection was found in the population in Southwest Hungary, where repeated introduction of sub-genotypes IA and IB HAV strains were identified between 2010 and 2020.

Ulbert Á, B, M Bukva, A Magyari, Z Túri, E Hajdú, K Burián and G Terhes (2022). "[Characteristics of hepatitis E viral infections in Hungary](#)." *J Clin Virol* 155: 105250.

BACKGROUND: Hepatitis E virus (HEV) is one of the most important causes of hepatitis worldwide. Despite this, limited data published more than ten years ago are only available about HEV epidemiology in Hungary. OBJECTIVES: We aimed to determine the epidemiological features of HEV infections among patients submitted to various departments of our university hospital in Hungary with signs and symptoms referring to acute hepatitis. STUDY DESIGN: One thousand four hundred thirty-one sera samples from 1,383 patients were analyzed by enzyme-linked immunosorbent assays (ELISA). In some patients, HEV RNA was detected by broad-range nested polymerase chain reaction (PCR) if acute hepatitis was confirmed. PCR products were sequenced and compared with other available sequences in GenBank. RESULTS: Five hundred eighteen sera from 429 patients proved positive (31.0%) for HEV-specific immunoglobulin G (IgG) with a mean age of 60.0 years. Most sera with anti-HEV IgG antibodies were collected from adults and elderly patients. Anti-HEV IgM positive results



were found in the case of 95 sera samples from 70 patients (5.1%). Acute HEV infections were confirmed mostly over 40 (n = 67, 95.7%). The number of males (n = 47, 67.1%) was higher than females (n = 23, 32.9%). We detected HEV-specific PCR products in seven patients (10.9%). Genotyping was successful for 5 out of 7 PCR-positive samples. All sequences belonged to genotype 3 (subgenotypes: e, f). CONCLUSIONS: In our survey, we confirmed the constant presence of acute HEV infections in Hungary and an increased seroprevalence of anti-HEV IgG antibodies compared to a previous study.

Werling, K, B Hunyady, M Makara, K Nemesi, G Horváth, F Schneider, J Enyedi, Z Müller, M Lesch, Z Péterfi, T Tóth, J Gács, Z Fehér, E Ujhelyi, E Molnár and A Nemes Nagy (2022). "[Hepatitis C Screening and Treatment Program in Hungarian Prisons in the Era of Direct Acting Antiviral Agents.](#)" *Viruses* **14**(2).

A hepatitis C virus (HCV) screening and treatment program was conducted in Hungarian prisons on a voluntary basis. After HCV-RNA testing and genotyping for anti-HCV positives, treatments with direct-acting antiviral agents were commenced by hepatologists who visited the institutions monthly. Patients were supervised by the prisons' medical staff. Data were retrospectively collected from the Hungarian Hepatitis Treatment Registry, from the Health Registry of Prisons, and from participating hepatologists. Eighty-four percent of Hungarian prisons participated, meaning a total of 5779 individuals (28% of the inmate population) underwent screening. HCV-RNA positivity was confirmed in 317/5779 cases (5.49%); 261/317 (82.3%) started treatment. Ninety-nine percent of them admitted previous intravenous drug use. So far, 220 patients received full treatment and 41 patients are still on treatment. Based on the available end of treatment (EOT) + 24 weeks timepoint data, per protocol sustained virologic response rate was 96.8%. In conclusion, the Hungarian prison screening and treatment program, with the active participation of hepatologists and the prisons' medical staff, is a well-functioning model. Through the Hungarian experience, we emphasize that the "test-and-treat" principle is feasible and effective at micro-eliminating HCV in prisons, where infection rate, as well as history of intravenous drug usage, are high.

Ánosi, N, B Kenyeres, V Szentgyörgyi, M Mátyus, L Orosz, T Bosnyákovits, K Bányai, K Burián and G Lengyel (2023). "[Seroprevalence of emerging hepatitis E virus in patients with acute hepatitis between 2004 and 2018 in Csongrád County, Hungary.](#)" *Cent Eur J Public Health* **31**(3): 166-170.

OBJECTIVES: Hepatitis E virus (HEV) has recently become endemic in Europe, however, it is often a remnant neglected by clinicians as the causative agent of acute and chronic hepatitis and is often misdiagnosed as a drug-induced liver injury. The infection rate in European pig farms is estimated to be around 15-20%, therefore, the primary source of HEV infections might be poorly prepared pork meat. As HEV infections may occur more often in clinical practice than previously thought, the present paper aims to analyse the seroprevalence of HEV in patients with acute hepatitis over a period of 14 years in Csongrád County, Hungary. METHODS: The sera of 4,270 hepatitis patients collected between 2004-2018 were tested for cumulative anti-HEV IgG/IgM. Furthermore, 170 IgM positive sera were tested for the presence of viral RNA by RT-qPCR. RESULTS: Between 2012-2018, the cumulative seroprevalence has increased 9.18 times, and between 2013-2018, IgM prevalence has increased 12.49 times. Viral RNA was detectable in 12.35% of IgM positive sera. CONCLUSION: The present paper presents data showing that the seroprevalence of hepatitis E virus has increased markedly over the course of the last decade in Hungary and in other European countries as well. The exact reason behind this phenomenon is yet to be determined. To assess the dynamics and the reason for this increase in prevalence, pan-European, multicentre studies should be conducted.

Balázs, B, Á Boros, P Pankovics and G Reuter (2023). "[High seroprevalence of hepatitis E virus \(HEV\) in South Transdanubia, Hungary \(2010-2022\).](#)" *Acta Microbiol Immunol Hung* **70**(2): 119-125.



Hepatitis E virus (HEV) is an increasingly recognized etiological agent of acute, chronic and extrahepatic human infections with primarily zoonotic origin in Europe. Limited numbers of comprehensive population-based studies are available related to HEV seroepidemiology, especially from Central Europe. The aim of this study was to investigate the seroprevalence and trends of total and IgM antibodies against HEV in different age groups in the population of South Transdanubia, Hungary, within a thirteen years long period between the years 2010 and 2022. We retrospectively analysed the serological test results of HEV total and HEV IgM antibodies carried out by ELISA technique using Dia.Pro (Diagnostic Bioprobes, Italy) kit from serum samples collected from patients with or without hepatitis between January 1, 2010 and December 31, 2022. The number of tested samples (Σ 6,996 for total antibody and Σ 6,582 for IgM) increased during the study period. The average HEV total and the IgM antibody seropositivities were 33% (2,307/6,996 samples) and 9.6% (642/6,582 samples), respectively, in the study population. The HEV total antibody seropositivity varied in different age groups between 3.9% (age group 1-5 years) and 58.6% (86-90 years) and showed an increasing positivity by age. At the age groups >50 years, nearly half (43%) of the population had antibodies against HEV. The HEV IgM positivity had an increasing trend of up to 13.9% in the age group 81-85 years. High HEV total and IgM antibody seroprevalence were detected in South Transdanubia, Hungary, confirming that this region is highly endemic for HEV infections in Europe.

Reuter, G, Á Boros and P Pankovics (2023). "[Molecular epidemiology and characterization of endemic, epidemic and imported hepatitis A virus \(HAV\) strains in Hungary \(2003-2022\).](#)" *Acta Microbiol Immunol Hung* **70**(3): 246-251.

Hepatitis A virus (HAV) is one of the most important etiological agents of acute viral hepatitis but comprehensive molecular epidemiological study with chrono-phylogeographical data are not available from Hungary. Between 2003 and 2022, a total of 8,307 HAV infections were registered officially in Hungary of which 400 (4.8%) HAV IgM antibody-positive serum samples were collected countrywide. HAV genomic RNA was successfully detected in 216/400 (54%) sera by RT-PCR subsequently confirmed by sequencing. The complete nucleotide sequences of VP1 region were determined in 32 representative HAV strains. Based on the sequence analysis, 150 (69.4%) strains were characterized as HAV sub-genotype IA and 66 (30.6%) as sub-genotype IB, respectively. Based on the combined epidemiological and molecular data, epidemic, endemic, and imported HAV strains were also characterized. The first two registered countrywide outbreaks started among men-sex-with men (MSM) in 2011 (sub-genotype IA) and 2021 (sub-genotype IB), the continuously circulating endemic/domestic HAV strain (sub-genotype IA) in East Hungary and the travel-related sub-genotype IB strains from Egypt should be highlighted. All HAV strains are deposited in the HAVNET database (<https://www.rivm.nl/en/havnet>). In this 20-year-long comprehensive molecular epidemiological study, we report the genetic characterization and geographic distribution of endemic, epidemic and imported HAV strains for the first time in Hungary with continuous co-circulation of sub-genotypes IA and IB HAV strains since 2003. These data provide basic information about the HAV situation in the country in an international context and can promote more effective national public health intervention strategies for the prevention of HAV transmissions and infections.



Poland

Braczkowska, B, M Kowalska, K Barański and U Mendera-Bożek (2017). "[Viral hepatitis C in Poland in the Silesian Province between 2005-2014](#)." *Ann Agric Environ Med* **25**(2): 224-228.

INTRODUCTION AND OBJECTIVE: Viral hepatitis C remains one of the major health and social problems related to infectious diseases in Poland. The aim of the study was assessment of the registered changes in the incidence of HCV in the Silesian Province of western Poland during the last 10 years, including age, gender and place of residence. **MATERIAL AND METHODS:** A retrospective analysis was performed of the HCV incidence between 2005-2014 in the Silesian Province. The crude and standardized incidence rates were calculated for males and females in each year. Subsequently, the territorial diversity of the epidemiological situation in the districts was assessed by calculating the average incidence rate over the entire study period. **RESULTS:** Incidence rates calculated according to the case definition of 2005 ranged between 5.95/100000 in 2005 to 10.36/100000 in 2014. Analysis of the structure of the incidence showed that during the analyzed period, the majority of hepatitis C cases were related to males (52.5%) rather than females (47.5%), and hepatitis C was more prevalent in younger males (aged 20-49) and older females (aged over 50). After excluding the effect of age, the standardized rates were twice as low, compared to the crude incidence rates. **CONCLUSIONS:** An increase in the HCV incidence rate was observed in males and females. It is obvious that the detection of additional cases will entail the need to provide funding for the treatment of more patients, which should be included in the map of regional health needs in the coming years. Our study demonstrates the temporal and spatial variability of HCV incidence in the Silesian Province of Poland. The observed increase in the crude and standardized rates suggests that the current registry system of HCV in Poland is more effective now. The current situation is comparable with the data in other EU countries.

Flisiak, R, D Zarębska-Michaluk, E Janczewska, A Staniaszek, A Gietka, W Mazur, M Tudrujek, K Tomaszewicz, T Belica-Wdowik, B Baka-Ćwierz, D Dybowska, W Halota, B Lorenc, M Sitko, A Garlicki, H Berak, A Horban, I Orłowska, K Simon, Ł Socha, M Wawrzynowicz-Syczewska, J Jaroszewicz, Z Deroń, A Czauż-Andrzejuk, J Citko, R Krygier, A Piekarska, Ł Laurans, W Dobracki, J Białkowska, O Tronina and M Pawłowska (2018). "[Treatment of HCV infection in Poland at the beginning of the interferon-free era-the EpiTer-2 study](#)." *J Viral Hepat* **25**(6): 661-669.

The aim of the EpiTer-2 study was to analyse patient characteristics and their medication for HCV infection in Poland at the beginning of the interferon-free era. Analysis of data of HCV infected patients treated during the initial period of availability of interferon-free regimens in Poland, who started therapy after 1 July 2015 and had available an efficacy evaluation report before 30 June 2017 was undertaken. A total of 2879 patients with chronic hepatitis C were entered, including 46% with liver cirrhosis. The most common was genotype 1b (86.8%). The study population was gender balanced, the majority of patients were overweight or obese and 69% presented comorbidities, with the highest prevalence that for hypertension. More than half of patients were retreated due to failure of previous therapy with pegylated interferon and ribavirin. Almost two-third of patients received current therapy with ombitasvir/paritaprevir/ritonavir±dasabuvir (OPrD) ±ribavirin. Other patients received mostly sofosbuvir-based regimens including combination with ledipasvir and pegylated interferon and ribavirin for genotype 3-infected patients. Efficacy of treatment in the whole study population measured as intent-to-treat analysis was 95%. The most frequent regimen, administered for patients infected with genotype 1b, was 12 weeks of OPrD, resulting in an SVR rate of 98%. At least one adverse event was reported in 38% of patients, and the death rate was 0.8%. In conclusion, data from the EpiTer-2 study confirmed the excellent efficacy and safety profile of the real-world experience with recently introduced therapeutic options for genotype 1 HCV infection, but demonstrated weakness of the current therapeutic programme regarding genotype 3 infections.



Moppert, J, K Zieniewicz-Cieślak, M Tyczyno, M Sobolewska-Pilarczyk and M Pawłowska (2018). "[The frequency of occurrence anti-HAV antibodies to health employees – own observations.](#)" *Przegl Epidemiol* **72**(4): 453-457.

INTRODUCTION: In the years 1997-2016, Poland was counted among the countries with a low and very low endemicity of hepatitis A. Based on the epidemiological data from NIZP–PZH (National Institute of Public Health - National Institute of Hygiene), since 2017, an increase in the incidence of hepatitis A has been observed in Poland. Considering the low number of cases by 2016 and a high percentage of seronegative persons, an increased risk of HAV infections should be expected. **OBJECTIVE:** The aim of the project was to assess the presence of anti-HAV IgG antibodies in the employees of the Provincial Hospital for Infectious Diseases and Observation in Bydgoszcz. **MATERIAL AND METHODS:** The study was conducted on 123 people who are employees of the hospital. The presence of anti-HAV antibodies was detected using HAV IgG Elisa FORTRESS DIAGNOSTICS kits. **RESULTS:** The presence of anti-HAV IgG antibodies was found in 28/123 (22.8%) subjects. Anti-HAV IgG antibodies were almost exclusively found in people over 40 years of age. Only one case involved a younger person. **CONCLUSIONS:** The low incidence of anti-HAV antibodies in the IgG class among medical personnel confirms the reasonableness of vaccinations against hepatitis A in this group.

Świątkowska, B and W Hanke (2018). "[Occupational diseases among healthcare and social workers in 2009-2016.](#)" *Med Pr* **69**(5): 531-538.

BACKGROUND: The aim of the paper is to present statistical data on the occurrence of occupational diseases among healthcare and social workers in Poland in 2009-2016. **MATERIAL AND METHODS:** All cards certifying that a case of occupational disease had been diagnosed in a patient belonging to this occupational group, received by the Central Register of Occupational Diseases, served as the basis of the study. Data is presented in absolute numbers and incidence rates. In the analysis, disease categories, voivodships and occupations were taken into account. **RESULTS:** In 2009-2016, as many as 1462 cases of occupational diseases were diagnosed for healthcare workers. In 2016, the number of cases was 42.6% lower than in 2009. Mean annual incidence rate in these years was 26.3 cases per 100 thousand workers. The most frequent were: infectious and parasitic diseases (64.8% of cases), peripheral nervous system diseases (9.6%), dermal diseases (8.9%), locomotor (8.3%), and chronic vocal organ disorders (3.2%). Among infectious or parasitic diseases, the most cases were viral hepatitis (56%) and tuberculosis (39%). Almost every second case of occupational disease in healthcare workers was detected in the nurses (47.8%). **CONCLUSIONS:** The incidence of occupational diseases in total and in the most frequent categories continued to decrease. One of the reasons for the decline is the improvement of working conditions resulting from the application of more modern instruments and apparatus as well as greater knowledge of the risks and the use of appropriate procedures. *Med Pr* 2018;69(5).

Zakrzewska, K, M Stępień, K Szmulik and M Rosińska (2018). "[Hepatitis C in Poland in 2016.](#)" *Przegl Epidemiol* **72**(2): 157-167.

INTRODUCTION: In 2016, the World Health Organization implemented a Global Strategy to eliminate viral hepatitis. For Hepatitis C, the goals of this Strategy include increased harm reduction coverage, improved safety of medical procedures and an increase the percentage of people diagnosed and treated. **OBJECTIVE:** This article aims at evaluating the epidemiological situation of HCV infections in Poland in 2016 in reference to the data from previous years. **MATERIAL AND METHODS:** Analysis of epidemiological situation of hepatitis C in Poland in 2016 was carried out on case-based data collected through routine surveillance system. Data on hepatitis C mortality from the Demographic Surveys and Labour Market



Department of the Central Statistical Office were also included. RESULTS: In 2016, a total of 4,261 cases were reported. Diagnosis rate was 11.09 per 100,000, on the similar level as in 2015 (1% decrease), but in comparison to the median for the years 2010-2014 it increased by 88%. The most common possible route of HCV infection were medical procedures accounting for 69.8% of all cases and for 58.2% of acute hepatitis C virus infection cases. In 2016, 224 deaths due to hepatitis C were registered. In 2016, a hepatitis C outbreak was reported in małopolskie voivodeship (11 patients of the Hemato-oncology Department, 129 people exposed). CONCLUSIONS: The increase of HCV diagnosis rate, which has been reported for last three years, is probably a consequence of improved the surveillance, including mandatory reporting of positive laboratory results, but also increased availability of HCV laboratory screening. Medical exposures are still an important route of transmission of HCV in Poland.

Zarębska-Michaluk, D, R Flisiak, J Jaroszewicz, E Janczewska, A Czauż-Andrzejuk, H Berak, A Horban, A Staniaszek, A Gietka, M Tudrujek, K Tomaszewicz, D Dybowska, W Halota, A Piekarska, M Sitko, A Garlicki, I Orłowska, K Simon, T Belica-Wdowik, B Baka-Ćwiercz, W Mazur, J Białkowska, Ł Socha, M Wawrzynowicz-Syczewska, Ł Laurans, Z Deroń, B Lorenc, B Dobracka, O Tronina and M Pawłowska (2018). "[Is Interferon-Based Treatment of Viral Hepatitis C Genotype 3 Infection Still of Value in the Era of Direct-Acting Antivirals?](#)" *J Interferon Cytokine Res* **38**(2): 93-100.

The aim of the study is to analyze treatments available for patients infected with genotype (G) 3 hepatitis C virus (HCV) in Poland at the beginning of the interferon (IFN)-free era and evaluate the efficacy and safety of different therapeutic options administered in a real-world setting. We analyzed data of 198 patients who started antiviral therapy after July 1, 2015, and completed it before December 31, 2016; 57.6% of them had liver cirrhosis and 46% were treatment experienced. Fifty percent of patients were assigned to sofosbuvir (SOF)+pegylated IFN alfa (PegIFNa)+ribavirin (RBV), 9% to PegIFNa+RBV, 36% received SOF+RBV, and 5% SOF+daclatasvir (DCV)±RBV. Cirrhotic patients were assigned more frequently to IFN-free regimens. Overall, a sustained virological response was achieved by 84.3% of patients in intent-to-treat (ITT) analysis and 87% in modified ITT analysis. For SOF+PegIFNa+RBV and SOF+DCV±RBV regimens, the sustained virologic response (SVR) rate reached at least 90%, whereas the two other therapeutic options demonstrated efficacy <80%. The SVR rate in noncirrhotics was higher than in cirrhotics, irrespective of regimen. Adverse events were documented in 52.5%, with the most common being weakness/fatigue and anemia. We confirmed effectiveness and safety of the SOF-based treatment in a real-world cohort of patients with chronic HCV G3 infection. Most notably, we demonstrated good tolerability and high efficacy of the SOF+PegIFNa+RBV regimen.

Flisiak, R and D Zarębska-Michaluk (2019). "[Perspectives of hepatitis C virus \(HCV\) elimination in Poland.](#)" *Clin Exp Hepatol* **5**(3): 210-214.

AIM OF THE STUDY: According to the World Health Organization (WHO) strategy, elimination of hepatitis C virus (HCV) as a major public health threat by 2030 includes diagnosis and cure of 90% of those infected between 2015 and 2030. The aim of this study is to estimate the realistic possibility to achieve the WHO elimination targets in Poland. MATERIAL AND METHODS: The Polish population was established according to data from Statistics Poland for the year 2017. Treatment efficacy was estimated based on publications in time-frames depending on the availability of therapeutic options in Poland. The mortality of HCV-infected patients was assumed on the basis of Statistics Poland and the EpiTer-2 database The number of annual antiviral treatments was estimated based on data from the National Health Fund. Two scenarios were considered, without and with intervention dependent on the national screening program. RESULTS: The current diagnosis rate in Poland was calculated as 31%. The scenario without intervention resulted in gradual reduction of annual treatments accompanied by a decrease in the number of infected patients in 2030 to 118



000 (0.31% of the current Polish population), which is only 38% compared with 2015 established as a baseline by WHO. Introduction of the HCV screening program, which includes 3 million people annually, would increase treatment uptake to 12 000 per year and reduce the number of HCV-infected persons in Poland by 90%. CONCLUSIONS: The urgent implementation of the national screening program for HCV in Poland is essential to achieve the WHO goal by 2030. The screening strategy should include up to 3 million persons annually to achieve treatment uptake of 12 thousand patients per year.

Pleśniak, R and M Wawrzynowicz-Syczewska (2019). "[Prevalence of hepatitis delta infections among HBs-antigen-positive inhabitants of southeastern and northwestern parts of Poland.](#)" *Clin Exp Hepatol* 5(3): 232-236.

Hepatitis delta (HDV) virus still poses a serious health problem worldwide. Being a satellite particle, it may complete its life cycle only in the presence of HBs antigen produced by hepatitis B virus (HBV). According to epidemiological data, about 5% of HBs antigen carriers are infected with this virus, which equates to approximately 15-20 million individuals worldwide. Although the infection with both HBV and HDV viruses is considered to be the worst form of viral hepatitis, the only approved treatment, with pegylated interferon α , is not satisfactory. Thus effective and safe therapy is still lacking, which stands in contrast to the latest development in therapeutic areas of HBV and hepatitis C virus (HCV) infections. As the exact data on prevalence of this infection in some countries as well as natural history of this disease are still incomplete, further studies are warranted. Polish investigations on this field are very scarce and at most dating from the 1990s. This publication makes another attempt to broaden our knowledge of this temporarily forgotten but still ongoing and complex problem.

Pyziak-Kowalska, KA, A Horban, M Bielecki and J Kowalska (2019). "[Missed opportunities for diagnosing viral hepatitis C in Poland. Results from routine HCV testing at the Emergency Department in the Hospital for Infectious Diseases in Warsaw.](#)" *Clin Exp Hepatol* 5(4): 294-300.

AIM OF THE STUDY: Current statistics indicate that approximately 150,000 (0.5%) people in Poland suffer from active hepatitis C virus (HCV) infection, but only 20% among them are aware of their status. This project is based on the concept that screening based on the presence of HCV-related risks (a patient's individual history and behavioural risk factors) is more effective than obligatory testing of the whole population. This study investigates prevalence of serological markers for HCV among patients with a risk of exposure to HCV infection. MATERIAL AND METHODS: The prospective study concerning patients of 18 years and older was conducted at the Emergency Department (ED) of the Hospital for Infectious Diseases in Warsaw (from 15 September 2016 until 23 July 2018). The inclusion criteria were: a blood transfusion before 1992, more than three hospitalizations in the lifetime, suspected liver disease, elevated aminotransferase activity, imprisonment, patient's own initiative, history of injecting drug use. The rapid HCV test was performed on all patients who fulfilled inclusion criteria. The statistical analyses included calculating serological positivity rate and comparing risk-group characteristics. RESULTS: Among 1502 patients consulted at the emergency department with risk factors for HCV infection during the study period, the HCV test was performed in 1487 cases. New diagnoses were confirmed in 25 cases, HCV seroprevalence was 1.68%, all patients were linked to care, 21/25 (84.0%) were HCV RNA positive. CONCLUSIONS: The study confirms that routine rapid testing in certain risk groups constitutes an essential tool for identifying new HCV infections and might have an important role for public health.

Bigoraj, E, I Kozyra, E Kwit and A Rzeżutka (2020). "[Detection of hepatitis E virus \(rabbit genotype\) in farmed rabbits entering the food chain.](#)" *Int J Food Microbiol* 319: 108507.



Hepatitis E virus (HEV) infects humans and many animal species. The rabbit HEV has been found in farmed, wild and pet rabbits as well as in human patients suggesting zoonotic transmission. Although the routes of human infection with rabbit strains are unclear a foodborne transmission is suggested especially when asymptotically infected animals could enter the food chain. The aims of the study were an evaluation of the prevalence of HEV infections in slaughtered rabbits, identification of the virus genotype(s) and assessment of their genetic relatedness to other zoonotic HEV strains. A pair of blood and liver samples (n = 482) were collected from meat rabbits of different breeds slaughtered at the age of 2.8 to 6 months. The animals originated from 20 small-scale and 4 large-scale commercial farms operating in Poland. The presence of anti-HEV antibodies in animals was detected by the use of a recomWell HEV IgG (human) ELISA kit (Mikrogen Diagnostik) adapted to rabbit sera. The isolation of HEV and sample process control virus (feline calicivirus) RNA from homogenates of liver destined for food and virus-positive sera was performed using a QIAamp® Viral RNA Mini Kit (Qiagen). A one-step real-time reverse transcription PCR method containing a target-specific internal amplification control was used for detection of HEV. The (sub)genotype of detected rabbit HEV strains was identified based on sequence analysis of the ORF2 and ORF2/3 virus genome fragments. Anti-HEV antibodies were detected in 29 (6%) out of 482 rabbit sera samples collected from animals raised only on the small-scale rabbit farms. Four sera were also positive for HEV RNA. Viral RNA was detected in 72 (14.9%) animal livers. Analysing ELISA and PCR results using Student's t-test, there were significant differences observed in the frequency of HEV infections between rabbits from small-scale and commercial farms ($t = 2.675$, $p = 0.015 < 0.05$ for ELISA and $t = 2.705$, $p = 0.014 < 0.05$ for PCR). All detected virus strains were identified as HEV gt3 ra subtype. The results of this study provide data on the occurrence of HEV infections in rabbits entering the food chain, suggesting that a risk of foodborne HEV infection due to consumption of contaminated meat and liver exists. In this light, the presence of rabbit HEV in food animals is pertinent as an issue of food safety and the surveillance of these animals for emerging or re-emerging viruses.

Bura, M, A Bura and I Mozer-Lisewska (2020). "[Syphilis and HIV infection in patients with hepatitis A: a preliminary study from one centre in Poland](#)." *Postepy Dermatol Alergol* **37**(5): 810-811.

Bura, M, M Łagiedo-Żelazowska, M Michalak, I Mozer-Lisewska and AE Grzegorzewska (2020). "[Exposure to hepatitis E virus in hemodialysis patients from west-central Poland](#)." *J Med Virol* **92**(8): 1363-1368.

Hepatitis E virus (HEV) causes travel-related but also locally acquired infections in industrialized parts of the world, including European countries. Food and blood transfusions are possible sources of transmission. Infections caused by zoonotic variants of the virus (particularly HEV-3) may progress to chronic liver disease in a nonnegligible proportion of immunocompromised people. The aim of this study was to assess the prevalence of serological markers of HEV infection in 189 patients on renal replacement therapy (RRT, currently on hemodialysis, HD) living in west-central Poland and to determine the factors related to HEV exposure in this group. Testing was carried out using commonly used commercial assays (Wantai Biological Pharmacy Enterprise Co, Beijing, China). Anti-HEV IgG was detected in 94 patients (49.7%); none of the participants had anti-HEV IgM or HEV Ag. Patients on RRT (HD) for less than 6 months were significantly more likely to be anti-HEV IgG-positive than dependent of RRT (HD) for more than half a year (80% vs 47%; $P = .014$). Exposure to HEV in patients from west-central Poland is frequent, but no clear sources of this infection have been identified. There were no serological features of ongoing liver disease caused by HEV in the study subjects.



Grabarczyk, P, D Kubicka-Russel, A Kopacz, G Liszewski, E Sulkowska, P Zwolińska, K Madaliński, M Marek, M Szabelewska, E Świątek, T Laskus and M Radkowski (2020). "[Seronegative hepatitis C virus infection in Polish blood donors-Virological characteristics of index donations and follow-up observations.](#)" *J Med Virol* **92**(3): 339-347.

Nucleic acid testing (NAT) was implemented in Poland in 1999 for screening of plasma for fractionation and for all blood donors in 2002. To analyze seronegative NAT-positive samples representing hepatitis C virus (HCV) window-period (WP) in the years 2000 to 2016 and to determine infection outcome. We analyzed results of 17 502 739 donations screened in minipools (6-48) or individually. Index samples underwent viral load (VL) quantification, genotyping and Ag, and anti-HCV re-testing using chemiluminescence (CMIA), electrochemiluminescence (ECLIA), and fourth-generation enzyme-linked immunosorbent assay (IV EIA) assays. HCV-seronegative infections were identified in 126 donations (7.2/mln donations; 95% confidential intervals, 6.0-8.6). Frequency of NAT yields was decreasing over time. Of the initial 126 seronegative index cases 106 were retested: 32.1% were reactive in IV EIA, 11.3% in ECLIA, and 1.9% in CMIA. The lowest VL correlated with absent anti-HCV and HCV Ag, while VL was highest when the antigen was detectable and then it decreased when anti-HCV appeared at a level detectable by sensitive third generation tests while retesting. The proportion of genotype 1 was 38.9% in samples positive only for HCV RNA and 71.4% in samples that were anti-HCV reactive in re-testing. In parallel, genotype 3 frequency was 50% in the former group and 21% in the latter. NAT is an effective measure to limit HCV transmission by transfusion and IV EIA seems to have higher clinical sensitivity than ECLIA. Samples representing likely successive phases of early HCV infection were characterized by different genotype distribution probably due to very early elimination of genotype 3.

Kalinka, E, J Drozd-Sokołowska, A Waszczuk-Gajda, J Barankiewicz, E Zalewska, I Symonowicz and E Lech-Marańda (2020). "[Hepatitis B virus screening in patients with non-Hodgkin lymphoma in clinical practice in Poland - a report of the Polish Lymphoma Research Group.](#)" *Arch Med Sci* **16**(1): 157-161.

INTRODUCTION: The risk of HBV reactivation is important in lymphoma patients receiving immunosuppressive chemotherapy containing steroids or anti-CD20 antibodies. We aimed to establish the prevalence of HBV Ag and anti-HBc serologic positive results in patients with non-Hodgkin lymphoma (NHL) and chronic lymphocytic leukemia (CLL) in Poland before anti-CD20 therapy initiation; to assess the frequency of insufficient HBV screening; and to assess the association between inadequate HBV screening and diagnosis according to the WHO classification and age or gender. MATERIAL AND METHODS: We retrospectively collected data from 805 patients with non-Hodgkin lymphoma and chronic lymphocytic leukemia treated in 2016-2018. RESULTS: We found a positive result of HBsAg in 13 (1.16%), and a negative result in 633 (78.64%) patients. The test was not done in 159 (19.75%) patients. In the HBsAg negative subgroup of 633 patients, we found that the anti-HBc was positive in 52 (8.22%), negative in 303 (47.87%) and not done in 278 patients. In 136 out of 805 (16.9%) patients diagnostics tests were not performed before therapy initiation. We found that age is significantly associated ($p = 0.0002$) with the lack of HBV infection screening, and in CLL this risk is significantly ($p = 0.024$) higher (by 49%) compared with other WHO diagnosis subgroups. CONCLUSIONS: In Polish lymphoma patients the incidence of positive HBsAg and/or anti-HBc results is consistent with the prevalence in the United States or Australia. The adherence to appropriate HBV screening guidelines in Polish centers is not sufficient. We should intensify educational strategies in the global oncohematologic medical community.

Nitsch-Osuch, A, B Pawlus, M Pawlak and E Kuchar (2020). "[Decreasing Vaccination Coverage Against Hepatitis B and Tuberculosis in Newborns.](#)" *Adv Exp Med Biol* **1251**: 99-105.

The number of parents who refuse to vaccinate their children or present the so-called hesitant behavior, i.e., delay the moment of vaccination beyond the mandatory time, has



increased in many developed countries. The purpose of this retrospective study was to evaluate the completeness and timeliness of vaccinations against hepatitis B (HBV) and tuberculosis (TB) in neonates in a single maternity hospital in Warsaw, Poland. We reviewed medical files of 14,785 children born in the hospital in 2015-2017 and calculated the proportion of newborns not vaccinated on time according to the Polish Immunization schedule that includes vaccination against HBV and TB in the first day of life. Newborns remained unvaccinated because of parental refusal (refusers) or decision for a delay (hesitants), or medical contraindications. The percentage of unvaccinated newborns in the 3 years was as follows: 7.3% in 2015, 6.7% in 2016, and 10.1% in 2017. Parental decisions rather than medical contraindications caused nonvaccination (4.4% vs. 2.9% in 2015, 4.7% vs. 2.0% in 2016, and 7.5% vs. 2.6% in 2017). The majority of refusals concerned both vaccinations (67.3% in 2015, 74.8% in 2016, and 68% in 2017). Among parents who refused only one vaccination, TB vaccination was refused more often than HBV (9.2% vs. 7.1% in 2015, 8.3% vs. 5.7% in 2016, and 5.9% vs. 2.7% in 2017). Similar trends were observed among the hesitants. In conclusion, it seems essential to implement effective educational and informative activities targeted to parents to reinforce positive attitudes toward vaccinations.

Piekarska, A, K Tomaszewicz, W Halota, J Jaroszewicz, R Krygier, P Małkowski, M Pawłowska, K Simon, O Tronina, D Zarębska-Michaluk and R Flisiak (2020). "[Searching for the optimal population for hepatitis C virus screening in Poland.](#)" *Clin Exp Hepatol* 6(2): 74-76.

AIM OF THE STUDY: The purpose of the study was to select the optimal target population for a possible national hepatitis C virus (HCV) screening program in Poland, based on the most recent available data. MATERIAL AND METHODS: The analysis included 723,654 participants from different populations screened for anti-HCV. Testing was performed in the whole blood using rapid anti-HCV kits. Presence of HCV RNA was additionally demonstrated in some anti-HCV positive patients with the real-time polymerase chain reaction method. RESULTS: Altogether 3,548 anti-HCV positive individuals were identified, so the prevalence rate in the whole studied population was 0.5%. The highest percentage (1.2%) was shown by diagnostic laboratories, which offered rapid testing for patients visiting their offices during the HCV awareness campaign. Relatively high anti-HCV prevalence of 0.6-0.7% was noted in hospitals and in private medical centers, as well as during music concerts. Surprisingly, the lowest prevalence (0.2%) was observed in general practitioners' offices. Among 502 anti-HCV positive individuals tested additionally for HCV RNA, viremic presence was demonstrated in 40%. CONCLUSIONS: Anti-HCV testing in Poland should be carried out using rapid anti-HCV kits at the patients' admission to the hospitals and should also be offered to patients during their visits for any purpose in diagnostic laboratories or private medical centers.

Pluta, M, M Pokorska-Śpiewak, M Aniszewska and M Marczyńska (2020). "[On a straight path to HCV elimination in children - new prospects for hepatitis C treatment in Poland.](#)" *Przegl Epidemiol* 74(4): 662-666.

Difficulties in achieving elimination targets of the World Health Organization's Global Strategy on viral hepatitis might be overcome through a new micro-elimination approach that allows for a quick, efficient targeting of treatment and prevention services. Particular focus on identification of high-risk and so far marginalized populations, such as children and adolescents, increases chances for HCV elimination on a country, and ultimately on a population level. Therefore, a broad access to safe and highly effective direct-acting antiviral drugs is of utmost importance in the pediatric population.

Sadkowska-Todys, M, A Zieliński and MP Czarkowski (2020). "[Infectious diseases in Poland in 2018.](#)" *Przegl Epidemiol* 74(4): 569-582.

OBJECTIVE OF THE ARTICLE: The introductory text to the Epidemiological Chronicle (EC) of the Epidemiological Review contains data on the incidence of infectious and parasitic



diseases in Poland in 2018 compared to 2017 data and medians from 2012-2016. It is a general overview of the epidemiological situation of infectious and parasitic diseases in Poland. With regard to selected diseases, widening and deepening picture is in the content of remaining articles of the epidemiological chronicle. MATERIAL AND METHODS: The source data for this article are mainly individual reports submitted by doctors to the County Sanitary/Epidemiological Stations. The basic material of this study is the data published in the bulletins "Infectious diseases and poisoning in Poland in 2018" and "Immunization in Poland in 2018", as well as data published in the reports "Influenza and suspected influenza in Poland in 2018". Data on deaths due to infectious diseases come from the summaries of the Demographic Research Department of the Central Statistical Office. RESULTS AND THE DISCUSSION: As in previous years, the highest incidence was recorded in the category of upper respiratory tract infections and, but to a much lesser extent, gastrointestinal infections. For at least two decades, there has been a shift in the profile of gastrointestinal infections characterized by an increase in viral infections compared to bacterial infections. Regarding healthcare associated infections, rotavirus infections predominate among children and *C. difficile* infections among adults. The later creates a serious, growing problem, largely related to the use of antibiotics, but also to fecal-oral transmission. Among infectious diseases, *C. difficile* caused the highest number of deaths in 2018. Viral infection of the liver continues to be an important problem. Apart from hepatitis B and C, this also applies to hepatitis A, which took the form of an epidemic in 2017. In 2018, the incidence decreased by more than a half, but still the number of cases was about thirty times higher than for the median from 2012-2016. Despite declining tendency for many years, the incidence of tuberculosis still remains above the numbers recorded in the developed countries of Western Europe. In other disease groups, there was no marked increase in risk compared to previous years.

Szczygielska, I, E Hernik, A Gazda, B Kołodziejczyk and P Gietka (2020). "[Assessment of anti-HBs antibody concentration in children with juvenile idiopathic arthritis treated with biological drugs, vaccinated against viral type B hepatitis in infancy.](#)" *Reumatologia* 58(1): 15-20.

OBJECTIVES: The introduction of vaccinations against viral hepatitis B in the years 1994-1996 in Poland significantly improved the epidemiological situation of hepatitis B virus (HBV) infections in our country. According to the report of the National Institute of Public Health - National Institute of Hygiene in 2018, 40 cases of acute hepatitis B were noted while still in the 1980s between 10 and 20 thousand new cases were reported annually. The aim of the study was to determine whether in children treated with biological drugs (adalimumab, etanercept, infliximab) due to juvenile idiopathic arthritis (JIA), vaccinated against hepatitis B in infancy, a protective concentration of anti-HBs antibodies persists. In patients, the value ≥ 10 mIU/ml is regarded as a protective concentration of antibodies, determined at least four weeks after administration of the last vaccine dose. Among healthy individuals, presence of anti-HBs antibodies in any concentration means seroprotection. No booster vaccinations are recommended in basically vaccinated healthy individuals. MATERIAL AND METHODS: The concentrations of anti-HBs antibodies were determined in 56 children with JIA (38 girls - 67.9% and 18 boys - 32.1%) aged from 2 years and 4 months to 17.5 years, treated for at least three months with biological drugs. The diagnosis of JIA was made based on the International League of Associations for Rheumatology (ILAR) criteria. All studied patients were at the stable stage of the disease and received a full course of hepatitis B vaccination during infancy (in accordance with 0,1,6 months injection scheme). RESULTS: In the studied children a protective anti-HBs antibody concentration was found in 34 cases (60.7%), and 22 children (39.3%) had anti-HBs antibody concentration < 10 mIU/ml (in these children no seroprotection was found). CONCLUSIONS: The post-vaccination antibody concentration should be determined in children with JIA, treated with biological drugs and, in case of absence of a protective concentration, revaccination should be started.



Wiktor, A and M Stępień (2020). "[Hepatitis B in Poland in 2018](#)." *Przegl Epidemiol* **74**(2): 196-208. OBJECTIVE: Evaluation of the epidemiological situation of hepatitis B in Poland in 2018 compared to the situation in previous years. MATERIAL AND METHODS: The epidemiological situation was assessed based on the results of the analysis of individual data on hepatitis B cases and HBV infections registered by Local Sanitary- Epidemiological Stations in the central database using Epidemiological Interview Registration System (SRWE). Aggregate data published in the annual bulletins "Infectious Diseases and Poisonings in Poland" and "Vaccinations in Poland" were also used. RESULTS: In 2018, a total of 3 196 hepatitis B cases were registered, which corresponds to an incidence of 8.3 cases per 100,000 population. Acute hepatitis B cases accounted for about 1.3 % of total. The incidence of acute hepatitis B was lower by 33% than in 2017 and lower by 44% than median of the years 2012-2016. No acute cases were reported among children and adolescents aged 0-19 years and in the age group 20-24. The incidence of chronic and unknown (in terms of the stage) was lower by 4.5% than in the previous year however, in comparison to median incidence of chronic hepatitis B in 2012-2016 an increase of 17% was noted. As in the previous years, acute, chronic and unknown stage (UNK) hepatitis B were more often detected in men and in urban residents. The dominant route of transmission of HBV infections still remains procedures performed in medical settings - 86% of cases with a known transmission route. The coverage with the third HBV vaccine dose in children aged two years was 91 % and remains (since 2017) below the 95% required in the elimination strategy. In 2018 three people died due to acute hepatitis B and 35 people due to chronic hepatitis B. CONCLUSIONS: In 2018 decrease in the incidence of acute and chronic hepatitis B was observed. In group of persons born after 1994 covered by obligatory hepatitis B vaccinations as newborns no acute cases have been reported, however, a progressive decline in children's vaccination coverage poses a risk for new HBV infection also among people subjected to mandatory vaccinations. Maintenance of a low incidence of acute hepatitis B requires improvement in carrying out of mandatory vaccination among newborns and further recommendation of vaccination for all persons previously unvaccinated. A slight decline in the detection of chronic and UNK cases may be related to the number of tests performed in a given year.

Zakrzewska, K, M Stępień and M Rosińska (2020). "[Hepatitis C in Poland in 2018](#)." *Przegl Epidemiol* **74**(2): 209-222.

OBJECTIVE: Analysis of data on hepatitis C, collected as part of epidemiological surveillance in 2018, compared to previous years. MATERIAL AND METHODS: Analysis of: 1) individual data from surveillance in 2018 2) diagnosis rate from bulletins "Infectious diseases and poisonings in Poland" for the years 2012-2018 and 3) data about deaths due to hepatitis C from the Demographic Surveys and Labour Market Department of the Central Statistical Office. RESULTS: In 2018, there was a decrease in the number of reported hepatitis C cases (3,442 cases) and the diagnosis rate (8.96 per 100,000; taking into account the territorial distribution: from 3.29 per 100,000 in the Podkarpackie voivodeship to 13.69 per 100,00 in the Lubuskie voivodeship). The disproportion of the rates between the sexes returned (in men 9.34 per 100,000 vs. women: 8.61 per 100,000). The disproportion of the diagnosis rate depending on the place of residence was still evident (urban: 10.84 per 100,000 vs. rural: 6.12 per 100,000). There are differences in the values of the diagnosis rates, analyzed in terms of gender, age groups and the place of residence. Based on the EU definition, 14 acute hepatitis C were reported, while according to the PL definition, 88 cases (0.4% and 2.6% of all reported cases, respectively). HCV infections due to medical procedures are still the main route of transmission, also in cases of acute hepatitis C - which indicates the current route of transmission. According to the Demographic Surveys and Labour Market Department of the Central Statistical Office, 119 deaths related to hepatitis C were reported. CONCLUSIONS: For years, the general picture of hepatitis C in Poland, observed through epidemiological



surveillance, is determined by the availability of testing for HCV infections. The analysis identified subpopulations in which primary prevention activities (e.g. safer medical procedures, intensifying activities in the area of harm reduction for people who inject drugs) as well as secondary prevention (access to testing and quick inclusion in treatment) should be particularly strengthened. According to the micro-elimination strategy, the improvement of testing in particularly affected groups, including marginalized populations, is necessary to achieve the WHO goal of eliminating HCV by 2030.

Bieńkowski, C, M Kowalczyk, M Pluta and M Pokorska-Śpiewak (2021). "[Acute Hepatitis B and Unusual Follow-Up in a 16-Year-Old Boy: Case Report.](#)" *Pediatr Rep* **13**(3): 534-537.

In this case report, we present a 16-year-old Ukrainian boy with acute hepatitis B. He had not been previously vaccinated against hepatitis B. Possible sources of infection included: a tattoo made at home, a finger cut made with hairdresser scissors during work, and unprotected sexual encounters. The clinical course of the disease was typical with jaundice and elevated aminotransferases levels without liver failure. During the follow-up visit 16 months after the onset of the disease, chronic hepatitis b was excluded but an ulcer around his anus was found. Additional tests for sexually transmitted diseases were ordered and they were positive for syphilis. The extended interview revealed that the patient had several unprotected bisexual encounters, which may have indicated a potential source of infections including the hepatitis B virus (HBV). The reported case shows that despite the significant decrease in the hepatitis B prevalence in Poland, the infection is still possible. It is necessary to conduct epidemiological interviews regarding sexually transmitted diseases in teenagers, especially when a blood-borne disease has been diagnosed.

Fernàndez-López, L, S Baros, M Niedźwiedzka-Stadnik, DV Staneková, M Rosińska, D Simic, V Jovanoic, M Hábeková, M Takáčová, I Wawer, P Wysocki, A Conway, I Klavs and J Casabona (2021). "[Integration of community-based testing data into national HIV surveillance in Poland, Serbia and Slovakia within the framework of INTEGRATE project.](#)" *BMC Infect Dis* **21**(Suppl 2): 800.

BACKGROUND: Community-based voluntary counselling and testing contributes to early HIV diagnoses among key populations. Testing data from such decentralized services is however often not standardized nor linked to national surveillance systems. This study aimed to support the integration of community testing data into respective national surveillance and monitoring and evaluation systems for those infections. We present results from three national pilots, focused on improved data collection and transfer. METHODS: Within the Joint Action INTEGRATE different pilot activities were planned and implemented according to the local context. In Slovakia, standardised data collection tools were implemented in three community testing services. The data generated was used to calculate the proposed indicators. In Poland, positive test results from the community testing database were linked to the national case-based surveillance database using confirmatory test number, to improve the completeness of behavioural data in the national database. In Serbia, voluntary counselling and testing forms were improved enabling identification of community-based testing. A system to generate unique client identifiers was initiated in the National registry of HIV cases to monitor linkage to care. RESULTS: All three sites were able to estimate most of the agreed indicators. In Slovakia during the study period 675 people were tested for HIV, 410 for hepatitis C and 457 for syphilis, with reactivity rates of 0.4, 2.5 and 1.8%, respectively. For HIV, 66.7% of reactive cases were confirmed and linked to care. In Poland, 28.9% of the community testing sites' records were linked to the national surveillance database (and accounted for 14.3% of all new diagnoses registered here during 2017-2018). Reactivity rate ranged between 1.9% and 2.1%. In Serbia, 80 persons were tested at community sites, from which two had a reactive HIV test result. By linking unique client identifiers from voluntary counselling and testing and National Registry of HIV cases databases, linkage to care within a two-month period was observed for



one of two people with reactive HIV test result. CONCLUSIONS: Pilot activities in the three countries demonstrate that integration of community-based testing data into surveillance systems is feasible and can help improve national surveillance data by providing key information.

Fernández-López, L, I Klavs, A Conway, T Kustec, M Serdt, S Baros, DV Staneková, L Lemsalu, I Wawer, P Wysocki and J Casabona (2021). "[Recommendations for collection and integration of community-based testing and linkage to care data into national surveillance, monitoring and evaluation systems for HIV, viral hepatitis and sexually transmitted infections: results from the INTEGRATE Joint Action.](#)" *BMC Infect Dis* **21**(Suppl 2): 794.

BACKGROUND: National testing strategy, including monitoring and evaluation, is critical in responding to HIV, sexually transmitted infections, and viral hepatitis. Community-based voluntary counselling and testing contributes to early HIV diagnoses among key populations. Countries providing community-based testing, should integrate some core data on testing and linkage to care in these services into national surveillance and monitoring and evaluation systems. This study aimed to support the integration of community-based voluntary counselling and testing data into respective national surveillance and M&E systems for those infections. METHODS: Preliminary consensus on indicators for the integration of community-based voluntary counselling and testing data into respective national surveillance and monitoring and evaluation systems was reached. Pilot studies were conducted in Estonia, Poland, Serbia, Slovakia, Slovenia and Spain. After pilot activities were implemented, the final consensus on indicators was reached. An analysis of the facilitators and barriers faced during pilot studies was conducted to inform the final recommendations for implementation. RESULTS: The minimum set of six indicators to be integrated into national surveillance and monitoring and evaluation systems were: number of tests, number of clients tested, reactivity rate for tests and clients, positivity (active infection) rates for tests and clients, linkage to care rates for clients with reactive and/or positive test result, proportion of all new diagnoses in a country with first reactive test result at community-based voluntary counselling and testing service. Seven additional indicators were identified. Each indicator should be disaggregated by key population, sex and age group. A list of 10 recommendations for the collection and integration of community-based voluntary counselling and testing data into national surveillance and monitoring and evaluation systems for HIV, sexually transmitted infections and viral hepatitis was identified. CONCLUSIONS: Integration of some community-based voluntary counselling and testing monitoring and evaluation data into national surveillance and monitoring and evaluation systems in all pilot countries was achieved. The recommendations will support such integration in other European countries. European Centre for Prevention and Control of Diseases included questions from the minimum list of indicators into their Dublin Declaration questionnaire 2020 to contribute to evidence based community testing policies in European countries.

Gasbarrini, N, D Dubravić, L Combs, A Dišković, M Ankiersztejn-Bartczak, F Colaiaco, I Wawer, P Wysocki, M Rosińska, A Marzec-Bogusławska, B Collins, D Simões, ML Jakobsen and D Raben (2021). "[Increasing integrated testing in community settings through interventions for change, including the Spring European Testing Week.](#)" *BMC Infect Dis* **21**(Suppl 2): 874.

BACKGROUND: Maximising access to testing by targeting more than one infection is effective in identifying new infections in settings or populations. Within the EU funded Joint Action INTEGRATE, this paper examined the feasibility and impact of expanding integrated testing for HIV, hepatitis C (HCV), chlamydia, gonorrhoea and/or syphilis in four community-based pilots through targeted interventions in Croatia, Italy and Poland and the Spring European Testing Week since community settings are key in detecting new infections and reaching key populations. METHODS: Pilots led by local INTEGRATE partners prioritised testing for other infections or key populations. The Croatian pilot expanded testing for men who have sex



with men to syphilis, chlamydia and gonorrhoea. Italian partners implemented a HIV and HCV testing/information event at a migrant centre. A second Italian pilot tested migrants for HIV and HCV through outreach and a low-threshold service for people who use drugs. Polish partners tested for HIV, HCV and syphilis among people who inject drugs in unstable housing via a mobile van. Pilots monitored the number of individuals tested for each infection and reactive results. The pilot Spring European Testing Week from 18 to 25 May 2018 was an INTEGRATE-driven initiative to create more testing awareness and opportunities throughout Europe. RESULTS: The Croatian pilot found a high prevalence for each syphilis, chlamydia and gonorrhoea respectively, 2.1%, 12.4% and 6.7%. The Italian migrant centre pilot found low proportions who were previously tested for HIV (24%) or HCV (11%) and the second Italian pilot found an HCV prevalence of 6.2%, with low proportions previously tested for HIV (33%) or HCV (31%). The Polish pilot found rates of being previously tested for HIV, HCV and syphilis at 39%, 37%, and 38%, respectively. Results from the Spring European Testing Week pilot showed it was acceptable with increased integrated testing, from 50% in 2018 to 71% in 2019 in participants. CONCLUSIONS: Results show that integrated testing is feasible and effective in community settings, in reaching key populations and minimising missed testing opportunities, and the pilots made feasible because of the European collaboration and funding. For sustainability and expansion of integrated community testing across Europe, local government investment in legislation, financial and structural support are crucial.

Kowalczyk, M, A Wiktor and M Stępień (2021). "[Hepatitis B in Poland in 2019](#)." *Przegl Epidemiol* 75(3): 367-378.

OBJECTIVE: Assessment of hepatitis B epidemiological situation in Poland in 2019 compared to previous years. MATERIAL AND METHODS: Data on the incidence of hepatitis B and HBV infections from 2019 registered by sanitary and epidemiological stations in the electronic Epidemiological Interview Registration System in Poland were analyzed. Data from the published annual bulletins: "Infectious diseases and poisonings in Poland" and "Vaccinations in Poland" were also used. Data on deaths were obtained from the Central Statistical Office. RESULTS: In 2019, 2,854 cases of hepatitis B were reported, which corresponds to the incidence of 7.4 per 100,000 population. Acute cases accounted for 1.6% of all registered cases. The incidence of acute hepatitis B was higher by 20% than in 2018 and lower by 20% than the median incidence for 2013-2017. There were no acute cases among children and adolescents aged 0-19 years. In the age group 20-24, 1 case was reported. The incidence of chronic and unknown stage of hepatitis B was lower by 11% than in the previous year, however, compared to the median incidence of chronic hepatitis B in 2013-2017, it was lower by 15%. As in previous years, acute, chronic and unknown infections occurred more often among men than among women, and more often among urban than rural residents. The most common and probable routes of HBV infections were medical procedures, which accounted for 75% of cases with a known route of transmission. In 2019, the HBV vaccination coverage with the third vaccine dose in children born in 2018 was 90.5%, which is less than in previous year. In 2019, 29 people died due to hepatitis B, including one as a result of an acute infection. CONCLUSIONS: The incidence of hepatitis B in Poland over the years (2015-2019) has a decreasing tendency. Among people covered by universal HBV vaccinations, born after 1994, no acute cases were reported. However, the decrease in newborns and infants vaccination coverage may cause the increased risk of new HBV infections, even in the people subject to compulsory vaccinations against hepatitis B. Changes introduced in the surveillance system on hepatitis B in 2014 allow for the levelling of territorial discrepancies in the hepatitis B registered cases and allow for the assessment of the actual number of newly detected HBV infections. The persistence of the low incidence of acute hepatitis B indicates the need to maintain the preventive measures applied so far, in particular the universal compulsory vaccinations of newborns and recommending vaccinations to all previously unvaccinated people.



Łapiński, TW, A Tarasik, M Januszkiewicz and R Flisiak (2021). "[Clinical aspects and treatment of hepatocellular carcinoma in north-eastern Poland.](#)" *Clin Exp Hepatol* **7**(1): 79-84.

AIM OF THE STUDY: Hepatocellular carcinoma (HCC) is the most common type of primary liver cancer, with poor treatment outcomes often because of delayed diagnosis. The aim of this study was to assess the co-incidence of cirrhosis, alcohol abuse, hepatitis B virus (HBV) or hepatitis C virus (HCV) infection and fatty liver disease in patients in the population of north-eastern Poland, to analyse the usefulness of α -fetoprotein (AFP) in the diagnosis of HCC and to assess the effectiveness of HCC treatment in this group. MATERIAL AND METHODS: The study involved 104 patients diagnosed with HCC. The age, sex, comorbidities, HCC risk factors and levels of AFP were analysed. The effect of antiviral therapy of HCV and HBV on HCC development was observed and the effectiveness of therapies used in the treatment of HCC was assessed. RESULTS: Over 90% of patients with HCC were older than 45 years. The incidence of HCC was higher in men than in women. Patients with HCC were also diagnosed with cirrhosis (72%), alcohol abuse (35%), HCV infection (35%), HBV infection (24%), and fatty liver disease (13%). HCC developed in 9/25 (36%) patients positive for HBV despite effective antiviral therapy. The highest AFP levels were found in HBV-positive patients. The mean survival time was 19 months for partial hepatectomy and 16 months for thermal ablation. CONCLUSIONS: The main predisposing factor for HCC is cirrhosis, followed by alcohol abuse and infection with HCV. Effective antiviral therapy for HBV does not prevent the development of HCC in all cases. Since 29% of patients were disqualified from HCC treatment due to an advanced stage of cancer, it indicates insufficient screening for HCC. Partial hepatectomy and radiofrequency ablation show comparable effectiveness in the treatment of HCC.

Pabjan, P, M Brzdęk, M Chrapek, K Dziedzic, PM Stępień, K Paluch, A Garbat, P Błoniarczyk, K Reczko and D Zarębska-Michaluk (2021). "[Genotype-specific versus pangenotypic regimens in patients infected with hepatitis C virus genotype 1b in real-world settings.](#)" *Pol Arch Intern Med* **131**(11).

Introduction: The introduction of direct-acting antivirals (DAAs) has provided us with hope to eliminate hepatitis C virus (HCV) infection as a significant public health problem in the coming years. Objective: Our study aimed to compare the effectiveness and safety of genotype-specific and pangenotypic regimens in genotype 1b–infected patients treated in real-world settings. Patients and methods: Patients were selected from 990 HCV-infected individuals treated with DAAs in the Department of Infectious Diseases in Kielce, Poland, who had the therapy initiated between July 1, 2015 and December 31, 2020. Results: A total of 795 genotype 1b–infected patients with a median age of 51 years, female predominance (55%), and a 21.1% rate of cirrhosis were included in the analysis. A total of 69.9% of patients were treated with genotype-specific regimens. Those patients were significantly older, more often were treatment experienced, and had advanced liver fibrosis and cirrhosis compared with patients assigned to pangenotypic regimens. An overall sustained virologic response rate of 97.9% in the intention-to-treat (ITT) analysis and 99% after excluding nonvirologic nonresponders was achieved, with no significant difference between patients in the 2 treatment arms. Significantly higher proportions of men ($P = 0.001$) and DAA-experienced patients ($P = 0.049$) were documented among virologic nonresponders. Conclusions: We confirmed very high effectiveness and a good safety profile of both genotype-specific and pangenotypic regimens used in patients with genotype 1b HCV infection, and we found no differences between these 2 generations of medications. Male sex and previous treatment with DAAs were identified as negative predictors for therapy effectiveness.

Paciej-Gołębiowska, P, M Pikala and I Maniecka-Bryła (2021). "[Years of life lost due to viral hepatitis in Poland, 2000-2014.](#)" *Ann Agric Environ Med* **28**(2): 300-305.



INTRODUCTION: Viral hepatitis often affects young people; it therefore seems reasonable to analyze the phenomenon of premature mortality due to this reason, using Years of Life Lost (YLLs) measurement. **OBJECTIVE:** The aim of the study was to analyze YLLs due to viral hepatitis in Poland in 2000-2014. For the years 2002 and 2011, socio-economic variables (marital status, level of education, working status, place of residence) were included. **MATERIAL AND METHODS:** The research material was a database containing information from 5,601,568 death certificates of Polish citizens from 2000-2014. The data on deaths caused by viral hepatitis, i.e. coded as B15-B19 according to the ICD-10, was used for the analysis. The Standard Expected Years of Life Lost measure was used to calculate YLLs. Analysis of time trends was performed with the linear regression method using the joinpoint model. **RESULTS:** In the studied period, 3.628 deaths of Polish citizens were caused by viral hepatitis (0.06% of all deaths), which translated to 92,845.70 YLLs (16.17 years per 100,000 inhabitants). The number of YLLs increased over time ($p < 0.05$), reaching its highest value in the last analyzed year - 22.14 years per 100,000. The YLLs average per one death was 25.59 years. Among the risk group there were individuals living in urban areas, divorced/separated, with lower than secondary education, and economically inactive. **CONCLUSIONS:** Despite the fact that Poland belongs to a group of countries with low mortality due to viral hepatitis, this disease is a serious social problem as measured with YLLs. The study provides the basis for policymakers to implement more effective methods to prevent premature deaths caused by this disease.

Parczewski, M, E Janczewska, A Pisula, D Dybowska, W Łojewski, A Witor, M Wawrzynowicz-Syczewska, Ł Socha, R Krygier, B Knysz, J Musialik, A Urbańska, K Scheibe and J Jaroszewicz (2021). "[HCV resistance-associated substitutions following direct-acting antiviral therapy failure - Real-life data from Poland.](#)" *Infect Genet Evol* **93**: 104949.

BACKGROUND: This study analysed the NS3 and NS5A mutation frequencies, persistence and drug susceptibility in a cohort of real-life patients, with failed hepatitis C virus (HCV) therapy following directly acting antiviral (DAA) treatment. **METHODS:** NS3/NS5A Sanger sequences from 105 patients infected with HCV genotype (G) 1a (6,5.7%), G1b (94,89.5%), G3a (4,3.8%), and G4 (1,1.0%) post DAA treatment failure were analysed. NS3 and NS5A resistance-associated substitutions (RASs) were identified using the geno2pheno algorithm and associated with clinical variables. Time trends were examined using logistic regression. **RESULTS:** NS5A RAS were found in 87.9% of sequences derived from patients exposed to this class of agents, whereas NS3 RAS was found in 59.1% of HCV protease-exposed subjects. The frequency of the NS3 RAS increased with fibrosis stage, from 40.0% among F0/F1 individuals to 81.8% among patients with liver cirrhosis (F4, $p = 0.094$). NS5A mutation frequencies were 7.6% for 28A/V/M, 10.6% for 30 K/Q/R, 42.4% for 31I/F/M/V, and 75.8% for 93H. For NS3, the most common RASs were 56F-23.7%, 168A/E/I/Y/T/V-14.0%, and 117H-5.4%. Susceptibility to glecaprevir/pibrentasvir, velpatasvir/voxlaprevir, and elbasvir/grazoprevir was retained in 92.9%, 43.4%, and, 25.3% of patients, respectively. The frequency of NS3 RAS decreased with time elapsed from failure to sampling ($p = 0.034$ for trend). NS5A RAS frequency remained stable over the 24-months. **CONCLUSIONS:** Following DAA treatment failure, NS5A and NS3 RASs were common with increasing frequency among patients with advanced liver disease. In most cases, despite the presence of RASs, susceptibility to DAA combinations with higher genetic barrier was retained.

Parfieniuk-Kowerda, A, J Jaroszewicz, TW Łapiński, M Łucejko, M Maciaszek, M Świdarska, A Grzeszczuk, B Naumnik, M Rowiński and R Flisiak (2021). "[High prevalence of anti-HEV antibodies among patients with immunosuppression and hepatic disorders in eastern Poland.](#)" *Arch Med Sci* **17**(3): 675-681.

INTRODUCTION: The incidence of hepatitis E virus (HEV) infections in Poland is largely unknown. This study aimed to describe seroprevalence of markers of HEV infection among



patients with immunodeficiency of diverse etiology and patients with advanced chronic liver diseases. MATERIAL AND METHODS: Four hundred fifty patients were enrolled; among them, 180 persons were solid organ transplant recipients, 90 patients were HIV-infected and 180 persons had confirmed liver cirrhosis of different etiology. Serum anti-HEV-IgG, IgM antibodies and HEV-antigen were detected by ELISA (Wantai, China). RESULTS: In the group of transplant recipients, serum anti-HEV-IgG antibodies were detected in 40.6%, IgM in 1.1% and HEV-Ag in 2.8% of subjects. In the HIV-infected population 37.7% had anti-HEV-IgG, 1.1% had anti-HEV-IgM and none had HEV-Ag. Among patients with advanced chronic liver diseases the highest prevalence of anti-HEV-IgG was recorded in alcohol-related liver cirrhosis (52.1%) ($p = 0.049$). In the population of all liver cirrhotics anti-HEV-IgG seroprevalence was 48.3%, anti-HEV-IgM seroprevalence was 5.0% and HEV-Ag seroprevalence was 1.7%. Older age and male gender were significant risk factors associated with increased anti-HEV-IgG prevalence, $p = 0.0004$ and $p = 0.02$, respectively. CONCLUSIONS: In this large cohort a high seroprevalence of anti-HEV-IgG was detected in comparison to other European countries, with the highest rates in patients with alcoholic liver disease and in transplant recipients.

Simões, D, R Matulionytė, L Stoniene, P Wysocki, J Kowalska, N Gasbarrini, L Cosmaro, TN Blažić, A Dišković, Z Dominković, I Jovovic, I Razmiene, M Maffeo and SF Jakobsen (2021). "[National multi-stakeholder meetings: a tool to support development of integrated policies and practices for testing and prevention of HIV, viral hepatitis, TB and STIs.](#)" *BMC Infect Dis* **21**(Suppl 2): 795.

BACKGROUND: Country level policies and practices of testing and care for HIV, viral hepatitis and sexually transmitted infections are lagging behind European recommendations on integration across diseases. Building on previous experiences and evidence, the INTEGRATE Joint Action arranged four national stakeholder meetings. The aim was to foster cross-disciplinary and cross-disease collaborations at national level as a vehicle for strengthened integration of testing and care services. This article presents the methodology and discusses main outcomes and recommendations of these meetings. METHODS: Local partners in Croatia, Italy, Lithuania and Poland oversaw the planning, agenda development and identification of key persons to invite to ensure that meetings addressed main challenges and issues of the respective countries. Invited national stakeholders represented policy and public health institutions, clinical settings, testing sites and community organisations. National experts and experts from other European countries were invited as speakers and facilitators. Main topic discussed was how to increase integration across HIV, viral hepatitis and sexually transmitted infections in testing and care policies and practice; tuberculosis was also addressed in Lithuania and Italy. RESULTS: The agendas reflected national contexts and the meetings provided a forum to engage stakeholders knowledgeable of the national prevention, testing and care systems in interaction with international experts who shared experiences of the steps needed to achieve integration in policies and practice. The evaluations showed that participants found meetings relevant, important and beneficial for furthering integration. Of the respondents 78% agreed or strongly agreed that there was a good representation of relevant national stakeholders, and 78% that decision/action points were made on how to move the agenda forward. The importance of securing participation from high level national policy makers was highlighted. Outcomes were nationally tailored recommendations on integrated policies and strategies, diversification of testing strategies, stigma and discrimination, key populations, cost effectiveness, surveillance and funding. CONCLUSIONS: Shifting from single to multi-disease approaches require collaboration among a broad range of actors and national multi-stakeholder meetings have proven excellent to kick-start this. Face-to-face meetings of key stakeholders represent a unique opportunity to share cross-sectoral perspectives and experiences, identify gaps in national policies and practices and agree on required next steps.



Stawinska-Witoszynska, B, J Klos, W Moryson and B Wieckowska (2021). "[Trends in the Incidence of Acute Hepatitis B in the Polish Population and Their Determinants.](#)" *Medicina (Kaunas)* **57**(8).

Introduction: The World Health Assembly adopted the Global Health Strategy and aims to reduce the incidence of Hepatitis from up to 10 million cases per year to 0.9 million cases and to reduce deaths from 1.4 million to 0.5 million per year by 2030. However, given the prevalence of chronic Hepatitis B in many countries and the incidence of new cases of acute Hepatitis B, the task is not easy. This study investigates the trends and determinants of the incidence of acute Hepatitis B in Poland in 2005-2019. Materials and Methods: Data on the incidence of acute hepatitis B (AHBV) were obtained from the National Institute of Public Health. A case definition for AHBV was consistent with the EU definition. The incidence trends were determined by considering the sex, age and place of residence. Due to the exponential dependence model, the computations were based on the logarithm of the incidence rate. This allowed for the transformation to linear form and analysis could be conducted using linear models. Pearson's correlation was used to determine the linear trend of incidence in general and according to sex and place of residence. The values of incidence rates (independent proportions test) and the coefficients illustrating the trends under study were also compared among males and females as well as urban and rural residents. Results: The incidence of AHBV in the Polish population decreased with similar slopes in both sexes. The newly reported cases of AHBV were more frequent in the male population. The incidence of acute Hepatitis B in the urban population was significantly higher than in the rural population. The significant decreasing trends in incidence were observed in all age ranges, with the exception of two age ranges 0-4 and 10-14, where the total incidence during the whole study period was negligible. Conclusion: Despite the significant decrease in the incidence of AHBV in Poland and its position among the European countries with the lowest hepatitis B (HBV) incidence, the alarmingly high proportion of iatrogenic infections requires further improvement in the sanitary condition of health care facilities. It is also necessary to decrease the number of unvaccinated individuals.

Zakrzewska, K, M Stępień and M Rosińska (2021). "[Hepatitis C in Poland in 2019.](#)" *Przegl Epidemiol* **75**(3): 379-389.

BACKGROUND: HCV infection continues to be a significant public health problem in Europe. The aim of the study was to assess the epidemiological situation of hepatitis C in Poland in 2019, based on data collected as part of epidemiological surveillance in 2019, comparing them to data from previous years. MATERIAL AND METHODS: The following were analyzed: 1) data from epidemiological surveillance in 2019 2) diagnosis rates from "Infectious Diseases and Poisonings in Poland" bulletins for the years 2013-2019 3) data on deaths due to hepatitis C from the Demographic Surveys and Labour Market Department of the Statistics Poland. RESULTS: In 2019, the HCV diagnosis rate was 8.71 per 100 thousand - a total of 3 343 cases of HCV infection were reported. This was a slight decrease compared to 2018. Still we observe the rate differentiation, territorial (differences in the value of the diagnosis rate are noticeable already at the voivodeship and powiat level) and demographic (higher rates in men than in women, higher rates in urban than in rural areas), which is probably related to HCV testing accessibility. Among acute hepatitis C cases according to the EU definition, indicative of current HCV transmission, exposures related to health care (haemodialysis and nosocomial transmission) were identified, followed by non-medical injection (community needle stick injuries, tattoos, piercings) and sexual contact. A low number of diagnoses (5.9%; 196/3343) among people who inject drugs indicate diagnostic difficulties. CONCLUSIONS: For years, the overview of hepatitis C in Poland, observed in epidemiological surveillance, has been determined by the availability of HCV testing. Developing the comfortable testing + treatment system in Poland that reaches people exposed to the current transmission of HCV infection (bearing in mind the possibility of re-infection) is the only possibility of eradication of HCV infections.



Brzdęk, M, K Dobrowolska, P Pabjan and D Zarębska-Michaluk (2022). "[Clinical characteristics and antiviral therapy in patients infected with hepatitis C virus in the interferon-free era.](#)" *Pol Arch Intern Med* **132**(9).

INTRODUCTION: The highly effective and safe interferon (IFN)-free options were a breakthrough in the treatment of patients infected with hepatitis C virus (HCV). **OBJECTIVE:** The current analysis was designed to evaluate changes in the patient profile and antiviral treatment characteristics over time. **PATIENTS AND METHODS:** The study population consisted of 963 consecutive HCV-infected patients who started IFN-free regimens between July 2015 and December 2020 in the Department of Infectious Diseases in Kielce, Poland. The analysis was carried out for 5 time intervals. **RESULTS:** The studied group was sex-balanced, with the median (interquartile range) age changing from 58 (44.8-63) in 2015-2016 to 43 (35-61) in 2020. The proportion of patients with comorbidities decreased over the years. The rate of treatment-naïve individuals increased from 40.9% in 2015-2016 to 91% in 2020, while the percentage of patients with liver cirrhosis decreased from 51.1% in 2015-2016 to 13.3% in 2020. Genotype-specific regimens dominated in the years 2015-2017, while pangenotypic options gained an advantage in 2019 and reached 91% in 2020. Overall effectiveness achieved 98.4% in the per-protocol analysis and was comparable over the years with lower efficacy among patients with liver cirrhosis and those infected with genotype 3. The therapy was well-tolerated, and the safety profile improved over time. **CONCLUSIONS:** The median age of HCV-infected patients decreased over the years. They were less burdened with comorbidities and comedications, more likely to be treatment-naïve, and had less advanced liver disease. The genotype-specific regimens, predominantly used at the beginning of the IFN-free era, were superseded by the pangenotypic regimens.

Kowalczyk, M and M Stępień (2022). "[Hepatitis B in Poland in 2020.](#)" *Przegl Epidemiol* **76**(2): 243-254.

OBJECTIVE: Aim of the study was the assessment of hepatitis B epidemiological situation in Poland in 2019 compared to previous years, taking into consideration the impact of the COVID-19 pandemic during that time. **MATERIAL AND METHODS:** Data for 2020 included in individual reports on hepatitis B and HBV infections recorded by sanitary and epidemiological stations at EpiBaza, i.e. in the electronic epidemiological surveillance system on infectious diseases, were analyzed. In the assessment of the epidemiological situation, data published in the annual bulletins: "Infectious diseases and poisonings in Poland in 2020" and "Vaccinations in Poland in 2020" were also used. Data on deaths were obtained from the Statistics Poland (GUS). **RESULTS:** In 2020, 2,854 cases of hepatitis B were reported, which corresponds to the incidence of 2.59 per 100,000 population, lower by 65.1% than in 2019. 14 cases of acute hepatitis B were reported, constituting 1.4% of all registered cases. The incidence of acute hepatitis B was 0.04 per 100,000 population and was lower by 67% compared to 2019 and lower by 71% compared to the median for the years 2014-2018. There were no cases of acute disease in the age group 0-29 years. A total of 978 chronic and unknown hepatitis B cases (UNK) were registered and the diagnosis rate was 2.56 per 100,000 population, lower by 64.2% than in 2019. Compared to the median diagnosis rate of chronic hepatitis B in 2014-2018, a decrease of 70.4% was observed. In the age group 0-19 years, there was no case reported. In 2020, 24 people died due to hepatitis B, including 22 from chronic hepatitis B. **CONCLUSIONS:** The COVID-19 pandemic resulted in a significant reduction in the number of HBV tests performed and, consequently, a reduction in the number of diagnosed infections. A decrease in the number of detected infections was observed from the second quarter of 2020, i.e. from the beginning of the COVID-19 pandemic, although already in the first quarter of 2020 the number of registered hepatitis B cases was lower than in the same period in 2019. No acute cases were reported among people who were vaccinated against hepatitis B during childhood. Vaccination with three



doses of hepatitis B vaccine in children in the second year of life was only slightly lower than in 2019, which proves the stability of the implementation of the preventive vaccination program, despite the limited access to primary health care during the pandemic.

Rajewski, P, D Zarębska-Michaluk, E Janczewska, A Gietka, W Mazur, M Tudrujek-Zdunek, K Tomaszewicz, T Belica-Wdowik, B Baka-Ćwierz, D Dybowska, W Halota, B Lorenc, M Sitko, A Garlicki, H Berak, A Horban, I Orłowska, K Simon, Ł Socha, M Wawrzynowicz-Szczewska, J Jaroszewicz, Z Deroń, A Czauż-Andrzejuk, J Citko, R Krygier, A Piekarska, Ł Laurans, W Dobracki, J Białkowska, O Tronina, M Wietlicka-Piszcz, M Pawłowska and R Flisiak (2022). "[Hepatitis C Infection as a Risk Factor for Hypertension and Cardiovascular Diseases: An EpiTer Multicenter Study.](#)" *J Clin Med* **11**(17).

Hepatitis C infection is one of the main reasons for liver cirrhosis and hepatocellular carcinoma. In recent years, more and more is being heard about extrahepatic manifestations of the hepatitis C infection including its possible influence on the development of hypertension and cardiovascular diseases. In the given work, the frequency analysis of the incidence of hypertension and cardiovascular diseases among 2898 HCV-infected patients treated in Poland and the assessment of their relevance to the HCV genotype and the progression of liver fibrosis can be found. The prevalence of hypertension in the group of analyzed patients was 39% and was significantly associated with old age (OR = 1.08 (1.07-1.08)) and female sex, as well as the progression of liver fibrosis (OR = 1.54 (1.29-1.85)). Hypertension was found in 47.6% of patients with F4 fibrosis, 42.1% of patients with F3 fibrosis, and 25% of patients with F1 fibrosis. The incidence of cardiovascular disease in the studied group of patients was as follows: all incidents, 131 (4.52%); including ischemic heart disease 104, (3.95%); stroke, 2 (0.07%); atherosclerosis, 21 (0.72%); and aneurysms, 4 (0.14%). The obtained results prove that the prevalence of cardiovascular diseases is significantly associated with the advanced age of patients and the progression of liver fibrosis. The relevance of sex and the HCV genotype to the prevalence frequency of cardiovascular diseases in the study group has not been proven. This being the case, no differences in the frequency of their incidence depending on the HCV genotype, including genotype 3, was found. Hepatitis C infection as a non-classical risk factor for cardiovascular disease and hypertension does require further studying.

Rajewski, P, D Zarębska-Michaluk, E Janczewska, A Gietka, W Mazur, M Tudrujek-Zdunek, K Tomaszewicz, T Belica-Wdowik, B Baka-Ćwierz, D Dybowska, W Halota, B Lorenc, M Sitko, A Garlicki, H Berak, A Horban, I Orłowska, K Simon, Ł Socha, M Wawrzynowicz-Szczewska, J Jaroszewicz, Z Deroń, A Czauż-Andrzejuk, J Citko, R Krygier, A Piekarska, Ł Laurans, W Dobracki, J Białkowska, O Tronina, M Wietlicka-Piszcz, M Pawłowska and R Flisiak (2022). "[HCV Genotype Has No Influence on the Incidence of Diabetes-EpiTer Multicentre Study.](#)" *J Clin Med* **11**(2).

HCV infection is one of the main reasons for liver cirrhosis and hepatocellular carcinoma. In recent years, one finds more and more extrahepatic manifestations of HCV infection, including its possible influence on the development of diabetes. In the presented work, one finds the frequency analysis of the incidence of diabetes among 2898 HCV infected patients treated in Poland, and the assessment of their relevance to the HCV genotype and the progression of fibrosis. The results indicate that the hepatitis C infection seems to be a risk factor for diabetes in persons with more advanced liver fibrosis, for older people, and for the male gender. Thus, one found no differences regarding the frequency of its incidence depending on HCV genotype, including genotype 3.

Sierpińska, L (2022). "[Expectations of patients with hepatitis C from family physicians - a Polish example.](#)" *Ann Agric Environ Med* **29**(4): 529-537.

INTRODUCTION: In Poland, approximately 1.9% of the general population is infected with Chronic hepatitis C (HCV), which develops in about 70-80% of infected patients who require constant care from family physicians. OBJECTIVE: The aim of the study was to define the



kinds of expectations of patients with chronic HCV from family physicians. MATERIAL AND METHODS: The study included 220 patients with HCV, and was conducted using a diagnostic survey, the Patient Request Form (PRF) and an author-constructed questionnaire. RESULTS: The respondents most often expected from a family physician, an explanation of the disease (9.67 scores), and obtaining information concerning examinations and treatment (9.65 scores), while to a lesser degree, emotional support (6.92 scores). Respondents with higher education to a significantly higher degree expected an explanation of the essence of the disease. Patients who were inactive occupationally significantly more frequently expected emotional support and information concerning examinations and treatment. Respondents who considered themselves disabled due to HCV, to a significantly higher degree expected emotional support and information concerning examinations and treatment. The remaining variables: age, gender, place of residence, marital status, self-reported state of health and ordered, diet had no significant effect on the expectations of patients with chronic hepatitis C from family physicians. CONCLUSIONS: Patients with HCV, to the highest degree expected an explanation of the disease and information concerning examinations and treatment, and to a lower degree - emotional support during consultations.

Sierpińska, LE (2022). "[Assessment of Health Behaviors of Patients with Hepatitis C.](#)" *Am J Health Behav* **46**(5): 586-594.

OBJECTIVES: In Poland, 1.9% of the population is infected with the hepatitis C virus (HCV). About 70%- 80% of the infected patients develop chronic hepatitis. The higher the level of health-promoting behaviors a person infected with HCV has, the higher their quality of life. The aim of this study was to assess health behaviors of patients with hepatitis C and determine the relationship with selected social and demographic characteristics. METHODS: This survey study included 220 patients infected with HCV and used the Health Behavior Inventory (HBI), and an author-constructed questionnaire. RESULTS: Overall, 40.5% of respondents reported average health behaviors (5-6 stens), with 30.9% low (1-4 stens), and 28.6% high (7-10 stens). The highest mean value was observed for 3 HBI categories: prophylactic behaviors (3.4 ± 0.7), positive psychological attitude (3.4 ± 0.6), and health practices (3.4 ± 0.7). The lowest value related to few health-promoting behaviors concerned positive eating habits (3.3 ± 0.7). CONCLUSIONS: Patients diagnosed with chronic hepatitis C presented an average level of health behavior. Significant differences in health behavior were noted by sex, age, marital status, and employment status. These patients should be provided with health education, especially regarding high-level nutrition.

Sierpińska, LE (2022). "[Assessment of the degree of illness acceptance in patients diagnosed with hepatitis C.](#)" *Ann Agric Environ Med* **29**(2): 224-231.

INTRODUCTION: In Poland, approximately 730,000 people are infected with the hepatitis C virus (HCV). Acceptance of a chronic illness may positively motivate patients in the process of treatment. The higher the degree of illness acceptance, the lower the feeling of psychological discomfort and a lower intensity of negative emotions. OBJECTIVE: The aim of the study was assessment of illness acceptance among patients with chronic hepatitis C, and determination of the level of the relationship between social and demographic variables, and the degree of illness acceptance. MATERIAL AND METHODS: The study included 220 patients with a diagnosis of chronic hepatitis C. The research method was a diagnostic survey, while the instruments used were the Acceptance of Illness Scale (AIS) and an author-constructed questionnaire. RESULTS: Respondents most frequently accepted their illness to the mean degree (30 scores), and a low category or even the lack of acceptance (<20 scores) of respondents. Urban inhabitants significantly more often accepted their illness to a high degree, compared to rural inhabitants. Disability pensioners and retired pensioners significantly more frequently accepted their disease in the category - low degree. The remaining independent variables: gender, age, education, marital status, number of years of



illness, had no significant effect on the degree of acceptance of hepatitis C. CONCLUSIONS: The majority of patients diagnosed with chronic hepatitis C accept their illness to the mean degree. Patients with hepatitis C should be covered with psychological assistance in order to change the way of perception and evaluation of their health situation in more positive terms.

Slonka, J, D Piotrowski, E Janczewska, A Pisula, J Musialik and J Jaroszewicz (2022). "[Significant Decrease in the Prevalence of Anxiety and Depression after Hepatitis C Eradication.](#)" *J Clin Med* **11**(11).

Chronic hepatitis C (CHC) is an ongoing epidemiological problem. The hepatitis C virus (HCV) may infect brain tissue, worsening mental health outcomes. The new era of highly effective oral Direct-Acting Agents (DAA) has brought a chance to eradicate the infection by 2030, however, screening campaigns are urgently needed as the majority of the infected are still undiagnosed. The aim of this study was to assess the prevalence of anxiety and depression among HCV patients, and the correlation with health-related quality of life (HRQoL) in the real-world setting, before and after DAA treatment. Data on anxiety, depression, and HRQoL, were collected by using self-reported questionnaires in a single center in Poland. The study group involved 90 respondents, 50% female, with a mean age of 43.8 years. HCV eradication decreased anxiety prevalence from 30.4% to 19.1% and depression from 35.2% to 18.2%. Significant improvement in 3 out of 4 of the WHOQOL-BREF (TheWorld Health Organization Quality of Life-BREF) domains and 8 out of 10 of the HQLQv.2 domains was obtained. Anxiety diminished the somatic domain scores by 3.5 ($p < 0.0001$), psychological by 2.3 ($p = 0.0062$), social by 1.75 ($p = 0.0008$), and environmental by 2.68 points ($p = 0.0029$). Depression diminished the somatic domain scores by 3.79 ($p < 0.001$), psychological by 2.23 ($p < 0.001$), social by 1.84 ($p < 0.001$), and environmental by 2.42 points ($p = 0.004$). In the Hepatitis Quality of Life Questionnaire version 2 (HQLQ v.2), the presence of depression and/or anxiety-impaired mental health, physical health, well-being, and vitality. These results indicate the need for an active search for HCV-infective people, especially among patients in psychiatric and psychological care.

Zakrzewska, K, M Stępień and M Rosińska (2022). "[Hepatitis C in Poland in 2020.](#)" *Przegl Epidemiol* **76**(2): 233-242.

BACKGROUND: The year 2020 in the extent of HCV infection was set for the first milestones on the road to the eradication of HCV infection in 2030. In addition, in 2020 there was a global public health crisis - the COVID-19 pandemic. The aim of this paper was to assess the epidemiological situation of HCV infection based on epidemiological surveillance data in Poland in 2020. MATERIAL AND METHODS: Analysis of: 1) individual data from surveillance in 2020 conducted by EpiBaza system; 2) diagnosis rate from bulletins "Infectious diseases and poisonings in Poland" for the years 2014-2020; and 3) data about deaths due to hepatitis C from the Demographic Surveys and Labour Market Department of Statistics Poland. RESULTS: In 2020, there was a significant decrease in the number of reported cases and thus in the diagnosis rate of HCV infection in Poland - 955 HCV infections were reported (2.49/100,000 - in comparison with 2019, 3.5 times less). The decrease occurred in all voivodeships (ranging from 0.50 to 6.37/100,000), we observe more districts in which HCV infections were not detected (in 2020 - 35.3%; in 2019 - 16.8%). The diagnosis rate of HCV infection in women and men was at a similar level. However, large disproportions are visible if age groups are considered in addition to gender. For years, we have observed a variation of the diagnosis rate of HCV infection depending on the environment of residence - also in 2020, higher values were reported overall in residents of urban than in rural areas (2.90 vs. 1.88/100,000). In 2.9% of newly diagnosed HCV infections, at the same time cirrhosis was already present, 0.4% had liver failure, and 0.1% had hepatocellular carcinoma. Among exposures of HCV infection, those related to nosocomial transmission still dominate (59%), also in acute hepatitis C (60%). One-third of reported infections were diagnosed in primary health care,



and one in four were diagnosed during hospitalization. CONCLUSIONS: The data presented in this paper show that the COVID-19 pandemic deepened the inequalities observed for years in HCV areas. Establishing a diverse system of testing and linking to care in Poland, reaching those in the greatest risk of ongoing transmission of HCV infection, and providing methodologically correct studies to assess progress in the eradication of HCV infection is becoming increasingly urgent to achieve the planned 2030 WHO targets.

Zawadzka, M and E Ejchman-Pac (2022). "[Analysis of the Number and Type of Vaccinations Performed among Polish Soldiers in 2018-2021.](#)" *Int J Environ Res Public Health* **19**(21).

Vaccination is a very common topic, but it is rarely raised or discussed with respect to military members. Soldiers are one of the main professional groups to be immunized on a regular basis. The military actively participates in research on new vaccine preparations. This paper presents data from 2018-2021 on vaccination among Polish soldiers. The material obtained from the Central Register of Vaccination for Professional Soldiers was analyzed using descriptive statistical methods. The number of injections performed in a given period depends on the location of the ongoing missions and the vaccination schedule specific to a given Polish Military Contingent. In Poland, soldiers undergo preventive vaccinations in accordance with the scheme developed by the Armed Forces Operational Command, taking into account the specific nature of the service, epidemiological risks and the calendar of current preventive vaccinations. Soldiers serving abroad are immunized against typhoid, hepatitis A, hepatitis B, rabies, measles, tick-borne encephalitis, Japanese encephalitis, polio, diphtheria, meningococcal disease, chickenpox, cholera and yellow fever. Regular vaccinations for soldiers are necessary to minimize the spread of infectious diseases, and they have a beneficial effect upon the effectiveness of military operations.

Czarnecka, P, K Czarnecka, O Tronina, T Baczkowska, W Zarychta-Wisniewska and M Durlik (2023). "[Are We on the Right Track for HCV Micro-Elimination? HCV Management Practices in Dialysis Centers in Poland-A National Cross-Sectional Survey.](#)" *J Clin Med* **12**(7).

Chronic hepatitis C (CHC) is prevalent in the hemodialysis-dependent population. Currently, all patients with CHC should be considered for treatment; however, many hemodialysis-dependent patients are still left untreated. Following HCV cure, accurate surveillance is mandatory to reduce liver-related mortality and prevent reinfection. We aimed to establish HCV management practices and barriers to HCV elimination in dialysis centers in Poland. Polish dialysis centers were surveyed via email. The HCV management strategies were investigated. Representatives of 112 dialysis centers responded, representing 43.1% of all dialysis centers in Poland and 43.4% of hemodialysis-dependent patients' volume. Most respondents were Heads of hemodialysis centers and board-certified nephrologists. The study demonstrated that in the vast majority of hemodialysis centers (91.6%), subjects are considered for antiviral treatment (AVT); however, many obstacles preventing patients from being prescribed AVT were identified; patients' reluctance to undergo AVT was most reported (60%). The majority of dialysis units neither evaluate patients with CHC for liver fibrosis (60.4%) nor screen them for hepatocellular carcinoma (53.5%). In conclusion, the presented study demonstrates that HCV management practices across Polish dialysis centers vary substantially. There is a need to optimize and streamline the HCV management infrastructure in the hemodialysis population in Poland.

Genowska, A, D Zarębska-Michaluk, B Strukcinskiene, A Razbadauskas, A Moniuszko-Malinowska, J Jurgaitis and R Flisiak (2023). "[Changing Epidemiological Patterns of Infection and Mortality Due to Hepatitis C Virus in Poland.](#)" *J Clin Med* **12**(12).

INTRODUCTION: Limited information is available on trends in hepatitis C virus (HCV) infection, particularly in Central Europe. To address this knowledge gap, we analyzed HCV epidemiology in Poland, considering socio-demographic characteristics, changing patterns



over time, and the impact of the COVID-19 pandemic. MATERIAL AND METHODS: We examined HCV cases (diagnosis and deaths) reported by national registries and used joinpoint analysis to estimate time trajectories. RESULTS: Between 2009 and 2021, there were changes in the trends of HCV, shifting from positive to negative in Poland. Among men, there was a significant increase initially in diagnosis rate of HCV in rural areas (annual percent change, APC(2009-2016) +11.50%) and urban areas (APC(2009-2016) +11.44%) by 2016. In subsequent years until 2019, the trend changed direction, but the reduction was weak ($P(\text{trend}) > 0.05$) in rural areas (-8.66%) and urban areas (-13.63%). During the COVID-19 pandemic, the diagnosis rate of HCV dramatically decreased in rural areas (APC(2019-2021) -41.47%) and urban areas (APC(2019-2021) -40.88%). Among women, changes in the diagnosis rate of HCV were less pronounced. In rural areas, there was a significant increase (APC(2009-2015) +20.53%) followed by no significant change, whereas changes occurred later in urban areas (APC(2017-2021) -33.58%). Trend changes in total mortality due to HCV were mainly among men, with a significant decrease in rural (-17.17%) and urban (-21.55%) areas from 2014/2015. CONCLUSIONS: The COVID-19 pandemic reduced HCV diagnosis rates in Poland, especially for diagnosed cases. However, further monitoring of HCV trends is necessary, along with national screening programs and improved linkage to care.

Genowska, A, D Zarębska-Michaluk, P Tyszko, B Strukcinskiene, A Moniuszko-Malinowska, P Rzymiski and R Flisiak (2023). "[Trends of infections and mortality due to hepatitis B virus \(2005-2022\) and the potential impact of the COVID-19 pandemic: a population-based study in Poland.](#)" *Clin Exp Hepatol* **9**(3): 286-296.

AIM OF THE STUDY: To analyze the hepatitis B virus (HBV) infection and mortality in Poland according to sociodemographic characteristics, trends over time, and the impact of the COVID-19 pandemic on hepatitis B epidemiology. MATERIAL AND METHODS: We examined HBV infection cases and deaths reported by national registries and used Joinpoint analysis to estimate time trends in the years 2005-2021. To assess the impact of the COVID-19 pandemic on HBV infection, we used monthly information and compared 2020-2022 with 2019. RESULTS: The Joinpoint analysis showed that in Poland between 2005 and 2021, there were pronounced decreasing trends of acute HBV infection, and during the pandemic period, acute HBV infection dramatically decreased (annual percent change, APC(2019-2021) for men -57.65%, and women -42.10%, both $p(\text{trend}) < 0.05$). There was a fluctuation in trends for chronic HBV infection, shifting from positive to negative in both genders in 2016, and over the pandemic, there were decreasing trends (APC(2019-2021) for men -26.94% and women -28.96%, both $p(\text{trend}) < 0.05$). From March to July 2022, the value of the diagnosis rate of HBV infection was lower compared to the respective months in 2019, but from September to December 2022, the rate changes were positive. Mortality due to HBV infection decreased in both genders, mainly within the 2005-2019 period. CONCLUSIONS: During the COVID-19 pandemic, a sharp decrease in HBV diagnosis rates in Poland, especially in acute cases, was observed. However, trends of hepatitis B infection require further monitoring. It is necessary to introduce a national screening program that also encompasses the population of migrants and improve the linkage to care.

Jaroszewicz, J, D Zarębska-Michaluk, J Janocha-Litwin, A Parfieniuk-Kowerda, M Sitko, A Piekarska, J Białkowska, D Dybowska, A Murawska-Ochab and R Flisiak (2023). "[Effectiveness of pangenotypic retreatment of chronic hepatitis C after prior failure of pangenotypic therapies.](#)" *Pol Arch Intern Med* **133**(3).

INTRODUCTION: Despite the overall excellent efficacy of pangenotypic direct-acting antiviral (DAA) options, there is still a small percentage of patients with hepatitis C virus (HCV) infection who do not respond to the therapy. OBJECTIVES: This analysis was designed to evaluate the effectiveness of pangenotypic retreatment in the cases of pangenotypic therapy failure. PATIENTS AND METHODS: The study included patients treated with the pangenotypic



regimen, selected from the EpiTer-2 database, a real-world project evaluating DAA-based treatment in Poland. RESULTS: Of a total 15 123 patients, 4345 received 1 course of the pangenotypic treatment (PAN group) and 48 patients were retreated with pangenotypic regimens after a failure of the pangenotypic therapy (PAP group). The patients from the PAP group were more often men (79% vs 53%; $P < 0.001$), had higher median (interquartile range [IQR]) body mass index (27.5 [25.7-30.1] vs 25.7 [22.9-28.7] kg/m²; $P < 0.001$), were more often infected with genotype 3 (58% vs 27%; $P < 0.001$), and more frequently had liver cirrhosis (46% vs 21%; $P < 0.001$) than the patients in the PAN group. Importantly, no significant difference in the treatment effectiveness was found between the PAP and PAN groups with sustained virologic response (SVR) rate of 89.6% vs 93.7% ($P = 0.39$) in intention-to-treat, and 91.5% vs 97.6% ($P = 0.17$) in the per-protocol analysis. The selection of a specific retherapy regimen did not affect SVR. CONCLUSIONS: Our study demonstrated the excellent effectiveness of pangenotypic regimens and confirmed that most DAA nonresponders could be successfully retreated with another pangenotypic regimen. The best retreatment strategy is a triple pangenotypic regimen, especially in patients with unfavorable response factors, such as genotype 3 infection, cirrhosis, and male sex.

Pazgan-Simon, M, J Jaroszewicz, K Simon, B Lorenc, M Sitko, D Zarębska-Michaluk, D Dybowska, M Tudrujek-Zdunek, H Berak, W Mazur, J Klapaczyński, E Janczewska, A Parfieniuk-Kowerda and R Flisiak (2023). "[Real-World Effectiveness and Safety of Direct-Acting Antivirals in Patients with Chronic Hepatitis C and Epilepsy: An Epi-Ter-2 Study in Poland.](#)" *J Pers Med* **13**(7).

INTRODUCTION: In Poland, active HCV infection affects between 0.4 and 0.5% of the population, i.e., about 150,000 people, while the number of patients with epilepsy is estimated to be 350,000-400,000. Currently available antiviral therapies show little interaction with neurological drugs. The aim of our study was to evaluate the effectiveness and safety of the treatment of chronic HCV infection in patients with coexisting epilepsy. METHODS: A total of 184 epilepsy patients were selected from the group of 10,152 HCV-infected patients treated for HCV infection within the EpiTer-2 database from 2015 to 2018. Comparing the effectiveness and safety of anti-HCV regimens between the patients with comorbid epilepsy and 3573 patients without comorbidities was our study's objective. RESULTS: The effectiveness of anti-HCV treatment was high in both the sample and the control group. No statistically significant SVR difference was observed between the sample group, with ITT = 93.5% and mITT = 95.5%, and the control group, with ITT = 95.2% and mITT = 97.5%, regardless of the genotype and the stage of liver disease at the start of therapy. The treatment was safe in patients with epilepsy. CONCLUSIONS: The effectiveness and safety of HCV treatment in patients with epilepsy are comparable to those of patients with no significant comorbidities.

Schneider, A, E Wojtasińska, K Pielaszkiwicz, M Joks, L Gil and J Rupa-Matysek (2023). "[Evaluation of the prevalence of hepatitis C virus infection in patients with hemophilia treated in a single hemophilia center in Poland.](#)" *Pol Arch Intern Med* **133**(5).

Sierpińska, LE (2023). "[Assessment of the Level of Life Satisfaction and Health Behaviors Among Patients with Chronic Hepatitis C.](#)" *Am J Health Behav* **47**(3): 595-604.

Objectives: An important aspect of complex care of patients with chronic hepatitis C is improvement of their quality of life. In Poland, a low level of life satisfaction is observed among patients with hepatitis C. Some patients experience concerns and anxiety that they will be identified by their employers, family, acquaintances. They are afraid of losing their job or breaking up with their loved ones. This study provides an analysis of the level of life satisfaction among patients with chronic hepatitis C. Methods: Overall, 220 patients with hepatitis C completed the Satisfaction With Life Scale (SWLS) along with an author-constructed questionnaire. Results: The mean level of satisfaction with life score was



16.3±4.9. More than a half of the patients presented a low level of satisfaction (1-4 stens)- 62,7%, approximately one-third of the respondents showed a mediocre level (5-6 stens), and 8,7% indicated a high level (7-10 stens). Patients who evaluated their state of health as "poor" had the lowest life satisfaction scores-mean=13.9. Conclusions: Patients with hepatitis C assessed their satisfaction with life negatively and those aged 51-60 expressed significantly lower evaluations. Women showed a slightly lower level of life satisfaction than men, which was associated with low health self-esteem.

Stępień, M and M Kowalczyk (2023). "[Hepatitis B in Poland in 2021](#)." *Przegl Epidemiol* **77**(3): 359-371.

OBJECTIVE: Evaluation of the epidemiological situation of hepatitis B in Poland in 2021 compared to previous years, considering the impact of the COVID-19 pandemic. **MATERIAL AND METHODS:** Data from individual reports on hepatitis B cases and HBV infections registered by local sanitary and epidemiological stations in the EpiBaza system were analyzed. Aggregate data published in the annual bulletins: "Infectious diseases and poisonings in Poland", "Vaccinations in Poland" and data on deaths provided by the Demographic Surveys Department of Statistics Poland (GUS) were also used. **RESULTS:** In 2021, a total of 1,547 cases of hepatitis B were registered, including 10 cases of acute hepatitis B, with an incidence of acute hepB 0.03/100,000 population. The incidence of acute hepB was lower by 25% than in 2020 and lower by 75% than the median incidence for 2015-2019. Acute cases occurred only in 6 voivodeships, all in people over 28 years of age. Two out of 10 acute cases were classified as imported. In 2021, 1,537 chronic or unknown-phase cases (UNK) were reported and registered, the diagnosis rate was 4.03/100,000 and was higher by 58% than the rate in 2020 and lower by 53% than the median for 2015-2019. The distribution of cases by gender, age and place of residence was similar to that observed previously - chronic cases or UNK were diagnosed more often in men (male-to female ratio 1.5:1) and people living in cities. Two chronic infections have been reported in infants born to HBV-infected women. 2.5% of chronic and UNK cases were considered imported. According to Statistics Poland (GUS), 20 people died in 2021, including 3 due to acute hepatitis B. The vaccination coverage of 1-year-olds with 3 doses of hepatitis B vaccine (HepB3) decreased slightly compared to 2020 and amounted to 89.3%. **CONCLUSIONS:** In the second year of the COVID-19 pandemic, a gradual levelling of the sharp decline in the number of diagnosed chronic and UNK cases that occurred in 2020 was observed. In acute cases, a further decline in incidence was noted compared to 2020, but a smaller number of acute cases was most likely due to the lower effectiveness of surveillance during the COVID-19 pandemic, rather than from an improvement in the epidemiological situation. The vaccination coverage of children in the second year of life (born in 2020) with the third dose of HepB vaccine continued to decline, although slightly.

Sulkowska, E, A Masny, A Kalińska, A Kopacz, D Kubicka-Russel, M Marek, M Parczewski, D Radłowski, J Jaroszewicz, A Trzcińska, M Łętowska and P Grabarczyk (2023). "[Hepatitis A virus \(HAV\) RNA detection in Polish blood donors and likely transmissions through blood components during the 2017-2019 epidemic](#)." *Transfusion* **63**(2): 349-359.

BACKGROUND: In Poland, hepatitis A virus (HAV) RNA screening was performed in plasma for fractionation usually immediately before shipment. **OBJECTIVE:** Our goal was to study epidemiology, rate of transfusion transmitted HAV during epidemic (2017-2019), and viral characteristics of infected plasma donors. **STUDY DESIGN AND METHODS:** HAV RNA was tested in 1,866,590 donations from 1,210,423 donors using RT-PCR in mini pools of 96 (MP96) or TMA in MP16. Virological characteristics included RNA level (RL), antibody testing, and sequencing. **RESULTS:** Twenty-one HAV infections were identified (1.13/100,000 donations; 95% confidence interval [95% CI]: 0.74-1.72) and (1.73/100,000 donors; 95% CI: 1.35-2.65). The Blood Transfusion Centers were also informed about three donors, who were



hospitalized for hepatitis A soon after their blood donation. In addition, we identified a donor, who had reactive result for HAV after receiving HAV vaccination. He tested positive twice 10 days after receiving the first and the second dose. The highest RL was 16 million IU/ml, mean 1,706,905 IU/ml, and median 220 IU/ml. The longest detectable RL lasted for 113 days. HAV-infected donors were seronegative (36%) or IgM positive (64%). We followed up on 12 HAV contaminated blood components issued for transfusion. In two out of seven identified patients viral transmission was confirmed (28.6%). CONCLUSION: Based on our results, we propose a 6 month deferral after HAV infection and 14 days post HAV vaccination. The infectivity rate was below 30%. The HAV RNA testing could be considered as an additional safeguard against HAV transmission at the time of increased incidence of HAV infections in the general population.

Tomasiewicz, K, R Flisiak, J Jaroszewicz, P Małkowski, M Pawłowska, A Piekarska, K Simon and D Zarębska-Michaluk (2023). "[Recommendations of the Polish Group of Experts for HCV for the treatment of hepatitis C in 2023.](#)" *Clin Exp Hepatol* **9**(1): 1-8.

The recommendations define the principles of diagnosis and treatment of hepatitis C virus (HCV) infection according to the latest knowledge. The main goal of the treatment of HCV infection is to eliminate the virus from the body, which in turn leads to stopping the progression or causes the regression of previously formed changes in the liver. The current version of the guidelines prioritizes pangenotypic regimens and includes guidelines for special patient populations such as children, patients with cirrhosis, human immunodeficiency virus (HIV) and hepatitis B virus (HBV) infection, patients with renal failure, liver failure and lack of response to previous therapies as well as patients in the peri-transplant period.

Tronina, O, M Panczyk, D Zarębska-Michaluk, J Gotlib and P Małkowski (2023). "[Global Elimination of HCV-Why Is Poland Still So Far from the Goal?](#)" *Viruses* **15**(10).

INTRODUCTION: Eradication of HCV in the global population remains one of the greatest challenges faced by the WHO. An insufficient level of knowledge and the lack of a national screening test strategy are obstacles to HCV eradication. AIM: This work aimed to summarize surveys assessing risk factors and awareness of the respondents regarding the prevention and course of HCV infection. The summary also includes the most important European and global attempts at eliminating HCV. MATERIALS AND METHODS: A cross-sectional, population-based study was conducted in the Mazowieckie district in Poland using anonymous surveys and conducted on people who willingly reported for a test. RESULTS: In the study cohort of $n = 7397$ adults, there were 5412 women (73.16%). The analysis of the quota sample ($n = 1303$) reflected the actual proportions in the population of the Mazowieckie Voivodeship. CONCLUSIONS: Insufficient knowledge about HCV decreases the probability of higher detection of infections, fast diagnostics, and treatment. According to the WHO model, assuming a 90% detection rate and treatment of 80% of infected by 2030, and taking into account 120-150 thousand infected persons in Poland, the number of detections of HCV should be increased 4-5 times and all diagnosed persons should be offered antiviral treatment.

Zakrzewska, K, MM Stępień and M Rosińska (2023). "[Hepatitis C in Poland in 2021.](#)" *Przegl Epidemiol* **77**(2): 220-232.

BACKGROUND: In 2021, the COVID-19 pandemic continued, however, due to the implementation of vaccination, fewer disruptions were observed in healthcare. In the detection of HCV - inextricably linked to access to testing - there was an incomplete return to the pre-pandemic level of diagnostics (in the EU/EEA in 2021, 4.1 infections/100,000, in 2019 - 8.8). The aim of the article was to present the HCV situation in 2021 according to the data of the epidemiological surveillance in Poland compared to 2015-2020. MATERIAL AND



METHODS: We used the data: 1) from individual epidemiological surveillance; 2) from bulletins for the years 2015-2021 (diagnosis rates) and 3) regarding deaths from the Statistics Poland, Demographic Surveys and Labour Market Department. **RESULTS:** In 2021, a 30% increase in the detection of new HCV infections was observed (3.26/100,000, 1,244 cases) - about 70%, more than 2,500 cases, are missing to return to the pre-pandemic level. The demographic distribution was different than in Europe: 1) the ratio of women to men 1:1.07; 2) people <25 years: 2.4% of all diagnoses - this may imply worse access to testing among men than women (tested during pregnancy), especially in younger age groups. In Poland, a large percentage of diagnoses involves people outside the high- risk population - mainly exposures related to medical procedures (>75%). The role of primary health care in diagnosing HCV has strengthened (38.6%) - despite the fact that the tests were not yet available within health insurance benefits. The burden on healthcare and sanitary inspection continued to reduce the quality of data. There were more deaths due to acute hepatitis C in 2020-2021 (4 and 6 cases) compared to 2018 2019 (0 and 1 death). **CONCLUSIONS:** The highlighted gaps in diagnosing HCV infections in Poland should be taken into consideration while developing the policy for HCV infections elimination. Poland still lacks in long term solutions, acceptable by and reaching the target population.

Rzymiski, P, D Zarębska-Michaluk, A Genowska, P Tyszko, B Strukcinskiene and R Flisiak (2024).

"Trends of Hepatitis A Virus Infection in Poland: Assessing the Potential Impact of the COVID-19 Pandemic and War in Ukraine." *Viruses* **16**(3).

Hepatitis A virus (HAV) is the most common cause of acute viral hepatitis, which is preventable by vaccination. This study analyzed trends of HAV infections in Poland according to socio-demographic features in the years 2009-2022 and assessed the potential impact of the COVID-19 pandemic (2020-2023) and the migration of war refugees from Ukraine (since February 2022). In 2009-2022, 7115 new cases of HAV infection were diagnosed in Poland, especially among men (66.4%) and in urban areas (77.4%). Infections among men were most common at the age of 25-34 (median rate 0.43 per 10(5)) and in women aged 15-24 (median rate 0.39 per 10(5)). Analysis of the 14-year frequency of HAV infections exhibited three trends, regardless of gender, age, and residence. The infections revealed a downward trend in 2009-2014, increased significantly in 2014-2018, and decreased again after 2018. A particularly rapid increase in HAV infections occurred between March 2017 and February 2018 (median rate 0.79 per 10(5)). The high level of new infections persisted until the beginning of the COVID-19 pandemic, at which point it dropped significantly but did not reach the level recorded before March 2017. During the Omicron SARS-CoV-2 dominance period, the median rate of HAV infections was 0.053 per 10(5), with a four-fold increase being observed from February 2022 (when the migration of war refugees from Ukraine began) to August 2022. The presented results can serve as a reference point for further observations in Central Europe. The HAV epidemiological situation is unlikely to escalate in Poland but requires further monitoring.



Slovakia

Trends in the evolution of communicable disease incidence (UVZSR, 2023): [Trendy vývoja výskytu prenosných ochorení - Portál úradov - Liferay \(uvzsr.sk\)](#)

Drazilova, S, M Janicko, P Kristian, I Schreter, B Kucinsky, M Kozlej, I Hockickova and P Jarcuska (2016). "[Lower Viral Response to Pegylated Interferon Alpha 2a Treatment of Chronic Hepatitis B in Roma People in Eastern Slovakia.](#)" *Gastroenterol Res Pract* **2016**: 8682494.

Aim. To evaluate the compliance and virological response to pegylated interferon alpha 2a treatment of chronic hepatitis B in Roma population compared to majority Caucasian population in Slovakia. Methods. Retrospective evaluation of a cohort of all Roma patients treated with pegylated interferon alpha 2a from 2007 to 2013 in 3 centers for treatment of chronic viral hepatitis B. The Study included 43 Roma patients with chronic viral hepatitis B and randomly selected control group. Treatment duration was 48 weeks. Viral response was evaluated after 24 weeks, at the end of treatment, and 24 weeks after the end of treatment. Results. Complete treatment course was finished by 79.1% of Roma patients compared to all patients from the control group ($p = 0.0009$). There was a tendency toward lower viral response rate in Roma at all time points; however significant difference was only at end of treatment viral response (51.2% Roma versus 81.4% majority, $p = 0.003$). We also did not find significant difference at the rate of HBsAg loss. Conclusion. Roma patients with chronic hepatitis B have significantly worse compliance to treatment with pegylated interferon and they have significantly lower rate of end of treatment viral response.

Kološová, A and J Gašparovič (2016). "[Viral hepatitis B and C outbreak related to parenteral treatment at an oncological department in Slovakia.](#)" *J Hosp Infect* **93**(2): 211-214.

The Regional Public Health Authority was notified about four cases of viral hepatitis (B and C) among patients with pre-event history of hospitalization at an oncological ward. An outbreak investigation was commenced in response. Forty-seven cases of viral hepatitis B and C in 39 patients hospitalized during the period from September 2009 to July 2010 were registered. We found an association between parenteral treatment and disease (hepatitis B: $\chi(2) = 49.53$; $P < 0.001$; hepatitis C: $\chi(2) = 22.42$; $P < 0.001$). Despite using disposable materials, there remains a risk of transmission of bloodborne virus infections in hospitals due to poor adherence to standard procedures.

Drazilova, S, P Kristian, M Janicko, M Halanova, D Safcak, PD Dorcakova, M Marekova, D Pella, A Madarasova-Geckova, P Jarcuska and T HepaMeta (2020). "[What is the Role of the Horizontal Transmission of Hepatitis B Virus Infection in Young Adult and Middle-Aged Roma Population Living in the Settlements in East Slovakia?](#)" *Int J Environ Res Public Health* **17**(9).

Background: The aim of our work is to objectify the manner of transmission of HBV infection in young adult and middle-aged Roma people who live in the settlements. Methods: We used data from the cross-sectional study HepaMeta. We analyzed Roma people living in the settlements in East Slovakia, who have had HBsAg and anti Hbc IgG antibodies examined. Results: We analyzed a cohort of 452 Roma participants with a mean of age 34.67 ± 9.14 years-159 (35.2%) were males. HBsAg positivity was diagnosed in 12.4% and the presence of anti Hbc IgG antibodies was confirmed in 52% of participants. Prevalence of HBsAg positivity increases significantly with higher age, ($p = 0.026$), as well as the presence of anti Hbc IgG antibodies ($p < 0.0001$). The prevalence of HBsAg positivity has doubled and anti Hbc IgG positivity has tripled within two decades (<25 years vs. 35-45 years) in Roma settlements in



East Slovakia. Conclusions: These findings allow us to express an opinion that horizontal transmission in adulthood may play an important role in the spreading of HBV infection.

Macejova, Z, P Kristian, M Janicko, M Halanova, S Drazilova, D Antolova, M Marekova, D Pella, A Madarasova-Geckova, P Jarcuska and H Team (2020). "[The Roma Population Living in Segregated Settlements in Eastern Slovakia Has a Higher Prevalence of Metabolic Syndrome, Kidney Disease, Viral Hepatitis B and E, and Some Parasitic Diseases Compared to the Majority Population.](#)" *Int J Environ Res Public Health* **17**(9).

Background: The Roma population is one of the largest marginalized population groups in Europe. The aim of our work was to summarize the morbidity of lifestyle-related diseases and infectious diseases in the Roma population living in segregated settlements. Methods: We used data from the cross-sectional study HepaMeta, in which we examined 452 Roma subjects with an average age of 34.7 ± 9.1 years, 35.2% of which were men, and 403 non-Roma subjects with an average age of 33.5 ± 7.4 years, 45.9% of which were men. We collected data by means of a questionnaire, anthropometric measures, and we analyzed blood and urine samples. Results: Roma subjects had a higher incidence of metabolic syndrome (RR: 1.478 (1.159-1.885), $p < 0.0001$), obesity or waist circumference >94 cm in men/ 80 cm in women (RR: 1.287 (1.127-1.470), $p < 0.0001$), and HDL-C < 1.03 mmol/L in men or < 1.29 in women (RR: 2.004 (1.730-2.321), $p < 0.0001$) than their non-Roma counterparts. Subjects of the Roma population were more frequently diagnosed with kidney disease (RR: 1.216 (1.096-1.349), $p < 0.0001$), HBsAg positivity (RR: 4.468 (2.373-8.415), $p < 0.0001$), anti HBc IgG positivity (RR: 3.13 (2.598-4.224), $p < 0.0001$), and anti HEV positivity (RR: 2.972 (1.226-7.287), $p < 0.0001$). Serological markers of *Toxoplasma gondii* infection and *Toxocara* spp. were observed much more frequently among Roma than non-Roma subjects (RR: 1.868 (1.520-2.296), $p < 0.0001$, for *Toxoplasma gondii*; and RR: 21.812 (8.097-58.761), $p < 0.0001$, for *Toxocara* spp.). Conclusions: Poor socio-economic conditions, an unhealthy lifestyle, and barriers precluding access to healthcare are factors that affect the Roma population in settlements and lead to an increased prevalence of metabolic syndrome and its components, kidney disease, viral hepatitis B and E, and some parasitic diseases.

Paraličová, Z, M Halánová, I Schréter, Z Kalinová, M Novotný, J Sekula, J Paralič and P Kristian (2020). "[Seroprevalence of hepatitis E among hospitalized patients in Slovakia: first report.](#)" *Cent Eur J Public Health* **28**(1): 70-73.

OBJECTIVE: Hepatitis E infection is one of the most frequent acute hepatitis in the world. Currently five human genotypes with different geographical distributions and distinct epidemiologic patterns are identified. In Slovakia, only rare cases of hepatitis E have been reported in recent years. Therefore, the aim of the study was to evaluate the prevalence of anti-HEV total antibodies and the main risk factors for HEV in the general population in Eastern Slovakia. METHODS: Detection of anti-HEV total antibodies samples was done by a commercial enzyme-linked immunosorbent assay (ELISA) kit. RESULTS: Of 175 hospitalized patients included in the study, 76 (43.5%) showed positivity for anti-HEV total antibodies. No statistically significant differences were found in anti-HEV positivity between men and women or in the groups of different living areas (town/village - urban/rural). CONCLUSION: Prevalence of anti-HEV total antibodies of hospitalised patients was high. The risk factor significantly associated with antibody positivity was eating raw meat. Other factors, such as sex, age, living area and contact with animals were not associated with antibody positivity.

Fernández-López, L, S Baros, M Niedźwiedzka-Stadnik, DV Staneková, M Rosińska, D Simic, V Jovanoic, M Hábeková, M Takáčová, I Wawer, P Wysocki, A Conway, I Klavs and J Casabona (2021). "[Integration of community-based testing data into national HIV surveillance in Poland, Serbia and Slovakia within the framework of INTEGRATE project.](#)" *BMC Infect Dis* **21**(Suppl 2): 800.



BACKGROUND: Community-based voluntary counselling and testing contributes to early HIV diagnoses among key populations. Testing data from such decentralized services is however often not standardized nor linked to national surveillance systems. This study aimed to support the integration of community testing data into respective national surveillance and monitoring and evaluation systems for those infections. We present results from three national pilots, focused on improved data collection and transfer. **METHODS:** Within the Joint Action INTEGRATE different pilot activities were planned and implemented according to the local context. In Slovakia, standardised data collection tools were implemented in three community testing services. The data generated was used to calculate the proposed indicators. In Poland, positive test results from the community testing database were linked to the national case-based surveillance database using confirmatory test number, to improve the completeness of behavioural data in the national database. In Serbia, voluntary counselling and testing forms were improved enabling identification of community-based testing. A system to generate unique client identifiers was initiated in the National registry of HIV cases to monitor linkage to care. **RESULTS:** All three sites were able to estimate most of the agreed indicators. In Slovakia during the study period 675 people were tested for HIV, 410 for hepatitis C and 457 for syphilis, with reactivity rates of 0.4, 2.5 and 1.8%, respectively. For HIV, 66.7% of reactive cases were confirmed and linked to care. In Poland, 28.9% of the community testing sites' records were linked to the national surveillance database (and accounted for 14.3% of all new diagnoses registered here during 2017-2018). Reactivity rate ranged between 1.9% and 2.1%. In Serbia, 80 persons were tested at community sites, from which two had a reactive HIV test result. By linking unique client identifiers from voluntary counselling and testing and National Registry of HIV cases databases, linkage to care within a two-month period was observed for one of two people with reactive HIV test result. **CONCLUSIONS:** Pilot activities in the three countries demonstrate that integration of community-based testing data into surveillance systems is feasible and can help improve national surveillance data by providing key information.

Fernández-López, L, I Klavs, A Conway, T Kustec, M Serdt, S Baros, DV Staneková, L Lemsalu, I Wawer, P Wysocki and J Casabona (2021). "[Recommendations for collection and integration of community-based testing and linkage to care data into national surveillance, monitoring and evaluation systems for HIV, viral hepatitis and sexually transmitted infections: results from the INTEGRATE Joint Action.](#)" *BMC Infect Dis* **21**(Suppl 2): 794.

BACKGROUND: National testing strategy, including monitoring and evaluation, is critical in responding to HIV, sexually transmitted infections, and viral hepatitis. Community-based voluntary counselling and testing contributes to early HIV diagnoses among key populations. Countries providing community-based testing, should integrate some core data on testing and linkage to care in these services into national surveillance and monitoring and evaluation systems. This study aimed to support the integration of community-based voluntary counselling and testing data into respective national surveillance and M&E systems for those infections. **METHODS:** Preliminary consensus on indicators for the integration of community-based voluntary counselling and testing data into respective national surveillance and monitoring and evaluation systems was reached. Pilot studies were conducted in Estonia, Poland, Serbia, Slovakia, Slovenia and Spain. After pilot activities were implemented, the final consensus on indicators was reached. An analysis of the facilitators and barriers faced during pilot studies was conducted to inform the final recommendations for implementation. **RESULTS:** The minimum set of six indicators to be integrated into national surveillance and monitoring and evaluation systems were: number of tests, number of clients tested, reactivity rate for tests and clients, positivity (active infection) rates for tests and clients, linkage to care rates for clients with reactive and/or positive test result, proportion of all new diagnoses in a country with first reactive test result at community-based voluntary



counselling and testing service. Seven additional indicators were identified. Each indicator should be disaggregated by key population, sex and age group. A list of 10 recommendations for the collection and integration of community-based voluntary counselling and testing data into national surveillance and monitoring and evaluation systems for HIV, sexually transmitted infections and viral hepatitis was identified. CONCLUSIONS: Integration of some community-based voluntary counselling and testing monitoring and evaluation data into national surveillance and monitoring and evaluation systems in all pilot countries was achieved. The recommendations will support such integration in other European countries. European Centre for Prevention and Control of Diseases included questions from the minimum list of indicators into their Dublin Declaration questionnaire 2020 to contribute to evidence based community testing policies in European countries.

Logoida, M, P Kristian, A Schreiberova, PD Lenártová, V Bednárová, E Hatalová, I Hockicková, S Dražilová, P Jarčuška, M Janičko, Š Porhinčák and M Halánová (2021). "[Comparison of Two Diagnostic Methods for the Detection of Hepatitis B Virus Genotypes in the Slovak Republic.](#)" Pathogens **11**(1).

The hepatitis B virus (HBV), belonging to the Hepadnaviridae family, is responsible for a global health concern still in the 21st century. The virus is divided into 10 genotypes, which differ in geographical distribution and in their effect on disease progression and transmission, susceptibility to mutations, and response to treatment. There are many methods for diagnostics of HBV and differentiating its genotypes. Various commercial kits based on real-time polymerase chain reaction (RT PCR) and hybridization available, as well as whole genome sequencing or the sequencing of only individual parts of the genomes. We compared a commercial kit AmpliSens HBV-genotype-FRT, based on RT PCR, with an adapted method of amplification of the surface genomic region combined with Sanger sequencing. In the examined samples we identified the A, B, C, D, and E genotypes. By PCR with Sanger sequencing, the genotypes were determined in all 103 samples, while by using the commercial kit we successfully genotyped only 95 samples, including combined genotypes, which we could not detect by sequencing.

Skladany, L, T Koller, S Adamcova Selcanova, J Vnencakova, D Jancekova, V Durajova, L Laffers, J Svac, K Janickova, M Palkovič, P Kohout and O Golubnitschaja (2021). "[Challenging management of severe chronic disorders in acute pandemic situation: Chronic liver disease under COVID-19 pandemic as the proof-of-principle model to orchestrate the measures in 3PM context.](#)" Epma j **12**(1): 1-14.

Chronic liver disease management is a comprehensive approach requiring multi-professional expertise and well-orchestrated healthcare measures thoroughly organized by responsible medical units. Contextually, the corresponding multi-faceted chain of healthcare events is likely to be severely disturbed or even temporarily broken under the force majeure conditions such as global pandemics. Consequently, the chronic liver disease is highly representative for the management of any severe chronic disorder under lasting pandemics with unprecedented numbers of acutely diseased persons who, together with the chronically sick patient cohorts, have to be treated using the given capacity of healthcare systems with their limited resources. Current study aimed at exploring potentially negative impacts of the SARS CoV-2 outbreak on the quality of the advanced chronic liver disease (ACLD) management considering two well-classified parameters, namely, (1) the continuity of the patient registrations and (2) the level of mortality rates, comparing pre-COVID-19 statistics with these under the current pandemic in Slovak Republic. Altogether 1091 registrations to cirrhosis registry (with 60.8% versus 39.2% males to females ratio) were included with a median age of 57 years for patients under consideration. Already within the very first 3 months of the pandemic outbreak in Slovakia (lockdown declared from March 16, 2020, until May 20, 2020), the continuity of the patient registrations has been broken followed by significantly increased ACLD-related death rates. During this period of time, the total number



of new registrations decreased by about 60% (15 registrations in 2020 versus 38 in 2018 and 38 in 2019). Corresponding mortality increased by about 52% (23 deaths in 2020 versus 10 in 2018 and 12 in 2019). Based on these results and in line with the framework of 3PM guidelines, the pandemic priority pathways (PPP) are strongly recommended for maintaining tertiary care uninterrupted. For the evidence-based implementation of PPP, creation of predictive algorithms and individualized care strategy tailored to the patient is essential. Resulting classification of measures is summarized as follows: The Green PPP Line is reserved for prioritized (urgent and comprehensive) treatment of patients at highest risk to die from ACLD (tertiary care) as compared to the risk from possible COVID-19 infection. The Orange PPP Line considers patients at middle risk of adverse outcomes from ACLD with re-addressing them to the secondary care. As further deterioration of ACLD is still probable, pro-active management is ascertained with tertiary center serving as the 24/7 telemedicine consultation hub for a secondary facility (on a physician-physician level). The Red PPP Line is related to the patients at low risk to die from ACLD, re-addressing them to the primary care. Since patients with stable chronic liver diseases without advanced fibrosis are at trivial inherent risk, they should be kept out of the healthcare setting as far as possible by the telemedical (patient-nurse or patient-physician) measurements. The assigned priority has to be monitored and re-evaluated individually in intervals based on the baseline prognostic score such as MELD. The approach is conform with principles of predictive, preventive and personalized medicine (PPPM / 3PM) and demonstrates a potential of great clinical utility for an optimal management of any severe chronic disorder (cardiovascular, neurological and cancer) under lasting pandemics.

Kristian, P, I Hockicková, E Hatalová, D Žilincánová, M Rác, V Bednárová, PD Lenártová, S Dražilová, Ľ Skladaný, I Schréter, P Jarčuška and M Halánová (2023). "[Is Slovakia Almost a Hepatitis D Free Country?](#)" *Viruses* **15**(8).

BACKGROUND: It is assumed that the prevalence of hepatitis D in HBsAg-positive individuals reaches 4.5-13% in the world and on average about 3% in Europe. Data from several European countries, including Slovakia, are missing or are from an older period. **METHODS:** We analyzed all available data on hepatitis D from Slovakia, including reports from the Slovak Public Health Authority and the results of one prospective study, and three smaller surveys. The determination of anti-HDV IgG and IgM antibodies and/or HDV RNA was used to detect hepatitis D. **RESULTS:** In the years 2005-2022, no confirmed case of acute or chronic HDV infection was reported in Slovakia. The presented survey includes a total of 343 patients, of which 126 were asymptomatic HBsAg carriers, 33 acute hepatitis B, and 184 chronic hepatitis B cases. In a recent prospective study of 206 HBsAg-positive patients who were completely serologically and virologically examined for hepatitis B and D, only 1 anti-HDV IgG-positive and no anti-HDV IgM or HDV RNA-positive cases were detected. In other smaller surveys, two anti-HDV IgG-positive patients were found without the possibility of HDV RNA confirmation. In total, only 3 of 329 HBsAg-positive patients (0.91%) tested positive for anti-HDV IgG antibodies, and none of 220 tested positive for HDV RNA. **CONCLUSION:** The available data show that Slovakia is one of the countries with a very low prevalence of HDV infection, reaching less than 1% in HBsAg-positive patients. Routine testing for hepatitis D is lacking in Slovakia, and therefore it is necessary to implement testing of all HBsAg-positive individuals according to international recommendations.

Hockickov, AI, AE Hatalov, J Gazda, AP LenArtov, M JaniCko, P JarCuSka, AS DraZilov, M Logoida, M HalAnova, I SchrEter and P Kristian (2024). "[Distribution and relevance of hepatitis B genotypes in the general population of Slovakia.](#)" *Bratisl Lek Listy* **125**(1): 17-23.

AIMS: The aim of the presented study was to determine the distribution of HBV genotypes and their influence on selected parameters in patients in eastern Slovakia. **METHODS:** The study includes 202 patients with confirmed chronic HBV infection or hepatitis. For each



patient, basic demographic data, and serum samples were collected. The degree of liver fibrosis was determined by transient elastography. The obtained data were evaluated statistically. RESULTS: Out of a total of 202 patients, 96.0 % of the patients were from the EU region and 27 patients (13.4 %) self-identified as Roma ethnic group. The most common genotype among our patients was genotype A (n = 104; 51.5 %), followed by genotype D (n = 76; 37.6 %) and A/D (n = 13; 6.4 %). In patients from the EU region, genotypes A and D predominated statistically significantly ($p < 0.0001$). Due to a low number of patients with other genotypes, in the subsequent analysis, we only compared patients with HBV genotypes A or D. Patients with genotypes D and A/D significantly more often mention tattoos as a possible risk factor for disease transmission compared to patients with genotype A ($p = 0.043$). Subsequently, we divided patients into two groups - treated and untreated. The level of qHBsAg was significantly higher in untreated patients with genotypes A ($p < 0.0001$). The influence of HBV genotypes on other laboratory parameters was not confirmed in our study. CONCLUSION: This is the first HBV genotypes study from Slovakia. We suggest that HBV genotypes may play a role in the virus-host relationship Keywords: chronic hepatitis B, genotypes, hepatitis B virus, prognostic factors, distribution.

Lenartova, PD, I Hockickova, M Janicko, P Jarcuska, S Drazilova, F Lami, I Schreter and P Kristian (2024). "[Importance of CHB's grey zone: analysis of patients with HBeAg negative chronic hepatitis B virus infection.](#)" Bratisl Lek Listy **125**(1): 59-63.

INTRODUCTION: HBeAg-negative chronic HBV infection is defined by viremia $< 2,000$ IU/ml (or $< 20,000$ IU/ml), normal ALT activity and minimal liver fibrosis. Some patients do not meet all the criteria and belong to the so-called grey zone. The aim of the work was to analyse a group of patients with asymptomatic chronic HBV infection, divide them according to the levels of HBV DNA during follow-up and to compare the clinical and laboratory parameters of the patients within the groups. METHODS: We retrospectively analysed patients with HBeAg-negative chronic HBV infection examined in the Centre for Viral Hepatitis of the Department of Infectology in Košice, Slovakia, from September 2018 to December 2021. Patients were divided into three groups based on HBV DNA levels during long-term follow-up ($2,000$ IU/ml). We evaluated selected demographic, anamnestic and laboratory data (HBV DNA, ALT, fibrosis stage). RESULTS: Of the 280 enrolled patients, 160 were men (57.1 %), the average age was 48.0 years, and the mean length of follow-up was 4.7 years. HBV DNA levels were consistently $2,000$ IU/ml in 62 patients. 165 patients had normal ALT activity, 74 had fluctuating ALT activity, and permanently increased ALT in 41 patients. 139 patients underwent transient elastography examination, 16 of them had stage F2 fibrosis, two stage F3 and 1 had cirrhosis. When comparing the three groups divided according to HBV DNA, patients with fluctuating HBV DNA had the longest follow-up, but patients with HBV DNA permanently over $2,000$ IU/ml were the youngest and the highest proportion of them had elevated ALT activity. 165 patients (58.9%) met the extended criteria of asymptomatic carriers, 115 were in the grey zone. CONCLUSION: Patients with HBeAg-negative chronic HBV infection often have fluctuating HBV DNA and ALT values during follow-ups. Statistically significantly higher proportion of abnormal ALT activity in patients with HBV DNA $> 2,000$ IU/ml may suggest higher risk of adverse outcomes. Initiation of treatment in such patients is not always necessary unless they also meet the other indication criteria for treatment. The exact definition of the grey zone is currently absent (Tab. 2, Fig. 2, Ref. 16).