VHPB TECHNICAL MEETING

Addressing Viral Hepatitis Among Europe's Migrant and Refugee Population:

lessons learnt and the way forward

Background document

26-27 March 2024

Antwerp, Belgium

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LIST OF LEARNING OBJECTIVES FOR THIS ACTIVITY

- Provide an overview of the available information concerning viral hepatitis among migrants and refugees in Europe, highlighting areas of concern and the associated public health threat.
- Examine efforts aimed at enhancing healthcare access for migrants and refugees, with a particular focus on viral hepatitis prevention, vaccination, screening, diagnosis and treatment.
- Evaluate the potential benefits and challenges of implementing guidelines for testing, treatment, and vaccination of migrants across Europe.
- Explore potential collaborations among the different stakeholders to enhance viral hepatitis prevention and control efforts among migrants and refugees.
- Lessons learnt from project and initiatives focusing on prevention and control of viral hepatitis in migrants
- Discuss the relation to the WHO elimination goals outlined in the new WHO Global Health Sector Strategies for 2022-2030.
- Discuss achievements, challenges and the way forward.

PARTICIPANTS (± 75 PARTICIPANTS)

- Public health experts, policy makers, healthcare workers, academics/experts involved in prevention and control of viral hepatitis, (healthcare) workers in migrant settings.
- VHPB advisors
- Some selected observers

EXPECTED IMPACT

Mapping the importance of viral hepatitis in migrants, asylum seekers and refugees as a public health threat and discuss the potential impact of (universal) measures and collaborative initiatives to enhance the prevention and control of viral hepatitis in these vulnerable populations.

VENUE

Antwerp, Belgium

NOTE: This pre-meeting document contains general background information on the topic(s) of the VHPB meeting. It contains a list of selected abstracts/references from a Pubmed MEDLINE and web search on different search terms depending on the topics discussed in the session of the meeting.
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 MIGRANT MEETING

Introduction

Viral hepatitis is a significant public health concern worldwide, including among migrants and refugees. Migrants and refugees may face unique challenges related to the prevention, diagnosis, and management of viral hepatitis due to their mobility, potential exposure to hepatitis in their home countries or during their journey, and barriers to healthcare access in host countries. Addressing viral hepatitis in migrants and refugees requires a multifaceted approach that combines prevention, screening, vaccination, access to healthcare, education, and research. It's essential to recognize the unique challenges these populations face and work towards solutions that ensure their health and well-being. Public health efforts should be collaborative and sensitive to the cultural and social contexts of migrants and refugees.

Definitions: what exactly is a refugee, an asylum seeker and a migrant?

The terms “refugee”, “asylum seeker” and “migrant” are used to describe people who are on the move, who have left their countries and have crossed borders.

The terms “migrant” and “refugee” are often used interchangeably but it is important to distinguish between them as there is a legal difference.

Who is a refugee?

A refugee is a person who has fled their own country because they are at risk of serious human rights violations and persecution there. The risks to their safety and life were so great that they felt they had no choice but to leave and seek safety outside their country because their own government cannot or will not protect them from those dangers. Refugees have a right to international protection.

Who is an asylum seeker?

An asylum seeker is a person who has left their country and is seeking protection from persecution and serious human rights violations in another country, but who hasn’t yet been legally recognized as a refugee and is waiting to receive a decision on their asylum claim. Seeking asylum is a human right. This means everyone should be allowed to enter another country to seek asylum.

Who is a migrant?

There is no internationally accepted legal definition of a migrant. Most agencies and organizations understand migrants to be people staying outside their country of origin, who are not asylum seekers or refugees.

Some migrants leave their country because they want to work, study or join family, for example. Others feel they must leave because of poverty, political unrest, gang violence, natural disasters or other serious circumstances that exist there.

Lots of people don’t fit the legal definition of a refugee but could nevertheless be in danger if they went home.

It is important to understand that, just because migrants do not flee persecution, they are still entitled to have all their human rights protected and respected, regardless of the status they have in the country they moved to. Governments must protect all migrants from racist and xenophobic violence, exploitation and forced labour. Migrants should never be detained or forced to return to their countries without a legitimate reason.

(source: Refugees, Asylum Seekers and Migrants - Amnesty International)

International organisations working with migrants

CDC – Division of Global Migration Health (DGMH)

Division of Global Migration Health | CDC

ECDC – Migrant and Refugee health

Migrants and refugees face many challenges that can have an impact on their health. Language barriers, cultural differences and a perceived lack of access to information and services, as well as stigma or discrimination, can all present challenges on health outcomes, both for individuals and on a regional, national or international level. ECDC works with EU Member States to identify and target vulnerable population groups in order to reduce the societal burden created by health inequalities.

Migrant and refugee health (europa.eu)

International Centre for Migration, Health and Development (ICMHD)

ICMHD's work is guided by the principle that the right to health applies to all people, including migrants, refugees, and asylum seekers, and that in protecting the health of people on the move, the health and welfare of the larger society is also promoted and protected.

The International Centre for Migration, Health and Development is a Swiss-based non-profit institution established in 1995. Its mandate is to work on research, training and policy advocacy on population movement and health, and in doing so, support national governments, international agencies, NGOs, private sector groups and others working on issues related to migration, health and development.

ICMHD – International Center for Migration Health and Development

International Centre for Migration Policy Development (ICMPD)

The International Centre for Migration Policy Development (ICMPD) is an international organisation with 20 Member States and more than 487 staff members. Active in more than 90 countries worldwide, it takes a regional approach in its work to create efficient cooperation and partnerships along migration routes. Priority regions include Africa, Eastern Europe and Central Asia, Mediterranean, Silk Routes, Western Balkans and Türkiye. Its approach to migration management – structurally linking policy & research, migration dialogues and capacity building – contributes to better migration policy development worldwide. The Vienna-based organisation has a mission in Brussels and is locally represented in 30 countries worldwide. ICMPD receives funding from its Member States, the European Commission, the UN and other multilateral institutions, as well as bilateral donors. Founded in 1993, ICMPD holds UN observer status and cooperates with more than 715 partners including EU institutions and UN agencies.

ICMPD

International Organisation for Migration (IOM)

Established in 1951, the International Organization for Migration (IOM) is the leading intergovernmental organization in the field of migration and is committed to the principle that humane and orderly migration benefits migrants and society. IOM is part of the United Nations system, as a related organization.

IOM supports migrants across the world, developing effective responses to the shifting dynamics of migration and, as such, is a key source of advice on migration policy and practice. The organization works in emergency situations, developing the resilience of all people on the move, and particularly those in situations of vulnerability, as well as building capacity within governments to manage all forms and impacts of mobility.

The Organization is guided by the principles enshrined in the Charter of the United Nations, including upholding human rights for all. Respect for the rights, dignity and well-being of migrants remains paramount.

International Organization for Migration | IOM, UN Migration

Médecins Du Monde (MDM)

Founded in 1980, Médecins du Monde is a medical organisation that fights tirelessly to defend a fair and universal health system. In the face of inertia and indifference, in a world where physical, psychological, political and institutional violence reigns, Médecins du Monde cares and challenges, without limits, ideology or censorship.

We fight through actions and rights, through our advocacy and field work, through 59 projects in France, and internationally in some thirty countries.

For Médecins du Monde, defending health does not only mean providing care, it also means listening, supporting, protecting, collaborating, defending, training and advocating. It is about getting to the root of a problem and removing the symptoms.

We are committed to caring for the most vulnerable populations, bearing witness to abuses in access to healthcare, denouncing infringements of dignity and human rights, and obtaining sustainable improvements in health policies for all. Our approach is local, collective and sustainable. We do not claim to be able to act alone, but with the help of other organisations and the people whom our programmes target.

Because without health there is no future, we at Médecins du Monde will not let anything or anyone stand in the way.

Médecins du Monde (medecinsdumonde.org)

Médecins Sans Frontières (Doctors Without Borders)

An international, independent medical humanitarian organisation: We provide medical assistance to people affected by conflict, epidemics, disasters, or exclusion from healthcare. Our teams are made up of tens of thousands of health professionals, logistic and administrative staff - most of them hired locally. Our actions are guided by medical ethics and the principles of impartiality, independence and neutrality.

Hepatitis C | MSF medical response

Hepatitis E | MSF medical response

Vaccination | MSF

MSF - Médecins Sans Frontières | Medical humanitarian organisation

UNICEF

UNICEF works in the world's toughest places to reach the most disadvantaged children and adolescents – and to protect the rights of every child, everywhere. Across more than 190 countries and territories, we do whatever it takes to help children survive, thrive and fulfil their potential, from early childhood through adolescence.

The world's largest provider of vaccines, we support child health and nutrition, safe water and sanitation, quality education and skill building, HIV prevention and treatment for mothers and babies, and the protection of children and adolescents from violence and exploitation.

Before, during and after humanitarian emergencies, UNICEF is on the ground, bringing lifesaving help and hope to children and families. Non-political and impartial, we are never neutral when it comes to defending children's rights and safeguarding their lives and futures.

Immunization | UNICEF

Migrant and displaced children | UNICEF

Vaccines and the diseases they prevent | UNICEF

What you need to know about vaccines | UNICEF

Getting your baby's first vaccines: Mini Parenting Master Class | UNICEF Parenting

UNICEF

UN Refugee Agency (UNHCR)

UNHCR, the UN Refugee Agency works to ensure that everybody has the right to seek asylum and find safe refuge, having fled violence, persecution or war at home.

Since 1950, we have faced multiple crises on multiple continents, and provided vital protection and assistance to refugees, asylum-seekers, internally displaced and stateless people, many of whom have nobody left to turn to. We help to save lives and build better futures for millions forced from home.

Access to healthcare | UNHCR

WHO migration health team

Website: Refugee and migrant health EURO (who.int)

International projects & initiatives

Fourth WHO Global School on Refugee and Migrant Health

Every year, the WHO Department of Health and Migration organizes its Global School on Refugee and Migrant Health in collaboration with regional and country offices to support countries in addressing the health needs and rights of people on the move by promoting knowledge sharing and leveraging experiences in advancing the health of these populations.

Link: Fourth WHO Global School on Refugee and Migrant Health

GAVI – COVAX Humanitarian Buffer

COVAX was designed to ensure the most vulnerable in every country get access to COVID-19 vaccines. But what about people in conflict zones or humanitarian settings that can't be reached by government vaccination campaigns?

The COVAX Humanitarian Buffer Explained | Gavi, the Vaccine Alliance

RIVER EU (2021-2026)

Increase MMR and HPV vaccine uptake in underserved communities thereby boosting herd immunity for all Europe.

RIVER-EU - H2020 project to reduce inequalities in vaccine uptake (funded by the European Union)

Contact: contact@river-eu.org

Expected results (impact):

- Reduce: mortality and morbidity related to vaccine preventable diseases
- Increase: capacity among health professionals in Europe
- Improve: general health system functioning and access to vaccination services

How (strengthen health systems):

- Target group: underserved communities
- Life course approach: focus on MMR (children) and HPV (adolescents)
- Identifying and removing: health systems barriers to increase access to vaccination

ReHIn – a research project on Refugees' Health Integration (2019-2022)

ReHIn aims to create web-based educational resources to raise awareness and enable integration of refugees into the EU health culture and system.

An objective of ReHIn is to support the integration of refugees in terms of using the health services. The web-based resources will provide information regarding the rights and the use of the health systems and will be made available in different languages.

To be able to develop these resources, we will need to understand the educational needs of refugees regarding the healthcare system better.

The project is a collaborative action research project between Karolinska Institutet (Sweden), University of Nottingham (UK), Aristotele University Thessaloniki (Greece) and Universitat Politècnica de València (Spain).

ReHIn - a research project on Refugees' Health Integration | Karolinska Institutet (ki.se)

CARE (2014-2020)

The project "CARE – Common Approach for REfugees and other migrants' health", funded by the European Union's Health Programme (2014-2020), aimed to promote a better understanding of refugees and migrants' health condition as well as to support the adaptation of the appropriate clinical attitude towards refugees and migrants' health needs and in particular towards the health needs of fragile subgroups, such as minors, pregnant women and victims of violence.

Care for migrants – Just another WordPress site

Mig Health Care (2014-2020)

Minimize health inequalities and improve the integration of vulnerable migrants and refugees into local communities.

The project aimed to facilitate the transition from institutional to community-based care and integrated services for migrants and refugees that will ensure health equality and promote social inclusion.

Co-funded by the European Union's Health Programme (2014-2020).

Project coordinator: Prolepsis

About - Mig Healthcare

EU-HEP-SCREEN: Screening for Hepatitis B and C among migrants in the European Union (2011-2014)

Chronic viral hepatitis B and C is a major health problem in many European countries. Migrants from endemic areas in particular, are the most affected and underserved population groups. The general objective of this project is to assess, describe and communicate to public health professionals the tools and conditions necessary for implementing successful screening programmes for hepatitis B and C among migrants in the European Union.

EU-HEP-SCREEN: Screening for Hepatitis B and C among migrants in the European Union | Knowledge for policy (europa.eu)

Literature and web search

Publications from international organisations

Action plan for refugee and migrant health in the WHO European Region 2023-2030. Action plan. Link: EUR/RC73/9: Action plan for refugee and migrant health in the WHO European Region 2023–2030

Action plan for refugee and migrant health in the WHO European Region 2023-2030. Decision. Link: EUR/RC73(8): Decision on Action plan for refugee and migrant health in the WHO European Region 2023–2030

Discussion: EASL HCV Policy Forum 2023 | Coalition for Global Hepatitis Elimination

Extension of the WHO global action plan on promoting the health of refugees and migrants, 2019-2023 to 2030. Seventy-sixth World Health Assembly. Link: Extension of the WHO global action plan on promoting the health of refugees and migrants, 2019–2023 to 2030

73rd session of the WHO Regional Committte for Europe – **Spotlight on refugee and migrant health**. Link: Refugee and migrant health (who.int)

New report on tuberculosis, HIV and viral hepatitis services for refugees and migrants across the WHO European Region. Link: New report on tuberculosis, HIV and viral hepatitis services for refugees and migrants across the WHO European Region

ECDC, EASL, WHO (2022). Joint Statement: Ensuring high-quality viral hepatitis care for refugees from Ukraine. url: WHO-ECDC-EASL-statement-FINAL_2May2022.pdf

Mahase E (2022). "**Hepatitis: Ukrainian refugees should be offered vaccines and free treatment, says WHO - PubMed (nih.gov)**" BMJ **May 5**:377:o1132. Doi: 10.1136/bmj.o1132.

European Centre for Disease Prevention and Control (2016). "**Epidemiological assessment of hepatitis B and C among migrants in the EU/EEA**." Stockholm: ECDC.

Literature

van Selm L, White TM, Picchio CA, Requena-Méndez A, Busz M, Perez Gayo R, Pouille A, Gelabert PM, Lazarus JV (2024). **A call to create integrated services to better address the needs of migrants who use drugs in Europe.** Harm Reduct J. **Jan 13**;21(1):9. doi: 10.1186/s12954-023-00923-6.

> Each year, thousands of migrants enter the EU. Data on drug use in migrant populations are scarce and inconclusive. However, several risk factors make them particularly vulnerable to engaging in problematic drug use. In this perspective, we summarize the limited information that is available on migrants who use drugs and make a case as to why it is essential to improve access to health and social services, including harm reduction services, for this population. With this aim, we call for the co-creation of integrated services that better address the needs of migrants who use drugs in Europe.

Baggeley RF, Nazareth J, Divall P, Pan D, Martin CA, Volik M, Seguy NS, Yedibayev A, Reinap M, Vovc E, Mozalevskis A, Dadu A, Waagensen E, Krugja K, Sy TR, Nellums L, Pareek M (2023). **National policies for delivering tuberculosis, HIV and hepatitis B and C virus infection services for refugees and migrants among Member States of the WHO European Region**. J Travel Med **Feb 18**;30(1):taac136. Doi: 10.1093/jtm/taac136

> **Background/objective:** Refugees and migrants to the World Health Organization (WHO) European Region are disproportionately affected by infections, including tuberculosis (TB), human immunodeficiency virus (HIV) and hepatitis B and C (HBV/HCV) compared with the host population. There are inequities in the accessibility and quality of health services available to refugees and migrants in the Region. This has consequences for health outcomes and will ultimately impact the ability to meet Regional infection elimination targets.

Methods: We reviewed academic and grey literature to identify national policies and guidelines for TB/HIV/HBV/HCV specific to refugees and migrants in the Member States of the WHO European Region and to identify: (i) evidence informing policy and (ii) barriers and facilitators to policy implementation.
Results: Relatively few primary national policy/guideline documents were identified which related to refugees and migrants and TB [14 of 53 Member States (26%), HIV (n = 15, 28%) and HBV/HCV (n = 3, 6%)], which often did not align with the WHO recommendations, and for some countries, violated refugees' and migrants' human rights. We found extreme heterogeneity in the implementation of the WHO- and European Centre for Disease Prevention and Control (ECDC)-advocated policies and recommendations on the prevention, diagnosis, treatment and care of TB/HIV/HBV/HCV infection among migrants across the Member States of the WHO European Region. There is great heterogeneity in implementation of WHO- and ECDC-advocated policies on the prevention, diagnosis, treatment and care of TB/HIV/HBV/HCV infection in refugees and migrants across the Member States in the Region.
Conclusion: More transparent and accessible reporting of national policies and guidelines are required, together with the evidence base upon which these policy decisions are based. Political engagement is essential to drive the changes in national legislation to ensure equitable and universal access to the diagnosis and care for infectious diseases.

Bivegete S, McNaughton AL, Trickey A, Thornton Z, Scanlan B, Lim AG, Nerlander L, Fraser H, Walker JG, Hickman M, Vickerman P, Johnson H, Duffell E, Brooks-Pollock E, Christensen (2023). "**Estimates of hepatitis B virus prevalence among general population and key risk groups in EU/EEA/UK countries: a systematic review.**" Euro Surveill **Jul;28(30)**:2200738.

Background. The burden of chronic hepatitis B virus (HBV) varies across the European Union (EU) and European Economic Area (EEA).
Aim. We aimed to update the 2017 HBV prevalence estimates in EU/EEA countries and the United Kingdom for 2018 to 2021.
Methods. We undertook a systematic review, adding to HBV prevalence estimates from an existing (2005-2017) database. Databases were searched for original English-language research articles including HBV surface antigen prevalence estimates among the general population, pregnant women, first-time blood donors (FTB), men who have sex with men (MSM), migrants and people in prison. Country experts contributed grey literature data. Risk of bias was assessed using a quality assessment framework.
Findings. The update provided 147 new prevalence estimates across the region (updated total n = 579). Median HBV prevalence in the general population was 0.5% and the highest was 3.8% (Greece). Among FTB, the highest prevalence was 0.8% (Lithuania). Estimates among pregnant women were highest in Romania and Italy (5.1%). Among migrants, the highest estimate was 31.7% (Spain). Relative to 2017 estimates, median prevalence among pregnant women decreased by 0.5% (to 0.3%) and increased by 0.9% (to 5.8%) among migrants. Among MSM, the highest estimate was 3.4% (Croatia). Prevalence among people in prison was highest in Greece (8.3%) and the median prevalence increased by 0.6% (to 2.1%).
Conclusions. The HBV prevalence is low in the general population and confined to risk populations in most European countries with some exceptions. Screening and treatment should be targeted to people in prison and migrants.

Bruggmann P (2023). "**Eliminating viral hepatitis B and C in times of war and increasing global refugee crisis**." Swiss Med Wkly **153**: 40058.

Martyn E, Eisen S, Longley N, Harris P, Surey J, Norman J, Brown M, Sultan B, Maponga TG, Iwuji C, Flanagan S, Ghosh I, Story A and Matthews PC (2023). "**The forgotten people: Hepatitis B virus (HBV) infection as a priority for the inclusion health agenda**." Elife **12**.

Hepatitis B virus (HBV) infection represents a significant global health threat, accounting for 300 million chronic infections and up to 1 million deaths each year. HBV disproportionately affects people who are under-served by health systems due to social exclusion, and can further amplify inequities through its impact on physical and mental health, relationship with stigma and discrimination, and economic costs. The 'inclusion health' agenda focuses on excluded and vulnerable populations, who often experience barriers to accessing healthcare, and are under-represented by research, resources, interventions, advocacy, and policy. In this article, we assimilate evidence to establish HBV on the inclusion health agenda, and consider how this view can inform provision of better approaches to diagnosis, treatment, and prevention. We suggest approaches to redress the unmet need for HBV interventions among

excluded populations as an imperative to progress the global goal for the elimination of viral hepatitis as a public health threat.

Mitchell T, Nayagam JS, Dusheiko G and Agarwal K (2023). "**Health inequalities in the management of chronic hepatitis B virus infection in patients from sub-Saharan Africa in high-income countries**." JHEP Rep **5**(2): 100623.

Chronic hepatitis B virus disproportionately affects migrant communities in high-income countries, reflecting increased migration from sub-Saharan Africa. Chronic hepatitis B virus is endemic in sub-Saharan Africa, yet the natural history of chronic infection experienced by patients remains incompletely understood, with evidence of variability across genotypes and regions within sub-Saharan Africa. Clinical guidelines recommending treatment thresholds are not specific to sub-Saharan African patients and are based on natural history studies from Western Pacific Asian countries. Access to standard of care treatment is available for sub-Saharan African people with chronic hepatitis B virus infection in high-income countries; however, the evidence base for these treatments was not established in this cohort and areas of uncertainty remain, particularly regarding HCC surveillance and treatment discontinuation. Participation in phase III clinical trials for chronic hepatitis B therapies is almost non-existent amongst sub-Saharan African patients, even when residing in high-income countries that participate in multicentre trials. Engagement with sub-Saharan African patients with chronic hepatitis B in high-income countries is challenging because of the stigma associated with the diagnosis, absence of routine screening systems and the complexities involved in navigating the healthcare system. Nonetheless, improved engagement is critical if we are to achieve global hepatitis B virus elimination.

Moonen CPB, den Heijer CDJ, Dukers-Muijrers N, van Dreumel R, Steins SCJ and Hoebe C (2023). "**A systematic review of barriers and facilitators for hepatitis B and C screening among migrants in the EU/EEA region**." Front Public Health **11**: 1118227.

INTRODUCTION: Hepatitis B and C are a threat to public health. Screening of high-risk groups, such as migrants from high-endemic areas, enables early identification and treatment initiation. This systematic review identified barriers and facilitators for hepatitis B and C screening among migrants in the European Union/European Economic Area (EU/EEA). METHODS: Following PRISMA guidelines, databases PubMed, Embase via Ovid, and Cochrane were searched for English articles published between 1 July 2015 and 24 February 2022. Articles were included, not restricted to a specific study design, if they elaborated on HBV or HCV screening in migrant populations from countries outside Western Europe, North America, and Oceania, and residing in EU/EEA countries. Excluded were studies with solely an epidemiological or microbiological focus, including only general populations or non-migrant subgroups, or conducted outside the EU/EEA, without qualitative, quantitative, or mixed methods. Data appraisal, extraction, and quality assessment were conducted and assessed by two reviewers. Barriers and facilitators were categorized into seven levels based on multiple theoretical frameworks and included factors related to guidelines, the individual health professional, the migrant and community, interaction, the organization and economics, the political and legal level, and innovations. RESULTS: The search strategy yielded 2,115 unique articles of which 68 were included. Major identified barriers and facilitators to the success of screening related to the migrant (knowledge and awareness) and community level (culture, religion, support) and the organizational and economic level (capacity, resources, coordinated structures). Given possible language barriers, language support and migrant sensitivity are indispensable for facilitating interaction. Rapid point-of-care-testing is a promising strategy to lower screening barriers. DISCUSSION: The inclusion of multiple study designs provided extensive insight into barriers, strategies to lower these barriers, and facilitators to maximize the success of screening. A great variety of factors were revealed on multiple levels, therefore there is no one-size-fits-all approach for screening, and initiatives should be adopted for the targeted group(s), including tailoring to cultural and religious beliefs. We provide a checklist of facilitators and barriers to inform adapted interventions to allow for optimal screening impact.

Scarso S, Marchetti G, Russo ML, D'Angelo F, Tosti ME, Bellini A, De Marchi C, Ferrari C, Gatta A, Caminada S, Papaevgeniou N, Dalma N, Karnaki P, Marceca M, Declich S (2023). **Access to Vaccination for Newly Arrived Migrants: Developing a General Conceptual Framework for Understanding How to Improve Vaccination Coverage in European Countries.** Int J Public Health; **Aug 7:68**:1605580. doi: 10.3389/ijph.2023.1605580. eCollection 2023.

Objectives: Access to vaccination for newly arrived migrants (NAMs) is a relevant concern that requires urgent attention in EU/EEA countries. This study aimed to develop a General Conceptual Framework (GCF) for understanding how to improve vaccination coverage for NAMs, by characterizing and critically analyzing system barriers and possible strategies to increase vaccination.
Methods: A theoretical conceptualization of the GCF was hypothesized based on conceptual hubs in the immunization process. Barriers and solutions were identified through a non-systematic desktop literature review and qualitative research. The GCF guided the activities and facilitated the integration of results, thereby enriching the GCF with content.
Results: The study explores the vaccination of NAMs and proposes strategies to overcome barriers in their vaccination process. It introduces a framework called GCF, which consists of five interconnected steps: entitlement, reachability, adherence, achievement, and evaluation of vaccination. The study also presents barriers and solutions identified through literature review and qualitative research, along with strategies to enhance professionals' knowledge, improve reachability, promote adherence, achieve vaccination coverage, and evaluate interventions. The study concludes by recommending strategies such as proximity, provider training, a migrant-sensitive approach, and data collection to improve vaccination outcomes for NAMs.
Conclusion: Ensuring equitable access to healthcare services, including vaccination, is crucial not only from a humanitarian perspective but also for the overall public health of these countries.

Trickey A, Bivegete S, Duffell E, McNaughton AL, Nerlander L, Walker JG, Fraser H, Hickman M, Vickerman P, Brooks-Pollock E and Christensen H (2023). "**Estimating hepatitis B virus prevalence among key population groups for European Union and European Economic Area countries and the United Kingdom: a modelling study**." BMC Infect Dis **23**(1): 457.

BACKGROUND: Hepatitis B virus (HBV) epidemiology in Europe differs by region and population risk group, and data are often incomplete. We estimated chronic HBV prevalence as measured by surface antigen (HBsAg) among general and key population groups for each country in the European Union, European Economic Area and the United Kingdom (EU/EEA/UK), including where data are currently unavailable. METHODS: We combined data from a 2018 systematic review (updated in 2021), data gathered directly by the European Centre for Disease Control (ECDC) from EU/EEA countries and the UK and further country-level data. We included data on adults from the general population, pregnant women, first time blood donors (FTBD), men who have sex with men (MSM), prisoners, people who inject drugs (PWID), and migrants from 2001 to 2021, with three exceptions made for pre-2001 estimates. Finite Mixture Models (FMM) and Beta regression were used to predict country and population group HBsAg prevalence. A separate multiplier method was used to estimate HBsAg prevalence among the migrant populations within each country, due to biases in the data available. RESULTS: There were 595 included studies from 31 countries (N = 41,955,969 people): 66 were among the general population (mean prevalence ([Formula: see text]) 1.3% [range: 0.0-7.6%]), 52 among pregnant women ([Formula: see text]1.1% [0.1-5.3%]), 315 among FTBD ([Formula: see text]0.3% [0.0-6.2%]), 20 among MSM ([Formula: see text]1.7% [0.0-11.2%]), 34 among PWID ([Formula: see text]3.9% [0.0-16.9%]), 24 among prisoners ([Formula: see text]2.9% [0.0-10.7%]), and 84 among migrants ([Formula: see text]7.0% [0.2-37.3%]). The FMM grouped countries into 3 classes. We estimated HBsAg prevalence among the general population to be < 1% in 24/31 countries, although it was higher in 7 Eastern/Southern European countries. HBsAg prevalence among each population group was higher in most Eastern/Southern European than Western/Northern European countries, whilst prevalence among PWID and prisoners was estimated at > 1% for most countries. Portugal had the highest estimated prevalence of HBsAg among migrants (5.0%), with the other highest prevalences mostly seen in Southern Europe. CONCLUSIONS: We estimated HBV prevalence for each population group within each EU/EAA country and the UK, with general population HBV prevalence to be < 1% in most countries. Further evidence is required on the HBsAg prevalence of high-risk populations for future evidence synthesis.

Chatziprodromidou IP, Dimitrakopoulou ME, Apostolou T, Katopodi T, Charalambous E and Vantarakis A (2022). "**Hepatitis A and E in the Mediterranean: A systematic review**." Travel Med Infect Dis **47**: 102283.

Hepatitis A (HAV) and Hepatitis E (HEV) considered to be major public health threats worldwide. Although, both infections are more common in developing countries, an increased number of HAV and HEV cases have been reported in developed countries. This systematic review analyzes epidemiological profiles of HAV and HEV in the Mediterranean countries. By using PRISMA guideline, we searched for

articles from 2010 to 2020 referring HAV and HEV outbreaks from online databases: Scopus, PubMed and Springerlink. From 33265 unique publications initially captured, data was extracted from 101 articles investigating country and year of outbreak, transmission mode, vehicle of infection, mean age and sex of patients, symptoms reported, vaccination applied and diagnostic method. Our results indicate that occurrence of HAV and HEV in Mediterranean countries had increased with main transmission vehicle reported as food or water and transmission point as refugee camps. More results (countries, differences, other characteristics). Thus, public health authorities should give a priority to face up challenges regarding the prevalence of both viruses and control strategies to prevent upcoming outbreaks.

Zenner D, Méndez AR, Schillinger S, Val E, Wickramage K (2022). "**Health and illness in migrants and refugees arriving in Europe: analysis of the electronic Personal Health Record system.**" J Travel Med **4**;29(7):taac035. Doi: 10.1093/jtm/taac035

Background: The electronic Personal Health Record (ePHR) is a health information system that registers health data on newly arriving migrants and was implemented in eight European countries (Bulgaria, Croatia, Cyprus, Greece, Italy, Romania, Serbia and Slovenia). This is a cross-sectional study aimed to describe the health problems and health status of all migrants attended at health clinics as part of the health assessment programme established in the reception centres (2016-2019).

Methods: Data were collected on demographics, clinical and laboratory findings and diagnostics performed, including medical records. We classified all diseases using pre-specified algorithms according to information on pre-specified variables from the ePHR questionnaire, ICD-10 codes, positive laboratory findings or review of medical records. Crude proportions were calculated and odds ratios (OR) estimated using logistic regression modelling.

Results: The ePHR dataset contained a total of 19 564 clinical episodes in 14 436 individuals, recorded between January 2016 and October 2019. Most individuals (75%) were refugees or asylum seekers (22%) from 92 different nationalities. There were 2531/19 564 (12.9%) infectious diseases episodes reported during the study period, being 1283/2531 (50.7%) of them pharyngo-tonsillitis, 529 (20.9%) scabies, 158 (6.2%) viral hepatitis and 156(6.1%) lower respiratory infections. There were 2462 (17.1%) individuals with non-communicable diseases reported; including 821 (5.7%) cardiovascular diseases, 1183 (8.2%) neurological condition, 644 (4.5%) Diabetes mellitus and 212 (1.5%) kidney disease cases. Having Diabetes Mellitus (adjusted OR, aOR 3.3, [95% confidence interval, CI 2.7-4.1], $P < 0.001$), and neurological disorders (aOR 1.8, [95% CI 1.4-2.2], $P < 0.001$) were associated with cardiovascular disorders in the multivariable logistic regression model. Mental health problems were reported in 641/14 436 (4.4%) individuals and were associated with increasing age. Furthermore, 610 episodes of acute injuries were reported among 585/14 436 (4.1%) people, 517 (88.4%) of them in men ($P < 0.001$).

Conclusions: The ePHR is a valuable tool to efficiently collect health-related data to better address migrant health issues. We described a mostly healthy population with many acute infectious disease episodes particularly in children, but also with significant number of chronic conditions and less frequent injuries or mental health problems.

Kim JU, Ingiliz P, Shimakawa Y and Lemoine M (2021). "**Improving care of migrants is key for viral hepatitis elimination in Europe**." Bull World Health Organ **99**(4): 280-286.

By 2040, deaths from chronic viral hepatitis worldwide are projected to exceed those from human immunodeficiency virus infection, tuberculosis and malaria combined. The burden of this disease is predominantly carried by low-resource countries in Africa and Asia. In resource-rich countries, the epidemiological spread of viral hepatitis is partially driven by migrant movements from areas of high endemicity. In the last decade, Member States of the European Union and the European Economic Area have experienced an unprecedented influx of migrants, which has resulted in the polarization of political views about migration. In addition, the coronavirus disease 2019 pandemic has worsened the economic and health conditions of migrants and contributed to hostility to ensuring their health rights. Moreover, the implementation of hostile laws in some host nations has increased the vulnerability of marginalized migrant subgroups, such as asylum seekers and undocumented individuals. These developments have complicated the historical challenge of identifying high-risk migrant groups for screening and treatment. However, if European countries can apply the simplified assessment tools and diagnostic tests for viral hepatitis that have been used for decentralized screening and monitoring in resource-poor countries, the uptake of care by migrants could be dramatically increased. Given the global calls for the elimination of viral hepatitis, European nations should recognize the importance of treating this vulnerable migrant

population. Political and health strategies need to be adapted to meet this challenge and help eliminate viral hepatitis globally.

Nazareth J, Baggaley RF, Divall P, Pan D, Martin CA, Volik M, Nellums LB and Pareek M (2021). WHO Health Evidence Network Synthesis Reports. **What is the evidence on existing national policies and guidelines for delivering effective tuberculosis, HIV and viral hepatitis services for refugees and migrants among Member States of the WHO European Region?** Copenhagen, WHO Regional Office for Europe
© World Health Organization 2021.

The WHO Regional Office for Europe has developed several action plans to deliver effective tuberculosis (TB)-, viral hepatitis- and HIV-related services for refugees and migrants within the WHO European Region. This report examines the available evidence on existing national policies and guidelines for delivering effective TB-, viral hepatitis- and HIV-related services for refugees and migrants in Member States of the WHO European Region. The review highlighted extreme heterogeneity between countries in the Region in the availability of relevant national guidelines and recommendations and in implementation of these documents. In the 53 Member States of the WHO European Region, only 15 primary policy/guideline documents relating to migrants and viral hepatitis, HIV or TB were identified. The promotion in Member States of policies advocated by WHO and the European Centre for Disease Prevention and Control requires an understanding of the macro-level barriers to implementation. Furthermore, the design of national programmes needs to take account of barriers at the micro (individual) and meso (community) levels to uptake by migrant populations and to the adoption of policies by health-care practitioners.

Noori T, Hargreaves S, Greenaway C, van der Werf M, Driedger M, Morton RL, Hui C, Requena-Mendez A, Agbata E, Myran DT, Pareek M, Campos-Matos I, Nielsen RT, Semenza J, Nellums LB, Pottie K, ECDC ad hoc scientific panel (2021). "**Strengthening screening for infectious diseases and vaccination among migrants in Europe: What is needed to close the implementation gaps?**" Travel Med Infect Dis **Jan-Feb:39**:101715.

Migration to the European Union (EU)/European Economic Area (EEA) affects the epidemiology of infectious diseases, including tuberculosis (TB), HIV, hepatitis B/C, and parasitic diseases. Some sub-populations of migrants are also considered to be an under-immunised group and thus at risk of vaccine-preventable diseases. Providing high-risk migrants access to timely and efficacious screening and vaccination, and understanding how best to implement more integrated screening and vaccination programmes into European health systems ensuring linkage to care and treatment, is key to improving the health of migrants and their communities, alongside meeting national and regional targets for infection surveillance, control, and elimination. The European Centre for Disease Prevention and Control (ECDC) has responded to calls to action to improve migrant health and strengthen universal health coverage by developing evidence-based guidance for policy makers, public health experts, and front-line healthcare professionals on how to approach screening and vaccination in newly arrived migrants within the EU/EEA. In this Commentary, we provide a perspective towards developing efficacious screening and vaccination of newly arrived migrants, with a focus on defining implementation challenges and evidence gaps in high-migrant receiving EU/EEA countries. There is a need now to leverage the increasing momentum around migrant health to both strengthen the evidence-base and to advocate for universal access to health care for all migrants in the EU/EEA, including undocumented migrants. This should include voluntary, confidential, and non-stigmatising screening and vaccination that should be free of charge and facilitate linkage to appropriate care and treatment.

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

Third EU Health Programme (2020). "**Report on the health status of newly arrived migrants and refugees in EU/EEA.**" European Commission.

Toy M, Ahishali E and Yurdaydın C (2020). "**Hepatitis Delta Virus Epidemiology in the Industrialized World.**" AIDS Rev **22**(4): 203-212.

Within the hepatitis virus landscape, one incomplete virus, the hepatitis delta virus (HDV), appears to differ from hepatitis B and C viruses in the context as it still may not infrequently lead to complications of chronic liver disease and continues to be associated with significant liver-related mortality even when patients have received available treatment for it. Breakthrough therapies are so far lacking for HDV-infected patients and treatment has not changed since the discovery of HDV in 1977 and consists mainly of interferons. While there was little interest on the global epidemiology of HDV until recently, this has changed in the past 2 years and we are currently observing a stream of papers on the global epidemiology of HDV and commentaries about why prevalence estimates appear to differ so dramatically. This may be related to the fact that reliable data are not available for most of the countries. However, in the industrialized world, data on the epidemiology of HDV are expected to be of better overall quality. Hence, this review was undertaken to provide a detailed overview on the epidemiology of HDV infection in industrialized countries using data from representative larger countries. In industrialized countries, with maybe the exception of China, HDV infection is a disease of high-risk groups. Migrant groups and people who inject drugs are the most encountered high-risk groups. This review summarizes the dynamics of their contribution to the HDV epidemiology in industrialized countries of the west and the east.

Hickman M, Mandel S, Vickerman P, Miners A, Martin N (2019). "**Hepatitis case finding among migrants in primary care.**" Lancet Gastro Entero Hepato **Jan;4(1)**:3-4.

Thijssen M, Lemey P, Amini-Bavil-Olyaeee S, Dellicour S, Alavain SM, Tacke F, Verslype C, Vevens F, Pourkarim MR (2019). "**Mass migration to Europe: an opportunity for elimination of hepatitis B virus?**" Lancet Gastroenterol Hepatol Apr;4(4):315-323.

People from low-to-middle income countries have been migrating to western Europe on a large scale in recent years. Data indicate that the number of first-time asylum applications by non-EU members increased from 290 000 in 2011 to more than 1·3 million in 2015. During the peak period of migration, The Global Health Sector Strategy on Viral Hepatitis was adopted by WHO. Viral hepatitis, and particularly hepatitis B virus (HBV), is an important disease because of its high prevalence and associated mortality. In some cases, HBV can be carried by refugees arriving from regions of high and intermediate prevalence. Refugees with HBV might not show clinical symptoms and not be diagnosed in destination countries with a low prevalence, where screening is not regularly done. Although transmission to the host population is low, dedicated surveillance and tailored public health policies are required. It is important to note that some of the countries that receive many migrants do not have a universal HBV vaccination programme. In this Viewpoint, we argue that the current large-scale movement from regions with high or intermediate HBV prevalence should be taken as an opportunity to achieve viral hepatitis elimination targets, by establishing a well prepared infrastructure for HBV screening, vaccination, and treatment.

Ahmad AA, Falla AM, Duffell E, Noori T, Bechini A, Reintjes R, Veldhuijzen IK (2018). "**Estimating the scale of chronic hepatitis B virus infection among migrants in EU/EEA countries.**" BMC Infect Dis **Jan11;18**(1):3.

Background: Chronic hepatitis B (CHB) related morbidity and mortality can be reduced through risk group screening, linkage to care and anti-viral treatment. This study estimates the number of CHB cases

among foreign-born (migrants) in the European Union and European Economic Area (EU/EEA) countries in order to identify the most affected migrant populations.

Methods: The CHB burden was estimated by combining: demographic data on migrant population size by country of birth in the EU/EEA, extracted from European statistical databases; and CHB prevalence in migrants' countries of birth and in EU/EEA countries, derived from a systematic literature search. The relative contribution of migrants from endemic countries to the total CHB burden in each country was also estimated. The reliability of using country of birth prevalence as a proxy for prevalence among migrants was assessed by comparing it to the prevalence found in studies among migrants in Europe.

Results: An estimated 1–1.9 million CHB-infected migrants from endemic countries (prevalence ≥2%) reside in the EU/EEA. Migrants from endemic countries comprise 10.3% of the total EU/EEA population but account for 25% (15%–35%) of all CHB cases. Migrants born in China and Romania contribute the largest number of infections, with over 100,000 estimated CHB cases each, followed by migrants from Turkey, Albania and Russia, in descending order, with over 50,000 estimated CHB cases each. The CHB prevalence reported in studies among migrants in EU/EEA countries was lower than the country of birth prevalence in 9 of 14 studies.

Conclusions: Migrants from endemic countries are disproportionately affected by CHB; their contribution however varies between EU/EEA countries. Migrant focused screening strategies would be most effective in countries with a high relative contribution of migrants and a low general population prevalence. In countries with a higher general population prevalence and a lower relative contribution of migrants, screening specific birth cohorts may be a more effective use of scarce resources. Quantifying the number of CHB infections among 50 different migrant groups residing in each of the 31 EU/EEA host countries helps to identify the most affected migrant communities who would benefit from targeted screening and linkage to care.

Falla AM, Ahmad AA, Duffell E, Noori T and Veldhuijzen IK (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 ≥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.

Myran DT, Morton R, Biggs BA, Veldhuijzen I, Castelli F, Tran A, Staub LP, Agbata E, Rahman P, Pareek M, Noori T, Pottie K (2018) "**The Effectiveness and Cost-Effectiveness of Screening for and Vaccination Against Hepatitis B Virus among Migrants in the EU/EEA: A Systematic Review**" Int J Environ Res Public Health Sep 1;15(9):1898

Migrants from hepatitis B virus (HBV) endemic countries to the European Union/European Economic Area (EU/EEA) comprise 5.1% of the total EU/EEA population but account for 25% of total chronic Hepatitis B (CHB) infection. Migrants from high HBV prevalence regions are at the highest risk for CHB morbidity. These migrants are at risk of late detection of CHB complications; mortality and onwards transmission. The aim of this systematic review is to evaluate the effectiveness and cost-effectiveness of CHB screening and vaccination programs among migrants to the EU/EEA. We found no RCTs or direct evidence evaluating the effectiveness of CHB screening on morbidity and mortality of migrants. We

therefore used a systematic evidence chain approach to identify studies relevant to screening and prevention programs; testing, treatment, and vaccination. We identified four systematic reviews and five additional studies and guidelines that reported on screening and vaccination effectiveness. Studies reported that vaccination programs were highly effective at reducing the prevalence of CHB in children (RR 0.07 95% CI 0.04 to 0.13) following vaccination. Two meta-analyses of therapy for chronic HBV infection found improvement in clinical outcomes and intermediate markers of disease. We identified nine studies examining the cost-effectiveness of screening for CHB: a strategy of screening and treating CHB compared to no screening. The median acceptance of HB screening was 87.4% (range 32.3–100%). Multiple studies highlighted barriers to and the absence of effective strategies to ensure linkage of treatment and care for migrants with CHB. In conclusion, screening of high-risk children and adults and vaccination of susceptible children, combined with treatment of CHB infection in migrants, are promising and cost-effective interventions, but linkage to treatment requires more attention.

Falla AM, Veldhuijzen IK, Ahmad AA, Levi M and Richardus JH (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.

Vedio A, Liu EZH, Lee ACK and Salway S (2017). "**Improving access to health care for chronic hepatitis B among migrant Chinese populations: A systematic mixed methods review of barriers and enablers**." J Viral Hepat **24**(7): 526-540.

Mipatrini D, Stefanelli P, Severoni S, Rezza G (2017). **Vaccinations in migrants and refugees: a challenge for European health systems. A systematic review of current scientific evidence.** Pathog Glob Health. **Mar**;111(2):59-68. doi: 10.1080/20477724.2017.1281374. Epub 2017 Feb 6.

Greenaway C, Thu Ma A, Kloda LA, Klein M, Cnossen S, Schwarzer G and Shrier I (2015). "**The Seroprevalence of Hepatitis C Antibodies in Immigrants and Refugees from Intermediate and High Endemic Countries: A Systematic Review and Meta-Analysis**." PLoS One **10**(11): e0141715.

Correction: The Seroprevalence of Hepatitis C Antibodies in Immigrants and Refugees from Intermediate and High Endemic Countries: A Systematic Review and Meta-Analysis - PubMed (nih.gov)

Sharma S, Carballo M, Feld JJ and Janssen HL (2015). "**Immigration and viral hepatitis**." J Hepatol **63**(2): 515-522.

Riccardo F, Dente MG, Kojouharova M, Fabiani M, Alfonsi V, Kurchatova A, Vladimirova N, Declich S (2012). "**Migrant's access to immunization in Mediterranean Counties.**" Health Policy. **Apr;105**(1):17-24.

Epidemiological and interventional studies in specific countries

Belgium

Belgium - Ho E, Michielsen P, Van Damme P, Ieven M, Veldhuijzen I and Vanwolleghem T (2020). "**Point-of-Care Tests for Hepatitis B Are Associated with A Higher Linkage to Care and Lower Cost Compared to Venepuncture Sampling During Outreach Screenings in an Asian Migrant Population**." Ann Glob Health **86**(1): 81.

BACKGROUND: This study compares venepuncture versus point-of-care (POC) HBsAg tests on screening cost and linkage to care in prospective outreach screenings in an Asian population in three major cities in Belgium between 10/2014 and 5/2018. METHODS: Two community outreach screening programs were organised between 10/2014 and 5/2018. The first screening program used venepuncture and serologic testing for HBsAg. In the second program, HBsAg was tested in finger stick blood POC tests. Positive results were confirmed during outpatient visits with serologic testing. Linkage to care was defined as having received specialist care follow-up with at least one abdominal ultrasound within three months of screening. RESULTS: For 575 participating individuals, 571 valid results were obtained, 456 with venepuncture, and 115 using POC testing. Overall HBsAg seroprevalence was 6.8%. Linkage to care was higher when using POC testing compared to venepuncture (86% or n = 6/7 versus 34% or n = 11/32; p = 0.020). The POC screening program was economically more attractive with a total cost of € 1,461.8 or € 12.7 per person screened compared to € 24,819 or € 54.0 per person screened when using venepuncture testing. Results and an appointment for specialist care follow-up were given onsite with

POC testing, while with venepuncture testing; results were sent within 20-45 days. CONCLUSION: In an Asian migrant population in Belgium with an HBsAg seroprevalence of 6.8%, HBV screening based on POC tests resulted in lower costs per person screened (76.5% lower), and higher linkage to care (2.5 times).

Belgium - Koc OM, Kremer C, Hens N, Bielen R, Busschots D, Van Damme P, Robaeys G (2020). "**Early detection of chronic hepatitis B and risk factor assessment in Turkish migrants, Middle Limburg, Belgium**. " PLoS One **Jul 27;15**(7): e0234740. Doi: 10.1371/journal.pone.0234740. eCollection 2020.

Background: Turkey is an intermediate hepatitis B virus (HBV) endemic country. However, prevalence among Turkish migrants in Belgium is unknown, especially in those born in Belgium with a foreign-born parent, i.e. second-generation migrants (SGM).

Aims: To evaluate the prevalence of HBV infection and associated risk factors in Turkish first-generation migrants (FGM), i.e. foreign-born, and SGM.

Methods: Between September 2017 and May 2019, free outreach testing for hepatitis B surface antigen (HBsAg), hepatitis B core antibodies (anti-HBc), and antibodies against HBsAg was offered to Turkish migrants in Middle-Limburg, Belgium. Face-to-face questionnaire assessed HBV risk factors. HBsAg positive patients were referred and followed up. Turkish SGM were stratified into birth cohort born before and after 1987, since those born after 1987 should be covered by the universal infant vaccination program.

Results: A total of 1,081/1,113 (97.1%) Turkish did go for HBV testing. Twenty-six (2.4%) were HBsAg positive; 11/26 were unaware of their status and 10/11 were successfully referred. HBsAg prevalence was 3.0% in FGM and 1.5% in SGM, p = .070. Only one out of seven HBsAg positive SGM was born after 1987. In the multiple generalized estimating equations model, the most important risk factors for anti-HBc positivity were male gender (p = .021), older age (p < .001), FGM (p < .001), low educational level of the mother (p = .003), HBV infected mother (p = .008), HBV infected siblings (p = .002), HBV infected other family member (p = .004), gynaecological examination in Turkey or unsafe male circumcision (p = .032) and dental treatment in Turkey (p = .049).

Conclusion: Outreach testing was well-accepted and referral to specialist care was generally successful. National HBV screening should be implemented in the Turkish FGM population and might be considered in SGM not covered by primary prevention strategies.

Belgium - Koc Ö M, Hens N, Bielen R, Van Damme P and Robaeys G (2019). "**Hepatitis B virus prevalence and risk factors in hard-to-reach Turkish population living in Belgium: A protocol for screening.**" Medicine (Baltimore) **98**(18): e15412.

BACKGROUND: Hepatitis B virus (HBV) infection is an important public health problem in the Turkish population, that is, one of the largest migrant populations in Europe. With the introduction of cost-effective antiviral treatments in the past decade, there is a need to identify HBV-infected patients who may benefit from treatment. This study describes the design of a study to assess the HBV prevalence in the Turkish population living in Belgium. Additionally, we will determine the risk factors of HBV infection and the uptake of screening, vaccination, and antiviral treatment in this hard-to-reach Turkish population. METHODS: A longitudinal, epidemiological study will be conducted in the region Middle Limburg Belgium, where the Turkish adult population, 18 years of age and older, will be screened for hepatitis B surface antigen (HBsAg), antibodies against HBsAg (anti-HBs), and antibodies against hepatitis B core antigen (anti-HBc). Educational meetings concerning viral hepatitis B will be organized and there will be 3 ways to be screened for HBV: immediately after the educational meetings, at the Outpatient Hepatology Department of Ziekenhuis Oost-Limburg, and at home visits. Subsequently, participants will be asked to fill in a questionnaire regarding sociodemographic factors, migration history, risk factors for HBV infection (e.g., sharing toothbrushes, HBV-infected family member), and HBV vaccination status. Six months after screening, HBsAg-positive patients will be assessed whether they are under follow-up at the general practitioner or hepatologist. We will also gather information regarding the uptake of vaccination in nonimmunized subjects. DISCUSSION: This study will provide information about the HBV prevalence and distribution of the stages of liver disease in the Turkish population in Belgium. By determining the risk factors for HBV infection, subgroups with an increased prevalence of HBV infection can be identified. CLINICAL TRIAL NUMBER: This clinical trial is registered at clinicaltrials.gov (NCT03396458).

Vanwolleghem T (2016). "**Belgium Hepatitis screening project to reach asian migrants "China aan de Schelde**" VHPB meeting: Highlight underserved for screening, prevention and treatment of viral hepatitis B and C in Europe. March 10-11, 2016- Ljubljana, Slovenia

Denmark

Denmark - Wendland A, Ehmsen BK, Lenskjold V, Astrup BS, Mohr M, Williams CJ and Cowan SA (2016). "**Undocumented migrant women in Denmark have inadequate access to pregnancy screening and have a higher prevalence Hepatitis B virus infection compared to documented migrants in Denmark: a prevalence study**." BMC Public Health **16**: 426.

Greece

Greece - Touloumi G, Karakosta A, Sypsa V, Petraki I, Anagnostou O, Terzidis A, Voudouri NM, Gavana M, Vantarakis A, Rachiotis G, Kantzanou M, Rosenberg T, Papatheodoridis G and Hatzakis A (2020). "**Design and Development of a Viral Hepatitis and HIV Infection Screening Program (Hprolipsis) for the General, Greek Roma, and Migrant Populations of Greece: Protocol for Three Cross-Sectional Health Examination Surveys.**" JMIR Res Protoc **9**(1): e13578.

> BACKGROUND: Although infectious diseases are globally on the decline, they remain a major global public health problem. Among them, the hepatitis B virus (HBV) or hepatitis C virus (HCV) and HIV infection are of primary interest. Valid prevalence data on these infections are sparse in Greece, especially for vulnerable populations. OBJECTIVE: This study aimed to present the design and methods of Hprolipsis, an integrated viral hepatitis and HIV screening program administered to adults (≥18 years) from the general, Greek Roma, and migrant populations. Its aims were to estimate the prevalence of HBV, HCV, and HIV; assess infectious disease knowledge level; design, implement, and assess population-specific awareness actions; and offer individual counseling and referral when indicated and HBV vaccination to susceptible Roma and migrants. METHODS: Multistage, stratified, random sampling based on the 2011 Census was applied to select the general population sample, and nonprobability multistage quota sampling was used for Roma and migrant sample selection. Trained personnel made home (general population) or community (Roma and migrants) visits. Collected blood samples were tested for Hepatitis B surface Antigen, Hepatitis B core Antibody, Hepatitis B surface Antibody, Hepatitis C Antibody, and HIV 1,2 Antibody. The surveys were conducted during May 2013 and June 2016. To estimate an HCV prevalence of 1.5% with 0.3 precision, the required general population sample size was estimated to be 6000. As migrants constitute 10% of the whole Greek population, the migrant sample size was set to 600. A feasible sample size of 500 Greek Roma was set. RESULTS: In total, 6006 individuals from the general population (response rate 72%), 534 Greek Roma, and 612 migrants were recruited. Blood test results are available for 4245 individuals from the general population, 523 Roma, and 537 migrants. CONCLUSIONS: Hprolipsis is the first nationwide survey on HBV, HCV, and HIV. Its results will enhance our understanding of the health needs and disease burden of these diseases in the 3 studied populations. Its implementation provided useful recommendations for future studies, particularly in vulnerable populations. INTERNATIONAL REGISTERED REPORT IDENTIFIER (IRRID): DERR1-10.2196/13578.

France

France - Brown C, Roucoux G, Dimi S, Fahmi S, Jeevan RB, Chassany O, Chaplin J and Duracinsky M (2023). "**Evaluating Clinician Expectations of mHealth Solutions to Increase Rapid-Screening for HIV and Hepatitis in Migrant Populations in France: Qualitative Study**." JMIR Hum Factors **10**: e41861.

> BACKGROUND: Migrants underuse screening opportunities for HIV, hepatitis B, and hepatitis C despite elevated risk factors for contracting these infections. Language barriers are an often given as reasons for limiting access to services. Translation and communication apps increase communication and overall patient satisfaction in the patient-provider relationship. In the development and adoption of new technology, expectations play an important role. OBJECTIVE: This study aimed to explore health care professionals' opinions and attitudes regarding their screening practices with migrants and their expectations for a new communication tool that could improve migrants' screening use. METHODS: In this qualitative study, a purposive (diverse) sampling method was used to invite doctors and nurses who

conduct rapid screening tests with migrants from 4 centers of the French Office of Immigration and Integration in 3 geographic regions of France. Semistructured interviews were conducted to survey their opinions on the rapid testing of migrants, the use of telephone interpreters, the concept of health literacy, and their expectations of a new communication tool that could overcome language barriers and promote rapid screening in the new migrant population. RESULTS: In all, 20 interviews were conducted with 11 doctors and 9 nurses with a median age of 58 (range 25-67) years. Participants favored the integration of an innovative communication tool in the context of rapid screening of migrants. However, there were concerns related to the implementation and added value of the tool while migrants were already reluctant to be screened. Expectations were for a tool that would present information in simplified French or a chosen language but also supports a positive attitude toward screening. Health professionals also expressed the wish that the technology could help with the collection of health data. CONCLUSIONS: Feedback from health professionals provides a better understanding of potential formats, characteristics, functions, content, and use of an innovative, digital method to communicate with migrants with limited French proficiency. Findings contribute to the conceptual development of an electronic app and its implementation within the ApiDé study, which aims to validate a digital app to address language barriers to increase the use of screening among migrants with limited French proficiency in France.

France - Doffoel M, Ernwein F, Chaffraix F, Haumesser L, Tripon S, Bader R, Lang JP, Lang A, Paya D, Royant M, Velay-Rusch A, Tebacher M, Meyer N, Habersetzer F and Baumert T (2022). "**Characteristics and care of chronic hepatitis C treated with direct-acting antivirals in migrants.**" Eur J Gastroenterol Hepatol **34**(6): 664-670.

BACKGROUND AND AIMS: Hepatitis C is poorly documented in migrants. The published studies mainly concern the screening in this population and are limited to some countries in Europe and North America. This study aimed to evaluate the characteristics and care of chronic hepatitis C in this population compared to the nonmigrant population, in the era of direct-acting antivirals (DAAs). METHOD: We performed a retrospective analysis based on data presented at the multidisciplinary team meetings of our tertiary care center between 2015 and 2019. RESULTS: We included 277 migrant- and 1390 nonmigrant patients mono-infected with hepatitis C virus (HCV) and treated with DAAs. The majority of the migrants were from Eastern European countries. In multivariable analysis, BMI classes associated with more obesity (OR = 1.84; 95% CI, 1.37-2.49; P < 0.001) and therapeutic patient education (OR = 3.91; 95% CI, 2.38-6.49; P < 0.001) were positively associated with migrant status, whereas age (OR = 0.92; 95% CI, 0.90-0.94; P < 0.001), female gender (OR = 0.46; 95% CI, 0.28-0.74; P = 0.002), modes of contamination with less drug use, transfusion history or nosocomial risk, as well more unknown mode (OR = 0.70; 95% CI, 0.50-0.96; P = 0.031), alcohol consumption (OR = 0.48; 95% CI, 0.29-0.73; P = 0.001), types of structures with less care in a general hospital or health network of general practitioners and more care in a university hospital or primary addictology center (OR = 0.78; 95% CI, 0.60-0.99; P = 0.046) and opioid substitution therapy (OR = 0.25; 95% CI, 0.08-0.68; P = 0.008) were negatively associated with migrant status. The substained virologic response 12 was close to 97% in both groups. CONCLUSION: Despite multiple differences in characteristics and therapeutic care between the two populations, the chances of healing hepatitis C were the same among migrant- compared with nonmigrant patients.

France - Thonon F, Fahmi S, Rousset-Torrente O, Bessonneau P, Griffith JW, Brown C, Chassany O and Duracinsky M (2021). "**Promoting HIV, Hepatitis B Virus, and Hepatitis C Virus Screening Among Migrants With a Language Barrier: Protocol for the Development and Evaluation of an Electronic App (Apidé).**" JMIR Res Protoc **10**(5): e22239.

BACKGROUND: Late diagnoses of HIV, hepatitis B, and hepatitis C are important public health problems that affect the population at large and migrants in particular. Missed opportunities of HIV and hepatitis screening are numerous, with language differences being a significant barrier to testing. Several studies have shown that migrants who do not speak the language of the health provider are less likely to get tested, due to health providers' reluctance to offer a test and to migrants' reluctance to accept testing. OBJECTIVE: The aim of our study is to develop a multilingual electronic tool (app) that assists health providers in offering and explaining HIV and hepatitis screenings to migrants with a language barrier and to evaluate its acceptability and impact in terms of public health. METHODS: The study will go through 3 stages: (1) concept development, (2) app development, and (3) app evaluation. A qualitative study has been undertaken to explore language barriers during health care encounters and their effect on communication, specifically when a screening test is offered. In parallel, a systematic review of the

literature was conducted to have a comprehensive overlook of electronic tools designed to help health care providers communicate with migrants with a language barrier. To generate a list of items to be translated for inclusion in the app, we will conduct a focus group and Delphi survey. The development of the app will include translation and voice recording of items. The electronic development will also include 3 steps of user testing. The acceptability of the app will be evaluated using the System Usability Scale. Evaluation of the app's efficacy will consist of a stepped wedge randomized controlled trial. The study will be carried out in 16 centers that treat migrants and offer them screening tests for infectious diseases. The primary outcome is the percentage of screening tests realized. The secondary outcomes are the rate of screening proposal by health professionals, acceptance rate by migrants, number of positive cases using this app, and frequency of use of the app. RESULTS: The app evaluation study received a 3-year grant from the Agence Nationale de la Recherche contre le SIDA et les hépatites virales (ANRS) and from the Office Français de l'Immigration et Intégration (OFII). At the time of publication of this protocol, the initial qualitative study and systematic literature review were completed. CONCLUSIONS: This study will develop an app that assists health providers in offering and explaining HIV and hepatitis screenings to migrants with a language barrier and measure its acceptability and effectiveness in terms of public health. When completed, this app could be distributed to numerous professionals carrying out screening with migrant populations in various health care settings. INTERNATIONAL REGISTERED REPORT IDENTIFIER (IRRID): PRR1-10.2196/22239.

France - Djaogol T, Fontaine H, Baudoin M, Protopopescu C, Marcellin F, Dorival C, Simony M, Petrov-Sanchez V, Bourlière M, Delarocque-Astagneau E, Pol S, Carrat F and Carrieri P (2021). "**Effectiveness of direct-acting antivirals for chronic hepatitis C treatment in migrant and non-migrant populations in France**." Liver Int **41**(10): 2328-2340.

Despite universal health coverage in France, migrants face specific socioeconomic barriers that increase the likelihood of a suboptimal cascade of care for chronic hepatitis C virus (HCV) infection and impaired treatment effectiveness in this sub-population. We selected data collected from 2012 to 2018 from the ANRS CO22 HEPATHER prospective cohort study for chronic HCV participants with available data on treatment failure (defined as the presence of a detectable HCV-RNA load 12 weeks after their first DAA treatment ended). We performed multivariable Poisson regression models to test whether treatment failure rates differed significantly between HCV-infected migrants and non-migrants receiving DAA in France (cross-sectional analysis), while taking into account the former's world region of birth and other potential social vulnerability factors. Among the study population's 7,879 patients, 5,829 (74%) were non-migrants and 2,050 (26%) migrants. Median [interquartile range] age was 57 [51-65] years, 4433 (56%) were men and 369 (5%) of the entire study population had treatment failure. After multivariable adjustment, only migrants from Central Asia were at higher risk of treatment failure than non-migrants (aIRR = 2.83; 95% CI [1.72, 4.65]). Results from this large-scale study performed in France suggest a higher risk of DAA treatment failure in migrants from Central Asia than in non-migrants and confirm the overall low treatment failure rate in chronic HCV patients treated with DAA (whether migrants or not). Simplified models of care taking into account language and cultural barriers are needed to improve DAA effectiveness in migrants from Central Asia.

France - Cailhol J and Khan N (2020). "**Chronic hepatitis and HIV risks amongst Pakistani migrant men in a French suburb and insights into health promotion interventions: the ANRS Musafir qualitative studyv**." BMC Public Health **20**(1): 1393.

BACKGROUND: Seine-Saint-Denis is a deprived departement (French administrative unit) in the North-East of Paris, France, hosting the majority of South Asian migrants in France. In recent years, the number of migrants from Pakistan, which has a high prevalence of hepatitis C globally, increased. As a corollary, this study addressed the high proportion of Pakistani patients in the infectious diseases clinic of a local hospital, diagnosed with hepatitis C, but also hepatitis B and Human Immunodeficiency Virus (HIV). It explored genealogies and beliefs about hepatitis and HIV transmission, including community, sexual and blood risk behaviours. The aim was to understand the ways these risk factors reduce or intensify both en route and once in France, in order to devise specific forms of community health intervention. METHODS: The study took place at Avicenne University-Hospital in Seine-Saint-Denis, and its environs, between July and September 2018. The design of the study was qualitative, combining semi-structured interviews, a focus group discussion, and ethnographic observations. The sample of Pakistani participants was selected from those followed-up for chronic hepatitis C, B, and/or HIV at Avicenne, and who had arrived after 2010 in Seine-Saint-Denis. RESULTS: Thirteen semi-structured interviews were

conducted, until saturation was reached. All participants were men from rural Punjab province. Most took the Eastern Mediterranean human smuggling route. Findings suggest that vulnerabilities to hepatitis and HIV transmission, originating in Pakistan, are intensified along the migration route and perpetuated in France. Taboo towards sexuality, promiscuity in cohabitation conditions, lack of knowledge about transmission were amongst the factors increasing vulnerabilities. Participants suggested a number of culturally-acceptable health promotion interventions in the community, such as outreach awareness and testing campaigns in workplaces, health promotion and education in mosques, as well as web-based sexual health promotion tools to preserve anonymity. CONCLUSIONS: Our findings highlight the need to look at specific groups at risk, related to their countries of origin. In-depth understandings of such groups, using interdisciplinary approaches such as were employed here, can allow for culturally adapted, tailored interventions. However, French colour-blind policies do not easily permit such kinds of targeted approach and this limitation requires further debate.

France - Khan N and Cailhol J (2020). "**Are migration routes disease transmission routes? Understanding Hepatitis and HIV transmission amongst undocumented Pakistani migrants and asylum seekers in a Parisian suburb.**" Anthropol Med **27**(4): 395-411.

Drawing on hospital-based interviews and fieldwork in a deprived Parisian suburb, this paper analyses the spatio-temporal dynamics of risk, exposure, and mobilities in individual stories of undocumented Pakistani male migrants, and asylum seekers-receiving treatment for single and combined diagnoses of HIV, and Hepatitis C and B. Inviting alignments with the 'sexual' turn in mobility studies, it prioritises the interface of all-male undocumented migration, mobility, sexuality, and homosociality in circumscribing disease transmission geneaologies. It questions the extent to which illegal migration routes are transmission routes, and risk environments assume different levels of intensity in everyday life in Pakistan, during the journey, and in France. It emphasises inadequately addressed epidemics of HIV and hepatitis in Pakistan, the significance of unequal routes to migrant healthcare in France, and the transnational adaptation of homosocial and sexual behaviours, including MSM. These factors interplay with intensified vulnerabilities relating to childhood sexual abuse, family traumas, sexual risks related to illegal migration and undocumented status in France, chronic stresses leading to depleted mental and physical health, and restrictions on heterosexual sex facing marginalised migrants. Further, temporal vulnerabilities relate to the colonial criminalisation of homosexuality in Pakistan, widespread sexual violence-and forms of contemporary exclusion and hostility regarding Muslim migrants in Europe. Particularly, we emphasise the paradox, and need to sensitively address, a complex confluence of hidden risks that are deeply embedded in ethnic communities of solidarity and support. The findings trouble the tendency to partition global hepatitis and HIV prevalence rates by 'developed' and 'developing' country variation.

France - Rosa-Hezode I, Chousterman M, Costes L, Labourdette C, Elghozi B, Krastinova E and Roudot-Thoraval F (2019). "**Cascade of care for migrants tested Hepatitis C antibodies positive in France through a systematic screening programme: The PRECAVIR study.**" J Viral Hepat **26**(12): 1496-1499.

Migration of people from HCV endemic countries is a public health issue for the French healthcare system. The PRECAVIR study focused on migrant patients and provides a multidisciplinary, patient-centred approach to treat chronic HCV-infected migrants through a systematic screening programme. Between 2007 and 2017, 101 (2.98%) out of 3386 consecutive adult migrants attending two primary healthcare settings in Créteil, France, tested positive for HCV. The median age was 44.5 years old, and 55% were women. Patients were mainly from sub-Saharan Africa, Eastern Europe and Asia. Seventy-four patients were undocumented migrants, and 25 were asylum seekers. Eighty-four (83%) patients were unaware of their serological status. All patients were offered referral to a specialist in the same setting. HCV RNA testing was performed in 88 (87%) of the patients who tested anti-HCV positive. Forty-nine (57%) were chronically infected, while 39 (43%) had an undetectable viral load. All patients were treatment-naïve. More than half of patients had access to treatment. Before 2014, thirteen patients were treated with pegylated interferon and ribavirin, and an SVR was achieved in 8 (61.5%) of them. By 2017, 17 patients had begun oral, direct-acting antiviral treatment. An SVR was achieved in 16 of 17 patients (93%). However, all patients not initially eligible for treatment were lost to follow-up. This study showed the effectiveness of a coordinated care network when anti-HCV testing, linkage to care and treatment are organized for a migrant population in the same setting as long as universal treatment makes a test and treat policy possible.

France/Italy - Santilli C (2018). "**Medical Care, Screening and Regularization of Sub-Saharan Irregular Migrants Affected by Hepatitis B in France and Italy.**" J Immigr Minor Health **20**(3): 668-673.

Both in France and in Italy hepatitis B is present mostly among the migrant population coming from sub-Saharan Africa and mainly among those migrants having a poor socio-economic background. This article is aimed at assaying the impact of public policies adopted by France and Italy for migrants' health on the treatment of migrants with HBV. The article is based on semi-structured interviews conducted with 30 immigrant adults taken into care by two associations dealing with medical, psychological and social issues of immigrants applying for a residence permit, mainly asylum seekers. The results of this study bring to light specific difficulties relating to national contexts, to the type of HBV (inactive or active) and to the administrative situation of the migrants. In France irregular migrants are screened in humanitarian associations. In Italy the screening is done in public hospitals. In both countries, only migrants suffering from chronic hepatitis B obtain a residence permit for medical reasons. More migrants in Italy than in France abandon HBV treatment. This study describes how specific national immigration and health policies impact in a different way the therapeutic and social path of migrants suffering from hepatitis B. The analysis provides useful material for the development of strategies to prevent and control hepatitis B among the migrant population. It also shows how social determinants affect migrants' health more than values or cultural factors do.

France - Chappuis M, Pauti MD, Tomasino A, Fahet G, Cayla F and Corty JF (2015). "**Knowledge of HIV and hepatitis B and C status among people living in extreme poverty in France, in 2012**." Med Mal Infect **45**(3): 72-77.

France - Pourette D (2013). "**[Chronic hepatitis B and HIV care: the key role of the doctor-patient relationship]**." Sante Publique **25**(5): 561-570.

France - Aubert JP, Catrice M, Bouée S, Di Pumpo A, Santana P, Gervais A, Wajsbro A, Gelly J and Nougairède M (2010). "**[Prevac B: prevention of hepatitis B among migrants from subsaharian Africa and Asia]**." Rev Prat **60**(6 Suppl): 13-20.

Finland

Finland - Tiittala P, Ristola M, Liitsola K, Ollgren J, Koponen P, Surcel HM, Hiltunen-Back E, Davidkin I and Kivelä P (2018). "**Missed hepatitis b/c or syphilis diagnosis among Kurdish, Russian, and Somali origin migrants in Finland: linking a population-based survey to the national infectious disease register.**" BMC Infect Dis **18**(1): 137.

BACKGROUND: Migrants are considered a key population at risk for sexually transmitted and blood-borne diseases in Europe. Prevalence data to support the design of infectious diseases screening protocols are scarce. We aimed to estimate the prevalence of hepatitis B and C, human immunodefiency virus (HIV) infection and syphilis in specific migrant groups in Finland and to assess risk factors for missed diagnosis. METHODS: A random sample of 3000 Kurdish, Russian, or Somali origin migrants in Finland was invited to a migrant population-based health interview and examination survey during 2010-2012. Participants in the health examination were offered screening for hepatitis B and C, HIV and syphilis. Notification prevalence in the National Infectious Diseases Register (NIDR) was compared between participants and non-participants to assess non-participation. Missed diagnosis was defined as test-positive case in the survey without previous notification in NIDR. Inverse probability weighting was used to correct for non-participation. RESULTS: Altogether 1000 migrants were screened for infectious diseases. No difference in the notification prevalence among participants and non-participants was observed. Seroprevalence of hepatitis B surface antigen (HBsAg) was 2.3%, hepatitis C antibodies 1.7%, and Treponema pallidum antibodies 1.3%. No cases of HIV were identified. Of all test-positive cases, 61% (34/56) had no previous notification in NIDR. 48% of HBsAg, 62.5% of anti-HCV and 84.6% of anti-Trpa positive cases had been missed. Among the Somali population (n = 261), prevalence of missed hepatitis B diagnosis was 3.0%. Of the 324 Russian migrants, 3.0% had not been previously diagnosed with hepatitis C and 2.4% had a missed syphilis diagnosis. In multivariable regression model missed diagnosis was associated with migrant origin, living alone, poor self-perceived health, daily smoking, and previous diagnosis of another blood-borne infection. CONCLUSIONS: More than half of chronic hepatitis and syphilis diagnoses had been missed among migrants in Finland. Undiagnosed hepatitis B among

Somali migrants implies post-migration transmission that could be prevented by enhanced screening and vaccinations. Rate of missed diagnoses among Russian migrants supports implementation of targeted hepatitis and syphilis screening upon arrival and also in later health care contacts. Coverage and up-take of current screening among migrants should be evaluated.

Germany

Germany - Brodzinski A, Neumeyer-Gromen A, Dudareva S, Zimmermann R, Latza U, Bremer V and Poethko-Müller C (2022). "**[Hepatitis B virus infection and vaccine-induced immunity: the role of sociodemographic determinants : Results of the study "German Health Interview and Examination Survey for Adults" (DEGS1, 2008-2011)]**." Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz **65**(2): 159-169.

BACKGROUND AND OBJECTIVE: Even though the prevalence of hepatitis B virus (HBV) infection in Germany is low, it is important to identify vulnerable groups and targeted approaches for infection prevention. Previous analyses from the "German Health Interview and Examination Survey for Adults" (DEGS1, 2008-2011) have shown that HBV infections and vaccination are associated with sociodemographic determinants. This paper examines the results in detail. MATERIALS AND METHODS: In the DEGS1, HBV serology was available for 7046 participants aged 18-79 years. HBV infection was defined by antibodies to hepatitis B core antigen (anti-HBc), vaccine-induced immunity by antibodies to hepatitis B surface antigen (anti-HBs) in the absence of other markers. Seroprevalences of HBV infection and vaccine-induced immunity were estimated stratified by sex, and associations with age, municipality size, income, formal education, health insurance and migration generation were analysed by logistic regression. RESULTS: In both sexes, HBV infection was independently associated with age groups 34-64 and ≥ 65 years, first migrant generation and living in larger municipalities as well as low income in men and low education in women. Vaccine-induced immunity was independently associated with age groups 18-33 and 34-64 years, middle and high education and high income in both sexes, middle income and private health insurance in men and having no migration background in women. CONCLUSIONS: HBV prevention measures should take into account migration status, income and education in order to focus prevention measures.

Germany - Zöllkau J, Ankert J, Pletz MW, Mishra S, Seliger G, Lobmaier SM, Prazeres Da Costa CU, Seidel V, Weizsäcker KV, Jablonka A, Dopfer C, Baier M, Horvatits T, Reiter-Owona I, Groten T and Schleenvoigt BT (2022). "**Hepatitis E, Schistosomiasis and Echinococcosis-Prevalence in a Cohort of Pregnant Migrants in Germany and Their Influence on Fetal Growth Restrictionv**." Pathogens **11**(1).

BACKGROUND: Infections, as well as adverse birth outcomes, may be more frequent in migrant women. Schistosomiasis, echinococcosis, and hepatitis E virus (HEV) seropositivity are associated with the adverse pregnancy outcomes of fetal growth restriction and premature delivery. METHODS: A cohort study of 82 pregnant women with a history of migration and corresponding delivery of newborns in Germany was conducted. RESULTS: Overall, 9% of sera tested positive for anti-HEV IgG. None of the patients tested positive for anti-HEV IgM, schistosomiasis, or echinococcus serology. Birth weights were below the 10th percentile for gestational age in 8.5% of the neonates. No association between HEV serology and fetal growth restriction (FGR) frequency was found. CONCLUSIONS: In comparison to German baseline data, no increased risk for HEV exposure or serological signs of exposure against schistosomiasis or echinococcosis could be observed in pregnant migrants. An influence of the anti-HEV serology status on fetal growth restriction could not be found.

Germany - Mattlinger C, Thumfart JO, Heinen W, Michels H, Berres M, Vogt M and Jansky M (2018). "**[Hepatitis C virus seroprevalence and dependency on country of origin of refugees in Rhineland-Palatinate, Germany in 2015]**." Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz **61**(11): 1472-1480.

BACKGROUND: Hepatitis C, a liver disease transmitted by the hepatitis C virus (HCV), can result in liver cirrhosis and hepatocellular carcinoma (HCC). According to WHO estimates for 2015, approximately 71 million people worldwide are chronically infected with HCV, representing 1% of the world population. Worldwide migration movements lead to immigration from HCV high- to low-prevalence countries. There are, however, no published data available on HCV seroprevalence and its correlation with the country of origin in current unselected larger refugee populations (>1000 people) having entered Europe/Germany. OBJECTIVES: Documentation and evaluation of hepatitis C seroprevalence and its correlation with the country of origin of refugees in Rhineland-Palatinate/Germany in 2015. METHODS: As part of routine diagnostics during the initial medical examination, 12,880 refugees in

Rhineland-Palatinate were screened for HCV antibodies in 2015. The data have been analyzed retrospectively and anonymously. RESULTS: The collective comprising 12,880 refugees showed a HCV seroprevalence of 1.5%. This is higher than the HCV prevalence of the general German population (0.5%). In particular, a correlation between HCV seroprevalence and the country of origin could be demonstrated. CONCLUSIONS: To reach the 2030 HCV-elimination target of the WHO, national and international recommendations to screen refugees/migrants from HCV high-prevalence countries for HCV should be emphasized. The chronically infected should be treated in accordance with HCV-guidelines. National, easily accessible information on HCV high-prevalence countries is required by attending physicians.

Germany - Jablonka A, Solbach P, Happle C, Hampel A, Schmidt RE and Behrens GMN (2017). "**[Hepatitis A immunity in refugees in Germany during the current exodus]**." Med Klin Intensivmed Notfmed **112**(4): 347-351.

Germany - Jablonka A, Solbach P, Wöbse M, Manns MP, Schmidt RE, Wedemeyer H, Cornberg M, Behrens GMN and Hardtke S (2017). "**Seroprevalence of antibodies and antigens against hepatitis A-E viruses in refugees and asylum seekers in Germany in 2015.v**" Eur J Gastroenterol Hepatol **29**(8): 939-945.

Germany - Hampel A, Solbach P, Cornberg M, Schmidt RE, Behrens GM and Jablonka A (2016). "**[Current seroprevalence, vaccination and predictive value of liver enzymes for hepatitis B among refugees in Germany]**." Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz **59**(5): 578-583.

Germany - Cai W, Poethko-Müller C, Hamouda O and Radun D (2011). "**Hepatitis B virus infections among children and adolescents in Germany: migration background as a risk factor in a low seroprevalence population.**" Pediatr Infect Dis J **30**(1): 19-24.

Italy

Italy – Pisaturo M, Alessio L, De Pascalis S, Messina V, Onorato L, Coppola N (2024). "**A model to eliminate viral hepatitis infection in migrants: a prospective, multicenter study in southern Italy**." Gastroenterology 166:191-193

No abstract.

Italy – Pisaturo M, Alessio L, Di Fraia A, Macera M, Minichini C, Cordua E, Onorato L, Scotto G, Di Caprio G, Calò F, Sagnelli C, Coppola N (2022). "**Hepatitis D virus infection in a large cohort of immigrants in southern Italy: a multicenter, prospective study.**" Infection 50:1565-1572

Background

Since few data are available in the literature on the prevalence of anti-Delta-positive subjects in immigrant populations, the aim of the present study was to evaluate the demographic and virological characteristics of HDV infection in a large cohort of immigrants living in southern Italy.

Methods

Between January 2012 and February 2020 all immigrants attending one of the 5 first- level centers were enrolled and screened for HBsAg, the HBsAg-positive for anti-Delta and if positive, for HDV-RNA and HDV genotype.

Results

Of the 3521 immigrants observed in the study period, 3417 (97.0%) agreed to be screened; they were mainly males (61%), with a median age of 27 years (IQR 8–74) and came prevalently (58%) from sub-Saharan Africa.

Of the 3417 patients enrolled, 319 (9%) subjects were HBsAg-positive, and of those, 8 (2.5%) were anti-Delta-positive. No difference in the demographic and epidemiological characteristics was observed between the anti-Delta-negative vs -positive. Of the 8 anti-Delta-positive subjects, only one was HDV-RNA-positive (viral load: 7050 IU/mL), genotype 1, with clinical signs of cirrhosis.

Conclusions

the present study showed a prevalence of HDV of 2.5% in a large cohort of asymptomatic immigrants, suggesting the need for screening campaigns for viral infections including delta hepatitis in this population.

Italy - D'Angelo F, Ferrigno L, Mele A, Alfonsi V, Declich S, De Ponte G, Crateri S, Burgio A, Caminada S, Tosti ME, On Behalf Of The Seieva Collaborating Group (2021). **Differences in incidence of acute viral hepatitis between foreigners and autochthonous population in Italy.** Int J Environ Res Public Health. Jul 27;18(15):7944. Doi: 10.3390/ijerph18157944.

Background: In European countries, the prevalence of HBV and HCV in refugees and migrants tends to reflect the prevalence in their countries of origin. The aim of this study is to analyse acute viral hepatitis cases diagnosed in Italy among foreign citizens and to compare incidence rates in foreigners and Italians. Methods: We analysed the cases of each viral hepatitis type among foreigners. Standardised incidence rates were compared between natives and foreigners.

Results: Between 2004 and 2019, 15,872 cases of acute viral hepatitis were notified by 10 Italian regions, 14.8% among foreign citizens. Until 2012, the percentage increased gradually, while a fluctuating trend set in from 2013 onwards; in 2019, 23.9% of cases were foreigners. Data from the SEIEVA surveillance show higher standardised incidence rates of hepatitis A and B among foreign citizens; no significant difference emerged between Italians and foreigners in terms of their hepatitis C incidence.

Conclusions: foreign citizens have an increased incidence of hepatitis A and B. Regarding hepatitis A, vaccination is strongly recommended to foreigners travelling to their countries of origin. Screening tests for hepatitis B and C infection should be offered to newly arrived migrants from high prevalence countries, or having specific risk factors.

Italy – Tosti ME, Marceca M, Eugeni E, D'Angelo F, Geraci S, Declich S, Della Seta M, Ferrigno L, Marrone R, Pajno C, Pizzarelli S, Rosso A, De Ponte G, Mirisola C, Baglio G (2021). **Health assessment for migrants and asylum seekers upon arrival and while hosted in reception centres: Italian guidelines.** Health Policy. March;125(3):393-405. Doi: 10.1016/j.healthpol.2020.12.010.

Background: During 2016-17, national guidelines were developed in order to provide evidence-based recommendations on health assessments for migrants and asylum seekers upon their arrival in Italy.

Methods: Scientific literature published between 2005 and 2016 was searched in different databases. A free search was also performed on international organizations' websites in order to identify additional relevant documents. A multidisciplinary panel discussed the resulting evidence and formulated recommendations.

Results: Evidence-based recommendations were formulated: signs and symptoms of specific diseases should to be actively searched for active TB, malaria, STI, intestinal parasites, diabetes, anaemia. In case of other health conditions (latent TB, HIV, HBV, HCV, STI, strongyloides, schistosoma, diabetes), testing should be offered to asymptomatic subjects coming from endemic areas or exposed to risk factors. Mass screening is recommended for anaemia and hypertension; a pregnancy test should be considered, while inclusion in cervical cancer screening and vaccination programs is recommended. A modulated, progressive approach was developed, covering an initial evaluation during rescue operations, a full medical examination at first line reception stage and the referral to national health services during second line reception.

Conclusions: It is important to produce and periodically update guidelines on these issues and local peculiarities should be taken into account in their design and implementation. Guidelines can not only support economic sustainability, but also counteract stigmatization dynamics.

Italy - Marchese V, Beltrame A, Angheben A, Marocco S, Gaeta GB and Bisoffi Z (2020). "**The impact of schistosomiasis co-infection in the presentation of viral hepatitis B in migrants: An observational study in non-endemic area**." Travel Med Infect Dis **35**: 101467.

BACKGROUND: In Europe, the prevalence rates of schistosomiasis and HBV infection in migrants from sub-Saharan Africa are high. The co-infection schistosomiasis-HBV has been scarcely studied. METHODS: This is a retrospective study assessing differences in clinical presentation, laboratory and ultrasound findings in a cohort of migrants admitted at the Department of Infectious - Tropical Diseases and Microbiology IRCCS Sacro Cuore Don Calabria Hospital of Negrar (Northeast Italy) with schistosomiasis, HBV infection or both. RESULTS: Of the 227 migrants, 175 (77.1%) with a diagnosis of schistosomiasis were classified as SCHISTO group, 35 (15.4%) with schistosomiasis and hepatitis B were classified as SCHISTO/HBV group, and 17 (7.5%) patients with a diagnosis of HBV infection were classified as HBV group. S. mansoni was found in 47 patients, classified in MANSONI (38/175, 21.7%) or MANSONI/HBV (9/35, 25.7%) group depending on HBsAg status. Mean transaminases and APRI index values were higher in SCHISTO/HBV compared to SCHISTO group ($p < 0.01$). AST differed between MANSONI/HBV and MANSONI group ($p = 0.038$). No differences were found between SCHISTO/HBV and HBV group.

Eosinophil count and total IgE differed only between MANSONI/HBV and HBV group (p = 0,049). CONCLUSIONS: Schistosomiasis seems not to increase the liver damage in people with HBV infection. Conversely, finding elevated transaminases in patients with schistosomiasis should alert for presence of HBV.

Italy - Marrone R, Baglio G, Bruscino G, Costanzo G, Cavani A and Mirisola C (2020). "**Prevalence of latent tuberculosis infection, hepatitis B, hepatitis C, and syphilis among newly arrived unaccompanied minors living in reception centers in Rome**." Int J Infect Dis **101**: 126-130.

OBJECTIVE: This study aimed to address the prevalence of infectious diseases in a population of unaccompanied immigrant minors living in reception centres of Rome, Italy. METHODS: The study was carried out from January 2013 to January 2019. All unaccompanied immigrant minors were screened for hepatitis B, hepatitis C, syphilis and latent tuberculosis infection. RESULTS: A total of 879 unaccompanied immigrant minors, 858 males and 21 females, aged 13-18 years old were studied. Of these, 615 were from Africa, 179 from Asia and 84 from Eastern Europe. A low prevalence of HBsAg carriage (2.5%) was observed as was very low prevalence of hepatitis C (0.72%) and latent syphilis (0.4%); latent tuberculosis, defined as tuberculin skin test (TST)+ X-ray case, was diagnosed in 102 (12%) minors. CONCLUSIONS: Similar to previous studies, these data demonstrate that migrant minors are generally healthy. However, given the relatively high prevalence of hepatitis B and latent tuberculosis, systematic screening for these diseases among immigrant minors immigrants is highly recommended for early detection and treatment of potentially transmissible diseases.

Italy - Bradanini L, Youkee D, Fabris P, Romanò L, Brunetti E and Giordani MT (2017). "**Acute hepatitis E virus infection in a migrant population in North East Italy: A retrospective analysis.**" Travel Med Infect Dis **20**: 37-42.

Italy - Scotto G, Armignacco O, Starnini G, Francavilla R, Foti G, Portelli V, Mazzeo M, Minerva N, Carretta V, Lo Muzio L and Fazio V (2016). "**Hepatitis C and immigration: a multicentre study**." Infez Med **24**(3): 210-216.

Italy - Buja A, Martines D, Lobello S, Vinelli A, Bardelle G, Lopatriello S, De Lazzari F, Perrier L and Baldo V (2015). "**A cost-consequence analysis of hepatitis B screening in an immigrant population**." Ann Ist Super Sanita **51**(4): 327-335.

Italy - Villano U, Lo Presti A, Equestre M, Cella E, Pisani G, Giovanetti M, Bruni R, Tritarelli E, Amicosante M, Grifoni A, Scarcella C, El-Hamad I, Pezzoli MC, Angeletti S, Ciccaglione AR and Ciccozzi M (2015). "**Molecular epidemiology and phylogenetic analysis of Hepatitis B virus in a group of migrants in Italy**." BMC Infect Dis **15**: 287.

Erratum to: Molecular epidemiology and phylogenetic analysis of Hepatitis B virus in a group of migrants in Italy - PubMed (nih.gov)

Netherlands

Netherlands - Eijsink JFH, Al Khayat M, Boersma C, Ter Horst PGJ, Wilschut JC and Postma MJ (2021). "**Cost-effectiveness of hepatitis C virus screening, and subsequent monitoring or treatment among pregnant women in the Netherlands**." Eur J Health Econ **22**(1): 75-88.

BACKGROUND: The prevalence of diagnosed chronic hepatitis C virus (HCV) infection among pregnant women in the Netherlands is 0.26%, yet many cases remain undiagnosed. HCV screening and treatment of pregnant HCV carriers could reduce the burden of disease and limit vertical transmission from mother to child. We assessed the impact of HCV screening and subsequent treatment with new direct-acting antivirals (DAAs) among pregnant women in the Netherlands. METHODS: An HCV natural history Markov transition state model was developed, to evaluate the public-health and economic impact of HCV screening and treatment. Besides all 179,000 pregnant women in the Netherlands (cohort 1), we modelled 3 further cohorts: all 79,000 first-time pregnant women (cohort 2), 33,000 pregnant migrant women (cohort 3) and 16,000 first-time pregnant migrant women (cohort 4). Each cohort was analyzed in various scenarios: i no intervention, i.e., the current practice, ii screen-and-treat, i.e., the most extensive approach involving treatment of all individuals found HCV-positive, and iii screen-and-treat/monitor, i.e., a strategy involving treatment of symptomatic (F1-F4) patients and follow-up of asymptomatic (F0) HCV carriers with subsequent treatment only at progression. RESULTS: For all cohorts, comparison between scenarios (ii) and (i) resulted in ICERs between €9,306 and €10,173 per QALY gained and 5 year budget impacts varying between €6,283,830 and €19,220,405. For all cohorts,

comparison between scenarios (iii) and (i) resulted in ICERs between €1,739 and €2,749 per QALY gained and budget impacts varying between €1,468,670 and €5,607,556. For all cohorts, the ICERs (scenario iii versus ii) involved in delayed treatment of asymptomatic (F0) HCV carriers varied between €56,607 and €56,892, well above the willingness-to-pay (WTP) threshold of €20,000 per QALY gained and even above a threshold of €50,000 per QALY gained. CONCLUSION: Universal screening for HCV among all pregnant women in the Netherlands is cost-effective. However, it would be reasonable to consider smaller risk groups in view of the budget impact of the intervention.

Netherlands - Zuure F, Bil J, Visser M, Snijder M, Boyd A, Blom P, Sonder G, Schinkel J and Prins M (2019). "**Hepatitis B and C screening needs among different ethnic groups: A population-based study in Amsterdam, the Netherlands.**" JHEP Rep **1**(2): 71-80.

Data on the prevalence of chronic hepatitis B (HBV) and hepatitis C (HCV) virus infections, including the proportion of individuals aware of infection, are scarce among migrants living in Europe. We estimated the prevalence of past and present HBV and HCV infection, along with their determinants and peoples' awareness of infection status, among different groups of first-generation migrants and Dutch-origin residents of Amsterdam. METHODS: Cross-sectional data of 998 Surinamese (mostly South-Asian and African-Surinamese), 500 Ghanaian, 497 Turkish, 498 Moroccan and 500 Dutch-origin participants from the observational population-based HELIUS study were used. Blood samples of participants were tested for HBV and HCV infection. Infection awareness was determined using records from participants' general practitioners. RESULTS: Age- and gender-adjusted chronic HBV prevalence was highest among Ghanaian participants (5.4%), followed by Turkish (4.1%), African-Surinamese (1.9%), Moroccan (1.2%), South-Asian Surinamese (0.9%) and Dutch (0.4%) participants. A total of 58.1% of the cases were aware of their infection. In multinomial logistic regression analyses, Ghanaian (adjusted odds ratio [aOR] 42.23; 95% confidence interval [CI] 9.29-192.01), African-Surinamese (aOR 6.16; 95% CI 1.27-29.79), and Turkish (aOR 13.44; 95% CI 2.94-61.39) participants were at increased risk of chronic HBV infection compared with those of Dutch origin. Older participants were also at increased risk (aOR 1.02 per year; 95% CI 1.00-1.05), whereas women were at lower risk (aOR 0.49; 95% CI 0.29-0.83). HCV prevalence was 0.4% (95% CI 0.1-1.3%) among Dutch and African-Surinamese and 0% (95% CI 0.0-0.5%) for each of the other groups; all cases with follow-up data were aware of their infection. CONCLUSIONS: Ghanaian, Turkish and African-Surinamese first-generation migrants are at increased risk of chronic HBV infection and many are unaware of their infection, whereas HCV prevalence was low among all ethnic groups. Screening campaigns are urgently warranted and need to consider specific ethnic groups. LAY SUMMARY: First-generation migrants of Ghanaian, Turkish and African-Surinamese origin were at increased risk of chronic hepatitis B infection, with most infections occurring in older individuals and males. Since over 40% of people were unaware of their chronic hepatitis B infection, screening of these migrant groups is urgently needed. The proportion of first-generation migrants chronically infected with hepatitis C virus was very low among all groups studied.

Netherlands/Belgium - Koc Ö M, Robaeys G, Yildirim B, Posthouwer D, Hens S and Koek GH (2018). "**Horizontal hepatitis B virus transmission through non-sexual close contact in Turkish chronic hepatitis B patients living outside of Turkey.**" Acta Gastroenterol Belg **81**(4): 503-508.

BACKGROUND AND AIMS: Hepatitis B virus (HBV) infection is a global threat and with the growing cultural diversity in Western Europe, knowledge on routes of infection in order to decrease HBV spreading is essential. This study assessed the risk of horizontal transmission through non-sexual close contact in the chronic hepatitis B (CHB) population in Maastricht (the Netherlands) and Genk (Belgium), with a main focus on the differences between ethnic groups. METHODS: In this multicenter retrospective study, 166 CHB patients, who were still under follow-up between December 2009 to December 2014, were recruited from the Hepatology Outpatient Departments of two hospitals, one in Maastricht and one in Genk. Ethnicity (defined as country of origin (COO)) and routes of transmission were collected from all patients. RESULTS: The CHB population in Maastricht and Genk consisted of 98 and 68 patients, respectively. In Maastricht, 31% were of Dutch and 16% of Chinese origin. In Genk, mainly Belgian (15%) and Turkish (50%) patients were included. The percentage of horizontal transmission in the total study cohort was 9%. Moreover, the COO groups Dutch/Belgian (n=40), Turkish (n=38) and Chinese (n=18) differed in the number of cases infected by horizontal transmission (4%, 30% and 6%, p=0.030). CONCLUSION: Although the prevalence of horizontal transmission in the total study cohort is low, non-sexual close contact may play a role in the migrant population, particularly the

Turkish. This should be an important public health target with respect to the prevention of HBV spreading.

Netherlands - Suijkerbuijk AWM, van Hoek AJ, Koopsen J, de Man RA, Mangen MJ, de Melker HE, Polder JJ, de Wit GA and Veldhuijzen IK (2018). "**Cost-effectiveness of screening for chronic hepatitis B and C among migrant populations in a low endemic country**." PLoS One **13**(11): e0207037.

BACKGROUND: Chronic infection with hepatitis B or C virus (HBV/HCV) can progress to cirrhosis, liver cancer, and even death. In a low endemic country as the Netherlands, migrants are a key risk group and could benefit from early diagnosis and antiviral treatment. We assessed the cost-effectiveness of screening foreign-born migrants for chronic HBV and/or HCV using a societal perspective. METHODS: The cost-effectiveness was evaluated using a Markov model. Estimates on prevalence, screening programme costs, participation and treatment uptake, transition probabilities, healthcare costs, productivity losses and utilities were derived from the literature. The cost per Quality Adjusted Life Year (QALY) gained was estimated and sensitivity analyses were performed. RESULTS: For most migrant groups with an expected high number of chronically infected cases in the Netherlands combined screening is cost-effective, with incremental cost-effectiveness ratios (ICERs) ranging from €4,962/QALY gained for migrants originating from the Former Soviet Union and Vietnam to €9,375/QALY gained for Polish migrants. HBV and HCV screening proved to be cost-effective for migrants from countries with chronic HBV or HCV prevalence of ≥0.41% and ≥0.22%, with ICERs below the Dutch cost-effectiveness reference value of €20,000/QALY gained. Sensitivity analysis showed that treatment costs influenced the ICER for both infections. CONCLUSIONS: For most migrant populations in a low-endemic country offering combined HBV and HCV screening is cost-effective. Implementation of targeted HBV and HCV screening programmes to increase early diagnosis and treatment is important to reduce the burden of chronic hepatitis B and C among migrants.

Netherlands - Sadik S, van Rijckevorsel GG, van Rooijen MS, Sonder GJ and Bruisten SM (2016). "**Seroprevalence of hepatitis E virus differs in Dutch and first generation migrant populations in Amsterdam, the Netherlands: a cross-sectional study**." BMC Infect Dis **16**(1): 659.

Netherlands - Whelan J, Sonder G and van den Hoek A (2013). "**Declining incidence of hepatitis A in Amsterdam (The Netherlands), 1996-2011: second generation migrants still an important risk group for virus importation**." Vaccine **31**(14): 1806-1811.

Netherlands - Richter C, Beest GT, Sancak I, Aydinly R, Bulbul K, Laetemia-Tomata F, De Leeuw M, Waegemaekers T, Swanink C and Roovers E (2012). "**Hepatitis B prevalence in the Turkish population of Arnhem: implications for national screening policy?**" Epidemiol Infect **140**(4): 724-730.

Netherlands - Whelan J, Sonder G, Heuker J and van den Hoek A (2012). "**Incidence of acute hepatitis B in different ethnic groups in a low-endemic country, 1992-2009: increased risk in second generation migrants**." Vaccine **30**(38): 5651-5655.

Netherlands - Urbanus AT, van de Laar TJ, van den Hoek A, Zuure FR, Speksnijder AG, Baaten GG, Heijman T, Vriend HJ, Op de Coul EL, Coutinho RA and Prins M (2011). "**Hepatitis C in the general population of various ethnic origins living in the Netherlands: should non-Western migrants be screened?**" J Hepatol **55**(6): 1207-1214.

Spain

Spain – Reyes-Uruena J, Costell-Gonzalez F, Agea-Cortés L, Ouaarab H, Saludes V, Buti M, Roca XMI, Colom J, Prat JGI, Casabona J, Martro E, HepClink Study Group (2023). **"Implementation of the HepC link test-and-treat community strategy targeting Pakistani migrants with hepatitis C living in Catalonia (Spain) compared with the current practice of the Catalan health system: budget impact analysis"** BMJ Open Aug 21;13(8):e068460. Doi: 10.1136/bmjopen-2022-068460

Objectives: To perform a budget impact analysis of the HepC*link* test-and-treat strategy in which community health agents offer hepatitis C virus (HCV) testing, diagnosis and treatment to the Pakistani population living in Catalonia compared with the current practice of the Catalan health system (without targeted screening programmes).

Methods: We estimated the population of adult Pakistani migrants registered at the primary care centres in Catalonia by means of the Information System for the Development of Research in Primary Care (n=37 972 in 2019, Barcelona health area). This cohort was followed for a time period of 10 years after HCV diagnosis (2019-2028). The statistical significance of the differences observed in the anti-HCV positivity rate between screened and non-screened was confirmed (α=0.05). The budget impact was calculated from the perspective of the Catalan Department of Health. Sensitivity analyses included different levels of participation in HepC*link*: pessimistic, optimistic and maximum.
Results: The HepC*link* scenario screened a higher percentage of individuals (69.8%) compared with the current scenario of HCV care (39.7%). Viraemia was lower in the HepC*link* scenario compared with the current scenario (1.7% vs 2.5%, respectively). The budget impact of the HepC*link* scenario was €884 244.42 in 10 years.
Conclusions: Scaling up the HepC*link* strategy to the whole Catalan territory infers a high budget impact for the Department of Health and allows increasing the detection of viraemia (+17.8%) among Pakistani migrants ≥18 years. To achieve a sustainable elimination of HCV by improving screening and treatment rates, there is room for improvement at two levels. First, taking advantage of the fact that 68.08% of the Pakistani population had visited their primary care physicians to reinforce targeted screening in primary care. Second, to use HepC*link* at the community level to reach individuals with reluctance to use healthcare services.

Spain - Dopico E, Rodriguez-Frias F, Ubillos I, Rando-Segura A, Garcia-Cehic D, Gregori J, Rando-Matos Y, Solsona L, Niubó J, Esteban JI, Costa J, Martínez MJ, Quer J (2022). "**Prevalence of Hepatitis C Virus Infection, Genotypes and Subtypes in Migrants from Pakistan in Barcelona, Spain**" Infect Drug Resist Aug 18:15:4637-4644

Background: Hepatitis C virus (HCV) is a major cause of chronic liver infection with 71 million people infected worldwide. Pakistan has the second highest prevalence of HCV infection and more than half (52%) of Pakistani living in Spain reside in Barcelona. The aim of this study was to analyse the seroprevalence and viraemic rate and determine the genotypes and subtypes of HCV among Pakistanis living in the southern metropolitan area of Barcelona.
Methods: We included all Pakistani patients seeking primary healthcare in the southern metropolitan area of Barcelona from August 2011 to July 2014. Serum samples were screened for HCV antibodies. HCV viral load was determined by reverse transcription polymerase chain reaction and genotypes and subtypes were performed using Versant HCV Genotype and/or deep-sequencing. Screening for hepatitis B virus (HBV) was also carried out.
Results: Among 5877 Pakistani patients, 565 (9.61%) were screened for anti-HCV antibodies, with 68 (12.04%) being positive. The viral load was determined in 65, with 31 presenting active infection and the viraemic rate was 47.69% (95% confidence interval 36.02-59.62). HCV genotyping and subtyping were performed in 24 individuals. Most infections corresponded to HCV genotype 3 (91.67%), and high resolution HCV subtyping was performed in 18 samples, 16 of which presented subtype 3a. One subject presented HBV coinfection with undetectable HBV DNA. During the study period, we identified a possible case of HCV vertical transmission followed by spontaneous viraemia clearance in a chronically infected mother with a C/T IL28B genetic polymorphism.
Conclusion: These results suggest that general HCV screening protocols in patients from high prevalence countries, such as Pakistan, would be helpful to identify and treat active HCV infections. This could avoid further transmission and contribute to building targeted health policies for micro-elimination of HCV infection in specific communities.

Spain - Martró E, Ouaarab H, Saludes V, Buti M, Treviño B, Roade L, Egea-Cortés L, Reyes-Ureña J, Not A, Majó X, Colom J and Gómez IPJ (2022). "**Pilot hepatitis C micro-elimination strategy in Pakistani migrants in Catalonia through a community intervention**." Liver Int **42**(8): 1751-1761.

BACKGROUND AND AIMS: Pakistani migrants in Catalonia, Spain, could have high hepatitis C virus (HCV) prevalence. The aims of the HepClink study were (i) to implement and assess the quality of a micro-elimination strategy based on a community intervention and (ii) to obtain data from primary care (PC) registries as a baseline comparator. METHODS: The community intervention targeted Pakistani adults and consisted of education, screening and simplified access to treatment. Quality indicators were calculated (effectiveness, impact and acceptability). The testing rate, the prevalence of HCV antibodies and HCV-RNA were compared with those observed in the Pakistani population accessing PC in the previous year. RESULTS: A total of 505 participants were recruited through the community intervention (64.6% men, median 37 years) vs those accessing PC (N = 25 455, 70.9% men, median 38 years). Among

study participants, 35.1% did not know about HCV and 9.7% had been previously tested. The testing rate in the community intervention was 99.4% vs 50.7% in PC. Prevalence was 4.6% vs 7.1% (p = .008) for HCV antibodies and 1.4% (3/6 new diagnoses) vs 2.4% (p = .183) for HCV-RNA. Among the six viremic patients, three began treatment within the intervention and two through the usual circuit and all completed the full course. CONCLUSIONS: This novel community intervention was well accepted and effective at reaching a Pakistani migrant population with a low-level knowledge of HCV and largely not tested before. The observed prevalence and the high unawareness of their HCV status justify a targeted screening in this group both in the community and in PC.

Spain - Alarcón Linares ME, Romay Barja M, Torres Cantero A and Requena-Méndez A (2021). "**Review of hepatitis C screening programs for immigrants in Spain from endemic countries**." Rev Esp Enferm Dig **113**(1): 7-13.

BACKGROUND: hepatitis C virus (HCV) screening strategies in European countries do not usually include the migrant population from endemic countries as a target group for screening. The aim of this study is to describe and to evaluate HCV screening strategies for the migrant population residing in Spain and to compare the differences at a regional level. METHODS: on-line research on every Health Public Department's website of each autonomous community was carried out during 2017 and 2019. RESULTS: Aragon, Cantabria, Catalunya, Canary Islands and Madrid have HCV screening programmes and include migrants from high-endemic countries as a high-risk group that should be targeted in the screening programme. The Valencian Community and the Basque Country have an HCV programme although migrants for high endemic countries are not included as a high-risk group. Finally, the other autonomic communities have no specific programme for HCV in place. Few of them have a screening control system and/or evaluation. CONCLUSION: there is heterogeneity on the different HCV autonomic programs concerning the risk groups that should be targeted. A homogenization of such criteria would be recommended. HCV screening in migrant populations from endemic countries should be extended to the rest of autonomic communities. More measures for control and evaluation should be implemented in autonomic strategies with specific indicators for migrant populations.

Spain - Folch C, Saludes V, Reyes-Ureña J, Antuori A, Ibáñez N, Majó X, Colom J, Matas L, Casabona J and Martró E (2021). "**The hepatitis C care cascade among people who inject drugs accessing harm reduction services in Catalonia: Major gaps for migrants**." Int J Drug Policy **90**: 103057.

BACKGROUND: This study aimed to describe the HCV cascade of care among people who inject drugs (PWID) in Catalonia, as well as to compare the observed gaps in care between Spanish-born and migrant PWID. METHODS: A cross-sectional study of PWID (N = 410) attending four harm reduction services (HRS) was performed in 2016-17 (HepCdetect II Study). Participants were tested for both HCV antibodies (rapid testing) and RNA (from dried blood spot samples). The HCV care cascade was estimated from HCV testing results combined with self-reported data on previous testing, diagnosis and treatment collected through a questionnaire. Logistic regressions were used to test for an association between migration status and the proportions observed in each step of the HCV care cascade adjusting for age, sex, years of injection, homelessness, and treatment for drug dependence. RESULTS: Overall, 85.4% were men and 28.0% were migrants. Among Spanish-born (n = 295) and migrant (n = 115) PWID participants in the study, 96.6% vs. 88.6% had previously been HCV screened (AOR=3.11; 95% CI: 1.11-8.65), 79.3% vs. 80.9% were antibody positive, and 70.7% vs. 67.6% were HCV-RNA positive or cured with treatment; among the latter, 36.6% vs. 18.2% had started treatment (AOR=2.41; 95% CI: 1.09-5.34), and 20.6% vs. 9.1% had been cured by treatment, respectively. Unawareness of having hepatitis C was more common among migrants than Spanish-born PWID (46.0% and 31.5%, respectively; p<0.05). CONCLUSION: This study estimates the HCV care cascade among Spanish-born and migrant PWID in Catalonia for the very first time, and highlights a higher attrition of migrant PWID in all HCV care cascade stages. The observed limited linkage to care and treatment by PWID that attend the HRS network warrants future implementation of decentralized diagnosis and antiviral treatment. Strategies focusing on migrants by increasing HCV screening coverage and treatment access will be especially relevant in our setting.

Spain - Alarcón Linares ME, Torres Cantero A, Subirá C, Ramírez Rubio O, Crespo J, Lazarus JV and Requena-Méndez A (2019). "**Geographic analysis and estimation of hepatitis C cases in migrant populations living in Spain: is a country-based screening strategy appropriate?**" Rev Esp Enferm Dig **111**(8): 615-625.

BACKGROUND: Spain needs to increase the number of new known cases in order to achieve the goal of eliminating hepatitis C virus (HCV) by 2030. The aim of this study was to estimate the number of HCV

cases among the migrant population in Spain and propose different scenarios for micro-elimination strategies, targeting the most relevant migrant groups. METHODOLOGY: this epidemiological and demographic cross-sectional descriptive study employed a systematic approach to estimate the number of migrants infected by HCV in Spain. Estimates are based on demographic data and details the size of the foreign-born population living in every Spanish province and the anti-HVC+ prevalence rates in their respective countries of origin. RESULTS: in Spain, there are 100,268 estimated cases of anti-HCV+ among the total adult migrant population who live in the country. The estimated cases of anti-HCV+ among migrants from moderate-high endemic countries with a prevalence of ≥ 2%, > 3%, > 4% and > 5% are 48,979, 48,029, 24,176 and 15,646, respectively. The anti-HCV+ endemic countries (≥ 2%) that contribute to the highest number of estimated cases in Spain are Romania, Italy, Pakistan, Ukraine, Senegal, Russia and Nigeria. The autonomous communities with the highest prevalence and number of estimated anti-HCV+ cases among migrant population are Catalonia, Valencian Community, Madrid and Andalusia, respectively. CONCLUSION: these data show the need to establish HCV screening strategies for the migrant population in Spain and, particularly, in the most affected areas. The strategy should target those migrant communities with a higher prevalence and a higher number of estimated cases, such as people from Eastern Europe, Sub-Saharan Africa and Pakistan.

Spain - Lazarus JV, Bromberg DJ, Del Amo J, Norgaard O, García-Samaniego J, Casellas A, Calleja JL and Requena-Méndez A (2019). "**Hepatitis C prevalence among the migrant population in Spain: A systematic review and meta-analysis.**" Enferm Infecc Microbiol Clin (Engl Ed) **37**(4): 222-230.

INTRODUCTION: Spain, which has one of the largest migrant populations in Europe, has committed to eliminating the hepatitis C virus (HCV). The aim of this study was to estimate the prevalence of HCV among migrant groups in Spain, a country of 46 million people, with an estimated HCV-antibody prevalence of 1.7%. METHODS: Studies on HCV and migration in Spain were identified by systematically searching three databases from the first records to 30 November 2017, and consulting experts at the Ministry of Health and in the 17 Spanish autonomous communities. A meta-analysis was conducted to determine pooled HCV prevalence for the general migrant population. Prevalences were also calculated for high-risk migrant populations and populations who had undergone hospital screening, stratified by region of origin. RESULTS: Out of 243 studies identified, 26 met the eligibility criteria. The meta-analysis of the general migrant population found HCV antibody prevalence to be 1.6%. Migrants originating from European countries, including those at high or moderate risk for HCV, had the highest pooled prevalence (7.1%). In the general migrant population, prevalence was highest among sub-Saharan African migrants (3.1%) and lowest among Latin American migrants (0.2%). CONCLUSION: Based on the limited available data, the prevalence among the general migrant population was found to be the same as the general Spanish population. Further research is needed to more accurately determine HCV prevalence for the overall migrant population and specific migrant subpopulations with a higher risk in the country as a whole and in each of Spain's 17 autonomous communities.

Sweden

Ramirez KG (2016). **Tailoring Immunization Programmes (TIP) an example of tailoring communication on vaccinations targeting hard-to-serve communities in Sweden (vhpb.org)**. VHPB technical meeting, Slovenia, Ljubljana.

ReHIn - a research project on Refugees' Health Integration | Karolinska Institutet (ki.se)

Switzerland

Switzerland - Fahrni O, Posfay-Barbe KM and Wagner N (2020). "**Immunization Against Hepatitis A in Migrant Children: Three Vaccination Strategies, A Retrospective Study**." Pediatr Infect Dis J **39**(2): 164-169.

BACKGROUND: Hepatitis A is endemic in many countries. Swiss guidelines recommend vaccinating patients native from endemic areas. In Geneva's Children's hospital, migrant children are screened and vaccinated if seronegative. Because hepatitis A's prevalence is decreasing worldwide, more children are seronegative at arrival, highlighting the need for immunization in medical centers and refugee camps and questioning the benefits of systematic serology. Other Swiss hospitals vaccinate regardless of serostatus. This study's aim is to assess migrant children's immunity according to origin and age, and the cost-effectiveness of different immunization strategies. METHODS: We retrospectively analyzed 329 children's serostatus (1-16 years of age) between 2012 and 2015, using enzyme-linked fluorescent assay

method. Serology and vaccine costs were based on local prices. Groups were compared with χ test and the age-seropositivity relationship was studied with linear regression. RESULTS: The predominant regions were the Eastern Mediterranean and European Regions with mostly negative serologies (71% and 83%) and the African Region with mostly positive serologies (79%). Immunity varied depending on birth country. Regardless of region, seropositivity increased with age (P < 0.001). The most cost-effective vaccination strategy was an individualized approach based on age and origin, reducing costs by 2% compared with serology-guided immunization and by 17% compared with systematic vaccination. CONCLUSIONS: Many migrant children >5 years old are seronegative and at risk of clinical infection. They need to be immunized. New guidelines according to age and origin should be defined to reduce immunization costs. We recommend systematic vaccination for patients <5 years old or native from low endemicity areas (≤25.7% of seropositivity). For the others, we propose serology-based vaccination.

Switzerland - Fougère Y, El Houss S, Suris JC, Rouvenaz-Defago S, Miletto D, Von der Weid L, Willen F, Williams-Smith JA, Gehri M and Crisinel PA (2018). "**High coverage of hepatitis B vaccination and low prevalence of chronic hepatitis B in migrant children dictate a new catch-up vaccination strategy**." Vaccine **36**(30): 4501-4506.

BACKGROUND: Worldwide coverage of hepatitis B (HB) vaccination is increasing. This should be considered when determining the best strategy for catch-up HB vaccination in migrant children, who rarely have written proof of past immunizations. This study aimed to estimate HB vaccine protection, chronic HB prevalence and to identify determinants of vaccine protection. METHODS: Newly arrived migrant children at Lausanne University Hospital from October 2014 to July 2017 were prospectively enrolled. Children and adolescents aged 1-18 years were approached for inclusion if they had no proof of past vaccinations and accepted a single dose of injected HB vaccine. HB surface antibody (anti-HBs) serology was performed after 4-6 weeks. Anti-HBs ≥100 IU/L were considered consistent with a booster-type antibody response. Patients with anti-HBs <100 IU/L received additional dose(s) of HB vaccine, after exclusion of chronic HB in children with anti-HBs <10 IU/L. Potential determinants of vaccine response were compared between children with and without booster-type response. RESULTS: Two hundred children were available for analysis. Median age was 8.9 years (IQR 4.8-12.9), and 97 (49%) were female. The majority (n = 124, 62%) came from the region classified by the WHO as eastern Mediterranean. One hundred and sixty-one children (81%) had a booster-type antibody response. Only 1 patient (<1%) had chronic HB. In the multivariate analysis, younger age (OR per decreasing-year, 1.28; 95%CI, 1.05-1.57; p = 0.017) and migration from an urban area (OR 1.16; 95%CI, 1.01-1.33; p = 0.043) were the only significant determinants of booster-type response. CONCLUSION: Post-vaccine serology may be used to identify a high proportion of individuals in our pediatric migrant population with previous immunization for HB. Our study also showed extremely low prevalence of chronic HB. No variable could definitively determine the results of serology. Post-vaccine serology represents the most effective strategy in this context of high vaccine coverage.

UK

Gogoi M, Martin CA, Bird PW, Wiselka MJ, Gardener J, Ellis E, Renals V, Lewszuk AJ, Hargreaves S, Pareek M (2024). **Risk of vaccine preventable diseases in UK migrants: A serosurvey and concordance analysis.** J Migr Health. **Feb 25**:9:100217. doi: 10.1016/j.jmh.2024.100217. eCollection 2024.

Background: Vaccine preventable diseases (VPDs) such as measles and rubella cause significant morbidity and mortality globally every year. The World Health Organization (WHO), reported vaccine coverage for both measles and rubella to be 71 % in 2019, indicating an immunity gap. Migrants in the EU/EEA may be at high risk of VPDs due to under-immunisation and poor living conditions. However, there are limited data on VPD seroprotection rates amongst migrants living in the United Kingdom (UK). Methods: We conducted an exploratory cross-sectional serosurvey amongst a sample of adult migrants living in Leicester, UK to: (a) determine seroprotection rates for measles, varicella zoster, and rubella in this group; (b) identify risk factors associated with seronegativity and, (c) understand if self-reported vaccine or diseases history is an effective measure of seroprotection. Participants gave a blood sample and completed a questionnaire asking basic demographic details and vaccine and disease history for the three VPDs. We summarised the data using median and interquartile range (IQR) for non-parametric continuous variables and count and percentage for categorical variables. We used logistic regression to establish predictors of seroprotection against these diseases. We examined the reliability of self-reported vaccination/disease history for prediction of seroprotection through a concordance analysis.

Results: 149 migrants were included in the analysis. Seroprotection rates were: varicella zoster 98 %, rubella 92.6 % and measles 89.3 %. Increasing age was associated with seroprotection (OR 1.07 95 % CI 1.01-1.13 for each year increase in age). Migrants from Africa and the Middle East (aOR 15.16 95 % CI 1.31 - 175.06) and South/East Asia and Pacific regions (aOR 15.43 95 %CI 2.38 - 100.00) are significantly more likely to be seroprotected against measles as compared to migrants from Europe and Central Asia. The proportions of migrants unsure about their vaccination and disease history combined were 53.0 % for measles; 57.7 % for rubella; 43.0 % for varicella. There was no agreement between self-reported vaccination/disease history and serostatus.

Conclusion: Our findings suggest lower levels of seroprotection against measles in migrants living in Leicester, UK, with younger migrants and those from Europe and Central Asia more likely to lack seroprotection. A high proportion of surveyed migrants were unaware of their vaccination/disease history and self-reported vaccine/disease was a poor predictor of seroprotection against VPDs which is important for clinical decision-making regarding catch-up vaccination in this population. Our results, although derived from a small sample, suggest that there may be gaps in seroimmunity for certain VPDs in particular migrant populations. These findings should inform future qualitative studies investigating barriers to vaccine uptake in migrants and population-level seroprevalence studies aimed at determining individualised risk profiles based on demographic and migration factors.

UK - Bailey H, Nastouli E, Webb S, Peckham C and Thorne C (2023). "**Characteristics, treatment and care of pregnant women living with hepatitis B in England: findings from a national audit**." Epidemiol Infect **151**: e50.

Around 0.4% of pregnant women in England have chronic hepatitis B virus (HBV) infection and need services to prevent vertical transmission. In this national audit, sociodemographic, clinical and laboratory information was requested from all maternity units in England for hepatitis B surface antigen-positive women initiating antenatal care in 2014. We describe these women's characteristics and indicators of access to/uptake of healthcare. Of 2542 pregnancies in 2538 women, median maternal age was 31 [IQR 27, 35] years, 94% (1986/2109) were non-UK born (25% (228/923) having arrived into the UK <2 years previously) and 32% (794/2473) had ⩾2 previous live births. In 39%, English levels were basic/less than basic. Antenatal care was initiated at median 11.3 [IQR 9.6, 14] gestation weeks, and 'late' (⩾20 weeks) in 10% (251/2491). In 70% (1783/2533) of pregnancies, HBV had been previously diagnosed and 11.8% (288/2450) had ⩾1 marker of higher infectivity. Missed specialist appointments were reported in 18% (426/2339). Late antenatal care and/or missed specialist appointments were more common in pregnancies among women lacking basic English, arriving in the UK ⩽2 years previously, newly HBV diagnosed, aged <25 years and/or with ⩾2 previous live births. We show overlapping groups of pregnant women with chronic HBV vulnerable to delayed or incomplete care.

UK - Bird PW, Holmes CW, Pan D, Martin CA, Pareek M, Gogoi M, Sandhu R, Sargeant P, McMurray CL, Baggaley RF and Nellums LB (2023). "**Awareness of HIV, hepatitis B, hepatitis C, tuberculosis and COVID-19 in migrant students in the UK: a pilot survey from an Institute of Higher Education**." J Infect **86**(4): e94-e96.

UK - O'Ferrall AM, MacElhinney-West A, Bell MS, Haslam MP, Walker G, Norton D, Burns SA, Ferrier G and Easom NJW (2023). "**Geographically targeted chronic infection screening: lessons from a hepatitis B pilot study in the UK**." Trans R Soc Trop Med Hyg **117**(6): 403-406.

Chronic hepatitis B (CHB) most commonly occurs following infection in early childhood. Prevalence varies markedly around the globe. Country of birth is therefore a strong predictor of CHB risk in adults. We used country of birth census data to predict CHB risk and carry out geographically targeted screening in East Yorkshire, UK. Despite engaging individuals born in high-prevalence countries with testing, we observed lower than expected prevalence in targeted highest-risk areas, which may indicate barriers to testing for people with undiagnosed CHB. Improved strategies for engagement with high-risk groups will be key for viral hepatitis elimination.

UK - Cargill Z, Brown SE, Dusheiko G and Agarwal K (2021). "**Risk stratification in chronic hepatitis B patients for hepatocellular carcinoma surveillance: management in migrant sub-Saharan African populations**." Gut **70**(3): 629-630.

UK - Kelly C, Pericleous M, Ahmed A, Vandrevala T, Hendy J, Shafi S, Skene SS, Verma S, Edge C, Nicholls M, Gore C, de Lusignan S and Ala A (2020). "**Improving uptake of hepatitis B and hepatitis C testing in South Asian migrants in community and faith settings using educational interventions-A prospective descriptive study**." Int J Infect Dis **100**: 264-272.

BACKGROUND: Chronic viral hepatitis (CVH) is a leading contributor to the UK liver disease epidemic, with global migration from high prevalence areas (e.g., South Asia). Despite international guidance for testing high-risk groups in line with elimination targets, there is no consensus on how to achieve this. The objectives of this study were to assess the following: (1) the feasibility of recruiting South Asian migrants to view an educational film on CVH, (2) the effectiveness of the film in promoting testing and increasing knowledge of CVH, and (3) the methodological issues relevant to scale-up to a randomized controlled trial. METHODS: South Asian migrants were recruited to view the film (intervention) in community venues (primary care, religious, community), with dried blood spot CVH testing offered immediately afterwards. Pre/post-film questionnaires assessed the effectiveness of the intervention. RESULTS: Two hundred and nineteen first-generation migrants ≥18 years of age (53% female) were recruited to view the film at the following sites: religious, n = 112 (51%), community n = 98 (45%), and primary care, n = 9 (4%). One hundred and eighty-four (84%) underwent CVH testing; hepatitis B core antibody or hepatitis C antibody positivity demonstrated exposure in 8.5%. Pre-intervention (n = 173, 79%) and post-intervention (n = 154, 70%) questionnaires were completed. CONCLUSIONS: This study demonstrated the feasibility of recruiting first-generation migrants to view a community-based educational film promoting CVH testing in this higher risk group, confirming the value of developing interventions to facilitate the global World Health Organization plan for targeted case finding and elimination, and a future randomized controlled trial. We highlight the importance of culturally relevant interventions including faith and culturally sensitive settings, which appear to minimize logistical issues and effectively engage minority groups, allowing ease of access to individuals 'at risk'.

UK - Flanagan S, Kunkel J, Appleby V, Eldridge SE, Ismail S, Moreea S, Griffiths C, Walton R, Pitt M, Salmon A, Madurasinghe V, Barnes E, Simms E, Agarwal K and Foster GR (2019). "**Case finding and therapy for chronic viral hepatitis in primary care (HepFREE): a cluster-randomised controlled trial.**" Lancet Gastroenterol Hepatol **4**(1): 32-44.

BACKGROUND: The prevalence of viral hepatitis (hepatitis B virus and hepatitis C virus) in migrants is higher than among the general population in many high-income countries. We aimed to determine whether incentivising and supporting primary-care physicians in areas with a high density of migrants increases the numbers of adult migrants screened for viral hepatitis. METHODS: HepFREE was a multicentre, open, cluster-randomised controlled trial in general practices in areas of the UK with a high density of migrants (Bradford, Yorkshire, and northeast and southeast London). Participants were adult patients (aged 18 years or older) in primary care, who had been identified as a first or second generation migrant from a high-risk country. General practices were randomly assigned (1:2:2:2:2) to an opportunistic screening (control) group or to one of four targeted screening (interventional) groups: standard (ie, hospital-based) care and a standard invitation letter; standard care and an enhanced invitation letter; community care and a standard invitation letter; or community care and an enhanced invitation letter. In control screening, general practitioners (GPs) were given a teaching session on viral hepatitis and were asked to test all registered migrants. In the intervention, GPs were paid a nominal sum for setting up searches of records, reimbursed for signed consent forms, and supported by a dedicated clinician. Patients who were eligible for testing and tested positive for viral hepatitis in the intervention groups were eligible to enrol in a second embedded trial of community versus hospital based care. The primary outcomes were the proportion of patients eligible for screening, the proportion of those eligible who were sent an invitation letter in the intervention groups, the uptake of viral hepatitis screening (in the intention-to-treat population), the proportion of patients who tested positive for viral hepatitis, the proportion who complied with treatment, and the cost-effectiveness of the intervention. This trial is registered with ISRCTN, number ISRCTN54828633. FINDINGS: Recruitment and testing ran from Oct 31, 2013, to Feb 4, 2017, and each practice recruited for 18 consecutive calendar months. We approached 70 general practices in three areas with a high density of migrants, of which 63 general practices agreed to participate. Five practices withdrew and 58 practices were randomly assigned: eight to control and 50 to an intervention. In control practices, 26 046 (38·4%) of 67 820 patients who were initially registered were eligible for testing, as were 152 321 (43·3%) of 351 710 patients in the interventional groups in London and Bradford. Of 51 773 randomly selected eligible patients in the intervention groups in London and Bradford, letters were sent to 43 585 (84·2%) patients.

In the eight control general practices, screening was taken up by 543 (1·7%) of 31 738 eligible participants, which included 5692 newly registered patients. However, in the 50 general practices that used the intervention, screening was taken up by 11 386 (19·5%) of 58 512 eligible participants (including 6739 newly registered patients; incidence rate ratio 3·70, 95% CI 1·30-10·51; p=0·014) and this intervention was cost-effective. 720 (4·5%) of 15 844 patients who received a standard letter versus 1032 (3·7%) of 28 095 patients who received the enhanced letter were tested (0·70, 0·38-1·31; p=0·26). In the control group, 17 patients tested positive for viral hepatitis, as did 220 patients (one with a co-infection) in the intervention groups. In the embedded study, 220 patients were randomly assigned to either hospital-based care or community care; 80 (87·9%) of 91 patients in the hospital setting complied with treatment versus 105 (81·4%) of 129 patients in the community setting. The intervention was cost-effective at willingness to pay thresholds in excess of £8540. One serious adverse event (thyroiditis) was noted. INTERPRETATION: Screening migrants for viral hepatitis in primary care is effective if doctors are incentivised and supported. Community care is expensive and there is no evidence that this offers benefits in this setting or that bespoke invitation letters add value. We suggest that bespoke invitation letters should not be used, and we suggest that outreach, community-based services for migrants should not be developed. FUNDING: National Institute for Health Research.

UK - Martin NK, Vickerman P, Khakoo S, Ghosh A, Ramsay M, Hickman M, Williams J and Miners A (2019). "**Chronic hepatitis B virus case-finding in UK populations born abroad in intermediate or high endemicity countries: an economic evaluation.**" BMJ Open **9**(6): e030183.

OBJECTIVES: The majority (>90%) of new or undiagnosed cases of hepatitis B virus (HBV) in the UK are among individuals born in countries with intermediate or high prevalence levels (≥2%). We evaluate the cost-effectiveness of increased HBV case-finding among UK migrant populations, based on a one-time opt out case-finding approach in a primary care setting. DESIGN: Cost-effectiveness evaluation. A decision model based on a Markov approach was built to assess the progression of HBV infection with and without treatment as a result of case-finding. The model parameters, including the cost and effects of case-finding and treatment, were estimated from the literature. All costs were expressed in 2017/2018 British Pounds (GBPs) and health outcomes as quality-adjusted life-years (QALYs). INTERVENTION: Hepatitis B virus case-finding among UK migrant populations born in countries with intermediate or high prevalence levels (≥2%) in a primary care setting compared with no intervention (background testing). RESULTS: At a 2% hepatitis B surface antigen (HBsAg) prevalence, the case-finding intervention led to a mean incremental cost-effectiveness ratio of £13 625 per QALY gained which was 87% and 98% likely of being cost-effective at willingness to pay (WTP) thresholds of £20 000 and £30 000 per additional QALY, respectively. Sensitivity analyses indicated that the intervention would remain cost-effective under a £20 000 WTP threshold as long as HBsAg prevalence among the migrant population is at least 1%. However, the results were sensitive to a number of parameters, especially the time horizon and probability of treatment uptake. CONCLUSIONS: HBV case-finding using a one-time opt out approach in primary care settings is very likely to be cost-effective among UK migrant populations with HBsAg prevalence ≥1% if the WTP for an additional QALY is around £20 000.

UK - Lee ACK, Vedio A, Liu EZH, Horsley J, Jesurasa A and Salway S (2017). "**Determinants of uptake of hepatitis B testing and healthcare access by migrant Chinese in the England: a qualitative study**." BMC Public Health **17**(1): 747.

UK - Cochrane A, Collins P and Horwood JP (2016). "**Barriers and opportunities for hepatitis B testing and contact tracing in a UK Somali population: a qualitative study.**" Eur J Public Health **26**(3): 389-395.

UK - Cochrane A, Evlampidou I, Irish C, Ingle SM and Hickman M (2015). "**Hepatitis B infection prevalence by country of birth in migrant populations in a large UK city.**" J Clin Virol **68**: 79-82.

UK - Hargreaves S, Seedat F, Car J, Escombe R, Hasan S, Eliahoo J and Friedland JS (2014). "**Screening for latent TB, HIV, and hepatitis B/C in new migrants in a high prevalence area of London, UK: a cross-sectional study**." BMC Infect Dis **14**: 657.

UK - Miners AH, Martin NK, Ghosh A, Hickman M and Vickerman P (2014). "**Assessing the cost-effectiveness of finding cases of hepatitis C infection in UK migrant populations and the value of further research**." J Viral Hepat **21**(9): 616-623.

UK - Vedio AB, Ellam H, Rayner F, Stone B, Kudesia G, McKendrick MW and Green ST (2013). "**Hepatitis B: report of prevalence and access to healthcare among Chinese residents in Sheffield UK.**" J Infect Public Health **6**(6): 448-455.

UK - Uddin G, Shoeb D, Solaiman S, Marley R, Gore C, Ramsay M, Harris R, Ushiro-Lumb I, Moreea S, Alam S, Thomas HC, Khan S, Watt B, Pugh RN, Ramaiah S, Jervis R, Hughes A, Singhal S, Cameron S, Carman WF and Foster GR (2010). "**Prevalence of chronic viral hepatitis in people of south Asian ethnicity living in England: the prevalence cannot necessarily be predicted from the prevalence in the country of origin.**" J Viral Hepat **17**(5): 327-335.