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Chronic Hepatitis B and C among Migrants and At-Risk Groups:

A Systematic Literature Review of Screening Practices and Approaches
to Minimize Morbidity and Mortality in Europe

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List of Abbreviations

ALT	Alanine aminotransferase
Anti-HBc	Antibodies to hepatitis B core antigen
Anti-HBe	Antibodies to hepatitis B e antigen
Anti-HBs	Antibodies to hepatitis B surface antigen
Anti-HCV	Antibodies to hepatitis C virus
CDC	Centers for Disease Control and Prevention
CHB	Chronic hepatitis B
ECDC	European Center for Disease Control and Prevention
ELPA	European Liver Patients Association
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
EU	European Union
FGM	First generation migrant
G-BA	Gemeinsamer Bundesausschuss
GP	General practicioner
HBcAg	Hepatitis B core antigen
HBeAg	Hepatitis B e antigen
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B virus
HBV-DNA	Hepatitis B virus deoxyribonucleic acid
HCC	Hepatocellular carcinoma
HCV	Hepatitis C virus
HCV DNA	Hepatitis virus deoxyribonucleic acid
HCV RNA	Hepatitis C virus ribonucleic acid
HDV	Hepatitis D virus
HIV	Human immunodeficiency virus
IDU	Injecting drug user
MSM	Men who have sex with men
MTCT	Mother-to-child-transmission
NGO	Non-Governmental Organization
OECD	Organisation for Economic Co-operation and Development
RIBA	Recombinant immunoblot assay
RKI	Robert Koch-Institut

SGM	Second generation migrant
STI	Sexually transmitted infection
VHPB	Viral Hepatitis Prevention Board
WHA	World Hepatitis Alliance
WHO	World Health Organization

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Abstract

Background: Viral hepatitis B and C are global health problems and major risk factors for liver cirrhosis and primary liver cancer, if becoming chronic. Worldwide, over 240 million people live with a chronic hepatitis B infection and about 150 million people are chronically infected with hepatitis C (WHO, 2012a, 2013); both contributing to a yearly amount of around one million deaths. Within Europe, chronic viral hepatitis B and C account for about 14 and nine million infected people (Hatzakis et al., 2011). Due to its largely asymptomatic nature, most people are unaware of their infection. Advancements in antiviral treatment emphasize the need for early identification of patients who qualify for treatment. Increase and diversification of global population movements have changed the global distribution of viral hepatitis. Especially migrants from high- or intermediate-prevalence countries are a vulnerable group and at risk for having, acquiring, and transmitting hepatitis infection. Despite migration being a determining factor for hepatitis B and C infection, migrants are currently not targeted routinely in European screening programs.

Objectives: To provide a comprehensive and detailed overview of the current situation of screening for (chronic) viral hepatitis B and C among migrants and at-risk groups in Europe. Determinants of screening among migrants are considered and recommendations for national actions and campaigns to confront viral hepatitis are formulated.

Methods: A systematic literature search among published and grey literature was carried out using scientific databases and websites of organizations involved in the field of viral hepatitis. Information concerning general and migrant/at-risk group specific screening approaches, policy, as well as determinants of screening was included and assessed.

Results: Guidelines and recommendations are available, but except for hepatitis B screening in pregnant women and hepatitis B and C screening in blood donors, no definite laws or obligatory guidelines could be identified. For numerous other risk groups screening is strongly recommended but there is no clear evidence how and if this advice was followed. On European level, the inclusion of migrants in screening recommendations is scarce; however several good practice examples of pilot projects could be identified, as well as worldwide good practice models.

Discussion: Several determinants are influencing the uptake of viral hepatitis screening. All of them depending on specific prerequisites of the local and national situation; including the target population or the health system infrastructure. Barriers and motivating factors of screening among migrants, and recommendations for implementing cultural-tailored viral hepatitis screening programs were provided.

Conclusion: There is no European one-size-fits-all solution. Strategies must be tailored to the local and national reality. Especially high-risk groups, such as migrants require screening approaches that are suitable for their needs, cultural identity and concept of health. Policy-makers and healthcare providers must consider determinants of screening on individual patient, provider and healthcare system level, and aim for possible solutions to provide cultural-tailored comprehensive viral hepatitis B and C screening programs.

1 Introduction

World Hepatitis Day: More must be done to stop this silent killer!

After searching the website of the World Health Organization (WHO) for "hepatitis", this is the introducing statement of the first page you can access. It sounds quite sensational; however it strongly emphasizes the need for global public health action in case of viral hepatitis.

Hepatitis B is one of the most common infectious diseases worldwide and counts, together with hepatitis C, to the major global health problems. Especially concerning is the disease's potential development into a chronic condition, contributing to a major part of liver damages, like liver cirrhosis or hepatocellular carcinoma. According to WHO estimates, more than 240 million people live with a chronic hepatitis B infection and approximately 150 million people are chronically infected with hepatitis C (WHO, 2012a, 2013); both contributing to a yearly amount of around one million deaths. Within Europe, about 14 million people are chronically infected with hepatitis B and about nine million people are chronically infected with hepatitis C (Hatzakis et al., 2011). Due to its largely asymptomatic nature, viral hepatitis is a silent epidemic and most people are unaware of their infection. Nevertheless they are carriers of the virus and could spread it to others, just as they could develop chronic infection or even serious liver disease. Advancements in antiviral treatment for chronic hepatitis B and C imply the relevance of early identification of patients who qualify for treatment. Once identified as HBV-/or HCV-infected, people can receive the necessary care to prevent, slow the progression or delay the onset of liver diseases and therefore prevent a considerable part of the hepatitis-related burden of disease and death. This underlines the urgent need for secondary prevention, next to primary prevention e.g. through vaccination for HBV. Screening of risk groups and case detection enables public health not only to provide infected patients with sufficient care and treatment, but also to identify and, for HBV, to vaccinate susceptible household and sex contacts to interrupt on-going transmission.

Viral hepatitis is a global health problem concerning every country, regardless of its economic situation. The increase and diversification of global population movements also changed the global distribution of viral hepatitis. After Hatzakis et al. (2013), migrant populations often represent the ‘overlap’ between viral hepatitis epidemics in the receiving countries and those in their countries of origin. Thus, especially migrants from high- or intermediate-prevalence countries are a vulnerable group and at risk for having or acquiring hepatitis infection. Despite increasing migration worldwide and migration being a determining factor for hepatitis B and C infection, migrants are currently not targeted routinely in screening programs. The EU still lacks a unified comprehensive strategy to tackle viral hepatitis and many European countries have done little to establish robust viral hepatitis policies and programs. Gaps can be seen between recommendations and practice. The cornerstones of preventing and reducing the burden of viral hepatitis are effective prevention programs, early diagnosis, and appropriate treatment, however even in countries with evidence-based hepatitis policies there is often inadequate implementation of protocols for prevention, treatment and control. Due to the hepatitis-related disease burden and potentially lethal consequences, it is important to increase awareness and knowledge on individual patient level, healthcare provider level, and health system and policy level. Strong efforts are needed to make hepatitis a more relevant and addressed public health issue on local, national, and international health agenda and thus, to decrease the hepatitis B and C –related morbidity and mortality worldwide.

In order to assess the burden of disease from (chronic) viral hepatitis B and C appropriately, it is important to acquire sufficient background information. Therefore, the present thesis first focuses on epidemiology and natural history of hepatitis B and C. Furthermore, screening and migration are defined in general and in relation to viral hepatitis.
the development and implementation of the systematic literature search is described in detail; resulting in a comprehensive overview of retrieved published primary and secondary studies, guidelines, recommendations,
Results are divided into general and migrant/ at-risk group specific hepatitis B and C screening approaches in six European countries of interest; Europe-wide viral hepatitis B and C strategies and approaches, especially those including migrants; and worldwide migrant-specific screening strategies and approaches of good practice.
The mere existence of tools and strategies for prevention and treatment is not enough to halt viral hepatitis. Several factors determine the screening among migrants and at-risk groups. Barriers for screening and recommendations to overcome those hindering factors are described in the Discussion part. Of special concern is the cultural-tailoring of (chronic) viral hepatitis strategies in order to address migrants and at-risk groups in an effective and suitable way.

2 Objective

The objective of the present thesis is to provide a comprehensive and detailed overview of the current situation of screening strategies and/or practices for (chronic) viral hepatitis B and C among migrants and at-risk groups in Europe. Furthermore determinants of screening among migrants are considered and possible recommendations for national actions and campaigns to confront viral hepatitis are formulated.

3 Background

Hepatitis is a general term meaning inflammation of the liver which can be caused by a variety of different hepatitis viruses. The five main strains of hepatitis viruses, referred to as types A, B, C, D and E, can cause acute and/or chronic infection. In particular, hepatitis B and C virus infection lead to chronic viral hepatitis infections in hundreds of millions of people worldwide, with possibly lethal health consequences. The highly infectious virus particles in the blood of infected individuals pose a serious health risk, with healthy asymptomatic carriers the main reservoir of infection. As hepatitis B and C share modes of transmission their combined occurrence is not uncommon, particularly in areas where both viruses are endemic, and in individuals at high risk of parenteral infection (e.g. injecting drug users, IDUs). Together, hepatitis B virus (HBV) and hepatitis C virus (HCV) infection likely account for the majority of end-stage liver diseases, such as liver cirrhosis (in 57%) and primary liver cancer (hepatocellular carcinoma, HCC) (in 78%); resulting in an estimated annually death rate of 950 000 people (≈2.7% of all deaths) worldwide. (Detels, Beaglehole, Lansang, & Gulliford, 2009; Perz, Armstrong, Farrington, Hutin, & Bell, 2006; Weston, 2008; WHO, 2012b)

3.1 Hepatitis B

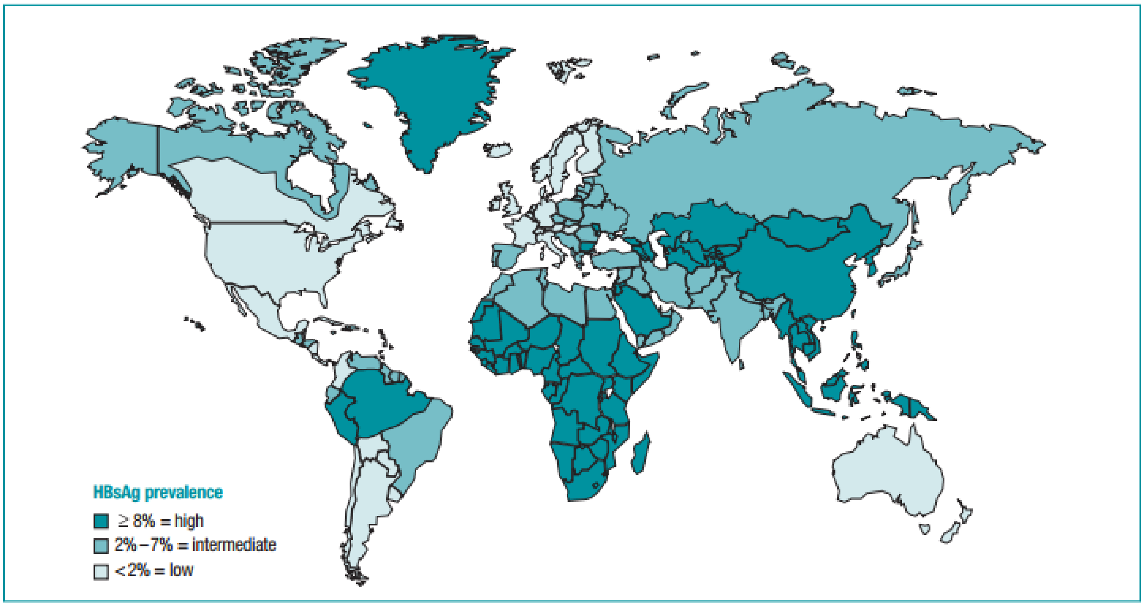
Hepatitis B is a viral infection caused by the hepatitis B virus that attacks the liver. It can cause both acute and chronic liver disease which puts people at high risk of death from liver cirrhosis and liver cancer. Being one of the most common infectious diseases worldwide and the most serious type of viral hepatitis, the World Health Organization (WHO) counts HBV infection to the major global health problems (WHO, 2012a, 2012b).

Burden of Disease

Worldwide

According to WHO, one third of the world's population, about two billion people, has been infected with the hepatitis B virus and an estimated 3% of the world's population, more than 240 million people, live with a chronic liver infection with high risk of serious illness and death from cirrhosis and HCC (WHO, 2012a). For illustrating the global distribution, WHO has categorized countries based upon the prevalence of HBsAg into high (≥8%), intermediate (2-8%) and low (<2%) prevalence countries (Figure 1).

Figure 1: World distribution map of chronic hepatitis B virus infection (CHB)



* For multiple countries, estimates of prevalence of hepatitis B surface antigen (HBsAg), a marker of chronic HBV infection, are based on limited data and might not reflect current prevalence in countries that have implemented childhood hepatitis B vaccination. In addition, HBsAg prevalence might vary within countries by subpopulation and locality.

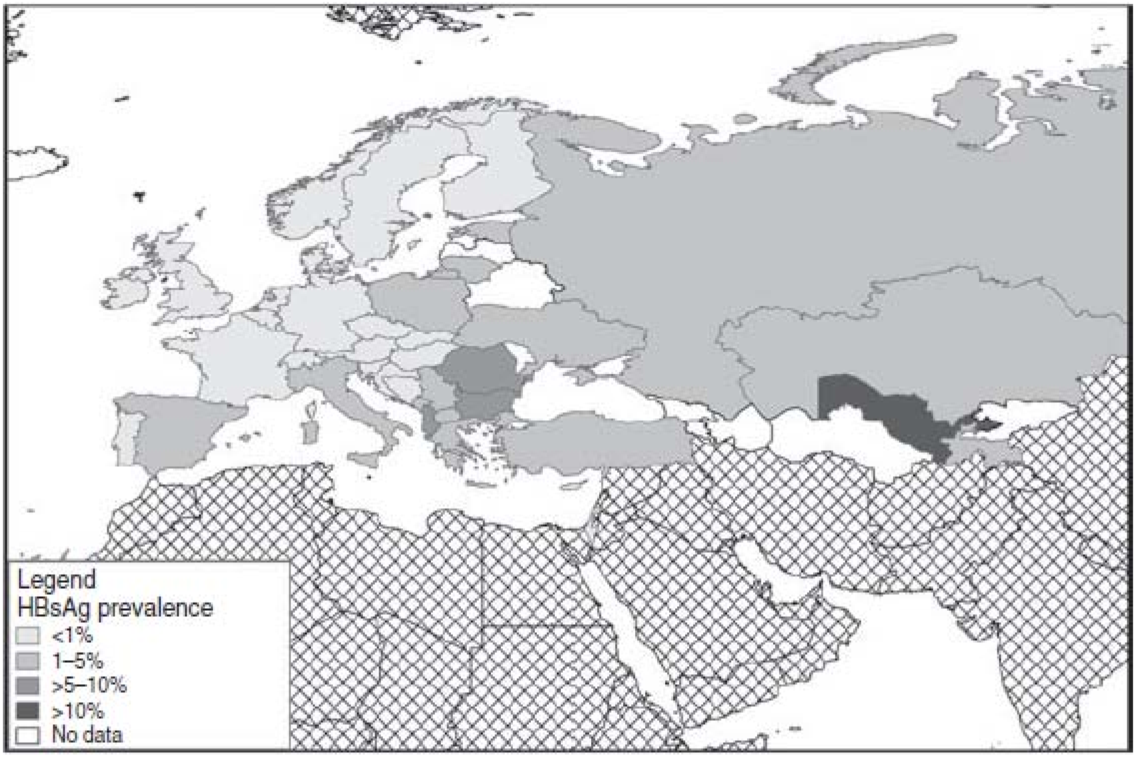
Source: CDC (2013).

High endemicity areas include for example sub-Saharan Africa, South-East Asia, and the Eastern Mediterranean countries. In these areas, about 70 to 90 % of the population becomes HBV-infected before the age of 40 years, and 5 to 15% are chronically infected carriers of HBV. In South-Central and South-West Asia, Eastern and Southern Europe, the Russian Federation, and most of Central and South America HBV infection is present with an intermediate prevalence of two to seven percent. Low endemicity areas include Australia, New Zealand, Northern and Western Europe, North America and parts of South America. In these areas less than 20% of the population is infected with HBV and less than two percent are chronic HBV carriers. It is estimated that worldwide 30% of all cases with liver cirrhosis and 53% of all cases with HCC are attributable to hepatitis B virus infection. These possible consequences of HBV infection represent a lethal danger; approximately one of every 40 deaths worldwide can be attributed to an end-stage liver disease, while HCC ranks as the third cause of cancer deaths worldwide. Together they contribute to a yearly amount of between 500 000 to 700 000 HBV-related deaths worldwide (Detels et al., 2009; Ghany & Doo, 2004; WHO, 2012a, 2013).

Europe

Within Europe, about 14 million people (1.8%) are chronically infected with HBV and 36 000 people die each year because of CHB-related liver disease. The prevalence widely differs between regions, with an obvious North-South divide (Figure 2): very scarcely distributed in Northern countries (less than 0.5% in Ireland, the Netherlands, Sweden or Finland), the prevalence of chronic hepatitis B infection rises up to over 7% in the general population in some parts of Turkey (Hatzakis et al., 2011; WHO, 2012b).

Figure 2: Prevalence of hepatitis B surface antigen (HBsAg) in the general adult population in the WHO European region

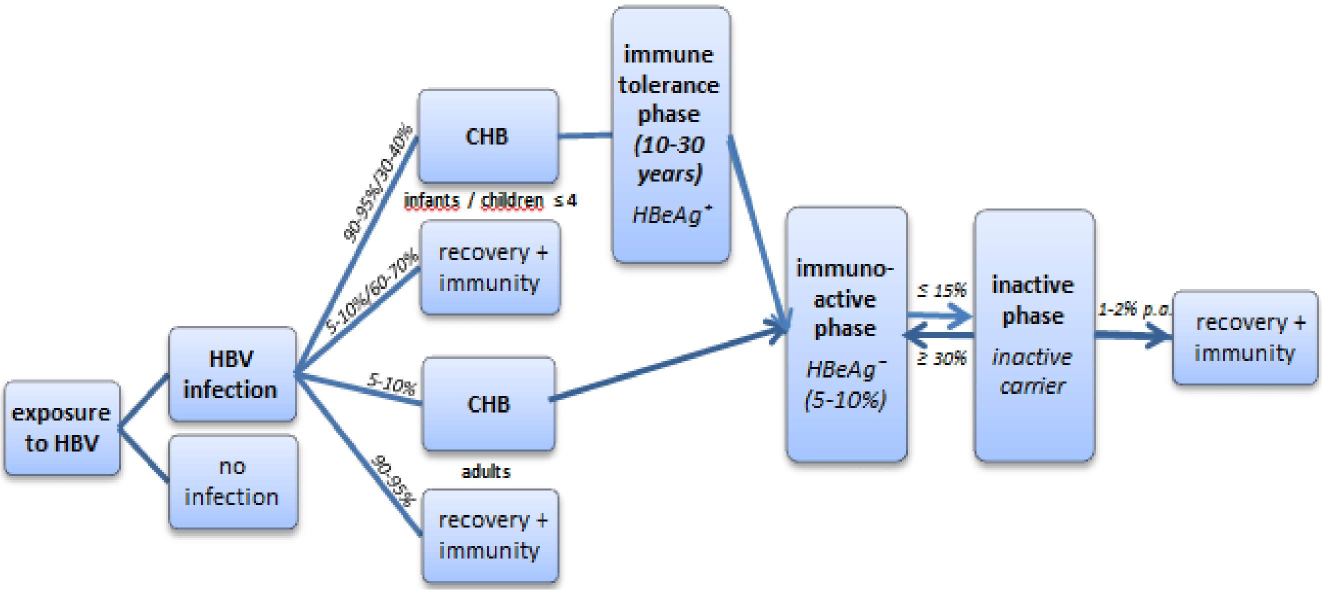


Source: Hope et al. (2013).

Natural History

Hepatitis B belongs to the group of Hepadnaviruses. It is a small enveloped double-stranded DNA virus, consisting of the nucleocapsid core (hepatitis B core antigen, HBcAg), the soluble component of the core (HBeAg) and the viral envelope which contains hepatitis B surface antigen (HBsAg). So far, nine different genotypes (A-I), several subgenotypes and eight serologically distinguishable HBsAg-subtypes are known. The clinical course of HBV infection is influenced by a complex interplay of different factors. Determining factors like the robustness of the immune response, the replication fitness of the virus, the age at time of exposure, the integrity of the immune system, alcohol consumption, obesity, and concurrent viral infections could pay a role in course and outcome of HBV infection. 90 - 95% of adult cases of HBV infection recover spontaneously and will be immune to future hepatitis B infection. However in some cases, HBV can also cause chronic liver infection with high risk of developing into cirrhosis of the liver or liver cancer. The risk of HBV infection becoming a chronic illness highly depends upon the age of the newly infected person. It is most likely in infants infected during their first year of life (90 - 95%) and children infected between one to four years of age (30 - 50%). If an infection occurs during infancy or early childhood, there is typically an absence of liver disease and a lack of symptoms. This is called the *immune tolerance phase* that may persist for ten to 30 years. After this variable time frame, the immune tolerance phase may be followed by an *immunoactive phase* with active viral replication and liver injury. In contrast to perinatally acquired HBV infection, the course of infection in adults who progress onto chronic hepatitis B (CHB) starts with the immunoactive phase. Up to 15% of patients may lose HBeAg spontaneously during these phase, followed by the development of anti-HBe; this is named the *inactive phase.* In the absence of cirrhosis, there is diminished risk for disease progression or HCC. One to two per cent of persons per year will clear HBsAg in the inactive phase, but as many as 30% of people relapse to the immunoactive phase. 25% of the adults who become chronically infected during childhood die from CHB-related consequences. The HBV infection course is illustrated in Figure 3 (Ghany & Doo, 2004; RKI, 2012b; Weston, 2008; WHO, 2012a).

Figure 3: Illustration of the HBV infection course (after Ghany & Doo, 2004)



Source: Own illustration.

Transmission Routes

The Hepatitis B virus spreads through contact with infected body fluids. Its modes of transmission are comparable to those of HIV, but HBV is 50 to 100 times more infectious. It can be transmitted through

- *percutaneous exposure* via transfusion of unscreened blood or blood products, sharing drug injecting equipment, haemodialysis, acupuncture, tattooing or needlestick injuries;
- *mucous membrane exposure* via sexual or perinatal exposure to high-risk body fluids like semen, saliva or cervical secretions;

- or *indirect exposure* via inanimate objects, such as toothbrushes, razors and eating utensils, or hospital equipment that are contaminated with infected blood since the virus can live on surfaces for at least seven days and is still contagious.

Table 1 highlights high risk groups for hepatitis B according to the European Center for Disease Prevention and Control (ECDC).

Table 1: Hepatitis B high risk groups
• injecting drug users (IDUs) • those who change sexual partners frequently • babies born to infected mothers • household contacts and sexual partners of people who are infected • health-care workers who have contact with infected body fluids • people who receive blood or blood product transfusions • some patients having blood dialysis *(although such nosocomial infections have become extremely rare in Europe after the introduction of HBV tests for all blood products in 2002 by the European Parliament and Council)*

Source: ECDC, 2005.

In developed countries (e.g. Western Europe or North America), most infections occur by exposure to infected body fluids through high-risk sexual behaviours or injecting drug use. Common modes of transmission in developing countries are perinatal, early childhood infections through close interpersonal contact with infected household contacts, unsafe injection practices or blood transfusions and unprotected sexual contact (ECDC, 2005; Weston, 2008; WHO, 2012a).

Clinical symptoms

Acute hepatitis B has a long incubation period of between 30 to 180 days, during which the individual is infectious. Exhibition and experience of symptoms vary greatly between infected individuals: one-third has sub-clinical infection without any symptoms; one-third experiences a mild “flu-like” illness with symptoms like malaise, vomiting, nausea, and mild fever; and the remaining one-third exhibits yellowing of the skin and eyes (jaundice), bilirubinuria (the dark urine caused by the jaundice), extreme fatigue, anorexia, right-sided upper abdominal discomfort and an enlarged tender liver. About 90% of adults recover completely, although this may require six months or more with persistent tiredness and intolerance to alcohol. In a majority of acute infections, persons are unaware of their condition. Clinical manifestations of CHB may appear during flares of hepatitis (Detels et al., 2009; Weston, 2008).

Diagnosis

In an infected individual HBV is detectable in the blood and also body fluids such as semen and vaginal secretions (concentration about 1:1000 of that in blood). A diagnosis of hepatitis B is based on the detection of the various viral antigens and antibodies in the blood or fluid:

- hepatitis B surface antigen (HBsAg) and antibody (anti-HBs)
- hepatitis B core antigen (HBcAg) and antibody (anti-HBc IgM and anti-HBc IgG)
- hepatitis B e antigen (HBeAg) and antibody (anti-HBe).

Tests can distinguish between acute and chronic infections. Table 2 provides an overview of the different hepatitis B diagnoses and the related serological and molecular markers (Weston, 2008; WHO, 2012a).

Table 2: Serological (and molecular) markers of HBV infection and their diagnostic interpretation

Diagnosis *Parameter*	**Acute Hepatitis B**	**Recovery from acute Hepatitis B**	**Chronic HBeAg+ Disease**	**Chronic HBeAg- Disease**	**Immunity** *(through vaccination or recovery)*	**Resistance to antiviral agents**
HBsAg	●*(may clear)*		●	●		
Anti-HBs		●			●	
HBeAg	●		●			
Anti-HBc IgM	●					
Anti-HBc IgG	●	●	●	●		
Anti-HBe		●*(in some cases)*		●	●	
(DNA*)	●*(may be only marker during incubation period)*		●	●		●

*detection with PCR (=Polymerase Chain Reaction), if required

Source: McMahon, 2006.

Prevention

Prevention is usually classified into primary, secondary and tertiary prevention. **Primary prevention** includes all measures carried out *before the onset* of a disease and aims at lowering its occurrence. It addresses healthy or asymptomatic individuals and includes exhaustive programs directed towards the whole population or selective programs for high-risk groups. **Secondary prevention** serves as *early detection and control of diseases in their early stages*. It aims at reducing the prevalence of the disease and at lowering the occurrence of later and more severe stages or chronification. Thus, it is important to identify diseases at early and curable stage to make following treatment possible. Screening is a common method used to identify cases at a curable stage. Finally, t**ertiary prevention** occurs *after manifestation or acute-treatment* of a disease and aims at reducing the consequences of the disease and at preventing consequential damage or relapse. It could be equated with medical-therapeutic treatment (Detels et al., 2009; Hurrelmann, Klotz, & Haisch, 2007).

Primary prevention of (chronic) viral hepatitis B

In 1982 the vaccine against hepatitis B was introduced and since 1991 WHO has advocated universal vaccination against hepatitis B. Worldwide, 179 countries have currently implemented universal vaccination programs. This has been shown to have an outstanding record of safety and efficacy to reduce the incidence, carrier rates and mortality related to hepatitis B. It is 95%

effective in preventing infection and its chronic consequences and the mainstay of hepatitis B prevention. Additionally, since HCC is one of the chronic consequences, it is also the first vaccine against a major human cancer. Prophylaxis can be administered pre-exposure in high risk groups or post-exposure through active immunization. Protection lasts at least 20 years and is possibly life-long. Table 3 highlights the WHO recommendations for vaccination against hepatitis B (Hatzakis et al., 2011; Weston, 2008).

Table 3: WHO recommendations for vaccination against hepatitis B

- people with high-risk sexual behavior
- partners and household contacts of infected people
- injecting drug users (IDUs)
- people who frequently require blood or blood products
- recipients of solid organ transplantation
- people at occupational risk of hepatitis B virus infection, including health-care workers
- travelers to countries with high rates of hepatitis B
- all infants, with the first dose given best within 24 hours or as soon as possible after birth in areas with high rates of perinatal transmission
- all children and adolescents younger than 18 years old and not previously vaccinated

Source: **(WHO, 2012a)**

Additionally, primary prevention includes methods like: advocacy and raising awareness for hepatitis infections, implementation of blood safety strategies, infection control precautions in health care and community settings, safe injection practices, safer sex practices and occupational safety methods (WHO, 2012b).

Secondary prevention of (chronic) viral hepatitis B

As mentioned before, secondary prevention aims at identifying diseases at early and curable stage and thus at identifying patients eligible for medical treatment to prevent further progression, worsening and spread of the disease. Screening usually is mentioned in the same breath as secondary prevention. It is an effective method to identify infected individuals before they reach the critical point where only palliative treatment is available. Recent advancements in treatment for chronic hepatitis B underline the possibility for secondary prevention and screening. Bearing in mind the severe and potentially lethal health consequences of CHB, like cirrhosis and HCC, there is an urgent need to identify patients who qualify for treatment. Next to antiviral treatment, early diagnosis of chronically infected individuals allows counseling and referral to specialists. Infected persons are able to take steps to prevent transmission of the disease to others in time, as well as to take precautions to protect the liver from additional harm, as alcohol and tobacco consumption or the use of drugs which are toxic to the liver (Detels et al., 2009; WHO, 2012b).

Tertiary prevention / Therapy of (chronic) viral hepatitis B

Therapy for chronic HBV infection primarily aims at suppressing replication of the virus, and thus at preventing disease progression to cirrhosis or HCC, and at reducing secondary spread of the disease. Thereby, mortality rates and quality of life should be improved. Identifying and selecting patients for treatment depends on several factors that can complicate the decision-making process. These include the stage of disease, the level of HBV DNA, the age of the patient, the pattern of liver disease, co-infection with other hepatotrophic viruses (HCV, HDV) or HIV, the presence of other comorbid conditions, the patient`s willingness to be treated, and adverse effects of treatment. Over the past decade, there have been made considerable advances in antiviral treatment of CHB, so that today viral replication can be effectively suppressed in 95% of cases. Treatment approaches either stimulate the immune system (e.g. through pegylated interferon) or suppress viral load through nucleo(t)side analogues. The most recently available agents for hepatitis B, tenofovir and entecavir, show promising resistance profiles; however, patient adherence remains challenging, because of the long-term treatment duration, and during asymptomatic phases of the disease. Another problem, especially in developing countries, is the high therapy costs that make treatment unavailable to the majority of those affected (Detels et al., 2009; Ghany & Doo, 2004; Hatzakis et al., 2011).

3.2 Hepatitis C

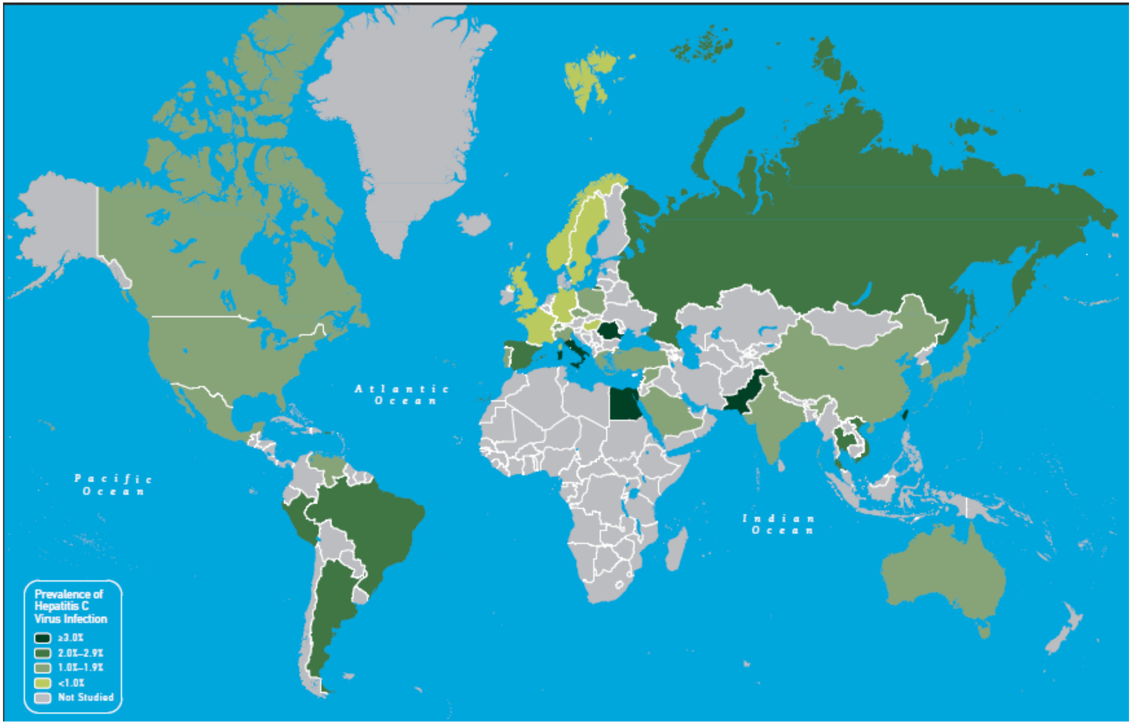
Hepatitis C is a contagious liver disease that is caused by the hepatitis C virus. It is characterized by a high rate of developing into chronic condition which can lead to long-term complications like cirrhosis or liver cancer, and is the primary cause for liver transplantation in industrialized countries (Detels et al., 2009; WHO, 2013).

Burden of Disease

Worldwide

WHO estimates three to four million people being newly infected with hepatitis C every year. Of these, only about 25% are symptomatic, but 60- 80% may progress into chronic HCV infection. About two to three per cent of the world’s population is chronically infected, equating to 130 to 170 million people (WHO, 2013). Prevalence rates for chronic HCV infection differ greatly between regions (Figure 4). Most countries have prevalence rates under 3%, whereas HCV-prevalence rates of up to 15% can be found in Africa and Asia, e.g. in Egypt (15%), Pakistan (4.8%), and China (3.2%). People infected with chronic HCV are at high risk of developing potentially lethal end-stage liver diseases: 27% of all cases with liver cirrhosis and 25% of all cases with HCC are attributable to hepatitis C virus infection. Together, both conditions contribute to a yearly amount of 350 000 HCV-related deaths worldwide (Perz et al., 2006; RKI, 2012a; WHO, 2013).

Figure 4: World distribution map of chronic hepatitis C virus infection

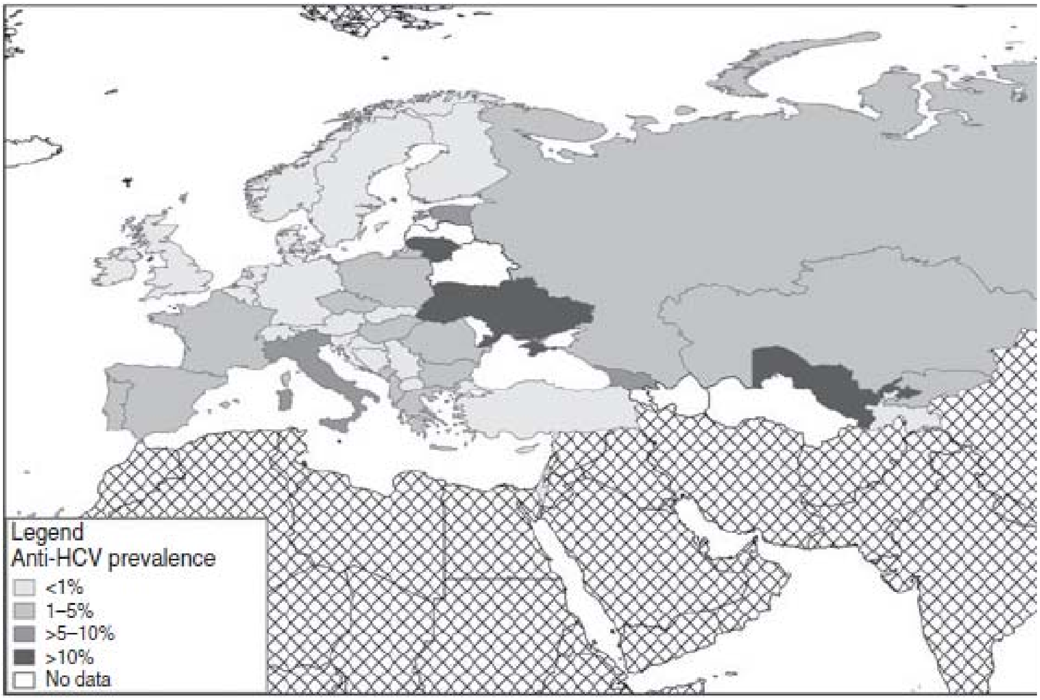


Source: CDC (2013).

Europe

In Europe, approximately 15 million people are chronically infected with the hepatitis C virus (Hatzakis et al., 2011). The geographical distribution of HCV infection in the general population differs between North-Western and South-Eastern European countries (Figure 5). In Northern Europe, especially in the Scandinavian countries, prevalence is very low, ranging from 0.1 to 1%. In Central or Western Europe overall prevalence is intermediate, with a low rate of 0.4% in the Netherlands to 1.3% in France. Prevalence rates in Southern Europe range between 1.7% (Portugal) and 5.2% (Italy), with isolated areas in Italy and Greece where 7-20% of the general population are infected. The highest overall prevalence can be found in Eastern Europe and central Asian countries, ranging from a quite low rate of 0.8% in Hungary over 3.6% in Russia to a very high prevalence rate of 12% in the Ukraine. About 86 000 people in European countries die from HCV-related consequences each year (Hope, Eramova, Capurro, & Donoghoe, 2013; RKI, 2012a; WHO, 2012b, 2013).

Figure 5: Anti-HCV prevalence in the general adult population in the WHO European region



Source: Hope et al., 2013.

Natural History

Hepatitis C is caused by infection with the hepatitis C virus (HCV), an enveloped single-stranded RNA virus that is classified in the virus family Flaviviridae. Although the virus was identified 24 years ago, its pathogenesis and replication are still not fully understood. Worldwide, a high degree of genetic variation of HCV exists. There are at least six major genotypes and more than 100 distantly related subtypes, which vary in pathogenicity and sensitivity to current standards of treatment. These characteristics of HCV resemble those of HIV and impede vaccine design. The incubation period for hepatitis C before the onset of clinical symptoms may range from two weeks to six months. About 25% of those infected develop an acute HCV infection with mostly mild symptoms. Many of those exposed to HCV recover fully, but the remainder (50 - 85%), whether they have symptoms or not, develops chronic disease. Recognition of chronic HCV is very difficult since symptoms are mild, and infection passes silently and insidiously from acute to chronic phase. The vast majority of those affected are symptom-free for at least 20 years. During this long period of undiagnosed infection, certain high risk behaviours and practices may contribute to an uncertain amount of HCV transmissions to other people. After 20 to 25 years of infection 2-35% of those chronically infected reach the stage of cirrhosis, with a high risk of developing liver cancer (two to five per cent each year). Spontaneous eradication and recovery rarely occur in chronically infected patients (Detels et al., 2009; RKI, 2012a; Weston, 2008; WHO, 2013).

Transmission Routes

The global epidemic of hepatitis C virus infection emerged in the second half of the 20th century and has been attributed to the increasing use of parenteral therapies and unscreened blood transfusions. During the last 20 years, epidemiological parameters of HCV infection (prevalence, incidence, transmission patterns and genotype distribution) have changed substantially. Iatrogenic transmission has sharply decreased in high-income countries, through increased blood transfusion safety and improvement of healthcare conditions. In these regions, today HCV is most commonly transmitted through parenteral exposure to infectious blood, while injecting drug use remains the main route of transmission accounting for nearly 90% of new HCV infections. Table 4 highlights high risk groups for acquisition and transmission of HCV.

Table 4: High risk groups for acquisition and transmission of HCV

- *current or former injecting drug users* who share contaminated needles and other drug-related equipment
- *recipients of unscreened blood transfusions, blood products and organ transplants prior to 1991*
- *healthcare workers*, especially those working in invasive sector and at risk of being injured by contaminated syringes and needles
- *infants born to a HCV-positive mother* (perinatal infection)
- long-term *haemodialysis patients*

Sexual transmission and indirect transmission through contaminated personal items (razor, toothbrush etc.) are possible but less common (Detels et al., 2009; Esteban, Sauleda, & Quer, 2008; RKI, 2012a; Weston, 2008; WHO, 2013).

Clinical symptoms

In about 75% of hepatitis C virus infections, people do not exhibit or experience any symptoms, or they show only unspecific “flu-like” symptoms. Chronic HCV infection is characterized by comparable mild and unspecific symptoms, like fatigue, unspecific upper abdominal discomfort, fever, anorexia, nausea and vomiting, progressing to jaundice and bilirubinuria in about 25% of patients (Detels et al., 2009; RKI, 2012a; WHO, 2013).

Diagnosis

Diagnosis of acute HCV infection is often missed because of its asymptomatic progression. The presence of antibodies against the hepatitis C virus (anti-HCV) indicates that a person is or has been infected. A differentiation between acute and chronic infection is only possible through the hepatitis C virus recombinant immunoblot assay (RIBA) or HCV RNA testing. Chronic HCV is diagnosed when antibodies to HCV are present in the blood for more than six months (WHO, 2013).

Prevention

Primary prevention of (chronic) hepatitis C

So far, no vaccine against hepatitis C is available since the high mutability of the HCV genome complicates vaccine development. Thus, primary prevention methods for HCV focus on avoiding exposure and transmission through

- *implementation of blood safety strategies* (e.g. anti-HCV screening of blood and blood products);
- *IDU-targeted information campaigns* and *needle & syringe exchange programs* to reduce unsafe injection practices*;*
- implementation of *infection control precautions* and *occupational safety methods* in healthcare and community settings (e.g. disinfection, hand hygiene, gloves, protection of broken areas of skin, sharps safety);
- *post-exposure prophylaxis (PEP)* for healthcare workers (HBV vaccination, screening, antiviral treatment)
- promoting *safer sex practices; and*
- *advocacy and raising awareness* for hepatitis C infection

(Detels et al., 2009; RKI, 2012a; WHO, 2013).

Secondary prevention of (chronic) hepatitis C

Recent advancements in treatment for chronic hepatitis C underline the possibility of secondary prevention. Equal to CHB, the severe and potentially lethal health consequences of chronic HCV emphasize the urgent need to identify patients who qualify for treatment at an early and potentially curable stage of disease, best before the onset of chronic HCV. Because of the wide genetic variability of HCV, careful screening is necessary to determine the most appropriate therapy for the patient. Next to antiviral treatment, early diagnosis of HCV infected individuals allows education and counselling on options for care and treatment, and referral to specialists (WHO, 2012b, 2013).

Tertiary prevention / Therapy of (chronic) hepatitis C

The aim of HCV treatment is the eradication of HCV RNA in order to reduce morbidity and mortality, disease progression, and the reservoir of chronic carriers for controlling further transmission. The need for treatment and its duration vary according to serotype and viral load. Therapeutic advances and intense research have led to the development of a number of HCV-specific oral antiviral drugs. So far, combination therapy with interferon and ribavirin has been the mainstay of hepatitis C treatment. Although hepatitis C is generally curable, for many people this is not a reality. Access to the expensive HCV treatment remains a big issue in many countries, especially in resource-constrained areas of the world, some virus genotypes respond better to interferon than others, and many people do not finish the long-term treatment (Detels et al., 2009; WHO, 2012b, 2013).

3.3 Screening

Definition of Screening

Screening is a public health service in which populations, or groups of people who are thought to be at risk, who either do not have or have not recognized signs or symptoms of a disease or pre-disease condition, thus, who are presumed or presume themselves to be healthy, are systematically offered screening tests, examinations, or other procedures (e.g. questionnaires). The purpose is to detect a disease in its early stages and to identify those affected individuals who are more likely to be helped than harmed by further tests and/or treatment. Screening shall reduce the risk of future ill health, complications and further transmission, or should provide information that is considered valuable even though risk cannot be altered. Since screening aims at identifying those with diseases at a time when they will still benefit from early detection and treatment, it is usually considered to be secondary prevention. Table 5 illustrates where screening is appropriate in the disease stage (Holland, Stewart, & Masseria, 2006; NSC, 2000; Raffle & Gray, 2007; Wilson & Jungner, 1968).

Table 5: Screening in different stages of disease

Stage in the disease pathway	Contribution of screening
Person at risk: no pathological changes present	Screening for risk marker
Symptomless: pathologically definable change present	Screening for pathological change
Unreported/Undiagnosed: Signs and/or symptoms of disease present but not reported/diagnosed	Campaigns to raise awareness of disease and encourage earlier presentation of signs and symptoms (sometimes called screening, but actually prompt recognition)
	Surveillance to look for unrecognized signs or symptoms
Clinical phase	Individuals with a particular disease may receive routine tests as part of clinical management (sometimes called screening, but actually controlling the disease, the side effects of treatment or diagnosing and managing associated conditions)

Source: Raffle, 2007.

Screening is not only the application of a test, but encompasses a whole program of events necessary to achieve risk reduction. Before implementation, the screening program must be carefully evaluated to estimate resources needed, health benefits, and possible severe side-effects for participants. It is also important to ensure availability and accessibility of appropriate health-care facilities for further diagnostics and treatment, if necessary.

Whether a screening test is valuable and will result in better health outcomes depends on several factors: (a) determining disease characteristics are, for example, the severity, the effects on the quality or duration of life, the prevalence rate, and the availability of acceptable and effective treatment; (b) the test itself should be simple to administer and interpret, safe, acceptable to patients and clinicians, and cost-effective, which is given if an effective screening test is inexpensive relative to the cost of diagnosis and treatment of advanced disease. A key parameter for the success of a screening program, but also reason for many controversial discussions, is the validity of the screening test. It is usually measured in sensitivity, the probability of being tested positive given that you have the disease, and in specificity, the probability of being tested negative given that you do not have the disease. Ideally, both measures should be high. This can sometimes be achieved by combining several tests, resulting in 'double', 'triple', or 'quadruple' tests; (c) the value of an early diagnosis for patients and the health system has to be examined. After screening, participants fall into four groups, either benefitting from or even being harmed by the test result: *(1)* for *True Positives,* early and accurate diagnosis and intervention at a curable stage of disease can lead to an improved prognosis: disease progression into severe stages may be slowed down or even prevented, and treatment may need to be less radical. On the other hand, they might be harmed by longer periods of morbidity when their prognosis is unchanged, and there may be overtreatment of non-serious conditions or abnormalities identified; *(2) True Negatives* often benefit from screening as they do not have the disease and are reassured by testing; *(3) False Negatives* may be given unfounded reassurance and may have a delay of the normal diagnostic routines; and *(4) False Positives* may experience, at the very least, unnecessary anxiety and may have to go through unpleasant and perhaps even risky diagnostic routines or, at the worst, inappropriate treatment due to the incorrect screening result. It is therefore important to know and to communicate to patients or participants, that a positive screening result is not a diagnosis. The test result is not confirmed before further testing and diagnosis have verified it. Among this, “labeling” and the psychological effects of a positive test result should be considered; (d) the characteristics of the patient population are important in critically evaluating a screening program; (e) considering effects on the health system, on the one hand, scarce health services resources will be saved by treating diseases before they progress. On the other hand, there are costs resulting of finding more illness in terms of the tests themselves, the personnel costs and the subsequent management of whatever is found. The controversial effects of screening emphasize the importance of continuous quality control and performance management to minimize errors in test results, and thus to minimize risks and harms to participants (Detels et al., 2009; Joshua Lee, Fordyce, & Rich, 2007; Raffle & Gray, 2007).

Relevance of Screening for Viral Hepatitis B and C

Public health aims to prevent disease at population level and thus reduce the burden of disease for individuals and for society as a whole. Prevention, detection and diagnosis, and treatment are essential elements of an optimal management of viral hepatitis B and/or C infection. Primary prevention (e.g. HBV-vaccination, needle-stick injury prevention or awareness campaigns) aims to reduce the incidence of hepatitis B and C by avoiding exposure to the viruses. Notwithstanding the importance of primary prevention, studies have shown that screening for Hepatitis B and C can significantly reduce mortality and improve quality of life. Secondary prevention aims at early detection of Hepatitis B and C through case-finding, including targeted screening of people at risk of contracting these viruses. Screening allows guiding infected individuals to appropriate antiviral care and treatment, and helping them to prevent the infection of others. It also allows for households and sexual contacts of infected individuals to be offered HBV-vaccination. Due to the largely asymptomatic nature of viral hepatitis B and C, infected individuals may be unaware that they are infected for years and health professionals often fail to diagnose the disease in its early stages. Thus, many patients, who might benefit from treatment, remain undetected despite effective antiviral treatment is available. The absence and difficulty of identifying clear symptoms, make screening critical for people at risk and (early) diagnosis extremely important.

Screening programs for hepatitis B and, to lesser extent hepatitis C, are in place in European countries, targeting blood donors, pregnant women and behavioural high-risk groups. The purpose of these programs is mainly primary prevention, e.g. through HBV-vaccination of new-borns to infected mothers, rather than detection and treatment of chronically infected individuals. Migrants from countries where hepatitis B and C are endemic, are at high risk for chronic hepatitis B and C but are currently not targeted in screening programs. Several pilot studies on screening for either chronic hepatitis B or C among migrant groups have been conducted in European countries, as described in the result section below. There is also evidence that screening might be cost-effective, but this evidence-base still needs to be strengthened. After ECDC (2010), wider screening as part of a comprehensive prevention and control policy could provide opportunities for significant future savings in both healthcare costs and productivity gains (ECDC, 2010; Hatzakis et al., 2011).

3.4 Migration and Hepatitis

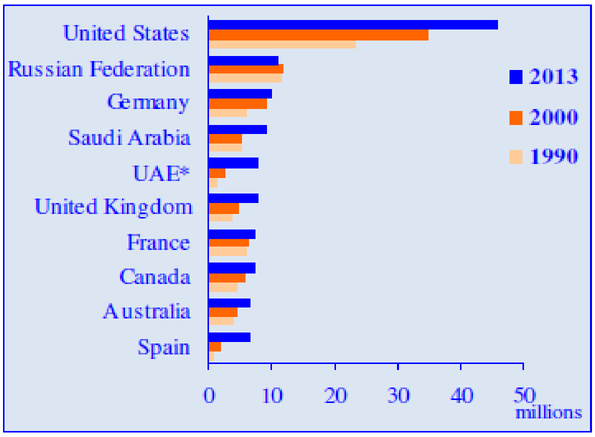
Definition of Migration and Migrants

Who is a 'migrant' is often unclear in public debate. Media discourses commonly use terms like migrants, foreign-born resident, foreign nationals, ethnic or religious minorities, or asylum seekers interchangeably but they have to be distinguished. Migrants are a heterogenic group and every country utilizes its own definitions, therefore it is very difficult to formulate a universal definition for migrants or 'a migrant'. After Schenk et al. (2006), the term 'migrant' is not based on biological, cultural, or religious attributes, but classified according to a biographic event – the migration – and its resulting (health-related) influences and particularities for the life of migrants. Mostly, migrants are considered as individuals who crossed international borders for the purpose of permanent resettlement in another country or society. Consensus is missing if only persons with own experiences of migration, so-called first-generation migrants (FGM), or even their descendants, so-called second or third generation migrants (SGM, TGM), should be counted as migrants. In Germany, the term 'person with a migration background' was introduced, still not answering the question how many generations are encompassed within this term. Nevertheless, for the present paper the terms 'migrant' and 'person with a migration background' are used synonymously. Thus, a person called 'migrant' can either be influenced by own experiences of migration or by those of its family (Schenk et al., 2006).

Extent of, Ways, and Reasons for Migration

In 2013, the number of international migrants worldwide reached an all-time high of 232 million people, equating to 3.2% of the global population. With 72 million international migrants, Europe remains the most popular destination region, followed by Asia with 71 million and Northern America with 53 million. Over 51 % of all international migrants reside in ten countries worldwide (Figure 6) (United Nations, Department of Economic and Social Affairs, 2013b).

Figure 6: Ten countries with the largest number of international migrants, 1990-2013



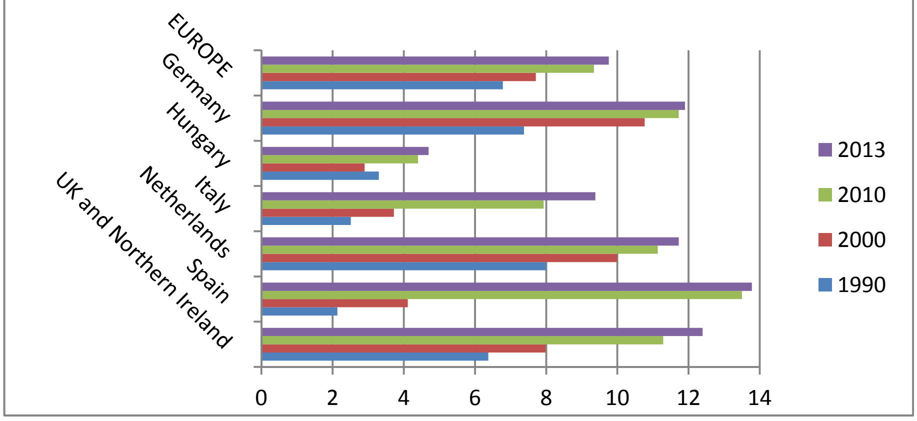
* United Arab Emirates.

Source: United Nations, Department of Economic and Social Affairs, 2013b.

In Europe, migration has certainly increased since the end of the Cold War. Considering the six European countries, which are main focus in the present thesis, a considerable increase of international migrants can be observed from 1990 to 2013 (Figure 7).

Figure 7: Stock of international migrants per country

(% of the total population)



Source: United Nations, Department of Economics and Social Affairs, 2013c.

Spain shows the biggest increase of international migrants from 2.1% of the total population in 1990 to 13.8% in 2013. At present, Spain is also hosting the highest amount of international migrants compared to the other five countries, followed by the UK and Northern Ireland (12.4%), Germany (11.9%), the Netherlands (11.7%), Italy (9.4%), and Hungary (4.7%). Additionally, the countries of origin of immigrants have become considerably diversified with an increasing influx of migrants from Eastern Europe, Asia, Africa, and Latin America compared to the 'classic' countries of origin, like South-East Asia, North Africa, or the Mediterranean countries (Knipper & Bilgin, 2009; United Nations, Department of Economic and Social Affairs, 2013a, 2013b).

Extent, ways, and reasons, as well as contemporary assessment of immigration flow in the receiving countries are subject to diverse and strong changes. Considering motivation and reasons, migration can be classified into different types: (1) *Economic migration* is strongly motivated by the desire for a better life, and includes highly skilled migrants and people escaping from poverty or disadvantaged socioeconomic and environmental backgrounds in their country of origin. (2) *Environmental migration* often arises in reaction to global climate and environmental changes, like rising sea levels, flooding, coastal erosion, and drought or even natural and environmental disasters, which are important and growing forces for the displacement of people. (3) *Educational migration* is increasing since education has become a major driver of human mobility. People moving for educational and career reasons often resettle from developing to developed countries. (4) *Political migration* is mostly the case in refugees, people who are forced to flee outside their country of nationality or habitual residence because of a threat of persecution and the lack of protection of their own country. Wars, conflicts, and persecution because of race, religion, political opinion, or nationality are common causes of forced migration. Since 1951, the rights of refugees have been protected by the International Convention on the Rights of Refugees, which was ratified by 141 countries in 2002. (5) *Irregular or undocumented migration* or resettlement across national borders is hard to assess but is thought to be growing, despite social and political measures and attitudes to migration have become more stringent in recent years. Those migrants are deliberately unseen by national and local authorities. The group of irregular migrants implies two 'special' subgroups, namely smuggled and trafficked migrants. (6) *Smuggled migration* is mostly associated with crime and fear; nevertheless many irregular migrants pay for being smuggled into the countries of final destination. In constant fear of being picked up by the police and sent back to their country of origin, their possibilities to complain or bring charges against smugglers are very constrained. (7) *Trafficked migration* is a modern form of slavery. In 2009, the International Organization for Migration (IOM) estimated a global number of trafficked people of over 12 million. The majority of trafficked migrants build women, who are often forced into illicit sex work (Carballo, Cody, & O'Reilly, 2010; United Nations High Commissioner for Refugees (UNHCR), 1951).

Migration, Health, and Viral Hepatitis – Challenges for Receiving Countries

The life of migrants is influenced by a complex interaction of factors that can shape their health, health behaviour, and their concept of health and illness. Determinants include for example the biographic event of the migration itself, presenting new, enriching, up to traumatic experiences and demands for reorientation and adaptation. Next to a biographic process in the life of individuals, migration is also a social, political and cultural phenomenon that is shaping the social and legal situation of migrants in the receiving country. Considering migrants as a social group, group-specific risks or frequencies of diseases are brought up sometimes, which do not have to be applicable to every migrant. On societal level, the view of and on migrants is often influenced by public debates and the communicated pictures and beliefs about migration and 'the migrants' in common or specific migrant groups (e.g. asylum seekers, refugees) by the media. These perceptions can affect health and illness of migrants, for example by providing access barriers to healthcare, by influencing the participation in national public health programs, or indirectly by influencing the relation between healthcare workers and migrant patients (Knipper & Bilgin, 2009; Schenk et al., 2006).

The vulnerability of migrants to communicable and non-communicable diseases is likely to be as different as the backgrounds they are coming from. With the increase and diversification of global population movements also the global distribution of viral hepatitis has changed. After Hatzakis et al. (2013), migrant populations often represent the 'overlap' between viral hepatitis epidemics in the receiving countries and those in their countries of origin. In a study among migrants originating from 153 different countries worldwide and being referred to 41 GeoSentinel clinics between 1997 and 2009, both viral hepatitis B and C ranked among the top ten diagnoses, with HBV being the second most commonly reported disease. 11% of all migrants were infected with chronic hepatitis B and hepatitis C virus was diagnosed in 5% of all migrants. Both conditions were highly present in migrants originating from Africa, Southeast Asia, and Eastern Europe (McCarthy et al., 2013). These findings indicate that international migration can have an obvious impact on the viral hepatitis prevalence in the receiving countries. After Rossi et al. (2012), the pooled seroprevalence estimates of CHB in international migrants mirror the prevalence of CHB in their regions of origin. Thus, especially migrants from intermediate or high hepatitis B and C prevalence regions contribute to an important risk group for chronic viral hepatitis in the receiving countries. Table 6 provides an overview of the five main migrant groups in the six European countries of particular concern in this thesis, their population size, and the chronic hepatitis B and C prevalence in the countries of origin.

Table 6: The five main migrant groups and the HBsAg / anti-HCV prevalence in the countries of birth

Country	Country of birth[a]	Population size[a]	HBsAg prevalence[b]	Anti-HCV prevalence[c]
Germany	Turkey	1,491,000	2 – 7%	1.0 - 1.9%
	Poland	1,137,000	2 – 7%	1.0 - 1.9%
	Russian Federation	1,004,000	2 – 7%	2.0 - 2.9%
	Kazakhstan	747,000	≥ 8%	1.0 - 5.0%[d]
	Italy	425,000	2 – 7%	> 3.0%
	Migrants total	*10,689,000*		
Hungary	Romania	214,543	≥ 8%	> 3.0%
	Germany	31,286	< 2%	< 1.0%
	Ukraine	29,185	2 – 7%	> 10.0%[d]
	Serbia	24,659	2 – 7%	< 1.0%[d]
	Slovak Republic	22,167	2 – 7%	< 1.0%[d]
	Migrants total	*473,331*		
Italy	Romania	953,943	≥ 8%	> 3.0%
	Albania	425,471	2 – 7%	1.0 - 5.0%[d]
	Morocco	402,318	2 – 7%	n.a.
	Germany	218,206	< 2%	< 1.0%
	Ukraine	201,830	2 – 7%	> 10.0%[d]
	Migrants total	*5,457,820*		
Netherlands	Turkey	197,434	2 – 7%	1.0 - 1.9%
	Suriname	185,499	2 – 7%	n.a.

	Morocco	168,339	2 – 7%	n.a.
	Indonesia	135,109	≥ 8%	n.a.
	Germany	122,824	< 2%	< 1.0%
	Migrants total	*1,906,295*		
Spain	Romania	833,161	≥ 8%	> 3.0%
	Morocco	775,752	2 – 7%	n.a.
	Ecuador	469,741	2 – 7%	n.a.
	United Kingdom	397,986	< 2%	< 1.0%
	Colombia	373,465	< 2%	n.a.
	Migrants total	*6,737,933*		
UK	India	686,000	2 – 7%	1.0 - 1.9%
	Poland	617,000	2 – 7%	1.0 - 1.9%
	Pakistan	441,000	2 – 7%	> 3.0%
	Ireland	429,000	< 2%	< 1.0%
	Germany	292,000	< 2%	< 1.0%
	Migrants total	*7,430,000*		

[a] *Source*: OECD (2011), for Italy: eurostat (2013)
[b] *Source*: CDC (2013)
[c] *Source*: CDC (2013), except [d] *Source*: Hope et al. (2013)

Since their access to, and use of health care services is limited, screening, early diagnosis and treatment of viral hepatitis B and/or C in immigrants is very difficult. Refugees and irregular migrants are representing a specifically challenging target group for public health. The social and environmental conditions in which many of them are forced to live, even temporarily, tend to be conducive to the spread of infectious diseases. Their conditions of life are often characterized by overcrowded housing, poor hygiene, marginalization from health care systems, and frequent mobility within or between cities. The additional reluctance and fear of being identified by judicial authorities in irregular migrants even complicate the task of reaching them by health initiatives (Carballo et al., 2010).

For the receiving countries, migrants therefore present a challenging target group. Due to the complex and sometimes still unknown influencing factors it is difficult to specify how migration affects the overall health profiles of countries or national health care systems. Nonetheless, there is no doubt that health care needs are changing with increasing migration. Up to now, European countries differ not only between the definitions of migrants, but also between the structure of providing health and social care to migrants, as well as the legal forms of access to health care, especially concerning undocumented migrants. Since there is no international consensus about the best approach, pre-departure and post-arrival interventions to address the health of new arrivals vary widely between countries, if ever present. However, there is a common statement of the right of everyone to the “enjoyment of the highest attainable standard of physical and mental health” across all member states. Next to structural differences between the countries, the topic of viral hepatitis and migration has received little attention so far; despite the fact that a large proportion of migrants into the EU come from intermediate or high endemicity countries for HBV and HCV. For both, national and individual public health reasons, governments are pressured to react on the increasing influx of migrants. The cycle of transmission in migrants must be intercepted, and people from high HBV- and HCV-prevalence countries must be diagnosed and treated early and efficiently. National and local strategies should meet the heterogenic needs and health concerns of migrants. Accessible, equitable, and good quality health services should be available for all, and the existence of public health infrastructure needed for ongoing care should be assured. This emphasizes the need for ongoing education of primary care and healthcare providers at all about health needs of migrants in general, and specific needs of new populations, as well as the provision of evidence-based protocols and guidelines (Barnett et al., 2013; Carballo et al., 2010; Priebe et al., 2011).

4 Methods

4.1 Introduction

In order to identify, collect and analyse information on the general and migrant/ at-risk group specific screening practices in Europe, a systematic literature search among published and grey literature was conducted. Initially, this systematic search provided the literary base for the screening part of a work package on behalf of the EU co-founded project ‘HEPscreen: Screening for hepatitis B and C among migrants in the European Union’ (further referred to as EU-HEPscreen). The general objective of the project was 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. In order to provide a basis for further activities of the project, work package 4 aimed to collect and analyse information on the current hepatitis B and C screening, treatment, and patient management practices in general and among migrants and ethnic minorities in particular.

4.2 Setting

Initially, the systematic literature search being the general basis of this thesis was conducted on behalf of the EU co-founded project ‘HEPscreen: Screening for hepatitis B and C among migrants in the European Union’. Therefore, the aim of the search was to identify general and migrant /ethnic minority specific hepatitis B and C screening approaches in six European countries, namely Germany, Hungary, Italy, the Netherlands, Spain, and the UK. This selection of countries should serve as representation of the current situation concerning hepatitis B and C screening policy and strategies in the European Union. These six countries are also main setting for the current thesis. In addition, Europe-wide and worldwide approaches have been examined to identify examples of good practice and to obtain an orientation how the problem of viral hepatitis is encountered in other parts of the world.

4.3 Population

Main focus of the systematic literature search and the present thesis was the identification of screening approaches targeting migrants. For identification of general screening approaches, the target population was the general population including several high-risk groups for hepatitis B and C, as mentioned in guidelines and recommendations for screening.

4.4 Systematic Literature Search on current Hepatitis B and C Screening Practices and Approaches in six European Countries

4.4.1 Development of Search Strategy

In order to identify the highest possible number of available published scientific literature, a search strategy was developed.

1 *Preparation of an enunciated scientific research question*

It forms the basic part of the process, helps to specify what you really want to know, and to limit the wealth of information to the specific and relevant amount you want. In evidence-based health care, the process of formulating a good search question is known as “the well-built clinical question” after Richardson et al. (1995). They developed the P.I.C.O. scheme which names essential elements for building a research question; namely: **P**atient or **P**opulation or **P**roblem, **I**ntervention (or Exposure), **C**omparison Intervention (or Exposure) or **C**ontrol and (Clinical) **O**utcome (Richardson, Wilson, Nishikawa, & Hayward, 1995). In case of the present thesis this leads to the following subjects:

Population = humans, especially migrants/ethnic minorities in European countries
Intervention = screening practices
Comparator = no screening
Outcomes = detection of people with (chronic) Hepatitis B or C, eligible for treatment to prevent disease progression and consequences like cirrhosis or liver cancer

The research question resulting of this scheme was:

What kind of general and migrant/at-risk group specific screening practices are in place in European countries to detect people with (chronic) Hepatitis B or C, eligible for treatment, to prevent disease progression and consequences like cirrhosis or liver cancer and where are they missing?

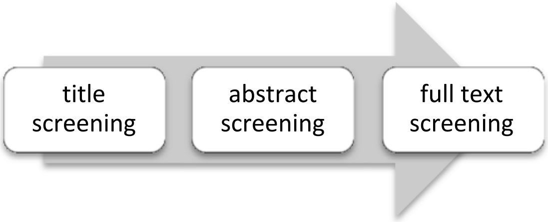
2 *Preparation of a search table* to identify and determine search terms, using synonyms and translations of relevant terms in

3 *Limitation of search results* by applying limits to the search:
Publication date range from 01.01.2000 to 08.08.2013

4 *Testing the search strategy* to possibly rework it

5 *Conduct final search*

6 *Identification of relevant studies* by applying pre-defined inclusion and exclusion criteria in a three-step process:



4.4.2 Systematic Literature Search

The databases Embase, Medline and Medline In-Process were systematically searched to gain insight into the general and migrant/at-risk group specific screening practices for hepatitis B and C in the six European countries, Europe-wide, and worldwide. The applied comprehensive search strategy is presented in detail in Table 7 (*Annex*). *Medline In-Process* is a database that also includes recent papers which are included in Medline but not yet indexed. *OvidSP* served as search interface for the systematic literature search in these databases. Access was gained via the Central Medical Library of the University Clinic Hamburg-Eppendorf (UKE).

The systematic literature search was conducted using a combination of terms. These terms were categorized under four main headings: (a) Population, (b) Disease, (c) Intervention and (d) Setting, including the following items:

(a) *Population*: (1) general population, (2) migrants/ ethnic minorities, (3) irregular migrants, (4) intravenous drug users (IDUs), (5) sex workers
(studies targeting IDUs and sex workers were included because of the high proportion of migrants among these groups)

(b) *Disease*: Hepatitis B/ Hepatitis C

(c) *Intervention*: testing/ screening/ diagnosis/ “prevention and control”/ surveillance

(d) *Setting*: Europe/ the six selected European countries
(Germany, Hungary, Italy, Netherlands, Spain and UK)

Each of the five groups listed under *(a) Population* was combined with *(b) Disease* and *(c) Intervention*. For population groups *(1), (3), (4)* and *(5),* the search was restricted to the six study countries and Europe by combining these with *(d) Setting*. Population group (2) migrants/ ethnic minorities formed an exception and remained unrestricted to a certain setting to include worldwide good practice examples. In order to restrict the wealth of information to a first manageable and relevant amount, the search was initially limited to articles published between 1st January 2000 and 3rd January 2012 for the EU-HEPscreen project. For supplementing the search for this thesis with up-to-date information, the search was re-conducted and expanded to articles published between 1st January 2000 and 8th August 2013.

An additional hand-search in grey literature provided numerous relevant documents, including scientific primary or secondary studies, reviews, letters, declarations, conference papers, guidelines, or directives. Websites of associations involved in the field of Hepatitis were assessed to find detailed information; namely the websites of the World Health Organization (WHO), the World Hepatitis Alliance (WHA), the Centers for Disease Control and Prevention (CDC), the European Association for the Study of the Liver (EASL), the European Centre for Disease Prevention and Control (ECDC), the Robert-Koch-Institute (RKI), and websites of patient associations like the European Liver Patients Association (ELPA) or the associazione ONLUS. To specifically retrieve hepatitis B and/or C related screening or prevention guidelines for Europe as a whole and for each of the six study countries, e.g. the international guidelines website [Guidelines International Network (http://www.g-i-n.net/)], the National Institute for Health and Clinical Excellence (NICE), the Scottish Intercollegiate Guidelines Network (SIGN), and the Sistema Nazionale Linea Guida - Istituto Superiore di Sanità (SNLG) were sifted. Several databases, including WHO data and statistics, Eurostat, Eurosurveillance or country-specific National Statistics Institutes, were also accessed to retrieve data on population demography, HBV and HCV incidence and prevalence rates, and migrants. The EUROHEP.NET project addressed issues related to surveillance and prevention of hepatitis A and B in the EU countries.

Study selection

Basic objective of the literature search was to identify articles focusing on screening or testing approaches for (chronic) hepatitis B and C infection among the general population and especially among migrants and at-risk groups. Additionally, articles that provided information on hepatitis epidemiology worldwide and in Europe, attitudes towards screening or the development of screening in Europe were identified and saved for re-assessment and supplementing background information. All studies retrieved in duplicate (Embase and Medline) were removed. Pre-defined inclusion and exclusion criteria were used to assess the articles:

Inclusion criteria

In order to incorporate a study: (a) one of the interventions (screening, testing, diagnosis, prevention and/or surveillance of Hepatitis B and/or C) has to be mentioned in the study; (b) at least one of the five subgroups (general population, migrants/ ethnic minorities, irregular migrants, IDUs, and/or sex workers) has to be focused; (c) the geographic focus of the paper has to be one of the six study countries or Europe, except for ´population (2) migrants/ ethnic minorities, where also worldwide studies were included; (d) Hepatitis B and/or C should be tested via blood/serum or oral fluid samples ; (e) the procedure has to be conducted in reality and has to be described in the article; and (f) articles published in Dutch, English, German, Hungarian, Italian or Spanish.

Exclusion criteria

Articles that did not fulfil the inclusion criteria were excluded from the systematic review. Characteristics of excluded studies were: (a) dealing with types of hepatitis other than B or C, or studies with a main focus on other diseases such as HIV or tuberculosis; (b) focusing epidemiology, natural history, clinical features or complications of hepatitis (e.g. hepatocellular carcinoma, liver cirrhosis etc.); (c) dealing with vaccination or immunization practices; (d) therapy, treatment, management, counselling and/or referral practices as main subject; (e) surveys, interviews, cost-effectiveness analyses or efficiency-assessment of different screening assays; and (f) re-use of samples where HBV/HCV-screening was not the main purpose of the sample test.

A first title screening excluded a substantial number of articles. It was followed by a thorough reading of the abstracts which again lead to the exclusion of studies. The final selection was based on full texts of the articles that could be retrieved. Articles excluded in first place to find only screening strategies were re-assessed and searched for additional information on hepatitis B and C in general and in Europe, awareness of the problem worldwide, in Europe and especially in migrants/ at-risk groups, or cost-effectiveness of screening among migrants/ at-risk groups for supplementing background information or recommendations.

Data extraction

To systematically extract and categorize relevant information from the selected articles, a data extraction sheet with multiple categories was prepared. These categories listed information on:

study country/region, study setting, period, target population, method for recruitment of participants, sample size, type of screening test, regular or one-time screening, screening for hepatitis B and/or C, whether vaccination was offered, key findings, strengths and limitations of the study and whether the study could be counted as good practice. The data extraction sheet reduced to the most essential categories is provided in Table 8 (*Annex).*

5 Results

After removal of duplicates (articles found both in Embase and Medline), a total amount of 1896 articles was identified in published scientific literature. A first selection based on title led to 492 articles being included, whereas 1404 articles were excluded. After the abstract-screening, 148 articles were included and 344 articles were excluded. A third selection was made based on full text, if retrievable. 27 articles could not be retrieved. Those were, basically, recent publications from 2012 or 2013 and published by SpringerLink. Of the remaining 121 articles, 81 articles were excluded based on full text, in first place, what led to a final amount of 40 articles which fulfilled all inclusion criteria. Re-assessment of excluded full-text articles lead to an additional amount of 20 papers. 151 documents were identified via hand search of references and grey literature. In total, the literature search resulted in an amount of 211 publications: 40 primary studies on general and migrant/at-risk group specific HBV and/or HCV screening, 42 primary and secondary studies providing general information, 38 viral hepatitis (screening) guidelines or recommendations, and 91 publications concerning background information. A detailed account of the step-wise selection of articles and the results is given in Figure 8 (*Annex*).

Key findings of identified published literature can be summarized in four categories: (1) general strategies, recommendations and approaches for regular or temporary hepatitis B and C screening targeting at-risk groups in the six EU-HEPscreen countries, (2) migrant-specific hepatitis B and C screening strategies, recommendations and approaches in the six EU-HEPscreen countries, (3) European strategies, recommendations and approaches for hepatitis B and C screening, and especially those including migrants, and (4) worldwide migrant-specific hepatitis B and C screening approaches that have been defined as examples of good practice and worldwide guidelines or recommendations including migrants.

An overview of all 40 included primary studies concerning general and migrant / at-risk group specific hepatitis B and C screening practices and of recommendations and guidelines is given in Table 8 and Table 9 (*Annex*). To allow for a better comparison, the results are described country-wise in alphabetical order in the following, not to be interpreted as ranking.

5.1 General Strategies, Recommendations and Approaches for Regular or Temporary Hepatitis B and C Screening for At-Risk Groups in the Six EU-HEPscreen Countries

To gain a first look at the six European countries which are focused in the EU-HEPscreen project and the present thesis (Germany, Hungary, Italy, the Netherlands, Spain and the UK), data about surveillance, referral and treatment from the WHO/WHA Global Hepatitis Survey in 2012 was extracted and visualized. In mid-2012, WHO and WHA conducted a survey among WHO Member States in all six regions, namely African Region, Region of the Americas, Eastern Mediterranean Region, European Region, South-East Asia Region and Western Pacific Region. Basic objective was to gather country-specific baseline data on hepatitis policies, as well as on the compliance with the four axes of the WHO health system approach facing viral hepatitis. The WHO approach resulted of the resolution WHA63.18 that was adopted by the World Health Assembly in 2010, and includes a comprehensive global strategy to raise awareness for viral hepatitis in policy and populations, and to prevent, diagnose and treat viral hepatitis (Lazarus, Safreed-Harmon, & Sperle, 2013; WHO, 2012b).

The four axes of the WHO strategy are:
1. Raising awareness, promoting partnerships and mobilizing resources
2. Evidence-based policy and data for action
3. Prevention of transmission
4. Screening, care and treatment.

The survey data offered insight into hepatitis policy conditions in the participating countries and gaps that need to be filled. Overall aim is to make the 'silent' epidemic of viral hepatitis more visible and more manageable. Results of the survey are available on the WHA database (http://globalreport. worldhepatitisalliance.org/en/compare-countries.html).

A short demographic and economic description of the six European countries is given in Table 10.

Table 10: Demographic and economic ratios of the six EU-HEPscreen study countries

	Germany	Hungary	Italy	Netherlands	Spain	UK
Population (in millions) (2011)	82.2	10.0	60.8	16.7	46.5	62.4
Country classification (2012)	High-income	High-income	High-income	High-income	High-income	High-income
Gross national income per capita (PPP int $) (2011)	$40 230	$20 310	$32 400	$43 140	$31 400	$36 010
Total health expenditure as % of GDP (2010)	11.64%	7.33%	9.53%	11.92%	9.54%	9.64%
Life expectancy at birth (in years) (2009)	80	74	82	81	82	80

Source: Lazarus et al., 2013.

Among the six EU-HEPscreen study countries, only UK reported the existence of a written national strategy or plan that focuses exclusively or primarily on the prevention and control of viral hepatitis. It focused exclusively on the prevention and control of hepatitis C. In none of the six countries, a designated governmental unit/department responsible only for coordinating and/or carrying out viral hepatitis-related activities was established. Public viral hepatitis awareness campaigns were funded in the Netherlands, considering issues like general information about hepatitis and its transmission, importance of knowing one's HBV and HCV status, safer sex practices, harm reduction for IDUs, safe workplace practices, receiving blood products before 1992, travellers to high endemic countries, HIV and MSM. In the UK, awareness campaigns included general information about hepatitis and its transmission and harm reduction for IDUs. In Hungary, the Netherlands and UK the government was reported to be collaborating with civil society groups within the country to develop and implement their viral hepatitis prevention and control program, namely the Májmoly Foundation (Hungary), the National Hepatitis Centrum (Netherlands), and the Hepatitis C Trust, Addaction, British Liver Trust, Exchange Supplies, Needle Exchange Forum and Injecting Advice (UK). Hepatitis disease reports were published annually in five of six countries, except Hungary, where weekly hepatitis disease reports were published. The British government additionally published quarterly reports. Regular viral hepatitis sero-surveys were conducted in Germany among children (aged 3 to 17 years) and the general population, in the Netherlands among the general population and prisoners, and in UK among IDUs. In Hungary, Italy and Spain no regular sero-surveys were established. The availability of national clinical guidelines for the management of viral hepatitis was reported by Germany, Hungary, the Netherlands and Spain. Treatment was publicly funded in all six EU-HEPscreen study countries for both, hepatitis B and hepatitis C. In Germany, the Netherlands and Spain, all people with health insurance are eligible for treatment. In the UK, treatment is available and free for the entire population, and Hungary and Italy didn't specify who is eligible for such treatment. Education and further training for health professionals to obtain skills and competencies, required for effective care of HBV-/HCV-infected individuals, is provided in schools for health professionals in all countries except Hungary, via on-the-job training in all countries except Italy, and in postgraduate training in all EU-HEPscreen study countries except Germany. None of the six EU-HEPscreen study countries indicated interest in assistance from WHO for the prevention and control of viral hepatitis.

Hepatitis B and C Screening Strategies in the six EU-HEPscreen Study Countries

Based on the systematic literature search, the *first category* of results encompasses all identified regular or temporary hepatitis B and C screening approaches and recommendations for the general population and specific risk groups, as mentioned in guidelines, policy reports, or surveillance reports. Nine primary studies conducted in the six examined European countries could be identified and are described in detail in Table 8 (*Annex*). Additionally, 21 international and national hepatitis B and C screening or management guidelines, policy reports, or recommendations could be retrieved. Those are summarized in Table 9 (*Annex*).

Two German studies concerning regular screening of blood and plasma donors for HBV and HCV (Offergeld, Ritter, & Hamouda, 2012) and pregnant women for HBV (Alba-Alejandre, Kainer, Friese, & Mylonas, 2009), and one temporary screening intervention for HBV and HCV among German inhabitants (Thierfelder, Hellenbrand, Meisel, Schreier, & Dortschy, 2001) could be retrieved. In Italy two screening approaches either temporary screening all people over nine years of age for HBV and HCV (Di Stefano et al., 2002) or regularly screening pregnant women for HBV and temporary for HCV (Baldo et al., 2000) were found. Two temporary screening studies were conducted in the Netherlands, both targeting inhabitants of Amsterdam, either screening only for HCV (Zuure et al., 2011) or for HBV and HCV (Baaten, Sonder, Dukers, Coutinho, & Van den Hoek, 2007). Another comprehensive study by Urbanus et al. (2011) combined results of four national Dutch studies targeting heterosexual visitors at a STI-clinic, pregnant women, inhabitants of Amsterdam (>18 years), and people living in the Netherlands. Finally, two studies were identified in the UK, concerning temporary screening of recipients of blood before 1991 for HCV (Soldan et al., 2002) and regular screening of prisoners for HCV (Horne, Clements, Drennan, Stein, & Cramp, 2004).

Next to the WHO/WHA survey in 2012, the ECDC conducted an international web-based survey on surveillance and prevention of hepatitis B and C in the 27 EU member States in 2008 and 2009 (ECDC, 2010). According to the results of both surveys, regular screening for hepatitis B and C in *blood and organ donors* is established in all of the six EU-HEPscreen study countries. Today's almost full coverage of mandatory viral hepatitis screening of blood, blood products and organ donors in European countries, is the result of the European Council Directive in 2002, which defined standards of quality and safety for the collection, testing, processing, storage and distribution of human blood and blood components (European Parliament and Council, 2002). Additionally, this target group is recommended to be screened for HBV and HCV in the worldwide guidelines for hepatitis B and C of the World Gastroenterology Organisation (WGO) (WGO, 2008, 2013), the European Liver Patients Association's (ELPA) recommendations (2009), and national guidelines or recommendations, like the German S3 guidelines for hepatitis B and C (Cornberg et al., 2011; Sarrazin et al., 2010) and the German transfusion law (Bundesministerium der Justiz, 1998), in the Hungarian consensus guideline for the diagnosis and treatment of B, C, and D viral hepatitis (Makara et al., 2012), in Italian recommendations for HBV and HCV (Carosi et al., 2010), in the Dutch LCI guideline for hepatitis B (LCI, 2012), in the Spanish guideline for hepatitis B (Ministerio de Salud, 2010), the British Hepatitis C strategy for England (Department of Health, 2002) and for primary care (Ford et al., 2007), and in the Scottish guideline for the management of hepatitis C (Scottish Intercollegiate Guidelines Network (SIGN), 2006). Likewise, *pregnant women* are regularly screened for hepatitis B in all six European countries and for HCV in Spain to prevent mother to child transmission (MTCT) according to the ECDC and WHO/WHA surveys. National guidelines considering this target group, are the German 'Mutterschaftsrichtlinien' (G-BA, 2012), the Italian hepatitis B recommendations (Carosi et al., 2010), the Dutch LCI guidelines for hepatitis B (LCI, 2012) with a specific appendix considering pregnancy (LCI, 2008) and the British NICE guideline 62 for antenatal care (NICE, 2008). Screening of *intravenous drug users (IDUs)* is recommended worldwide by the WGO for hepatitis C (WGO, 2013), in Germany for HBV and HCV (Cornberg et al., 2011; Sarrazin et al., 2010), in Italy for HBV and HCV (Carosi et al., 2010; The Writing Committee on behalf of the Consensus Panel, 2006), in the Netherlands for HBV (LCI, 2012), in Spain for HCV (Abraira García, García Sierra, Guillán Pavón, Otero Antón, & Suárez López, 2009), and in the UK and Scotland for HCV (Department of Health, 2002; Ford et al., 2007; Scottish Intercollegiate Guidelines Network (SIGN), 2006). *Haemodialysis patients* are screened for HBV and HCV in all study countries according to the ECDC survey, except in Hungary for HCV. Nowadays, since the Hungarian consensus guideline for hepatitis B, C and D was implemented in 2012, this target group is also screened for HCV in Hungary (Makara et al., 2012). Other guidelines that recommend the screening of haemodialysis patients are the WGO Global Guidelines for the diagnosis, management and prevention of hepatitis C (WGO, 2013), the German S3 guidelines for hepatitis B and C (Cornberg et al., 2011; Sarrazin et al., 2010), the Italian recommendations for hepatitis B and C (Carosi et al., 2010) and the Italian Expert Consensus Conference for hepatitis C (The Writing Committee on behalf of the Consensus Panel, 2006), the Spanish practice guideline for hepatitis C (Abraira García et al., 2009), the British Hepatitis C strategy for England (Department of Health, 2002) and the British guidance in primary care for HBV and HCV (Ford et al., 2007), and the Scottish guideline for the management of hepatitis C (Scottish Intercollegiate Guidelines Network (SIGN), 2006).

Other risk groups for whom viral hepatitis screening is recommended by some national or international guidelines, directives, or recommendations include: healthcare workers; recipients of blood, organ, or tissue transplants; STI-clinic patients; people with abnormal liver function; jaundiced people or people with signs and symptoms of hepatitis; residents or inmates of closed facilities (e.g. prison, psychiatry); household and sexual contacts of HBV+/HCV+ patients; men who have sex with men (MSM); HIV-positive patients; HBV+/HCV+ patients; infants of HBV+/HCV+ mothers; people who may have had unsterile medical, dental, or cosmetic procedures (abroad); people on immunosuppressive therapy or chemotherapy; and people with high risk sexual practices (e.g. multiple partners). A detailed overview of which risk group is recommended to be screened in which country and which guideline is given in Table 9 (*Annex*).

According to the WHO/WHA survey in 2012, testing for hepatitis B and C was free of charge for all individuals in the EU-HEPscreen study countries (including specific risk groups), except for Hungary and the Netherlands. In Hungary, hepatitis B and C tests were subject to charge for everybody. In the Netherlands testing was free of charge only for specific risk groups, namely: patients attending sexually transmitted infection (STI) clinics on indication (MSM, CSW, people from HBV endemic countries, HIV positive patients, IDUs) for hepatitis B and HIV positive patients, and MSM for hepatitis C. In Germany, Italy and the Netherlands testing for hepatitis B and C was not compulsory for any specific risk group. Whereas in Hungary testing was compulsory for certain healthcare providers, in Spain for blood donors and in the UK for healthcare workers who wish to do exposure-prone procedures (Lazarus et al., 2013).

The viral hepatitis strategy in one of the examined EU-HEPscreen study countries is important to be underlined at this point. Scotland provides a successful example for the implementation of comprehensive awareness-raising and case-finding mechanisms for Hepatitis C through a national action plan. The plan was developed in two phases: Phase I was undertaken from September 2006 to March 2008. It focused on increasing awareness about Hepatitis C and on gathering evidence through surveys and other investigations to inform proposals for the development of Hepatitis C services during Phase II. Phase II (2008 – 2010) aimed at improving case-finding of Hepatitis C and ensuring better coordination, planning and accountability of existing services (Scottish Executive, 2006; The Scottish Government, 2008).

5.2 Migrant-Specific Hepatitis B and C Screening Strategies, Recommendations and Approaches in the Six EU-HEPscreen Countries

Category 2 considers migrant-specific hepatitis B and C screening approaches in Germany, Hungary, Italy, the Netherlands, Spain, and the UK. Studies targeting IDUs and sex workers have been included in this category because of the often high amount of migrants in these two subgroups (Carballo et al., 2010). 20 primary studies targeting migrants (n=17), IDUs (n=2), and sex workers (n=1) and two additional migrant-specific approaches in Germany, found in grey literature, could be identified. The migrant groups targeted in the identified screening approaches mainly represent the main migrant groups in each country (compare Table 6, p. 21). For Germany these were people originating from Turkey, Hungary dealt with the ethnic minority group of Roma, in Italy and Spain migrant-specific approaches were mostly directed towards legal and illegal immigrants and refugees from Africa and Eastern Europe, Dutch approaches targeted Turkish and Chinese migrants, and in the UK, the largest migrant groups are Asian, predominantly originating from India and Pakistan. Table 11 provides an overview of the 22 included migrant-specific hepatitis B and C screening approaches in the six EU-HEPscreen study countries, the target migrant population, and if screening was offered for HBV, HCV, or both conditions.

Table 11: Migrant-specific hepatitis B and C screening approaches in the six EU-HEPscreen study countries

Country	Time	Target population	HBV	HCV	Reference
Germany	2010	Migrants in Munich	x		Referat für Gesundheit und Umwelt, 2010.
	2008	Turkish Muslim community in Germany	x		Türkisch-Islamische Union der Anstalt für Religion e.V. (DITIB), 2008.
Hungary	2006 - 2008	IDUs attending the Hepatology Outpatient Clinic of Szent László Hospital		x	Gazdag et al., 2012.
	2004	Residents of Dzsumbuj, a predominantly Roma neighbourhood	x	x	Gyarmathy et al., 2008.
Italy	2008	Refugees of various nationalities arriving at the Asylum Seekers Center in Bari, who were in apparent good health and did not report signs or symptoms for viral hepatitis in recent or remote past	x	x	Tafuri et al., 2010.
	2004 - 2005	Illegal Sub-Saharan immigrants living in Verona and attending a health care centre	x	x	Majori et al., 2008.
	2003 - 2004	Recent immigrants (< 6 months), aged 14 years and older, who were temporary guests in a camp for refugees without contact to the indigenous population	x	x	Palumbo et al., 2008.
	1999 - 2007	Immigrant female sex workers in Verona	x	x	Zermiani et al., 2012.
Netherlands	2009 - 2010	First-generation Egyptian migrants in Amsterdam	x	x	Zuure et al., 2013.
	2009	Chinese FGM and SGM in Rotterdam	x		Veldhuijzen et al., 2012.
	n.a.	FGM and SGM migrants in the Turkish community of Arnhem	x	x	Richter et al., 2012.
	2004	People from the neighborhood aged 18 to 65 years (Dutch, Moroccan, Turkish, Surinamese, Antillean, and Cape Verdean)	x	x	Veldhuijzen et al., 2009.
Spain	2006 -2007	Healthy recent immigrants (residence time <5 years) to the EU without HBV vaccination and/or past or suspected liver disease, consulting primary care pro-	x	x	Valerio et al., 2008.

		viders in Barcelona			
	2001 - 2004	Immigrants (legal and illegal) from tropical, subtropical regions and Eastern Europe, consulting the Tropical medicine and International Health Unit 'Drassanes' in Barcelona	x	x	Manzardo et al., 2008.
	2001	Immigrants who came to the Red Cross center to have a health examination as required procedure for requesting permission to residence/ work on a regularization resit of immigrants resident in the Valencian Community	x	x	Ramos et al., 2003.
	1998 – 2003	Immigrant sex workers in the major site of open prostitution in Madrid, within the first three months of their arrival in Spain	x	x	Gutierrez et al., 2004.
	1989 - 1999	Legal and illegal immigrants from tropical or subtropical areas as well as from Eastern Europe who were treated at the Tropical Medicine Unit (TMU) of the Ramón y Cajal Hospital in Madrid, Spain	x	x	López-Vélez et al., 2003.
(Scotland)	2009	Pakistani FGM and SGM in Dundee	x	x	Jafferbhoy et al., 2012.
UK	2009	FGM who originated in the Indian sub-continent (India, Bangladesh, Pakistan) + SGM	x	x	Uddin et al., 2010.
	2004 - 2008	Pregnant women of different ethnic groups	x		Caley et al., 2012.
	2000 - 2008	Recent initiate IDUs (first injection not >2 years ago), taking part in the annual voluntary and anonymous survey for IDUs between 2000 and 2008.	x	x	Hope et al., 2012.
	1999	Female street sex workers attending the Health and social care drop-in-centre (DIC) in Glasgow		x	Taylor et al., 2008.

n.a. = not available

Considering national guidelines or recommendations, viral hepatitis screening of migrants is recommended in four of the six European countries that have been examined. The German S3-guidelines advise screening of 'persons with a migration background' for HBV if they originate from regions with elevated HbsAg prevalence (Cornberg et al., 2011) and for HCV if they originate from regions with elevated HCV infection rate (Sarrazin et al., 2010). Additionally, the 'Orientation towards a better management of hepatitis B in Germany' recommends HBV screening in parallel with vaccination to all immigrants who intend to take up permanent residency within the EU in immigration and health agencies (Bisotti, 2009). Italian recommendations for HBV and HCV suggest screening in migrants from regions with elevated prevalence of HBV and HCV infection (Carosi et al., 2010). The Spanish clinical practice guideline for hepatitis C recommends screening for HCV in migrants from regions with elevated prevalence of hepatitis C (Abraira García et al., 2009). Finally, the British guideline for hepatitis C in primary care recommends HCV screening for people from countries where hepatitis C is endemic (e.g. Bangladesh, Egypt, India, Japan and Pakistan) (Ford et al., 2007).

5.3 European Strategies, Recommendations and Approaches for Viral Hepatitis B and C Screening

44 out of 53 WHO European region Member States (83%) responded to the WHO/WHA Global Hepatitis Survey in 2012. In seven of the 44 responding Member States (16%), a governmental unit or department responsible solely for viral hepatitis-related activities was established. 13 responding Member States (30%) reported that there was a written national strategy or plan in place, that focused exclusively or primarily on the prevention and control of viral hepatitis. Viral hepatitis prevention and control programs that include activities targeting specific populations were established in 34 of 44 responding Member States (77%). Mostly they targeted healthcare workers, IDUs, and prisoners. Less frequently included specific populations were migrants, indigenous populations, low-income populations, those who are uninsured, and those who are homeless. Ten responding Member States (23%) reported that they had funded some type of viral hepatitis awareness campaign other than World Hepatitis Day since January 2011. Topics included general information about hepatitis and its transmission, HBV-vaccination, safer sex and safe work practices, or the importance of knowing one's HBV and HCV status. The existence of routine surveillance for viral hepatitis was reported by 43 of 44 responding Member States (98%). Hepatitis B surveillance was established in 43 Member States (100%) for acute infection and in 30 Member States (65%) for chronic infection. Hepatitis C surveillance was conducted in 41 responding Member States (95%) for acute infection and in 27 Member States (63%) for chronic infection. Sero-surveys were regularly conducted in 20 responding Member States (46%), mainly targeting the general population, pregnant women, men who have sex with men, and people who inject drugs. National clinical guidelines for the management of viral hepatitis existed in 29 responding Member States (66%) and 22 (50%)/ 21 (48%) reported the existence of a national policy for screening and referral to care for hepatitis B / C. The treatment was reported to be publicly funded in 36 responding Member States (82%) for hepatitis B and in 34 responding Member States (77%) for hepatitis C. Testing for hepatitis B was reported to be free of charge for all individuals in 19 responding Member States (43%). In 19 responding Member States, hepatitis B testing was free of charge for specific risk groups, including blood donors, health-care workers, prisoners, pregnant women, IDUs and people living with HIV. In 24 responding Member States (55%), hepatitis B testing was even compulsory for specific risk groups; these include blood donors, health-care workers, pregnant women and patients on haemodialysis. Testing for hepatitis C was free of charge for all individuals in 20 responding Member States (46%). In 18 responding Member States (41%), hepatitis C testing was free of charge for specific risk groups, including blood donors, health-care workers, prisoners, pregnant women, IDUs and people living

with HIV. In half of the responding Member States, hepatitis C testing was even compulsory for specific risk groups; these include blood donors, health-care workers, pregnant women and patients on haemodialysis. Finally, education and further training for health professionals to obtain skills and competencies, required for effective care of HBV-/HCV-infected individuals, was most frequently provided in schools for health professionals (pre-service education, 82%), via on-the-job training (80%) and in postgraduate training (75%) among responding WHO Member States.

Next to the findings of the WHO/WHA Global Hepatitis Survey in 2012, the hand-search in grey literature provided useful information about strategies and recommendations for hepatitis B and C screening among migrants Europe-wide and in single European countries. In 2007, the hepatitis B expert group held a meeting at the European Parliament, resulting in the 'European orientation towards the Better Management of Hepatitis B in Europe'. Systematic screening for hepatitis B was recommended to be available to all persons at risk within all relevant health care and community settings, including HIV-positive persons, IDUs, pregnant women. A special focus was set on raising awareness and encouraging screening within migrant communities. The expert group recommended the screening for hepatitis B in parallel with vaccination to all immigrants who intend to take up permanent residency within the EU (Wait, 2007). In 2009, the European Liver Patients Association (ELPA) published the results of an expert meeting where concrete recommendations for the detection of hepatitis B and C in European countries have been developed. The 'Recommendations for the Promotion of case-finding for Viral Hepatitis B and C, including targeted screening measures for risk groups' were the first Europe-wide guideline providing a detailed list of defined risk groups for hepatitis B and C which should be targeted in national screening programs (Table 9, Annex). Furthermore, the document proposed objectives, guiding principles and key contents for a European council recommendation on hepatitis screening that could serve as a guideline for member states. The recommendation for hepatitis B also includes screening of migrants from high-prevalence countries (ELPA, 2009b). Due to the adoption of the 63rd World Health Assembly Resolution on Viral Hepatitis in May 2010, viral hepatitis raised on the global health policy agenda in recent years. WHO and ECDC developed guidance, surveillance and research strategies for viral hepatitis in European countries. The EMCDDA is annually collecting and reporting data on HBV and HCV sero-prevalence in IDUs. The European Commission developed public health and research programmes. The Directorate General for Health and Consumers (DG-Sanco) has funded several projects targeting hepatitis, a full list of which can be found on http://ec.europea.eu/eahc/ index.html. And finally, the

European Medicines Authority (EMA) has drafted guidance to drug developers on the clinical evaluation of antiviral agents against HBV and HCV (Hatzakis et al., 2011).
As the first EU member state, France took decisive and innovative action to tackle the rising public health threat posed by HBV and HCV infections. A national plan which included targeted screening of risk groups for Hepatitis C was introduced in 1999. The plan has had a direct effect on numbers tested: in 2002-03 more than 2.9 million tests for HCV took place – a rise of more than 28% from 2000-01. Increased testing went hand-in-hand with government-led campaigns. As a result, the proportion of HCV positive people aware of their condition increased from 24% in 1994 42to 57.4% in 2004.43 Better access to screening could lead to better access to treatment (ELPA, 2009b).

5.4 Worldwide Migrant-Specific Hepatitis B and C Screening Approaches of Good Practice and Worldwide Guidelines or Recommendations including Migrants

In *category 4* migrant-specific studies or approaches are summarized, which were defined as 'good practice examples'. Included approaches emphasize the importance of detailed knowledge of the target group, and their inclusion in planning and implementation for a successful hepatitis screening project. This was primarily applicable to cultural-tailored, low-threshold, and outreaching recruitment methods and the use of disseminators, multi-linguistic, and multimedia in order to reach a high amount of migrants in a suitable way. Additionally, the patient pathway was examined and rated as good practice, if migrant patients have been guided through the whole pathway, including recruitment, pre-test counselling, screening, post-test counselling, referral, treatment and follow-up. 21 primary studies and two migrant-specific screening approaches, identified in grey literature, were included in this category. The 23 included approaches are listed in Table 12 (*Annex*) and are described in detail in the following.

13 screening approaches of good practice recruitment and screening methods, conducted in the six EU-HEPscreen countries, were included in this category. In Germany, two migrant-specific screening and awareness approaches for hepatitis B could be identified. In 2008, the German Muslim association (DITIB) and Deutsche Leberhilfe e.V. established a project to alert and educate the Muslim community in Germany about hepatitis B vaccination, diagnosis and treatment. An awareness plan was developed, including a campaign to inform and educate Turkish doctors in areas with a high rate of Turkish migrants. Imams in 900 German mosques all over Germany spoke to their communities about hepatitis B in the Friday sermon. Afterwards, brochures and

flyers in Turkish language providing information about HBV-vaccination, diagnosis and treatment were distributed. The Muslim community was called for HBV vaccination and consultation of doctors for counselling, screening, and treatment (DITIB - Türkisch-Islamische Union der Anstalt für Religion e.V., 2008). One migrant-specific project was established 2010 in Munich. The project aimed at improving the knowledge about HBV infection, prevention and treatment, increasing immunization coverage, case detection, and the patients' acceptance of treatment, and at improving the quality of treatment. In order to achieve these components, a comprehensive approach in different settings was developed: a flyer in nine languages was distributed in mosques and on community festivals; the STI-advice centre provided information and free-of-charge, anonymous HBV-screening tests for migrants, household/ family members, or migrant workers; one information campaign was raised in a mosque with an offer for screening afterwards; and doctors with a high amount of migrant patients could participate in information seminars (Referat für Gesundheit und Umwelt, 2010b). Gyarmathy et al. (2008) conducted a study among residents of Dzsumbuj, a predominantly Roma (Gypsy) neighbourhood in Budapest, Hungary. Initiated by community representatives and the local district government organization (Dzsumbuj Help), a health fair was organized for community members. Inhabitants were offered free testing for infectious diseases, including HBV, HCV and HIV, and counselling about blood-borne and sexually transmitted infections. In Italy, one approach among immigrant female sex workers (FSW) in Verona was considered good practice. The "Sirio" project aimed at establishing a regular contact between FSW, their clients, and health services. By involving FSW in appropriate educational programs, and by increasing their awareness about risky behaviour, STIs should be decreased and prevented among these groups. Health professionals contacted the FSW directly through the use of an outreach mobile unit, and distributed printed information materials about STD transmission, safer sex, screening and treatment. The FSW were offered social, psychological and medical support, like hepatitis B and C screening and treatment at social health services and an out-patient clinic in Verona (Zermiani et al., 2012). Four Dutch studies were published between 2009 and 2013. In 2009, people from a multi-ethnic neighbourhood (Dutch, Moroccan, Turkish, Surinamese, Antillean, and Cape Verdean) in Rotterdam aged 18 to 65 years were targeted in a community-based study. Individuals were invited by mail for a personal consultation at the community centre and were offered hepatitis B and C screening. Participants received their test results via e-Mail and susceptible persons were offered free HBV vaccination (Veldhuijzen et al., 2009). Richter et al. (2012) established a HBV screening approach for FGM and SGM in the Turkish community of Arnhem with comprehensive recruitment methods. A project group consisting of several experts, e.g. Turkish educators, Dutch and Turkish GPs, and the Municipal Health Service, was formed. A multimedia approach was developed for distributing information about hepatitis B and C and the screening project among Turkish migrants. A website focusing on HBV/HCV in migrants and a special phone number for information in Turkish and Dutch, and questions was established. Two Turkish health educators were trained to be 'ambassadors' of the hepatitis project, visiting Turkish organizations in Arnhem to supply project information. Cooperation with delegates of mosques, primary schools, social and cultural organizations, community centres, Turkish shops, restaurants and immigrant organizations were built. Turkish and Dutch newspapers and the local radio featured the project. Brochures and posters were distributed in Turkish shops, barbers, and community centres. 15 educational meetings on HBV/HCV in mosques and community centres for all Turkish migrants were held, where a video documentary about HBV/HCV in migrants was shown by a Turkish GP. Thereafter all participants were offered blood screening by a mobile laboratory team including a Turkish laboratory technician, or they could be screened on a bazar in the mosque and at GP's practices. Another project, targeting Chinese FGM and SGM living in Rotterdam, started in 2009. The aim was to inform and promote HBV testing and treatment or HBV vaccination, as appropriate. Community-based organizations were engaged in the campaign. 13 outreach activities in community centres in China town, Chinese schools, and churches took place and free-of-charge HBV screening was offered. Posters and flyers also advertised free HBV on-site testing at outreach locations and at the Municipal Health Service. Patients who tested positive for HBsAg were contacted by phone by a Chinese speaking employee of the MPHS and were invited for counselling as well as source and contact tracing. HBeAg+ patients were referred to a hepatologist, HBeAg- patients were referred to the GP for further management (Veldhuijzen et al., 2012). Zuure et al. (2013) conducted a hepatitis B and C screening approach among first-generation Egyptian migrants in Amsterdam, Netherlands. With support of key figures of community organizations (imam, priest, chairperson, owner of supermarket), eleven viral hepatitis educational and screening sessions were established at Egyptian meeting places, including a Coptic church, mosques, a weekend school for Islamic Egyptians, and an Egyptian supermarket. HAV, HBV, and HCV flyers in Dutch and Arabic language, informing about transmission routes, risk factors, HBV vaccination, consequences, treatment and free-of-charge screening during the study period, were distributed for invitation. Arab educators held educational sessions in standard Arabic. Afterwards, HBV/HCV screening was offered at each session and screening on appointment was available at the Public Health Service of Amsterdam. Those who agreed for screening received an information package about the disease and the project, available in Dutch and Arabic. From 1998 to 2003, a project in Madrid targeted immigrant sex workers within their first three months of their arrival in Spain. A multidisciplinary team led by 'Medicus Mundi' visited the major site of open prostitution in Madrid and offered counselling, hepatitis B and C screening, and medical care to willing participants (Gutiérrez et al., 2004). The

Tropical Medicine Unit (TMU) of the Ramón y Cajal Hospital in Madrid, Spain, provided routine screening for legal and illegal immigrants from tropical or subtropical areas as well as Eastern Europe. They were either referred or came by their own initiative to visit the Tropical Medicine clinic for illness or screening. In case of undocumented migrants, referral to the TMU is done by 'Karibu'. Karibu is a non-governmental organization (NGO) dedicated to aid undocumented immigrants in Madrid by offering basic medical assistance along with other services, when an immigrant goes for the first time for a medical consultation or when the immigrant outlines diagnostic or therapeutic problems that cannot be resolved at the NGO. At TMU, after compiling the medical history and carrying out a physical examination, all immigrants (symptomatic or asymptomatic) were offered screening for hepatitis B and C, and treatment (López-Vélez, Huerga, & Turrientes, 2003). Manzardo et al. (2008) described regular Hepatitis B and C screening in a comparable institution, the ' Tropical medicine and International Health Unit Drassanes'. It was offered to legal and illegal immigrants from tropical and subtropical regions and Eastern Europe in Barcelona, Spain. Since 1983, the centre offers access without charge to immigrants, independently of their legal status. With this approach, also undocumented migrants could be reached. Patients were referred from NGOs (Médicins sans Frontieres, Spanish Red Cross), GPs, Community Health Agents or took access spontaneously to the centre. Each patient, symptomatic or asymptomatic, was offered a complete screening for tropical and common diseases and treatment. Two studies could be identified in UK. One study was conducted in five British regions. Target groups were FGM and SGM originating in the Indian sub-continent (India, Bangladesh, and Pakistan). Local religious leaders and community representatives were contacted to identify potential testing sites. Public meetings were held at the sites to inform and to invite Asian migrants for hepatitis B and C screening. The testing sessions were advertised internally and arranged according to interest and request (from 3 to 6 sessions). Volunteers recruited and consented study participants at the sessions (Uddin et al., 2010). In 2009, a team of Scottish researchers arranged speeches in three mosques following the imam's Friday teaching with support of Pakistani community representatives. A short talk about risk factors, prevalence, lack of symptoms, slow progressive nature of disease, complications and the existence of treatment for HCV was delivered in English and Urdu language to the target group of Pakistani FGM and SGM. Another educational session was held at the Pakistani women's centre. The sessions concluded with an offer to set up short-term, outreach testing clinics. Interpreters were available on site and each participant received a copy of printed educational material about HCV and HBV in Urdu and English language. Positive patients were contacted and follow-up treatment was offered to them (Jafferbhoy, Miller, McIntyre, & Dillon, 2012).

Next to the approaches in the six EU-HEPscreen study countries, ten worldwide good practice approaches could be identified. In France, one study targeted underprivileged individuals without any social insurance consulting eight health centres in Lyon, where a high proportion of the clientele was in economically or socially underprivileged situations. 43 GPs participated in the campaign. They were trained in HCV infection and screening. Patients consulting the GPs were invited for screening according to inclusion criteria. Positive patients received follow-up treatment (Sahajian et al., 2007). Another study targeted all new patients visiting the French Doctors of the World Reception Centres of care and orientation (Caso) in six French cities. Those are highly frequented by migrant patients (up to 90%). Hepatitis B and C screening was proposed systematically after medical consultation or special prevention consultation (Pauti, Simonnot, & Estecahandy, 2008). Seven approaches conducted in the USA could be retrieved. Lin et al. (2007) used comparable multimedia recruiting methods in their study targeting Asian American adults, 18 years and older San Francisco Bay Area. Adverts for free HBV screening appeared in newspapers, on radio and TV in Chinese and English language. Screening was offered at community-based events, like street fairs or cultural festivals, and clinics held at community-based organizations and churches in six areas, and at a screening clinic. A study targeting immigrants from the Former Soviet Union living in Brooklyn and Queens, with the highest density of FSU immigrants in the New York City metropolitan area, offered free screening and counselling for hepatitis C. Adverts and announcements in Russian cable television were used to recruit immigrants for participation (Batash, Khaykis, Raicht, & Bini, 2008). Cotler et al. (2009) conducted a study among Chinese immigrants who had at least one office visit to a Chinatown internal medicine practice. During the study period, patients were screened at their initial visit. The practice routinely screened Asian patients for HBV during their course of care and provided follow-up treatment. In Michigan, health fairs for Asian Americans were organized in collaboration with local community or health service organizations. Recruiting methods for health fairs included adverts in local Asian news media, flyers posted in Asian markets and restaurants, announcement and/or flyers distributed during large gatherings or local events, personal recruitment through friends and family members and referral from past health event participants. All information materials were provided in different Asian languages, like Chinese, Korean, Vietnamese etc.). Disseminators and translators for each Asian group were also included to provide a low-threshold approach for migrants. On eight health fairs in two and a half years, free HBV screening was offered as a community service (Janilla Lee, Lok, & Chen, 2010). Another comprehensive recruitment approach was 'BfreeNYC', a New York City pilot program, primarily targeting Asian Americans, but also other racial and ethnic minority groups, like African and Caribbean immigrants. A coalition of stakeholders, including community health centres, social service groups, community-based organizations, city council members, public hospitals, physician groups, and academic institutions, developed a multimedia campaign with assistance from a New York based advertising agency. Advertisements appeared in ethnic newspapers, posters and fliers were distributed in the community, along with radio spots and announcements on cable television. Educational workshops were developed and implemented at community screenings, and a website was established to host information about screenings and educational materials. For insured and uninsured patients all interventions were provided free-of-charge or at low cost, due to reimbursement by community-based partners and health care facilities. Those included, awareness and education, screening for HBV, vaccination of family members and contacts, and treatment. Supported by the CDC, 'BfreeNYC' established the National Center of Excellence in the Elimination of Hepatitis B Disparities (B Free CEED) in 2008 (Pollack et al., 2011). A recent study in a Floridian community, set up an exhibit booth at an annual 2-day Asian Culture Festival to promote awareness about HBV and HCV. Free screening was offered to all willing and volunteering fair attendees. Recruitment was conducted in various languages by physicians and nurses who specialized in hepatology (Woo et al., 2013). Finally, two studies described the work of GeoSentinel sites, which are specialized travel or tropical medicine clinics that collect clinician-based surveillance data on travel-related diseases. The first study assessed data on migrants, who crossed international borders for the purpose of resettlement and underwent systematic protocol-based health screening for various diseases including HBV, submitted by two US clinics. Most of the participants were refugees of whom almost all underwent pre-departure interventions as part of US government overseas screening programs implemented by the International Organization for Migration (IOM) and directed by the CDC. Some were asylees, Cuban entrants, Haitian parolees, victims of trafficking, or SGM, without pre-departure interventions (Barnett et al., 2013). Data of migrants, who have been evaluated for specific health concerns, other than protocol-based screening, at 41 GeoSentinel clinics on 5 continents and in 19 countries, were presented by McCarthy et al. (2013). The predominantly non-refugee participants were, among other things, screened for HBV and HCV. Purpose of the study was to analyse the spectrum of infectious diseases and acute medical problems in migrants resettled internationally and to provide a snapshot of common acute and chronic conditions affecting the heterogeneous group of migrants.

Worldwide Viral Hepatitis Policy and Migrant-Specific Recommendations and Approaches

Apart from the results of published primary studies, some information about worldwide viral hepatitis policy and migrant-specific recommendations and approaches could be identified in grey literature. Within the WHO/WHA Global Hepatitis Survey 2012, 36 of 126 responding Member

States (28.6%) reported that they had a governmental unit or department responsible solely for viral hepatitis-related activities. Besides, 47 Member States (37%) reported the existence of a written national strategy or plan that focuses exclusively or primarily on the prevention and control of viral hepatitis. A viral hepatitis prevention and control program targeting specific populations was available in 93 responding Member States (73.8%). The populations most commonly targeted were health-care workers (86.0% of responding Member States within this subset) and IDUs (54.8% of responding Member States within this subset). People living with HIV and prisoners were targeted in 44 responding Member States (47.3%) and 36 responding Member States (38.7%). Groups identified less frequently included migrants, indigenous populations, low-income populations, those who are uninsured and those who are homeless. 104 responding Member States (82.5%) reported that they had routine surveillance for viral hepatitis. Details are listed in Table 13.

Table 13: Types of routine surveillance in WHO Member States (*n=104*)

	Yes (%)	No (%)
*There is a national surveillance system for **acute** hepatitis infection for the following forms of hepatitis:*		
hepatitis B	100 (96%)	3 (3%)
hepatitis C	89 (86%)	10 (10%)
*There is a national surveillance system for **chronic** hepatitis infection for the following forms of hepatitis:*		
hepatitis B	55 (53%)	45 (43%)
hepatitis C	50 (49%)	48 (46%)

Source: Lazarus et al. 2013.

Viral hepatitis sero-surveys are regularly conducted in 41 responding Member States (32.5%). Among this subset, 17.1% reported that sero-surveys take place at least once a year. Table 14 provides an overview of existing national policies or guidelines for the prevention of viral hepatitis.

Table 14: Existence of national policies or guidelines for prevention of viral hepatitis in WHO Member States *(n=126)*

Issue	existing in (%) of Member States
Screening of all donated blood units (including family donations) and blood products nationwide for hepatitis B	94
Screening of all donated blood units (including family donations) and blood products nationwide for hepatitis C	91
National infection control policy for blood banks	89
Injection safety in health-care settings	87
Prevention of perinatal transmission of hepatitis B	76
of them include: Screening of all pregnant women for hepatitis B	66
Prevention of HBV and HCV infection in health-care settings	70

HBV vaccine for healthcare workers prior to start work that might put them at risk of exposure to blood	64
Prevention of viral hepatitis among IDUs	34

Source: Lazarus et al., 2013.

In more or less half of the responding Member States, there are screening, care, and treatment policies or guidelines for viral hepatitis in place. Testing for hepatitis B is free of charge for all individuals in 52 responding Member States (41%). In 43 responding Member States (61%), hepatitis B testing is free of charge for specific risk groups, including blood donors, health-care workers, pregnant women, people living with HIV, patients on haemodialysis, prisoners and IDUs. In 61 responding Member States (48%), hepatitis B testing is even compulsory for specific risk groups; these include blood donors, health-care workers, pregnant women, people living with HIV, patients on haemodialysis and prisoners. Testing for hepatitis C is free of charge for all individuals in 48 responding Member States (38%). In 39 responding Member States (57%), hepatitis C testing is free of charge for specific risk groups, including blood donors, health-care workers, pregnant women, people living with HIV, patients on haemodialysis, prisoners and IDUs. In 57 responding Member States (45%), hepatitis C testing is even compulsory for specific risk groups; these include blood donors, health-care workers, pregnant women, people living with HIV, patients on haemodialysis and prisoners. Publicly funded treatment is available in 79 responding Member States (63%) for hepatitis B and in 75 responding Member States (60%) for hepatitis C. Education and further training for health professionals to obtain skills and competencies, required for effective care of HBV-/HCV-infected individuals, is most frequently provided in schools for health professionals (pre-service education, 77%), via on-the-job training (73%) and in postgraduate training (62%) among responding WHO Member States. Finally, Member States were asked to indicate areas in which they might want assistance from WHO for the prevention and control of viral hepatitis. The areas most commonly selected were: development of the national plan for viral hepatitis prevention and control (58.1%), estimation of the national burden of viral hepatitis (54.8%), and development of education/training programs for health professionals (54.0%).

Internationally, especially Australia, Canada, and the USA could be named as pioneers in the matter of hepatitis screening among migrants. In several national guidelines and recommendations, migrants are a concrete and highlighted risk group for hepatitis B and C (Table 9, *Annex*). Screening approaches, funding programs and organizations are widely distributed and build a supportive base for further development of secondary prevention of viral hepatitis.

The *Australian* 'National Hepatitis B Strategy 2010–2013' described the people already infected with (chronic) hepatitis B as being the greatest burden of hepatitis B, since many of them were infected at birth or as children and may be unaware of their infection. As a result, optimising diagnosis and screening, and subsequent management of chronic hepatitis B were prioritised in the strategy. Besides, priority areas were: raising awareness in the community and among practitioners; building partnerships and strengthening community action; preventing hepatitis B transmission; and developing health maintenance, care and support for people with hepatitis B. Primarily targeted groups included Aboriginal and Torres Strait Islander people as well as people from culturally and linguistically diverse (CALD) backgrounds what refers to individuals and their families who were born in or born to parents who came from countries with intermediate (2-7%) to high (≥ 8%) prevalence of HBV infection. Additionally, among others, people travelling to and from high prevalence countries, particularly those visiting families and friends in their country of origin were covered as population of interest. Undiagnosed cases of chronic hepatitis B should mainly be identified through practitioner-initiated testing, or screening, in primary healthcare. Therefore, practitioners should be educated and assisted, and partnerships between agencies should be developed to establish a coordinated and consistent hepatitis B identification, care and management process (Australian Government, 2010). In the 'National Hepatitis B Testing Policy' written by the National Hepatitis B Virus (HBV) Testing Policy Expert Reference Committee (2012), the above mentioned main target groups were emphasised again. As screening being a crucial part of Australia’s public health response to HBV, the document strongly advised that all adults from priority CALD communities and all Aboriginal and Torres Strait Islander adults "should be tested once in adulthood for HBsAg, anti-HBc and anti-HBs to establish whether they have chronic hepatitis B, are immune through past infection or vaccination, or are susceptible to infection". Mandatory testing for HBV was also required "under the migration health requirements applicable to specified visa subclasses". Additionally, clinicians should routinely ask patients to identify their country of birth, parents’ countries of birth, and languages spoken at home. This is to establish the relevance of an offer of screening particularly for patients born in high and intermediate HBV prevalence countries (≥ 2%). Clinicians should also stress the high risk of perinatal and early childhood transmission in people from priority CALD backgrounds. In 2007, the NSW Department of Health published the ' National Hepatitis C Strategy 2007-2009' for Australia. According to that, prevention, education and HCV testing should be implemented in priority populations, including Aboriginal people and people from culturally and linguistically diverse (CALD) backgrounds. Those should be planned in accordance with the cultural and social context of the target populations (NSW, 2007). The subsequent 'Third National Hepatitis C Strategy 2010-2013' again stressed the importance of screening for hepatitis C in people from culturally and linguistically diverse (CALD) backgrounds, among others, for reducing the burden of hepatitis C in Australia (Commonwealth of Australia, 2010). People born in countries with high HCV prevalence and Aboriginal and Torres Strait Islander were again recommended to be screened for hepatitis C in the 'Hepatitis C Testing Policy'. This Policy was published in 2012 by the National HCV Testing Policy Expert Reference Committee and is aligned with the Third National Hepatitis C Strategy 2010–2013.

In *Canada*, a special clinical guideline for immigrants and refugees was identified. 'Evidence-based clinical guidelines for immigrants and refugees' emphasizes the need for and recommends routine screening of immigrants and refugees from endemic countries with a HBV prevalence of ≥ 2% and an expected HCV prevalence of ≥3. Those found positive should be referred to a hepatitis expert for evaluation and assessment of the need for treatment. Lifelong monitoring is required. People found negative for HBV markers but are susceptible should be vaccinated. The committee attributes more value to the diagnosis, prevention of serious complications, and the reduction of transmission of hepatitis B and C than to the burden of screening and HBV-vaccination, the costs and potential adverse effects of treatment (Pottie et al., 2011). The 'Canadian Association for the Study of the Liver consensus guidelines' additionally recommends screening for chronic hepatitis B virus in immigrants as part of their routine pre-immigration health care evaluation (especially from endemic and developing countries)(Coffin, Fung, & Ma, 2012).

In the *USA*, several institutions developed guidelines and/or recommendations for viral hepatitis B and C screening, care and treatment. Especially the CDC published a number of recommendations for general, as well as migrant-specific hepatitis screening approaches. In the “Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States”, pre-vaccination testing is recommended for all foreign-born persons (including immigrants, refugees, asylum seekers and internationally adopted children) from high endemic regions, e.g. Africa, Asia, the Pacific Islands (HBsAg prevalence ≥ 8%), regardless of the vaccination status. It is also advised that for all persons born in high endemic countries who are applying for permanent U.S. residence, HBsAg screening and appropriate follow-up on the basis of HBsAg test results should be included as part of the required overseas pre-migration and domestic adjustment-of-visa status medical examination process. Infected persons should be counselled and recommended for follow-up medical evaluation and management in U.S. resettlement communities. Additionally, in all healthcare settings providers should identify persons born in high-endemicity countries and provide HBsAg testing and follow-up. Retesting of persons who were already tested for HBsAg in other countries should be considered. All HBsAg-positive persons should be referred for evaluation to a specialist for chronic liver disease. They require counselling and medical management for chronic HBV infection to reduce their risk for chronic liver disease. Their susceptible household, sex and needle-sharing contacts should be counselled and vaccinated against hepatitis B (Mast et al., 2006). In 2008, CDC published the 'Recommendations for Routine Testing and Follow-up for Chronic Hepatitis B Virus (HBV) Infection' were routine HBV testing for all individuals born in regions with an intermediate or high population seroprevalence of HBsAg (≥ 2%)(including immigrants, refugees, asylum seekers, and internationally adopted children) is recommended, regardless of the vaccination status in their country of origin. Additionally, US-born individuals who were not vaccinated during infancy and whose parents were born in regions in which HBsAg seroprevalence is high (≥ 8%) are recommended to be tested for HBV (CDC, 2008; Weinbaum et al., 2008). In response to the CDC's recommendations, the American Association for the Study of Liver Diseases (AASLD) updated their practice guidelines for chronic HBV with recommending HBV screening for people born in endemic areas, such as Asia, South America, and the Caribbean. US-born individuals who were not vaccinated during infancy and whose parents are from highly HBV-endemic areas should be screened for HBV as well (Lok & McMahon, 2009). In 2012, the U.S. Department of Health and Human Services recommended the routine screening of all asymptomatic refugees, who were born in or most recently lived in intermediate or high endemicity countries (HBsAg prevalence ≥2%) for HBsAg, anti-HBc and anti-HBs, during the new arrival domestic medical examination for refugees. Refugees originating from low-prevalence countries (<2%) should be screened for HBV if they belong to a high-risk group (Table 9, *Annex*). Routine screening for hepatitis C was recommended in refugees belonging to high-risk groups (Table 9, *Annex*)(U.S. Department of Health and Human Services, CDC, & National Center for Emerging and Zoonotic Infectious Diseases, 2012). Already in 2005, the 'National Hepatitis B Act' was introduced in Congress and the Senate (Dent & Honda, 2005). It calls for the development of a national plan for hepatitis B that would increase screening and expand vaccination in high-risk populations, and increase federal funding for research to improve HBV prevention and treatment options, giving priority to individuals with limited healthcare access. In October 2009, a new bill, the 'Viral Hepatitis and Liver Cancer Prevention and Control Act of 2009', was introduced to address the US hepatitis B and hepatitis C epidemic. In October 2008, an independent panel convened by the National Institutes of Health examined issues related to HBV infection and management. Their recommendations included routine HBV screening for newly arrived immigrants from countries with an HBV prevalence >2%, consistent with the latest CDC screening recommendations.

Next to political approaches and published guidelines, two national US initiatives are worth mentioning. In 2001, the Asian Liver Center at Stanford University - School of Medicine, a non-profit organization in the United States addressing chronic hepatitis B infection and liver cancer in Asians and Asian Americans, initiated the 'Jade Ribbon Campaign'. Its mission is to raise awareness and to improve the knowledge about hepatitis B and liver cancer in health professionals and the affected populations. In collaboration with over 400 community-based organizations and federal and state agencies, the program sponsors community HBV screening and education clinics, and provides culturally and linguistically tailored information and multimedia public service announcements about hepatitis B. These include information about burden, risk factors, transmission, prevention, detection, treatment, and follow-up. The model has been adapted by a number of cities around the USA (Asian Liver Center, 2013; Colvin & Mitchell, 2010). The above mentioned program 'B Free CEED' is one of 18 Centers of Excellence in the Elimination of Disparities in the United States that were funded between 2007 and 2012 under the REACH US program. These are active in one or more of seven designated areas, including hepatitis B. REACH - The Racial and Ethnic Approaches to Community Health - is a national initiative to eliminate racial and ethnic disparities in health and was launched in 1999 by the CDC. Through REACH, CDC supports awardee partners that establish community-based programs and culturally-tailored interventions to eliminate health disparities among African Americans, American Indians, Hispanics/Latinos, Asian Americans, Alaska Natives, and Pacific Islanders (CDC, 2012).

6 Discussion

6.1 Strengths

The databases Embase, Medline and Medline In-Process were accessed via OvidSP in the Library of the University Medical Center Hamburg-Eppendorf (UKE). Medline-In-Process was assessed to include articles that have not been published yet. This provided a broad insight and access to published scientific literature on hepatitis B and C screening, management, care, epidemiology, and policy. Combined with the results of the hand-search of grey literature, it was possible to gain meaningful reflection the current situation of general and migrant/at-risk group-specific hepatitis B and C screening worldwide and in Europe.

The expansion of the initial search for the EU-HEPscreen project until August 2013 resulted in a big additional amount of papers. Particularly apparent was the increase of published literature concerning screening among migrants in the last three years. Within these papers, the description of cultural tailored approaches has widened and many recommendations could be extracted.

6.2 Limitations

The literature search did not encompass all available, but strongly recognized databases concerning health literature, namely PubMed and Medline. Despite retrieving a broad insight into the topic, systematic reviews and meta-studies examining the relation of chronic viral hepatitis and migration could only be identified for chronic hepatitis B. No comparable study for chronic hepatitis C was retrieved. Thus, published scientific literature about this issue is one-sided. Due to language barriers, studies and reports in other European languages than English and German, could only be examined and used to a limited extent. Additionally, hand-screening of identified papers is always prone to selection bias; thus, it is possible to miss or exclude papers in first place that could have contained useful information. In order to keep the wealth of information on a manageable level, it is necessary to end the search at a certain point. Although much more information could be detected if expanding the search, the results allowed for a sufficient overview and insight into the subject. However, some results and recommendations can only be transferred to a limited extent to all European countries since some countries are lacking of the appropriate infrastructure and financial resources to implement comprehensive screening methods.

6.3 Determinants of Viral Hepatitis Screening among Migrants and At-Risk Groups

Despite several recommendations worldwide and in European countries are existing, the implementation and maintaining of viral hepatitis screening among migrants and at-risk groups is often hindered due to different determining factors. Motivating factors, as well as perceived barriers, influence the access and utilisation of healthcare offers. Those can occur on health system level, provider level, and on individual patient level. In order to access patients who are difficult to reach, motivating factors must be strengthened and barriers must be recognized, taken serious and broken down, or even lowered.

6.3.1 Migrant and At-Risk Group (Patient)-Related Determinants

The individual decision for viral hepatitis screening is a process influenced by personal, cultural, social, economic, as well as environmental factors. Migrants and at-risk groups are heterogenic groups and therefore it is important to recognize and understand the diverse factors that are influencing their screening behaviours. This might help to improve screening interventions and vaccination rates, and facilitate appropriate follow-up care in these populations. Again, determinants can be either related to the individual itself, the healthcare providers, or the whole health system.

Awareness of and Knowledge about Viral Hepatitis

Since hepatitis B vaccination has been implemented universally, viral hepatitis has received increasing attention in public. As a result, basic awareness about hepatitis B (and C) exists among the general public and migrant and at-risk groups. Nevertheless there is still a wide lack of knowledge about the diseases among these target groups. This ignorance often leads to misinformation, missing of opportunities for prevention and treatment, and stigmatization of infected populations. Additionally, being unaware of the own risk for infection and transmission, affected persons run the risk of unknowingly infecting others, and of missing appropriate and timely medical management. So far, more research was done considering the knowledge and awareness about HBV among migrants and at-risk groups. Only few studies have evaluated immigrants' and at-risk groups' knowledge about HCV yet.

Results of qualitative studies among migrants showed high rates of people being unaware of their own (risk-group specific) risk for infection. This is linked to the unawareness of the own infection status and necessary prevention methods to avoid further transmission (Colvin & Mitchell, 2010; Lin, Chang, & So, 2007). Knowledge deficits also include misinformation or misconceptions about transmission routes and the own risk of transmission. Common myths were inadequate hygiene conditions or sharing of contaminated food and eating utensils being the most common routes of HBV transmission, whereas sexually or parenterally transmission was mentioned few. Nevertheless, the risk of transmission through blood contact was well known. The reason for such misinformation had often been confusion with other hepatitis infections like A or E (Colvin & Mitchell, 2010; Cotler et al., 2012; Hu, Pan, & Goodwin, 2011; Lutgehetmann et al., 2010; Vu et al., 2012). Studied individuals were also often unaware of the risk of hepatitis B and C infection becoming chronic, the commonly asymptomatic course, and the dangerous and possibly lethal consequences, like cirrhosis or HCC (Bruggmann, 2012; Cotler et al., 2012; Hu et al., 2011; Lutgehetmann et al., 2010; Vu et al., 2012; Woo, Hill, de Medina, & Schiff, 2013). A high amount of migrants have been uninformed about of the possibility to prevent HBV via vaccination; or they have not been vaccinated despite knowing about the existence of such a vaccine (Lutgehetmann et al., 2010). The knowledge about prevention, testing and treatment options was limited in general. In qualitative studies, participants stated that they often misunderstand the meaning of medical terminology or antibody-test results. Another problem was, that many migrants shared the misconception that nothing can be done if tested positive, due to the poor knowledge about treatment options (Hu et al., 2011). This could also lead to reluctance in case of screening and seeking medical attention. Just as the facts that a high amount of infected people do not experience any symptoms and that many are afraid of intrusive tests and treatment side effects

(Bruggmann, 2012; Colvin & Mitchell, 2010; Cotler et al., 2012; Guirgis, Nusair, Bu, Yan, & Zekry, 2012; Hu et al., 2011; Lin et al., 2007; Woo et al., 2013).

IDUs as one high risk-group are better informed about the own serological status, and their risk of HCV infection. Better knowledge about viral hepatitis in migrants was associated with being female, higher school education, being SGM, longer treatment duration, having an infected family member, awareness of the own infection status, being vaccinated, and having a testing history (Cotler et al., 2012; Lutgehetmann et al., 2010; Pottie et al., 2011).

Unfamiliarity with the Health System

A lack of familiarity with the health care system is often contributing to reluctance in case of utilisation of healthcare, prevention services and treatment adherence among migrants and at-risk groups. Complex and internationally diverse structures of healthcare systems can be challenging for finding the correct and suitable patient pathway, especially for (migrant) patients with language difficulties. Furthermore, the lack of knowledge about health benefits and available health and social services, are limiting the use of existing healthcare offers. Previous experience in other health care systems often led migrants to have different, and sometimes unrealistic, expectations of the roles of doctors and patients. If experiences differ greatly from expectation, it may result in uncertainty, confusion, and even mistrust in the existing healthcare system and providers (Carballo et al., 2010; Priebe et al., 2011).

Linguistic Barriers

Language and communication barriers can have a strong and adverse effects on the patient-provider relationship, and thus on the effectiveness of prevention, medical care and treatment. Diverse studies have shown the negative effect of language barriers or missing multilingual information to the access of healthcare in migrants (Guirgis, Nusair, et al., 2012; Lutgehetmann et al., 2010; Vu et al., 2012). Migrant patients who are lacking of sufficient language skills often have difficulties to express themselves, to communicate their problems, or to provide relevant medical information like describing symptoms. As a result the providers struggle to reach a correct diagnosis, or may be forced to require more examinations or diagnostic tests than generally needed to compensate for the inability to communicate verbally. Additionally, medical and administrative procedures can be prolonged and complicated (Priebe et al., 2011). At worst, language barriers can have deleterious effects if treatment advices were misunderstood (Guirgis, Nusair, et al., 2012). Communication barriers and misunderstandings can also cause or reinforce the fear in migrants to be unable to communicate their symptoms, to be misunderstood or to misunderstand medical instructions. Helplessness and anxiety can lead to reluctance, a strained relationship, verbal aggression or even physical violence, in worst case (Guirgis, Nusair, et al., 2012; Priebe et al., 2011). For the decision to participate in preventive services like hepatitis screening, it is essential for patients to get informed about and to understand the reasons and need for maintaining or improving one’s health, especially when they are asymptomatic. Misinformation and ignorance due to linguistic problems can reinforce inappropriate stigma and fear.

Despite these facts, translation or interpreting services in healthcare are often missing or restricted; just as are information material in different languages. To overcome language barriers, sometimes family members, like children or spouses, were used as translators. However, their translation might be selective and prone to distortion. Despite its simplification for communication, involving a third party, if professional interpreter or family member, might also impact on the patient-practitioner relationship in case of trust and sharing of sensitive or intimate information (Priebe et al., 2011). Studies showed the wish of migrants themselves for multilingual information and interpreting services (Lutgehetmann et al., 2010; Vu et al., 2012). As might be expected, migrants preferred receiving information in their mother tongue when asked about language preferences. The most commonly used sources for information are medical practitioners and the internet (Vu et al., 2012). This might also affect the general knowledge and navigation through the healthcare system (Hu et al., 2011).

Social and Cultural Determinants

Depending on background, origin, and reason for migration, migrants have to deal with several influencing factors that can affect their life and health. These include experiences from the migration itself, trauma, war or conflict in country of origin, and experiences in the new country like being away from family and friends, the challenge of integration, prejudice, stigmatization, social marginalisation, poverty, unemployment, language barriers.

Van der Veen et al. (2009) identified diverse socio-cultural determinants of screening behaviour of migrants; either being motivating or repressing. These included social norm and social support regarding screening and vaccination (for HBV), religious responsibility, religious doctrine regarding health and disease, reputation, sensitivity regarding sexuality, and the perceived efficacy of health services. A common fear among migrants and at-risk groups is the fear of stigmatization if they were tested positive for hepatitis. Cotler et al. (2012) described health-related stigma as an adverse social judgment resulting in inappropriate reactions, exclusion, rejection, blame or devaluation. Stigmatization can damage self-esteem, adversely affect family members and social and economic status, and can lead to discrimination and self-discrimination. Health-related stigma in case of hepatitis often results of the fear of infection or disease caused by ignorance or misinformation about the disease and its transmission routes. It is not only the 'general' stigmatization, but especially the cultural stigmatization within the own cultural community that migrants are afraid of. In some cultures, people infected with hepatitis are strongly discriminated and excluded from social life. For example, in China, people who are chronically infected with hepatitis B are frequently expelled from schools, fired from jobs, and shunned by other community members despite the recent passage of national antidiscrimination laws *(China Digital Times, 2009)*(Colvin & Mitchell, 2010). As a result, people who are afraid of a positive test result and its associated stigma and discrimination are reluctant to undergo testing and seek medical attention. Concerns about discrimination can motivate infected individuals without outward signs of infection to choose anonymity (Colvin & Mitchell, 2010; Cotler et al., 2012; Guirgis, Nusair, et al., 2012; Woo et al., 2013). Negative attitudes and prejudices against people being infected with hepatitis often reveal from the association of the infection with STD, sexual activity, and injection drug use (Colvin & Mitchell, 2010; Y. van der Veen, de Zwart, Voeten, Mackenbach, & Richardus, 2009). In contrast, having a hepatitis carrier in the own family and therefore being aware of the disease and its transmission routes, is associated with lower levels of stigma (Cotler et al., 2012).

Cultural and religious attitudes, practices and customs could also affect the patient-practitioner relationship e.g. in case of different attitudes towards physical contact, gender, nudity, or dresscode. For example not all services are able to offer treatment from either gender, if requested, what can result in patients refusing care or being unwilling to disclose sensitive information (Priebe et al., 2011). Beyond the personal contact, those factors can also affect the acceptance of information and advice, the treatment, and follow-up care. Specific cultural or religious dietary requirements or prohibitions for example, can complicate treatment outside of medication. Cultural differences and misunderstandings can also appear in practical issues like making and keeping appointments, or patients turning-up late or seeking consultation outside of opening hours. These situations could lead to administrative problems, as well as disappointment and frustration in patients (Priebe et al., 2011; Y. van der Veen et al., 2009).

Health Belief Barriers

Carballo et al. (2010) described five concepts that are influencing health behaviour and engagement in health promotion services like screening: (1) *perceived susceptibility*, requires knowledge about the disease to be able to place yourself in broader context of the disease and to be aware of the factors contributing to it and to what extent you might be affected by them; (2) *perceived severity*, is a person's individual assessment of the seriousness of a problem and its potential consequences; (3) *perceived benefits*, are mostly influenced by previous experiences with healthcare or preventative services; (4) *perceived barriers*, are the assessment of people what might prevent them from acting on given advice. It is important to distinguish between real and perceived barriers that are often resulting of misinformation or ignorance; (5) *self-efficacy*, is the belief in the own power to "take the life in one's hands" and to be able to influence the course of a disease (Carballo et al., 2010).

The way these concepts are influencing health and screening behaviour is strongly dependent on the person's individual understanding of health and illness, which can differ widely between people, cultures, and religious groups. Differences in perception and expression of illness, pain, and symptoms and dissimilar understanding of treatment and the human body can complicate the patient-provider relationship. They can affect diagnosis, care, and treatment and can result in non-compliance/-adherence of patients or reluctance. Some migrants even rely on self-treatment or travel to their country of origin for care (Hu et al., 2011; Priebe et al., 2011; Y. van der Veen et al., 2009).

Patient-Healthcare Provider Relationship

The relationship between the (migrant) patient and its healthcare provider is an essential part in the care and treatment process. Factors like trust in the provider, concern and respect from the provider, and continuity of care influence the patients' commitment and compliance to medical services and care.

Luthgehetman et al. (2010) examined an overall good satisfaction with the medical counselling among migrants patients in a German hospital. Nevertheless, migrant patients showed a strong wish for more information, e.g. about the antiviral therapy, disease progression, prevention, and transmission routes. What can become really problematic within the (migrant) patient-provider relationship are negative attitudes or distrust on both sides. Those can arise from previous negative experiences, prejudices, cultural differences, or misunderstandings. In a survey among general practitioners, interviewees reported certain patients as being explicit in their requests to be seen by another member of staff, withholding information, or being non-compliant with medical advice. The patients' behaviour can be explained by fears of discrimination, the feeling of not being taken serious, current or previous negative societal experiences, or even opinions reported in the media. However, staff behaviour towards migrant patients may also perpetuate this fear of discrimination (Priebe et al., 2011).

Next to barriers, the individual uptake of screening can also be influenced by motivating factors. As ignorance and misinformation are hindering, the knowledge that e.g. chronic viral hepatitis is treatable, that screening is important for diagnosing and preventing the disease and that health insurance is covering costs for screening and treatment are motivating migrants and at-risk groups for screening. Social support and even positive pressure can also be motivators, in family members, friends, or the doctor recommending screening. More negative shaped pressure but also motivating are the development of severe complications (e.g. cirrhosis, HCC) in a family member or friend, the fear of transmitting the disease to a family member or contact, or peace of mind (Hu et al., 2011).

6.3.2 Institutional Determinants

The previous chapter highlighted several factors that can determine migrants' and at-risk groups' individual decision to participate in screening programs and to seek medical attention to greater or lesser extent. Beside these barriers or motivators on individual patient level, their uptake of screening can be influenced by diverse conditions on healthcare provider or health system level. Thus, even if migrant and at-risk group patients were willing to participate in preventive services like viral hepatitis screening, their access could be hampered by institutional determinants outside their sphere of influence.

Awareness of the Problem and Knowledge among Healthcare Providers

Primary care physicians can be named as the common point of entry into the healthcare system for patients in general, and also for migrant and high risk group patients. This unique position provides them with the opportunity but also the challenge to identify individuals at risk for (chronic) viral hepatitis B and C, and to provide screening and referrals to specialists, if necessary. To fulfil this task, it is essential the be informed and educated about the disease, risk factors, risk groups, the importance of screening for identifying infected individuals, and the possibility for treatment. Despite having this important role in the patient pathway, studies showed essential gaps in knowledge among healthcare providers. These gaps included a poor understanding of the natural history of chronic hepatitis B and C, unawareness of the risk factors or underestimation of the risk, and the lack of confidence in ordering the correct diagnostic test or in correctly interpreting the test results (Colvin & Mitchell, 2010; Hu et al., 2011; Pottie et al., 2011; Woo et al., 2013). Furthermore, primary care physicians reported having little experience in treating patients who tested positive for hepatitis infection, unawareness or uncertainty regarding treatment, or unfamiliarity with existing treatment guidelines (Pottie et al., 2011; Woo et al., 2013). Another problem arises through the fact that some primary care providers do not routinely ask patients about risk factors for hepatitis B or C on an initial visit (Pottie et al., 2011). Given this situation, it is not surprising that there is a lack of timely referrals to specialists for appropriate care and treatment in migrant patients (Woo et al., 2013).

Next to the gaps in knowledge, healthcare and social-service providers, like the migrant patients, are faced with language barriers that can complicate the relationship and the medical care and navigation. Within the restricted time frames, there can be a lack of time for prolonged explanations and counselling due to linguistic and cultural misunderstandings. Additionally, translation and interpreter services are often missing. Given these prerequisites, it can be very difficult for the healthcare personnel to provide appropriate counselling, referral, and care to migrant patients without sufficient language skills (Hu et al., 2011; Woo et al., 2013).

Another problem, especially in the care of undocumented migrants, can be the lack of access to the medical history of a patient. Either because it is unavailable or in a foreign language, not knowing patients' previous health problems, whether they had allergies or vaccinations, can complicate the treatment. Often patients cannot remember all of their previous examinations or language barriers hamper the communication. This can make medical decisions very difficult for physicians (Priebe et al., 2011).

However, screening for hepatitis B and C can be motivated by the providers' understanding that screening is cost-effective, vaccination of high-risk groups is covered by insurance, and that effective HBV treatment is available if it is indicated (Hu et al., 2011)

Healthcare System-Related Barriers

Complex and time-consuming administrative rules and procedures can be important barriers for migrants' access and use of healthcare services. For foreigners it might not be easy to comprehend a health system that either differs widely from the one they knew or is a completely new occurrence. They often lack of an adequate knowledge of how the system works, the health and social services available, and knowledge about health benefits. Especially undocumented migrants can struggle when work or residence permits, health insurance papers or permanent addresses are required for receiving healthcare other than essential (emergency) care. This situation might be even more complicate since some EU countries have introduced more difficult-to-meet requirements for acquiring refugee status (Carballo et al., 2010; Hu et al., 2011). Without adequate health insurance receiving care, including hepatitis screening, vaccination, and treatment, is as challenging for patients as is providing care for practitioners. Respondents of a survey among care professionals in 16 European countries reported that they are unsure of the legal entitlements of different patient groups, especially regarding undocumented migrants. In consensus with their medical oath, most interviewees reported that they would always provide emergency care, but the awareness of the legal situation of the patient may put them into a dilemma (Priebe et al., 2011). Financial concerns are therefore another major obstacle for migrants to seek medical attention, and for healthcare workers to offer viral hepatitis screening and treatment (Guirgis, Nusair, et al., 2012; Priebe et al., 2011). Among the respondents was also prevalent the concern about not seeing or being able to contact the migrant patient again, if having a positive test result. In fear of deportation, undocumented migrants may be constantly on the move or use fake or someone else's identity to receive care (Priebe et al., 2011).

The absence of culturally responsive support services might also be one major barrier for migrants accessing healthcare services. As mentioned before, the lack of interpreters and translators among healthcare and social services, as well as the lack of intercultural competency training among providers, is anything but helpful to improve the communication and relationship between migrant patients and providers (Colvin & Mitchell, 2010).

The complicated and insufficient infrastructure for viral hepatitis prevention and treatment among migrants is also due to the insufficient understanding about the extent and seriousness of chronic viral hepatitis B and C as a public health problem at policy level. The EU still lacks a unified comprehensive strategy to tackle viral hepatitis and Member States often lack a robust viral hepatitis policy and programmes (Colvin & Mitchell, 2010; Hatzakis et al., 2011).

Lack of Comparable Surveillance Standards

In order to pass adequate national and international viral hepatitis policy guidelines and recommendations, it is essential to be aware of the full extent of the problem in the own country, Europe-wide, or worldwide. This knowledge is still hampered due to significant differences between the country's surveillance systems for viral hepatitis. Different countries use different parameters of measurement and there has not yet been any major attempt to develop national or international registries. Thus, a comparison of surveillance data between countries is challenging. Since ECDC’s first Annual Epidemiological Report was published in 2007, there have been made some improvements, like the availability of standard European case definitions for diseases. The objectives of the surveillance systems are very similar and basic data sets, like age, sex, place of residence, date of onset, data on hospitalisation, and risk factors, are collected in most countries. Nevertheless, the surveillance systems are very heterogenic regarding the use of EU case definitions, the distinction between acute and chronic cases, inclusion of asymptomatic cases in the reporting, data sources, and the legal aspects of reporting. While the availability of electronic data has significantly improved within the last years, many different data types and formats are being used. Underreporting of cases also seems to be a common phenomenon. All these issues are likely to pose a major challenge for EU-wide harmonised data collection (Carballo et al., 2010; Fraser, Hruba, Quinton, & Albu, 2013; Rantala & van de Laar, 2008). Table 15 provides an overview of the surveillance systems in the six EU-HEPscreen study countries.

Table 15 : Surveillance systems in the EU-HEPscreen study countries

Country	Data source	Compulsory (Cp) vs. Voluntary (V)	Comprehensive (Co) vs. Sentinel (Se)	Active (A) vs. Passive (P)	Case based (C) vs. Aggregated (A)	Data reported by				National coverage
						Laboratories	Physicians	Hospitals	Other	
Hepatitis B										
Germany	DE-SURVNET@RKI-7.1/6	Cp	Co	P	C	✓	✓	✓	✓	✓
Hungary	HU-EFRIR	Cp	Co	P	C	✓	✓	✓		✓
Italy	IT-NRS	Cp	Co	P	C		✓	✓		✓
Netherlands	NL-OSIRIS	Cp	Co	P	C	✓	✓			✓
Spain	ES-STATUTORY_DISEASES	Cp	Co	P	C		✓	✓		✓
UK	UK-HEPATITISB	O	Co	P	C	✓		✓		✓
Hepatitis C										
Germany	DE-SURVNET@RKI-7.1/6	Cp	Co	P	C	✓	✓	✓	✓	✓
Hungary	HU-EFRIR	Cp	Co	P	C	✓	✓	✓		✓
Italy	IT-NRS	Cp	Co	P	C		✓	✓		✓
Netherlands	NL-OSIRIS	Cp	Co	P	C	✓	✓			✓
Spain	-	-	-	-	-	-	-	-	-	-
UK	UK-HEPATITISC	O	Co	A	C	✓		✓		✓

Source: Fraser et al., 2013.

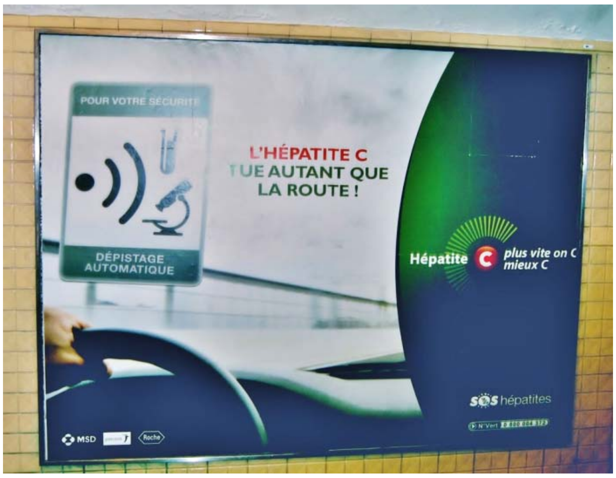
6.4 Recommendations

The previous chapters outlined the barriers hampering the uptake of viral hepatitis screening that are related to migrant and at-risk group patients, healthcare providers, and the healthcare system. Examining and understanding actual and perceived barriers, as well as motivating factors are essential to improve screening rates among high risk groups. After defining and ranking determinants of screening, it is possible to overcome barriers or to enhance motivators; and thus, to develop effective, measurable, target-group oriented, and cost-effective screening approaches. According to Hu et al. (2011), effective screening programs should include culturally sensitive educational outreach efforts that promote awareness of viral hepatitis B and C screening, prevention, and treatment, and include counselling services with linkage to healthcare services and follow-up care. Next to patients, important addressees are healthcare providers and healthcare system correspondents. Raising awareness and knowledge about chronic viral hepatitis, including improvement of cultural competencies, are essential basics for establishing a supportive institutional infrastructure for hepatitis screening programs. A systematic approach to asses and prioritize resource needs and establish an evidence-based strategy might be necessary for integrating all available resources to reduce ethnic disparities, and prevent or improve the outcomes of chronic viral hepatitis B and C infection in all patients at risk. Additionally, evaluation and validation regarding feasibility and effectiveness of these programs is needed (Hu et al., 2011). The following chapters will provide recommendations for overcoming barriers on patient, provider, and healthcare system level in order to approach a cultural sensitive healthcare structure for high-risk group communities for chronic viral hepatitis B and C.

6.4.1 Increasing General Awareness and Knowledge about Viral Hepatitis

The lack of knowledge and awareness about chronic hepatitis B and hepatitis C in the general population is an important barrier to testing, prevention, and care. Besides, missing information about the disease, transmission routes, and treatment can lead to stigmatization and discrimination of infected people in the community; another hindering factor for the uptake of screening. Both are strong reasons to close these gaps in knowledge and to increase the public awareness and understanding regarding viral hepatitis infections.

Education programs are one possible strategy to address knowledge deficits. Viral-hepatitis and liver-health education could be integrated into existing health-education curricula in schools, at working places, or community centres. Many schools already require health education on HIV which has been effective to reduce HIV-risk in students. Since hepatitis B and C have transmission routes similar to those of HIV, these education programs could serve as models for viral hepatitis education initiatives (Colvin & Mitchell, 2010). Broader community education should include print- and multimedia educational materials and community-specific awareness campaigns. Information could be distributed via flyers e.g. in doctor's practices, hospitals, or community settings (supermarkets, cafés…), via posters, via radio, TV, and the Internet. One example of a public hepatitis awareness campaign was spotted in a Métro station in Paris, France, in summer 2012.



Source: Own picture.

The poster has been created by 'SOS hépatites', a French association aiming at the prevention, education, solidarity, and defence of viral hepatitis. The conveyed message is: "Hepatitis C – life-threatening as traffic! For your safety – manual screening. The faster - the better."

Increasing public knowledge and awareness about chronic hepatitis as early as possible might change people's attitude and behaviour towards infected individuals. Studies showed the positive effect of public HIV-awareness campaigns in reducing stigma and discrimination. As in the case of HIV/AIDS, increasing general public knowledge about chronic hepatitis B and hepatitis C can be expected to reduce discrimination towards infected people, reduce transmission, and increase screening, early diagnosis, and treatment (Colvin & Mitchell, 2010).

6.4.2 Creating a Supportive Health System Infrastructure

Several efforts and recommendations on international and EU-level have been made so far in order to tackle the public health problem of chronic viral hepatitis B and C. Those include for example: (a) the 63rd World Health Assembly Resolution on Viral Hepatitis adopted on 21 May 2010, and emphasizing the need for governments and populations to take action to prevent, diagnose and treat viral hepatitis; (b) the European Parliament Report 2010 on the European Commission communication on action against cancer, stating that "the prevention and control of diseases which can develop into cancer, for instance primary and secondary prevention of viral hepatitis and treatment where appropriate, should be addressed by the Cancer Partnership and in future EU initiatives" (Peterle, 2010, p. 11); (c) hepatitis B and C have been included in the surveillance and monitoring programs of the European Centre for Disease Prevention and Control (ECDC) and the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA); and (d) the European Association for Disease of the Liver (EASL), the European Liver Patient Association (ELPA), and the Viral Hepatitis Prevention Board (VHPB) are consistently working on providing evidence, knowledge and awareness to prevent and treat viral hepatitis. Nevertheless, there are still barriers that could be overcome by providing a supportive infrastructure, implementing clear and mandatory screening and treatment policies and guidelines, improving access to care, or providing adequate, sufficient, and specifically allocated funds and resources. Policy-makers and healthcare providers need to take into consideration the determinants of viral hepatitis screening on individual patient, provider and especially on healthcare system level, and aim for possible solutions.

Addressing and Overcome Barriers Concerning Healthcare Providers

Primary care practitioners are often the first point of contact for patients entering the healthcare system. They are given the opportunity to provide information and support to viral hepatitis patients and high risk groups, like migrants from endemic countries. They are also involved in referral to specialist services, and the maintenance and monitoring of HBV and HCV infection and treatment responses. Therefore, primary care physicians are expected to play a key role within any model of care for viral hepatitis (Guirgis, Yan, Bu, & Zekry, 2012; Vu et al., 2012). To fulfil this obligation, providers should seek and receive up-to-date education in terms of chronic viral hepatitis B and C risk factors, testing, diagnosis, prevention, and treatment. Of essential importance is the message of the increased effectiveness of antiviral treatment: by current antiviral agents, 95% of chronic HBV cases can be treated and survival can be improved, and 60% of chronic HCV cases can be cured in reversing the natural history (Hatzakis et al., 2011). Despite the high impact on morbidity and mortality, this knowledge is often lacking among physicians, as well as policymakers and patients themselves. Primary care providers must also be aware of specialist services where infected patients can be referred to. Thus, resources should focus on the primary care - tertiary care interface and should involve specific educational initiatives for primary healthcare providers. These activities should focus on identified deficiencies and specifically target providers in geographically highly prevalent regions or with high caseloads. In terms of preferred educational resources, the majority of respondents to a survey among GP's listed continuing medical education sessions and published guidelines as most useful (Guirgis, Yan, et al., 2012). Furthermore, in contact with patients from different cultural, ethnic, and religious backgrounds, healthcare providers should be endowed with cultural competencies. Cultural sensitivity can ease the establishment of an effective and satisfactory relationship for both sides. Build on trust and understanding, the patient-provider relationship can be an important prerequisite for patients to share sensitive medical information and for providers to reach more accurate diagnoses and provide appropriate treatment, while meeting patients' needs for cultural acceptance. Besides, necessary features for a positive patient-provider relationship include respect, listening, being open-minded and non-judgemental, warmth, and familiarity. Consistency of staff and effective response are also important for patients' positive experience. Next to the advantages in personal contact and experiences, a trusting relationship can serve as an essential motivator for screening, prevention, and compliance with treatment advice in (migrant) patients (Priebe et al., 2011). Especially for providers with a high amount of migrant patients, cross-cultural training is an important component and should be provided to all healthcare personnel as well as incorporated in medical training and school curricula (Guirgis, Nusair, et al., 2012; Hu et al., 2011). Questioned providers suggested that courses should include information on migrant specific diseases, cultural understanding of illness and treatment, and information on cultural and religious norms and taboos (Priebe et al., 2011). Moreover, healthcare providers named increased access to professional interpreter services, the availability of interpreters at the reception point, multilingual or migrant healthcare workers, and facilities for multiple languages as helpful for achieving good quality cultural-sensitive care and patient satisfaction (Guirgis, Nusair, et al., 2012;

Guirgis, Yan, et al., 2012; Priebe et al., 2011). But even if there are interpreter options available in the clinical setting, e.g. a doctor phone line interpreting service, practitioners sometimes lack awareness of their existence (Guirgis, Yan, et al., 2012).

Enhanced and Comparable Surveillance Systems

Significant differences between the country's surveillance systems for viral hepatitis are a major determinant for the lack of reliable and comparable data on the epidemiology of viral hepatitis B and C across Europe and worldwide. There is an urgent need for comprehensive, enhanced and coordinated surveillance of hepatitis B and C to provide improved and more representative epidemiological data. National protocols for disease surveillance must be harmonized, and core surveillance for active AND chronic cases of hepatitis B and C should be supported in order to convey the full burden of disease (Hatzakis et al., 2011). Current recommendations also include the support of targeted active HBV and HCV surveillance, including serologic testing, to monitor incidence and prevalence in populations not fully captured by core surveillance and to correct existing prevalence estimates. These under-represented populations are mostly vulnerable and risk groups, such as migrants and IDUs (Colvin & Mitchell, 2010; Hatzakis et al., 2011). The development of appropriate policy for (chronic) viral hepatitis B and C at national and international level relies on up-to-date epidemiological information and evidence-based estimates about the burden of disease (Hatzakis et al., 2013). As testing and treatment patterns change, monitoring the implementation of testing recommendations and utilization of healthcare by infected persons will also be needed to guide policy-makers in improving and enhancing guidelines (Weinbaum, Mast, & Ward, 2009).

Clear and Mandatory Guidelines for Screening and Treatment of Viral Hepatitis B and C

So far, creation and enactment of screening policy varies widely between countries in Europe and worldwide. It ranges from central policy making and national provision of screening, through to national recommendations, obligating individuals to procure screening from independent providers. Factors influencing screening policy decisions are for example evidence, resources, values and beliefs of the society, ethics, fairness, amount of exerted central control over quality assurance, commercial issues, and the information amount provided to participants and public (Raffle & Gray, 2007). For addressing the hepatitis B and C burden, there is a need for solutions that are tailored to the reality of the local and national situation of a country. As mentioned before, more representative surveillance data are needed, especially for sub-populations, to receive a comprehensive picture of the epidemic and to tailor interventions according to it. What might be (cost-) effective in high-prevalence countries, doesn't have to be in lower-prevalence countries; as in the case of universal screening and vaccination programs. For low-prevalence countries screening of certain high-risk groups, such as migrants or IDUs, might be more (cost-) effective (Hatzakis et al., 2011). Such gaps in knowledge have to be clarified before decisions on policy-level could be enacted. Nevertheless, the provision of appropriate and mandatory guidelines for screening and treatment are essential to tackle chronic viral hepatitis B and C. In 2010, CDC recommendations already emphasized the need for incorporating "[…]guidelines for risk-factor screening for hepatitis B and hepatitis C as a required core component of preventive care so that at-risk people receive serologic testing for hepatitis B virus and hepatitis C virus and chronically infected patients receive appropriate medical management." (Colvin & Mitchell, 2010) When defining at-risk groups, migrants from intermediate or high prevalence countries should definitely be included. Because of the heterogeneity of the migrant population, guidelines should clearly formulate care entitlements of different migrant groups, such as undocumented migrants.

The UK National Screening Committee Criteria provide a logical framework for initiating screening and approaching policy decisions. However, very few screening programs actually meet all the criteria and it is seldom possible to follow an entirely logical approach. Nevertheless, every screening should be performed embedded in a screening program. This should be coordinated at three levels:

1. Program management, responsible for e.g. supervision, resource management, and monitoring outcomes;
2. Clinical services, responsible for education, recruitment, obtaining informed consent, offer of screening, non-directive counselling, offer of intervention, follow-up etc.;
3. Laboratory testing, responsible for analytical validity, clinical validity, quality assurance, data storage, confidentiality etc. (NSC, 2000).

The implications of screening can vary widely depending on the target disease, the test(s) used, the timing of testing, the intervention(s), the target population, the screening programme and the implementation context. In order to be effective, viral hepatitis screening programmes must always be accompanied by counselling, integrated into existing public health and care practices and connected to treatment programmes (Hatzakis et al., 2011).

Providing Resources and Funding

Data from the ECDC and other studies suggest that screening of certain risk groups is effective and potentially cost-effective. This evidence, as well as the need for up-to-date epidemiological information emphasize the importance of expanded investment in viral hepatitis research and screening implementation (Hatzakis et al., 2011). Necessary components for providing appropriate, comprehensive, and sustainable screening programs include for example sufficient resources, organizational flexibility, positive attitudes of staff, training for staff, and the provision of information. The provision of sufficient resources is essential to achieve most of the other factors, such as more practitioner time, additional staff and good interpreting services. Acquiring funding and resources is a challenge that is likely to be influenced by political priorities (Priebe et al., 2011). Therefore, according to CDC recommendations, federal, state, and local agencies or federally funded organizations in cooperation with key stakeholders and community organizations or health-insurance programs must ensure that sufficient resources are allowed to centres offering viral hepatitis screening to ensure that appropriate follow-up information, counselling and care are available to those requesting screening. All HBV sero-negative persons should be offered a full course of vaccination against hepatitis B and efforts should be made to optimise compliance with the full schedule offered. Additionally they should ensure adequate resources and guidance for provision of comprehensive viral-hepatitis services; for the expansion of community-based programs that provide hepatitis B screening, testing, and vaccination services that target foreign-born populations; to integrate comprehensive viral hepatitis services into settings that serve high-risk populations such as STD clinics, sites for HIV services and care, homeless shelters, and mobile health units; and to perinatal hepatitis B prevention program coordinators to expand and enhance the capacity to identify chronically infected pregnant women and provide case-management services, including referral for appropriate medical management (Colvin & Mitchell, 2010). Besides, screening programs could be supported by pharmaceutical and insurance companies, research and service grants, community hospitals, and other private funding sources. For EU countries, Horizon 2020 - the EU Framework Programme for Research and Innovation, 2014-2020 – could provide new opportunities for funding (Hatzakis et al., 2013).

Improving Access to Health Care

As a result of the hepatitis B and C summit conference in 2010, experts on EU and national policy-level gave advice to strengthen health systems in order to adequately provide local populations with the most cost-effective and affordable interventions for viral hepatitis prevention, control, and management, in accordance with the local epidemiological situations. Screening of high risk individuals should be prioritized, and universal and equal access to early counselling and treatment for persons infected with hepatitis B or hepatitis C should be ensured (Hatzakis et al., 2011). Access to secondary care and treatment is critical for a screening campaign to achieve health impact. However, to those who might need it the most, it is often restricted due to administrative, legal, and financial barriers. Data on access to medical care and treatment are often missing in the description of results of published screening programs and thus it is difficult to draw a comprehensive picture of the current situation.

A common problem in viral hepatitis care is inappropriate referral from primary to secondary care. Often, patients diagnosed positive for chronic hepatitis B or C are missed to be referred for appropriate treatment and follow-up care. Another problem is the restricted access to care only for insured individuals. Especially for uninsured people like those who cannot afford health insurance (in countries without statutory compulsory insurance) or undocumented migrants, it is important to overcome the barrier to care, which is mostly due to lack of funding or reimbursement. In a survey among primary healthcare providers suggestions were made to overcome access barriers; those included seeking funding for treatment from Non-Governmental Organizations (NGOs), sending patients to clinics specialized in providing care to undocumented migrants, providing cheap or free medication, giving private prescriptions, or registering undocumented migrants in an alternative way, e.g. as a tourist. Additionally, many respondents reported that in practice staff would first treat patients and then possibly consider issues of entitlement and insurance. Nevertheless providers could be put in a dilemma situation because of the legal situation of the patient (Priebe et al., 2011).

This situation needs to be addressed by policy makers on national and regional level, especially because the demand for care will increase if screening increases. Health system and reimbursement policy changes are essential for overcoming these barriers. Viral hepatitis screening programs should be characterized by the principles of equity and respect for the patient. They should have objectives of preserving public health and contributing to the immigrant's integration into the society of the new host country (López-Vélez et al., 2003; Weinbaum et al., 2009).

Networking and Multi-Sectoral Cooperation

The 'National Strategy for Prevention and Control of Hepatitis B and C' describes CDC recommendations considering a multi-sectoral cooperation. According to those recommendations, governmental organizations should work with other federal agencies, state and local governments to form partnerships and collaborations with key stakeholders like health-care providers, private organizations (including employers and NGOs), educational institutions, and community organizations. The objective should be to develop awareness programs and campaigns to educate the general public and at-risk populations, as well as health-care and social service providers about hepatitis B and hepatitis C. The programs should be linguistically and culturally appropriate and support integration of education about viral hepatitis and liver health into other health programs that serve at-risk populations. Besides, comprehensive viral hepatitis services for at-risk populations should be developed, coordinated, and evaluated within these partnerships (Colvin & Mitchell, 2010).

Next to this coordinated effort between government, health departments, and communities, a network between providers on local level might be an essential part of a comprehensive screening approach. Multiple healthcare providers play a role in identifying and treating persons with chronic hepatitis infection; those include primary care, refugee clinics, substance abuse treatment programs, dialysis clinics, employee health clinics, STI-clinics, and other venues. Health departments also provide clinical services in a variety of settings serving persons recommended for hepatitis testing, including foreign- born persons, MSM, and IDUs. They should seek ways to develop partnerships and cooperation in order to implement viral hepatitis testing and to encourage community members to participate in those programs. Integrated community-based treatment settings including health, social, administrative and legal services are one example for providing everything under one roof, or in immediate vicinity. However, such infrastructure is not possible everywhere. Nevertheless, the cooperation and networking of diverse services concerning the health of migrants and at-risk groups can ease the patient pathway. Advantages could arise on provider, as well as patient side. Working together and sharing knowledge about common diseases, patients' medical history, or cultural tailoring can make it easier to find the adequate care for the patient. On the other side, patients feel guided and don't get lost in the healthcare or administrative system. Especially in case of migrant patients, healthcare providers should collaborate with refugee organisations, projects for immigrant women, language learning centres, or other training courses (Bruggmann, 2012; Priebe et al., 2011; Weinbaum et al., 2009).

In order to coordinate all these efforts, they will have to be adapted to the needs of each individual country and applied nationwide. Regional and national coordination of action is needed. As the international community moves forward to respond to the challenges of preventing and treating HBV and HCV in migrant populations, support to some governments will be required if they are to adopt international standards and operating procedures to the challenge of viral hepatitis in the context of migration. That support should include improving national surveillance, sharing common reporting and databases, using common guidelines on action including prevention and treatment, screening and reporting (Bruggmann, 2012; Carballo et al., 2010).

6.4.3 Implementing Cultural-Tailored Viral Hepatitis Screening and Treatment Services

Effective approaches to meet the (chronic) viral hepatitis burden require a comprehensive structure that includes education, awareness building, screening, care, and treatment. (Pollack 2011).

The following list provides criteria that should be met for the implementation of successful viral hepatitis B and C screening programs:

1. The epidemiology and natural history of the condition should be adequately understood and there should be a detectable risk factor, or disease marker and a latent period or early symptomatic stage.
2. There should be a simple, safe, precise and validated screening test.
3. The target population or specific individuals within a population who are to be screened should be identified.
4. Clear public awareness and education campaigns should be developed targeted at the general public and at-risk groups, including different migrant communities.
5. Education programs should also target providers about the needs for screening and the management pathways.
6. Clinical guidelines should be revised to endorse screening for hepatitis B and C in specified risk-groups and reinforce dissemination of good practice for case finding.
7. There should be an agreed policy on the further diagnostic investigation of HBV- and HCV-infected individuals and on the choices available to them.
8. Systematic referral for individuals screening positive to secondary care should be conducted.
9. There should be an effective treatment or intervention for patients identified HBV- and HCV-positive.
10. There should be agreed evidence-based policies covering which individuals should be offered treatment and the appropriate treatment to be offered.
11. Clinical management of the condition and patient outcomes should be optimized by all health care providers prior to participation in a screening programme.
12. Screening should always be carried out in an evidence-based way that defines when and how often screening should be offered and ensures clinical, social and ethical acceptability to participants, health professionals and the public.
13. In case of vulnerable groups, such as migrants or IDUs, stigmatization because of their viral hepatitis status must be hindered; Anonymous testing should be considered in instances where confidentiality is hard to remain e.g. in small communities.

14. There must be evidence-base that the screening programme is effective in reducing mortality or morbidity.
15. Evidence-based information and counselling, explaining the consequences of testing, investigation and treatment, should be made available to potential participants and family to assist them in making an informed choice; Foreign-born people should have access to culturally appropriate information in their preferred language, e.g. via multi-lingual staff or professional interpreters.
16. The benefit from the screening programme should outweigh the physical and psychological harm (caused by the test, diagnostic procedures and treatment).
17. Adequate staffing and facilities for testing, diagnosis, treatment and programme management should be made available prior to the commencement of the screening programme.
18. Networking between hospitals, GPs, specialists and physicians in special settings (e.g. prisons, STI-clinics) should be strengthened
19. The opportunity cost of the screening programme (including testing, diagnosis, treatment, administration, training and quality assurance) should be economically balanced in relation to expenditure on medical care as a whole.
20. There must be a plan for managing and monitoring the screening programme and an agreed set of quality assurance standards.

    (Hatzakis et al., 2011; Holland et al., 2006; National Hepatitis B Virus (HBV) Testing Policy Expert Reference Committee, 2012; NSC, 2000).

Whatever the approach, screening concepts must be robust and tested and appropriate to the national or regional conditions. Methods should be evidence-based and clearly defined with regards to (1) target population; (2) time of screening; (3) timing of screening, single or a multiple time; and (4) testing side. In case of migrants this means, for example: (1) (a) all immigrants entering the country, (b) specific high-risk groups, e.g. migrants from high or intermediate endemicity countries, or (c) all people applying for permanent residence; (2) (a) pre-migration, or (b) on entry; (3) (a) single time, or (b) multiple times; and (4) (a) immigration service, (b) GPs, (c) hospitals, (d) specialists. Screening policies should be both helpful to the population already in the country and to anyone moving into the country (VHPB, 2011). To overcome barriers in people who are foreign-born and unfamiliar to the given healthcare system and prevention measures, cultural tailoring is an effective and promising approach that should be included in viral hepatitis policy decisions.

Cultural tailoring

Cultural tailoring in healthcare can be defined as a combination of information and change-strategies recognizing and reinforcing a group's cultural norms, values, beliefs, attitudes and behaviours, and building upon those to provide context and meaning about a health issue among this cultural group. It pays attention to the strong interaction of human health behaviour and the cultural context or social structure. Cultural-tailored healthcare services are based on the principle of universality, wherein cultural difference is expected, respected and considered. This becomes apparent for example by using language(s) and role models preferred by the target population, or by addressing religious or cultural values and norms that could influence health behaviour and attitudes of migrants and at-risk groups (Henderson, Kendall, & See, 2011; Y. J. van der Veen, de Zwart, Mackenbach, & Richardus, 2010). The positive effect of culturally safe and competent services for health can result in a cycle of improvement: by improving knowledge about health and services among migrants and at-risk groups and improving communication between patients and providers together with expanding cultural understanding within the health system and among providers, the assessment, diagnosis, and treatment are likely to become more appropriate to the target population and culture. Over time, this should result in increasing trust in the healthcare system and the providers among migrants and in increasing use of services. Higher presence of migrants in the system will increase awareness of service providers how to work effectively with these target group, and of the need for and benefit of cultural tailoring (Henderson et al., 2011).

Addressing and Overcome Barriers in Migrants and At-Risk Groups

Migrants are a heterogeneous group regarding country of origin, viral hepatitis profile, socio-economic background, health and healthcare history, and levels of health literacy. Some need and require targeted assistance; some do not need more support than the host population. For establishing and implementing promising cultural-tailored screening programs it is essential to be informed about the specific prerequisites, abilities and needs of the target migrant or at-risk group population. Programs should address the psychological, cultural, legal, and economic factors that affect the capacity of migrants to participate in and benefit from public health initiatives (Carballo et al., 2010).

A key part for the implementation and utilisation of viral hepatitis screening approaches is the enhancement of knowledge and awareness among migrants and at-risk groups. As mentioned before, lack of knowledge or misinformation about natural history, risk of transmission and treatment may constitute major barriers to seek medical attention and participate in screening which have to be tackled. Equally important for migrants is the information about the host country's health care system; to access appropriate services and seeking effective treatment. Another basic part of education and information services should be the explanation of the screening procedure itself; for informing about its medical value and decreasing doubts and fear among patients. Disseminating information among migrants in a culturally sensitive manner can be challenging. Nevertheless, it is a strategy that promises success.

Communication and education among providers and migrants is most promising if it happens on the same level. This means not to communicate "top-down" but to cooperate as partners. The objective is to share information and to increase the patients' knowledge and understanding for preventive measures and treatment. Thus, it is important to choose an appropriate style of language that is easy to understand and balances rational facts and emotive content. Next to personal provider-patient contact, information must also be distributed within the community for reaching a high amount of people in migrant and at-risk group populations (ELPA, 2009a; Guirgis, Nusair, et al., 2012; Priebe et al., 2011). Several studies used promising strategies like the use of multimedia internal communication and information channels (Batash et al., 2008; DITIB - Türkisch-Islamische Union der Anstalt für Religion e.V., 2008; Jafferbhoy et al., 2012; Janilla Lee, Lok, & Chen, 2010; Lin et al., 2007; Pollack et al., 2011; Referat für Gesundheit und Umwelt, 2010a; Richter et al., 2012; Uddin et al., 2010; Veldhuijzen et al., 2012; Zuure et al., 2013). Multi-lingual information, depending on the target community, has emerged as a very important factor. Just like understanding how communication really happens within the community. Thus, informing people about (chronic) viral hepatitis, the healthcare system, and access to viral hepatitis services like screening and treatment is possible via flyers, posters, (local) newspapers, (local) radio, TV, cultural clubs, or mouth-to-mouth communication. Printed information could be distributed in common community settings like churches, mosques, supermarkets, bazaars, community centres, barber shops, meeting point etc. While using mass media, careful planning and personal contact with journalists might be important to assess the risk of inappropriate communication or uncontrollable dynamics (ELPA, 2009a). The Internet is another effective way for reaching a wide range of people, especially in sensitive issues such as viral hepatitis B and C and sexual transmission or drug use. Further advantages of the web-based education for health promotion include the interactivity, use of active learning methods, multimedia presentation, temporal flexibility, and low costs relative to its potential population reach (Richter et al., 2012; Y. J. van der Veen et al., 2010; Vu et al., 2012). Another option is the organisation of (regular) information campaigns or evenings, health projects or health fairs for raising awareness and education among the community (Gyarmathy, Ujhelyi, & Neaigus, 2008; Jafferbhoy et al., 2012; Pollack et al., 2011; Richter et al., 2012; Uddin et al., 2010; Zuure et al., 2013). **Multi-lingual health educators**, e.g. medical staff out of the community or local GPs could explain and educate migrants about how the health care system works, and about viral hepatitis screening. Patients would be enabled to make informed decisions about screening and practitioners would spend less time explaining the system and more time providing direct patient care (Henderson et al., 2011; Priebe et al., 2011). Furthermore, the access to professional interpreters and health educators should become the norm for healthcare providers and migrant patients, especially in areas with a high amount of migrant inhabitants. Delivering culturally appropriate care ensures better communication between the patient and the provider and better understanding and adherence of the patients (Guirgis, Yan, et al., 2012; Pollack et al., 2011). Involving multi-lingual health educators who are culturally acceptable to the target community emphasizes another effective factor for cultural-tailored interventions: the **participation** and active engagement of the community or community representatives in preparation, implementation, and maintenance of the program. Cooperation with people who are well-known, accepted, and respected in the community or target group can be essential for the acceptance, utilization, and sustainability of the program. They can also function as cultural bridge or as disseminators or "ambassadors" of the approach (Colvin & Mitchell, 2010; DITIB - Türkisch-Islamische Union der Anstalt für Religion e.V., 2008; Guirgis, Nusair, et al., 2012; Henderson et al., 2011; Jafferbhoy et al., 2012; Janilla Lee et al., 2010; Richter et al., 2012; Uddin et al., 2010; Zuure et al., 2013).

When developing an HBV and/or HCV screening program for migrants and at-risk groups, it seems worthwhile to point out the responsibility for one's own health and the health of others. Not in an exhorting but **empowering** manner by showing them that they are able to positively contribute to their own health, that of their family and wider community. Viral hepatitis screening should be advertised as a positive health act by encouraging people that they can help themselves (Y. van der Veen et al., 2009). Cultural tailoring also encompasses respect for and inclusion of cultural and religious traditions, values, norms, and restrictions among the target population. Socio-cultural factors can be essential barriers for healthcare services when they appear in the form of prejudice, stigma, shame, or discrimination. Thus, it is important to express interest in and to understand migrants' culture, beliefs, fears and attitudes towards healthcare services for implementing viral hepatitis screening programs. A sensitive and empathic approach can enhance a cooperation based on **trust, transparency and respect.** Again, the use of cultural mediators could be very helpful for this task (Priebe & Sandhu, 2008; Y. J. van der Veen et al., 2010). To overcome **stigmatization** e.g. due to the association between hepatitis and sexual contact, emphasis should be placed on the most common routes of transmission for hepatitis B and C, like perinatal transmission. Screening approaches should avoid anything that could be considered discriminatory or that could lead to social exclusion, varying across countries and communities. Promising in reducing stigma might be a multimodality approach consisting of counselling, education and contact at the personal and community levels, encouraging voluntary participation in both the screening and the follow-up treatment (Carballo et al., 2010; Cotler et al., 2012; ELPA, 2009a; Y. van der Veen et al., 2009).

Ensure access to treatment and follow-up care

In a comprehensive hepatitis screening program, the availability of screening facilities, treatment and follow-up care for patients who tested positive must be ensured. Just like their appropriate access to care. These are the logical consequences of communication and education that have to be considered and satisfied in the end. Positive patients need to be supplied with suitable medical care plans according to their test results and navigated on the chronic viral hepatitis patient pathway. It is also important to advise positive patients to have their family members tested for viral hepatitis, and then either to get vaccinated or seek treatments according to the test results (ELPA, 2009a; Janilla Lee et al., 2010). Thus, it is necessary to cooperate with secondary care or to include screening services into existing healthcare structures.

Integrating viral hepatitis screening into existing (primary) healthcare settings ensures an existing patient care infrastructure and might be less resource-intensive than establishing stand-alone screening events (Pollack et al., 2011). The collaboration between primary care providers and specialists is a crucial part for the effectiveness of a comprehensive hepatitis screening and treatment program. Involving hepatitis screening in a broad array of settings, like community health centres, creates more opportunities to identify at-risk clients and to provide them with other services they might need; such as psychological, administrative, legal, and social service. Advantages of cooperation and networking might affect healthcare providers and migrant patients. Providers could share experiences and knowledge about patients' medical history, background and diseases and thus, save valuable time for the patient care; patients could be protected against getting lost in the system and missing treatment and care opportunities. System-level and policy changes are needed to implement such programs. This will require substantial resources and commitment (Colvin & Mitchell, 2010; Pollack et al., 2011).

A proposal for a comprehensive cultural-tailored hepatitis B and/or C screening approach is provided in Figure 9 (Annex).

Financing

Costs of healthcare services can present another major barrier to the uptake of viral hepatitis screening and treatment, especially for services that are not covered by national health insurances or for uninsured individuals. A financial arrangement with the local or federal government, health insurances, pharmaceutical companies, or non-governmental organisations

(NGOs) might therefore be considered in order to provide free-of-charge screening, HBV vaccination and follow-up care. Resources are also needed for the program infrastructure, including grass-roots outreach and communication initiatives, and cultural training of providers (Pollack et al., 2011; Veldhuijzen et al., 2012).

7 Conclusion

Several efforts on international and European level have been made so far in order to tackle the public health problem of chronic viral hepatitis B and C in the general public, and some progress was made concerning migrants and at-risk groups. In 2010, the 63rd World Health Assembly Resolution on Viral Hepatitis emphasized the need for governments and populations to take action to prevent, diagnose and treat viral hepatitis, and called upon the World Health Organization to develop and implement a comprehensive global strategy to support these efforts. WHO has crafted guidance for the World Health Assembly's 194 Member States within a health systems approach, as described in 'Prevention and control of viral hepatitis infection - framework for global action' (WHO, 2012b). Internationally, especially Australia, Canada, and the USA could be named as pioneers in the matter of hepatitis B and C screening among migrants. Several national guidelines and recommendations include concrete strategies for migrants, or are specifically designed for the target group of migrants. Additionally, screening approaches, funding programs and organizations are widely distributed and build a supportive base for further development of secondary prevention of viral hepatitis. On European level, hepatitis B and C have been included in the surveillance and monitoring programs of the European Centre for Disease Prevention and Control (ECDC) and the EMCDDA. Additionally several organisations, e.g. the European Association for Disease of the Liver (EASL), the European Liver Patient Association (ELPA), and the Viral Hepatitis Prevention Board (VHPB), are consistently working on providing evidence, knowledge and awareness to prevent and treat viral hepatitis. Nevertheless, a unified and comprehensive European strategy, as well as national strategies to tackle the hepatitis-related burden of disease is still lacking.

The aim of the systematic literature review was to identify studies, articles or guidelines considering general and migrant-specific hepatitis B and C screening practices in Europe. Guidelines and recommendations are available, but except for hepatitis B screening in pregnant women and hepatitis B and C screening in blood donors, no definite laws or obligatory guidelines could be identified. For numerous other risk groups screening is strongly recommended but there is no clear evidence how and if this advice was followed. Especially for migrants, few recommendations for hepatitis B and C screening exist in European countries. Concerning the six

European countries assessed in the EU-HEPscreen project, four of six countries (Germany, Italy, Spain, UK) included migrants in national guidelines and recommendations. However, as is the case for Europe-wide strategies, scarce or no data is published on how these recommendations are followed. Facing the increasing burden of liver disease caused by viral hepatitis B and C in Europe, and the fact that viral hepatitis is nowadays estimated to cause more deaths than HIV, concerted and enhanced effort is needed. This call for action is intensified since Europe is the most popular destination region for migrants, and migration has an obvious impact on the viral hepatitis distribution and prevalence in the receiving countries.

Several determinants are influencing the uptake of viral hepatitis screening. All of them depending on specific prerequisites of the local and national situation; including the target population or the health system infrastructure. Therefore there is no European one-size-fits-all solution. Strategies must be tailored to the local and national reality. Especially risk-groups and within migrants, require screening approaches that are suitable for their needs, cultural identity and concept of health. Cultural-tailored screening programs should address the psychological, cultural, legal, and economic factors that affect the capacity of migrants to participate in and benefit from viral hepatitis screening programs. Consideration, respect and proper handling of these aspects are important to overcome fears and prejudices on patient and provider side. In order to overcome institutional barriers, it is also important to provide an encompassing framework of support and guidance. There is a need for clear and mandatory screening and treatment policies and guidelines, for improved access to care, and adequate and specifically allocated funds and resources. Policy-makers and healthcare providers need to take into consideration the determinants of viral hepatitis B and C screening on individual patient, provider and especially on healthcare system level, and aim for possible solutions to meet the demand and need for comprehensive cultural-tailored hepatitis B and C screening programs.

Annex

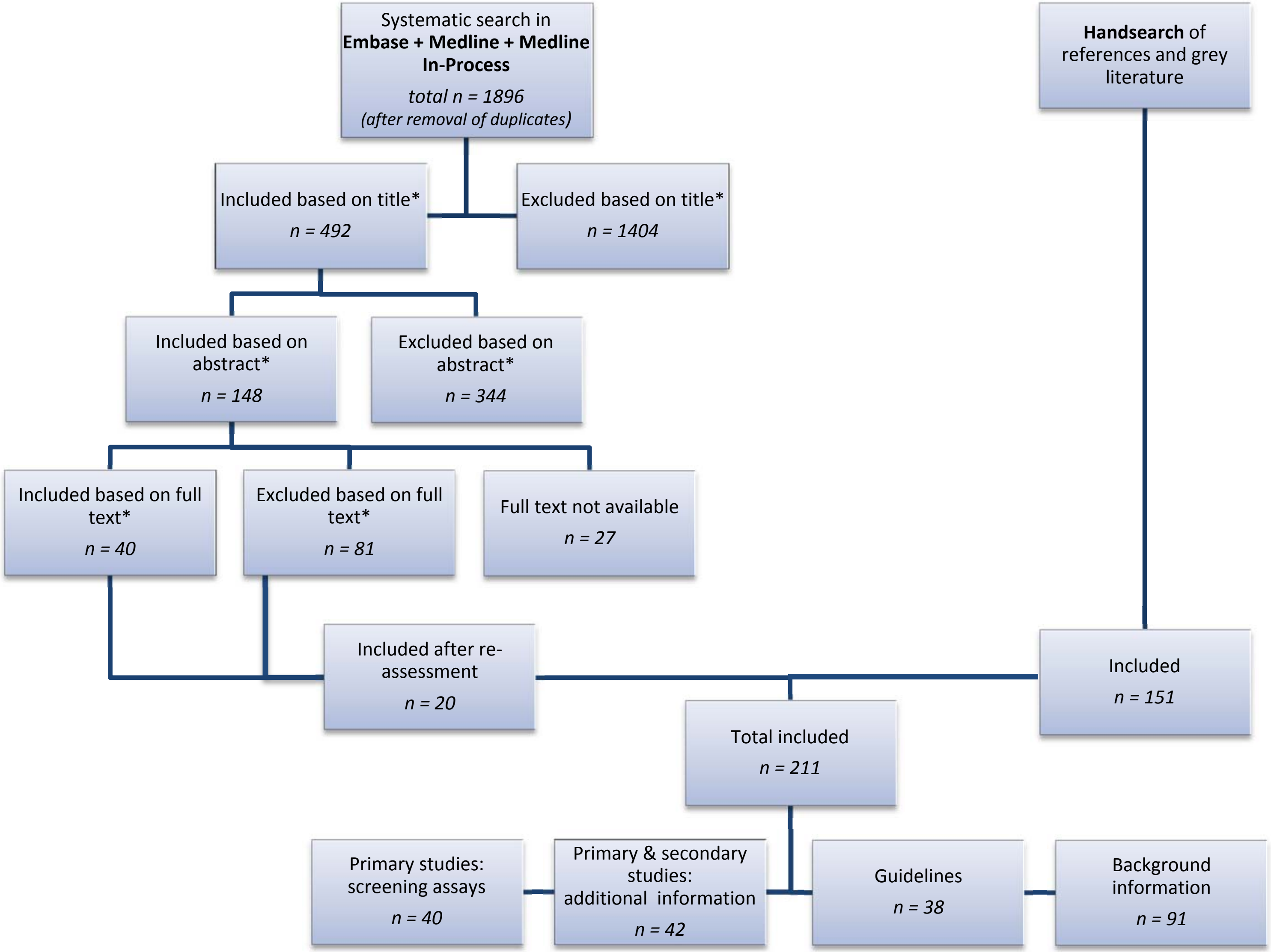
Table 7: Search strategy in Embase, Medline and Medline In-Process

#	Search term	
1	population.mp.[a]	**(a) Population**
2	inhabitants.mp.	
3	**1 OR 2 = (1) general population**	
4	migrant*.mp.	
5	immigrant*.mp.	
6	“ethnic minority”.mp.	
7	“ethnic minorities”.mp.	
8	**4 OR 5 OR 6 OR 7 = (2) migrants/ethnic minorities**	
9	refugee*.mp.	
10	"irregular migrants".mp.	
11	"irregular immigrants".mp.	
12	"undocumented migrants".mp.	
13	"undocumented immigrants".mp.	
14	"illegal migrants".mp.	
15	"illegal immigrants".mp.	
16	**9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 = (3) irregular migrants**	
17	"intravenous drug users".mp.	
18	"injecting drug users".mp.	
19	IDUs.mp.	
20	**17 OR 18 OR 19 = (4) IDUs**	
21	sex workers.mp. = **(5) sex workers**	
22	hepatitis b.mp.	
23	hepatitis c.mp.	
24	HBV.mp.	
25	HCV.mp.	
26	chronic hepatitis.mp.	
27	chronic viral hepatitis.mp.	
28	**22 OR 23 OR 24 OR 25 OR 26 OR 27 = (b) Disease**	
29	testing.mp.	
30	screening.mp.	
31	diagnosis.mp.	
32	"prevention and control".mp.	
33	surveillance.mp.	
34	**29 OR 30 OR 31 OR 32 OR 33 = (c) Intervention**	
35	("united kingdom" or "great britain" or engl* or scotland).mp.	
36	(spain or spanish).mp.	
37	(netherlands or dutch).mp.	
38	ital*.mp.	
39	hungar*.mp.	
40	german*.mp.	
41	europe*.mp.	
42	**35 OR 36 OR 37 OR 38 OR 39 OR 40 OR 41 = (d) Setting**	
Combinations with AND + Limit to year 2000 – Current[b]:		
43	3 AND 28 AND 34 AND 42	
44	limit 43 to yr="2000 - Current"	
45	8 AND 28 AND 34	
46	limit 45 to yr="2000 - Current "	
47	16 AND 28 AND 34 AND 42	
48	limit 47 to yr="2000 - Current "	
49	20 AND 28 AND 34 AND 42	
50	limit 49 to yr="2000 - Current "	
51	21 AND 28 AND 34 AND 42	
52	limit 51 to yr="2000 - Current "	
Final results after removal of duplicates:		
53	remove duplicates from 44	**(general population = 1227 results)**
54	remove duplicates from 46	**(migrants/ethnic minorities = 431 results)**
55	remove duplicates from 48	**(irregular migrants = 28 results)**
56	remove duplicates from 50	**(IDUs = 192 results)**
57	remove duplicates from 52	**(sex workers = 18 results)**
Total: 1896 results		

[a] .mp [ti, ab, sh, hw, tn, ot, dm, mf, dv, kw, nm, ps, rs, an, ui] =*multi-purpose (looks in Title, Original Title, Abstract, Subject Heading, Name of Substance, Registry Word fields, Heading Word, Subject Heading)*

[b] *limit = publication date range from 01.01.2000 to 08.08.2013*

Figure 8: Selection process and no. of identified articles



**applied inclusion and exclusion criteria are described in detail on p.37f.*

Source: Own illustration

Table 8: Data extraction table of included primary studies for general and migrant/at-risk group specific Hepatitis B and/or C screening practices

n°	Population	Country, Region	Period	Study population	Good practice	Recruitment	Sample size	Screening offer	HBV	HCV	HBV – vaccine offered	Key findings/ Comments/ Strengths	Reference
1	General population	Germany	2008-2010	Blood and plasma donors		Voluntary blood donation	new donors: 560.047 regular: 2.514.149	regular	x	x		mandatory screening after §22 of the Transfusion Act; annual report	Offergeld et al., 2012.
2	General population	Germany, Munich	2001 - 2008	Pregnant women in the 32nd week of gestation			17001	regular	x		x	mandatory screening; HBsAg+: 0.8%	Alba-Alejandre et al., 2009.
3	General population	Germany	1998	Participants in the National Health Survey 1998			6748	temporary	x	x		HBsAg+: 0.6%; HCV+: 0.4%	Thierfelder et al., 2001.
4	General population	Italy, Camporeale	1999 - 2000	General population older than 9 years of age		Subjects from the census list, invited for blood sampling.	721	temporary	x	x		HBsAg+: 0.7%; HCV+: 10.4%	Di Stefano et al., 2002.
5	General population	Italy, Padua	1996	Pregnant women			2059	HBV: regular; HCV: temp.	x	x		HBsAg+: 1.0% (in migrants: 3.1%); HCV+: 1.9%	Baldo et al., 2000.
6	General population	Netherlands, Amsterdam & South Limburg	2007 - 2008	Inhabitants of Amsterdam and South Limburg at risk for HCV		Regional mass media campaign + questionnaire on website (www.heptest.nl) to assess the risk for HCV; individuals with at least one risk factor were advised to have an anonymous blood test; chronic HCV cases were referred to hepatologist.	420	temporary		x		HCV+: 3.6% / Questionnaire was available in Dutch, English, French, Spanish, Turkish and Arabic.	Zuure et al., 2011.
7	General population	Netherlands, Amsterdam	2004	General population, registered in the Population Registry of Amsterdam, aged 18 years or older		Health monitoring survey of a random sample of residents from the Population Registry of Amsterdam.	1,364	temporary	x	x		Interviews offered in Dutch, English, Turkish, Maroccan and Berber.	Baaten et al., 2007.
8	Migrants	Netherlands, Amsterdam	(1) 2007-2009 (2) 2003 (3) 2004 (4) 2006-2007	(1) heterosexual visitors at STI-clinic (2) pregnant women (3) inhabitants of Amsterdam, >18 years (4) people living in the Netherlands		(1) visitors of STI-clinic were asked to participate (2) routine annual testing of pregnant women for HBV (3) the Amsterdam Health Monitor (4) The Pienter study (population-based cross-sectional sero-survey)	(1) 3895 (2) 4563 (3) 1309 (4) 4428 *total: 14.195*	temporary	x	x		High proportion of migrants.	Urbanus et al., 2011.
9	General population	UK, England	1980 - 1991	Patients who received blood donations prior to Sep 1991 from donors who were found to be positive for anti-HCV.		Recipients of blood from known anti-HCV-positive donors were identified and elected to receive testing	1209	temporary		x		HCV+: 55%	Soldan et al., 2002.

Table 8: Data extraction table of included primary studies for general and migrant/at-risk group specific Hepatitis B and/or C screening practices *(continued)*

n°	Population	Country, Region	Period	Study population	Good practice	Recruitment	Sample size	Screening offer	H B V	H C V	HBV – vaccine offered	Key findings/ Comments/ Strengths	Reference
10	General population	UK, Dartmoor	1998 - 2001	All prisoners entering the prison since 1998		Screening offer at entry to prison	376	regular		x		HCV+: 16%/ Screening, counselling and referral was offered at induction, access to an outreach clinic.	Horne et al., 2004.
11	IDUs	Hungary, Szent László	2006 - 2008	IDUs attending the Hepatology Outpatient Clinic of Szent László Hospital		IDUs attending the Hepatology Outpatient Clinic of Szent László Hospital were offered screening for HCV.	1.177	temporary		x		HCV+: 25%	Gazdag et al., 2012.
12	IDUs	UK, England	2000 - 2008	Recent initiate IDUs (first injection not >2 years ago), taking part in the annual voluntary and anonymous survey for IDUs between 2000 and 2008.		Around 60 drug agencies throughout England invite clients who have ever injected to participate.	3463	regular (since 1998)	x	x		'Unlinked Anonymous Monitoring of People Who Inject Drugs' in England: HBV and HIV screening since 1990 and HCV screening since 1998.	Hope et al., 2012.
13	Migrants	France	2006 - 2008	All patients consulting the French Doctors of the World Reception Centres of care and orientation	x	Screening is proposed systematically to all new patients after medical consultation or special prevention consultation		temporary	x	x		90% were migrant patients.	Pauti et al. 2008.
14	Migrants	France, Lyon	2003 - 2004	Underprivileged individuals without any social insurance	x	After training in HCV infection and screening, 43 GPs from eight health centres in Lyon, where a high proportion of the clientele was in economically or socially underprivileged situation, participated in the campaign. Patients consulting the GPs were invited for screening according to inclusion criteria.	944	temporary		x		HCV+: 4.7%/ High proportion of before unknown cases; follow-up of positive patients.	Sahajian et al., 2006.
15	Migrants	Hungary, Budapest	2004	Residents of Dzsumbuj, predominantly Roma (78%), 18 years and older	x	Initiated by community representatives, a health fair was organized in the Dzsumbuj neighbourhood. Inhabitants were offered free testing for infectious diseases and counselling.	64	temporary	x	x		HCV+: 23.4%/ Study among an understudied and hard-to-reach subgroup.	Gyarmathy et al., 2008.
16	Migrants	Italy, Bari	2008	Refugees of various nationalities, who were in apparent good health and did not report signs or symptoms in recent or remote past		On arrival at the Asylum Seekers Center in Bari, each new resident was examined by the centre's medical staff. If symptomatic or with disease history, immigrants were treated as necessary. Asymptomatic immigrants were asked if they wish to undergo testing after counselling.	529	temporary	x	x	x	HBsAg+: 8.3%; HCV+: 4.5%/ Counselling was provided in different mother tongues; Positive cases were referred to further treatment.	Tafuri et al., 2010.

Table 8: Data extraction table of included primary studies for general and migrant/at-risk group specific Hepatitis B and/or C screening practices *(continued)*

n°	Population	Country, Region	Period	Study population	Good practice	Recruitment	Sample size	Screening offer	HBV	HCV	HBV – vaccine offered	Key findings/ Comments/ Strengths	Reference
17	Migrants	Italy, Verona	2004 - 2005	Illegal Sub-Saharan immigrants living in Verona and attending a health care centre		Illegal immigrants from sub-Saharan Africa attending a volunteer health centre, predisposed especially for illegal immigrants, as these subjects cannot use the standard national medical devices. After a medical check-up, all subjects were invited to participate.	182	temporary	x	x		HBsAg+: 9.3%; HCV+: 2.7%/ Involvement of a hard-to-reach subgroup; Cultural mediators were present.	Majori et al., 2008.
18	Migrants	Italy	2003 - 2004	Recent immigrants (< 6 months), age > 14 years		Participants were temporary guests in a camp for refugees without contact to the indigenous population	890	temporary	x	x		HBsAg+: 9.3%/ Follow-up treatment was difficult due to constant movement and health beliefs of refugees.	Palumbo et al., 2008.
19	Migrants	Italy, Verona	1999 - 2007	Immigrant female sex workers	x	The “Sirio” project deals with female sex workers (FSWs) and their clients. The goal is to establish a regular contact and to prevent STDs by the involvement of FSWs in appropriate educational programs, and by increasing awareness about risky behaviour. Through the use of an outreach mobile unit, FSW are contacted and sent to social health services where they are able to obtain social, psychological and medical support. Health professionals contact the FSWs directly and distribute printed prevention materials to them in order to give women information about STD transmission and safe sex, screening and treatment protocols.	345	regular	x	x		HBsAg+: 3.5%; HCV+: 0.9%/ Anonymity, privacy and free treatment are guaranteed to every FSW, regardless if they have any health insurance or not; Since 2003, a cultural mediator is present during counselling in order to facilitate and strengthen the relationship between the FSWs and the health service.	Zermiani et al., 2012.
20	Migrants	Netherlands, Amsterdam	2009 & 2010	First-generation Egyptian migrants	x	With support of key figures (imam, priest, chairperson, owner of supermarket), 11 viral hepatitis educational and screening sessions were established at Egyptian meeting places, e.g. a Coptic church, mosques, weekend school for Islamic Egyptians, Egyptan supermarket; HAV, HBV, HCV flyers were distributed for invitation; HBV/HCV screening was offered at each session.	527	temporary	x	x	x	HBsAg+: 1.1%; HCV+: 2.4%/ Cultural-tailored approach, information in Dutch and Arabic, Arab educators; Referral and follow-up of positive patients.	Zuure et al., 2013.

Table 8: Data extraction table of included primary studies for general and migrant/at-risk group specific Hepatitis B and/or C screening practices *(continued)*

n°	Population	Country, Region	Period	Study population	Good practice	Recruitment	Sample size	Screening offer	HBV	HCV	HBV – vaccine offered	Key findings/ Comments/ Strengths	Reference
21	Migrants	Netherlands, Rotterdam	2009	Chinese FGM and SGM	x	Community-based organizations were engaged in the campaign. 13 outreach activities in community centres in China town, Chinese schools, and churches took place where free HBV testing was offered. Posters and flyers also advertised free HBV on-site testing at outreach locations and at Municipal health Service.	1090	temporary	x		x	Outreaching, cultural-tailored, and low-threshold approach.	Veldhuijzen et al., 2012.
22	Migrants	Netherlands, Arnhem	n.a.	FGM and SGM migrants in the Turkish community of Arnhem	x	Development of a brochure, poster, video documentary and website focusing on HBV/HCV in migrants; a special phone number for Turkish/Dutch information and questions was established; 2 Turkish health educators were trained to be 'ambassadors' of the hepatitis project, visiting Turkish organizations in Arnhem to supply project information; cooperation with delegates of mosques, primary schools, social and cultural organizations, community centres, Turkish shops, restaurants and immigrant organizations; Turkish and Dutch newspapers featured the project; item on project in local radio; brochures were distributed in Turkish shops, barbers, and community centres; 15 educational meetings on HBV/HCV in mosques and community centres for all Turkish migrants were held, where a video about HBV/HCV in migrants was shown by a Turkish GP with time for questions. Thereafter all participants was offered blood screening by a mobile laboratory team including a Turkish laboratory technician, at a bazar in the mosque and at GP's practice	709	temporary	x	x		Cultural-tailored, outreaching, low-threshold approach.	Richter et al., 2012.
23	Migrants	Netherlands, Rotterdam	2004	People from the neighbourhood aged 18 to 65 years (Dutch, Moroccan, Turkish, Surinamese, Antillean, and Cape Verdean)	x	Individuals were invited by mail for a personal consultation at the community centre. Reminder letters were sent to groups, where response lagged.	288	temporary	x	x	x	Interviews in native language	Veldhuijzen et al., 2009.

Table 8: Data extraction table of included primary studies for general and migrant/at-risk group specific Hepatitis B and/or C screening practices *(continued)*

n°	Population	Country, Region	Period	Study population	Good practice	Recruitment	Sample size	Screening offer	HBV	HCV	HBV – vaccine offered	Key findings/ Comments/ Strengths	Reference
24	Migrants	Spain, Barcelona	2006 - 2007	Healthy recent immigrants (residence time <5 years) to the EU without HBV vaccination and/or past or suspected liver disease		Consultation of Primary Care Provider in 2 basic health areas of Barcelona	791	temporary	x	x		HBsAg+: 5.9%; HCV+: 6.1%/ Screening carried out as recommended by the Society of Catalan Family and Community Medicine.	Valerio et al., 2008.
25	Migrants	Spain, Barcelona	2001 - 2004	Immigrants (legal and illegal) from tropical, subtropical regions and Eastern Europe	x	Patients were referred from NGOs (Médicins sans Frontieres, Spanish Red Cross), GPs, Community Health Agents or took access spontaneously to the Tropical medicine and International Health Unit 'Drassanes'. Each patient was offered a complete screening for tropical and common diseases.	2464	regular	x	x	x	HBsAg+: 7.7%; HCV+: 3.1%/ Since 1983, the 'Drassanes' offers access without charge to immigrants, independently of their legal status, including complete screening and treatment for tropical and common diseases for symptomatic and asymptomatic persons; Also undocumented migrants could be reached.	Manzardo et al., 2008.
26	Migrants	Spain, Alicante	2001	Immigrants who came to the Red Cross centre to have a health examination as required procedure for requesting permission to residence/ work on a regularization resit of immigrants resident in the Valencian Community		In the centre of the Red Cross Crevillente all immigrants undergo a systematized physical examination, including test for tuberculosis, HBV, HCV, HIV and syphilis	488	regular	x	x	x	HBsAg+: 1.2%; HCV+: 1.0%/ Follow-up of positive patients; HBV vaccine offered to their relatives.	Ramos et al., 2003.
27	Migrants / Sex workers	Spain, Madrid	1998 - 2003	Immigrant sex workers, within the first three months of their arrival in Spain	x	A multidisciplinary team led by 'Medicus Mundi' visited the major site of open prostitution in Madrid.	762	temporary	x	x		HBsAg+: 3.5%; HCV+:0.8%/ Counselling and treatment was provided to participants.	Gutierrez et al., 2004.
28	Migrants	Spain, Madrid	1989 - 1999	Legal and illegal immigrants from tropical or subtropical areas as well as from Eastern Europe who were treated at the Tropical Medicine Unit (TMU) of the Ramón y Cajal Hospital in Madrid, Spain	x	Patients were either referred or came by their own initiative to visit the Tropical Medicine clinic for illness or for routine screening. In case of undocumented migrants, referral to the TMU is done by the NGO 'Karibu'. After compiling the medical history and carrying out a physical examination, all immigrants (symptomatic + asymptomatic) were invited to participate in a testing protocol for hepatitis B and C, including blood cell counts, serum biochemistry, and basic urine tests.	988	regular	x	x		HBsAg+: 7.6%; HCV+: 8.8%/ Karibu is a non-governmental organization (NGO) dedicated to aid undocumented immigrants in Madrid by offering basic medical assistance along with other services, when an immigrant goes for the first time for a medical consultation or when the immigrant outlines diagnostic or therapeutic problems that cannot be resolved at the NGO.	López-Vélez et al., 2003.

Table 8: Data extraction table of included primary studies for general and migrant/at-risk group specific Hepatitis B and/or C screening practices *(continued)*

n°	Population	Country, Region	Period	Study population	Good practice	Recruitment	Sample size	Screening offer	HBV	HCV	HBV – vaccine offered	Key findings/ Comments/ Strengths	Reference
29	Migrants	UK, Scotland, Dundee	2009	Pakistani FGM and SGM	x	With support of Pakistani community representatives, speeches in three mosques following the imam's Friday teaching were arranged; a short talk about risk factors, prevalence, lack of symptoms, slow progressive nature of disease, complications and the existence of treatment for HCV was delivered in English and Urdu; a talk was also given at the Pakistani women's centre; both concluded with an offer to set up short-term, outreach testing clinics.	177	temporary	x	x		HBsAg+: 0.6%; HCV+: 4.1%/ Interpreters were available on site; Each participant received a copy of printed educational material about HCV and HBV in Urdu and English; Contacting and follow-up treatment of positive patients; these patients underwent clinical examination and investigation to rule out other causes of liver disease.	Jafferbhoy et al., 2012.
30	Migrants	UK	2009	First generation immigrants who originated in the Indian sub-continent (India, Bangladesh, Pakistan) + second generation migrants	x	Local religious leaders and community representatives were contacted to identify potential testing sites, public meetings were held at the sites to inform and to invite to participate, testing sessions were advertised internally and arranged according to interest and request (3 to 6), volunteers recruited and consented study participants at the sessions.	4381 FGM (+ 452 SGM)	temporary	x	x		HBsAg+: 1.3%; HCV+: 1.7%/ Cultural-tailored, outreaching approach.	Uddin et al., 2010.
31	Migrants	UK, Birmingham	2004 - 2008	Pregnant women of different ethnic groups		Routine antenatal screening	595	regular	x				Caley et al., 2012.
32	Migrants	USA, Miami	n.a.	All willing and volunteering fair attendees, aged 18 to 65 years	x	An exhibit booth was set up at an annual 2-day Asian Culture Festival to promote awareness about HBV and HCV and to provide free screening for a local Floridian community.	404	temporary	x	x		Recruitment was conducted in various languages by physicians and nurses who specialize in hepatology.	Woo et al., 2013.
33	Migrants	USA, Michigan	2006 - 2008	Asian Americans in Michigan visiting a health fair where free HBV screening was offered	x	Collaboration with local community or health service organizations and inclusion of coordinators for each Asian group. Recruiting methods for health fairs included adverts in local Asian news media, flyers posted in Asian markets and restaurants, announcement and/or flyers distributed during large gatherings or local events, personal recruitment through friends and family members and referral from past health event participants. For 2,5 years free HBV screening was offered on 8 health fairs as a community service.	567	temporary	x			HBsAg+: 6%/ Flyers, adverts and education materials available in different Asian languages (Chinese, Korean, Vietnamese); Inclusion of translators and disseminators out of the community.	Lee et al., 2010.

Table 8: Data extraction table of included primary studies for general and migrant/at-risk group specific Hepatitis B and/or C screening practices *(continued)*

n°	Population	Country, Region	Period	Study population	Good practice	Recruitment	Sample size	Screening offer	HBV	HCV	HBV – vaccine offered	Key findings/ Comments/ Strengths	Reference
34	Migrants	USA, Chicago	2006 - 2007	Adult Chinese immigrants, age >18 years	x	Patients who had at least one office visit to a Chinatown internal medicine practice was offered screening.	4671	regular	x			HBsAg+: 11.1%; 99% of positive patients were born in Asia/ lack of knowledge in migrants; Follow-up treatment was offered.	Cotler et al., 2009.
35	Migrants	USA, New York	2006	Immigrants from the Former Soviet Union living in Brooklyn and Queens	x	Adverts and announcements in Russian cable television was used to invite immigrants from the FSU to come for free HCV testing and counselling.	283	temporary		x		HCV+: 28.3%	Batash et al., 2008.
36	Migrants	USA, New York	2004 - 2008	Asian Americans, African and Caribbean immigrants	x	Announcements in ethnic newspapers, posters and fliers in the community, ethnic radio, TV: A multimedia campaign was developed with assistance from a NewYork–based advertising agency that focused on reaching Asian Americans. The campaign was then refined in focus groups. Advertisements appeared in Chinese and Korean publications, along with radio spots and announcements on Korean cable television. Educational workshops were developed and implemented at community screenings, and a website was established to host information about screenings and educational materials. Free HBV screening was offered.	8.888	temporary	x		x	HBsAg+: 18%; Poor knowledge and misinformation about HBV, and social, cultural stigma among migrants./ Wide-reaching multimedia campaign; Screening, vaccination of family members and contacts, and treatment was provided free-of-charge or at low cost, due to reimbursement by community-based partners and health care facilities; Insured AND uninsured patients received treatment; The study 'BfreeNYC' was established as 'B Free CEED' and funded by the CDC.	Pollack et al., 2011.
37	Migrants	USA, San Francisco	2001 - 2006	Asian American adults (18 years and above)	x	Advertisements in newspapers, on radio and TV in Chinese and English for free HBV screening at community-based events, like street fairs, cultural festivals, and clinics held at community-based organizations and churches in six areas, and at a screening clinic.	3163	temporary	x			HBsAg+: 8.9%; prevalence in FGM was approximately 20 times higher than in SGM/ High proportion of unawareness of and poor knowledge about the disease among migrants.	Lin et al., 2007.

Table 8: Data extraction table of included primary studies for general and migrant/at-risk group specific Hepatitis B and/or C screening practices *(continued)*

n°	Population	Country, Region	Period	Study population	Good practice	Recruitment	Sample size	Screening offer	HBV	HCV	HBV – vaccine offered	Key findings/ Comments/ Strengths	Reference
38	Migrants	USA	1997 - 2009	Migrants, who crossed international borders for the purpose of resettlement and underwent systematic protocol-based health screening: (1) refugees of whom almost all underwent pre-departure interventions, (2) 80% refugees, with pre-departure interventions; and 20% asylees, Cuban entrants, Haitian parolees, victims of trafficking, or SGM, some without pre-departure interventions.	x	Migrants resettled internationally and were seen at GeoSentinel clinics to undergo systematic protocol-based health screening.	7792	regular	x			HBsAg+: 6%; regional differences: West Africa (11%), Southeast Asia (10%), East Africa (6%), the Caribeean (4%), and Eastern Europe (2%)/ regularly conducted systematic protocol-based health screening.	Barnett et al., 2013.
39	Migrants	Worldwide	1997 - 2009	Migrants seen at GeoSentinel clinics, resettled internationally for the purpose of immigration and evaluated for specific health concerns, other than protocol-based screening	x	Migrant patients at 41 GeoSentinel clinics on 5 continents and in 19 countries were evaluated for specific health concerns, other than protocol-based screening, and screened for HBV and HCV.	7629	regularly	x	x		HBsAg+: 11% (second most commonly reported disease); HCV+: 5%.	McCarthy et al., 2013.
40	Sex workers	UK, Glasgow	1999	Female street sex workers attending the Health and social care drop-in-centre (DIC) during the study period		Invitation to participate while attending the DIC.	114	temporary		x		HCV+: 64.3%; 98% of positive patients had ever injected drugs.	Taylor et al., 2008.

n.a. = not available

Table 9: Hepatitis B and C screening recommendations for migrants and at-risk groups as mentioned in guidelines, policy reports, or surveillance reports

Country	Name	HBV	HCV	Migrants (from countries with HBV/HCV prevalence >2%/ ≥3%)	Pregnant women	Blood/ organ/ tisue… donors	IDUs	Health-care workers	Recipients of blood/ organ/ tissue transplants	Haemodialysis patients	STI clinic patients	People with abnomal liver function	Jaundiced people / people with signs and symptoms of hepatitis	Residents/inmates of closed facilities (e.g. prisoners)	Household / sexual contacts of HBV /HCV + patients	MSM	HIV+ patients	HBV/HCV+ patients	Infants of HBV /HCV positive mothers	People who may have had unsterile medical/ dental/ cosmetic procedures (abroad)	People on immuno-suppressive therapy/ chemo-therapy	People with high risk sexual practices	Reference
Germany	*S3 Leitlinie - Hepatitis B*	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x	x		x		Cornberg et al., 2011
	S3 Leitlinie - Hepatitis C		x	x		x	x	x	x	x			x	x	x		x	x	x				Sarrazin et al., 2010
	Empfehlungen für einen besseren Umgang mit Hepatitis B in Deutschland	x		x	x	x	x				x			x			x						Bisotti, 2009
	Mutterschaftsrichtlinien	x			x																		G-BA, 2012
	Transfusionsgesetz	x	x			x																	BMJ, 1998
	Empfehlungen der DVV zur Prävention der nosokomialen Übertragung von HBV und HCV durch im Gesundheitswesen Tätige	x	x					x															DVV, 2007
	ECDC - Surveillance and prevention in the EU	x			x	x	x	x		x	x			x								x	ECDC, 2010
			x			x	x	x		x	x			x								x	
	WHO/WHA - Global policy report	x			x	x																	Lazarus et al, 2012
			x			x																	
Hungary	*Ajánlás a B-, a C- és a D-vírus hepatitisek diagnosztikájára és antivirális kezelésére*		x			x			x	x			x				x		x				Makara et al., 2012
	ECDC - Surveillance and prevention in the EU	x			x	x	x			x													ECDC, 2010
			x			x	x																
	WHO/WHA - Global policy report	x			x	x																	Lazarus et al, 2012
			x			x																	
Italy	*Epatiti: Un' emergenza sommersa*	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x	x		x	x	Carosi et al., 2010
			x	x		x	x	x	x	x		x	x	x	x		x	x	x	x	x		
	Gestione intraospedaliera del personale HBsAg o anti-HCV positive	x	x					x															Mele et al., 1999
	Expert Consensus Conference - Hepatitis C		x				x		x	x					x							x	The Writing Committee, 2006
	ECDC - Surveillance and prevention in the EU	x			x	x		x		x													ECDC, 2010
			x			x		x		x													
	WHO/WHA - Global policy report	x			x	x																	Lazarus et al, 2012
			x			x																	
Netherlanc	*LCI-richtlijn Hepatitis B*	x			x	x	x								x								LCI, 2012
	LCI-richtlijn Hepatitis C		x												x		x		x			x	LCI, 2011
	ECDC - Surveillance and prevention in the EU	x			x	x				x													ECDC, 2010
			x			x				x													
	WHO/WHA - Global policy report	x			x	x																	Lazarus et al, 2012
			x			x																	
Spain	*Guía de práctica clínica - Hepatitis C*		x	x		x	x	x	x	x		x			x		x		x	x		x	Abraira García et al., 2009
	ECDC - Surveillance and prevention in the EU	x			x	x				x													ECDC, 2010
			x		x	x		x		x	x												
	WHO/WHA - Global policy report	x			x	x																	Lazarus et al, 2012
			x			x																	
(Scotland)	*Management of Hepatitis C*		x			x	x	x	x	x		x			x		x		x	x			SIGN, 2006
	Hepatitis C Action Plan Phase I+II		x																				Scottish Executive, 2006; The Scottish Government, 2008

Table 9: Hepatitis B and C screening recommendations for migrants and at-risk groups as mentioned in guidelines, policy reports, or surveillance reports *(continued)*

Country	**Name**	**HBV**	**HCV**	**Migrants** (from countries with HBV/HCV prevalence >2%/ ≥3%)	**Pregnant women**	**Blood/ organ/ tisue… donors**	**IDUs**	**Health-care workers**	**Recipients of blood/ organ/ tissue transplants**	**Haemodialysis patients**	**STI clinic patients**	**People with abnomal liver function**	**Jaundiced people / people with signs and symptoms of hepatitis**	**Residents/inmates of closed facilities (e.g. prisoners)**	**Household / sexual contacts of HBV /HCV + patients**	**MSM**	**HIV+ patients**	**HBV/HCV+ patients**	**Infants of HBV /HCV+ mothers**	**People who may have had unsterile medical/ dental/ cosmetic procedures (abroad)**	**People on immuno-suppressive therapy/ chemo-therapy**	**People with high risk sexual practices**	**Reference**
UK	*Guidance for the prevention, testing, treatment*	**x**				x		x		x													Ford et al., 2007
	and management of hepatitis C in primary care		**x**	x		x	x	x	x	x		x					x	x	x	x	x		
	Hepatitis C Strategy for England		**x**			x	x		x	x					x				x	x			Department of Health, 2002
	NICE clinical guideline 62 – antenatal care	**x**			x																		NICE, 2008
	ECDC - Surveillance and prevention in the EU	**x**			x	x				x													ECDC, 2010
			x			x		x		x													
	WHO/WHA - Global policy report	**x**			x	x																	Lazarus et al, 2012
			x			x										x	x						
Europe	*Council Directive 2002*	**x**	**x**			x																	European Parliament and Council, 2002
	Recommendations for the Promotion of case-	**x**		x	x	x	x	x	x	x		x	x	x	x	x	x	x	x		x	x	ELPA, 2009
	finding for Viral Hepatitis B and C, including targeted screening measures for risk groups		**x**				x	x	x	x		x	x	x			x		x	x			
	European orientation towards the Better Management of Hepatitis B in Europe	**x**		x	x	x	x				x			x			x						Wait, 2007
Australia	*National Hepatitis B Strategy 2010–2013*	**x**		x																			Australian Government, 2010
	National Hepatitis B Testing Policy	**x**		x		x	x	x		x		x	x	x	x	x	x	x			x	x	National HBV Testing Policy Expert Reference Committee, 2012
	National Hepatitis C Strategy 2007-2009		**x**	x			x																NSW, 2007
	Third National Hepatitis C Strategy 2010-2013		**x**	x			x							x				x					Commonwealth of Australia, 2010
	Hepatitis C Testing Policy	**x**	**x**	x	x	x	x	x							x				x	x	x		National HCV Testing Policy Expert Reference Committee, 2012
Canada	*Evidence-based clinical guidelines for immi-*	**x**		x																			Pottie et al., 2013
	grants and refugees		**x**	x																			
	Management of chronic hepatitis B	**x**		x	x		x			x		x		x	x	x					x	x	Coffin et al., 2012
USA	*A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States*	**x**		x																			Mast et al., 2006
	Recommendations for identification and public health management of persons with chronic hepatitis B virus infection	**x**		x	x	x	x			x		x			x	x	x		x	x	x		Weinbaum et al., 2009
	Screening for Viral Hepatitis during the Refugee			x	x		x	x	x	x					x	x	x	x	x	x	x	x	U S. Department of Health and
	Domestic New Arrival Medical Examination		**x**	x	x		x		x	x							x		x	x		x	Human Services, 2012
Worldwide	*WGO Practice Guideline – Hepatitis B*	**x**			x	x													x		x		WGO, 2008
	WGO Global Guidelines - Diagnosis, management and prevention of hepatitis C		**x**		x	x	x	x	x	x		x	x		x		x		x	x		x	WGO, 2013

Table 12: Good practice examples for migrant-specific hepatitis B and C screening strategies in the six EU-HEPscreen countries and worldwide

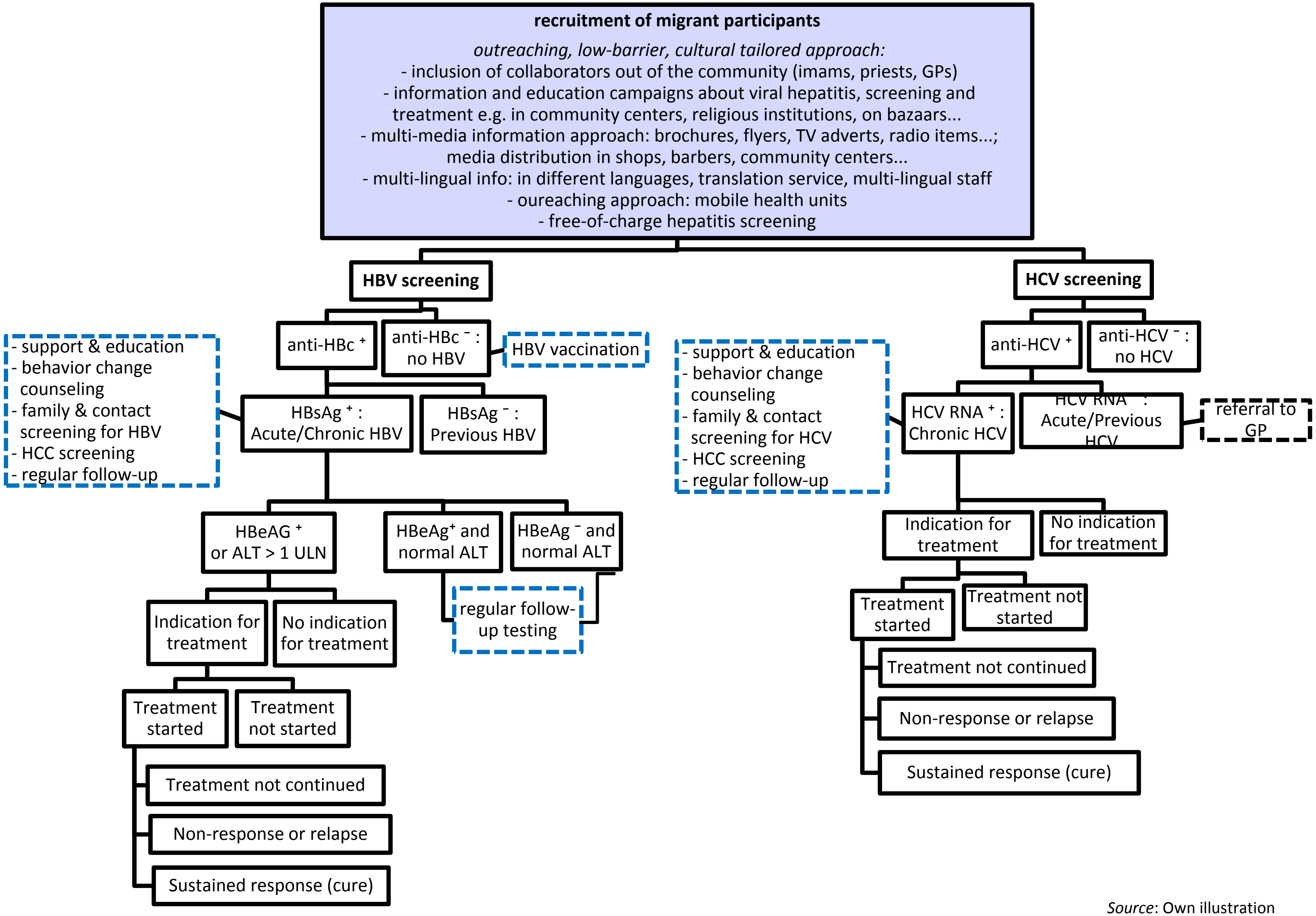
Country	Time	Target population	Recruitment	Reference
Germany	2010	Migrants in Munich	Comprehensive approach in different settings: flyer in 9 languages was distributed in mosques and on festivals, the STI-advice centre provided information and free-of-charge, anonymous HBV screening tests for migrants and household/ family members, or migrant workers, an information campaign was raised in a mosque with additional screening offer and doctors with a high amount of migrant patients could participate on information seminars.	Referat für Gesundheit und Umwelt, 2010.
	2008	Turkish Muslim community in Germany	Development of an awareness plan: campaign to inform Turkish doctors in areas with a high rate of Turkish migrants, imams in 900 German mosques all over Germany spoke to their communities about hepatitis B in the Friday sermon, distribution of information about HBV-vaccination, diagnosis and treatment, as well as brochures and flyers in Turkish which were distributed after the Friday sermon.	Türkisch-Islamische Union der Anstalt für Religion e.V. (DITIB), 2008.
Hungary	2004	Residents of Dzsumbuj, a predominantly Roma neighbourhood	Initiated by community representatives, a health fair was organized in the Dzsumbuj neighbourhood. Inhabitants were offered free testing for infectious diseases and counselling.	Gyarmathy et al., 2008.
Italy	1999 - 2007	Immigrant female sex workers	Through the use of an outreach mobile unit, the sex workers were contacted and sent to social health services where they are able to obtain social, psychological and medical support. Health professionals contact the FSWs directly and distribute printed prevention materials to them in order to give women information about STD transmission and safe sex, screening and treatment protocols.	Zermiani et al., 2012.
Netherlands	2009 - 2010	First-generation Egyptian migrants	With support of key figures (imam, priest, chairperson, owner of supermarket), 11 viral hepatitis educational and screening sessions were established at Egyptian meeting places, e.g. a Coptic church, mosques, weekend school for Islamic Egyptians, Egyptan supermarket; HAV, HBV, HCV flyers were distributed for invitation; HBV/HCV screening was offered at each session.	Zuure et al., 2013.
	2009	Chinese FGM and SGM	Community-based organizations were engaged in the campaign. 13 outreach activities in community centers in China town, Chinese schools, and churches took place where free HBV testing was offered. Posters and flyers also advertised free HBV on-site testing at outreach locations and at Municipal Health Service.	Veldhuijzen et al., 2012.
	n.a.	FGM and SGM migrants in the Turkish community of Arnhem	Development of a brochure, poster, video documentary and website focusing on HBV/HCV in migrants; a special phone number for Turkish/Dutch information and questions was established; 2 Turkish health educators were trained to be 'ambassadors' of the hepatitis project, visiting Turkish organizations in Arnhem to supply project information; cooperation with delegates of mosques, primary schools, social and cultural organizations, community centers, Turkish shops, restaurants and immigrant organizations; Turkish and Dutch newspapers featured the project; item on project in local radio; brochures were distributed in Turkish shops, barbers, and community centers; 15 educational meetings on HBV/HCV in mosques and community centers for all Turkish migrants were held, where a video about HBV/HCV in migrants was shown by a Turkish GP with time for questions. Thereafter all participants was offered blood screening by a mobile laboratory team including a Turkish laboratory technician, at a bazar in the mosque and at GP's practice.	Richter et al., 2012.
	2004	People from the neighborhood aged 18 to 65 years (Dutch, Moroccan, Turkish, Surinamese, Antillean, and Cape Verdean)	Individuals were invited by mail for a personal consultation at the community center. Reminder letters were sent to groups, where response lagged.	Veldhuijzen et al., 2009.

Spain	2001 - 2004	Immigrants (legal and illegal) from tropical, subtropical regions and Eastern Europe	Patients were referred from NGOs (Médicins sans Frontieres, Spanish Red Cross), GPs, Community Health Agents or took access spontaneously to the Tropical medicine and International Health Unit 'Drassanes'. Each patient was offered a complete screening for tropical and common diseases.	Manzardo et al., 2008.
	1998 - 2003	Immigrant sex workers, within the first three months of their arrival in Spain	A multidisciplinary team led by 'Medicus Mundi' visited the major site of open prostitution in Madrid.	Gutierrez et al., 2004.
	1989 - 1999	Legal and illegal immigrants from tropical or subtropical areas as well as from Eastern Europe who were treated at the Tropical Medicine Unit (TMU) of the Ramón y Cajal Hospital in Madrid, Spain	Patients were either referred or came by their own initiative to visit the Tropical Medicine clinic for illness or for routine screening. In case of undocumented migrants, referral to the TMU is done by the NGO 'Karibu'. After compiling the medical history and carrying out a physical examination, all immigrants (symptomatic + asymptomatic) were invited to participate in a testing protocol for hepatitis B and C, including blood cell counts, serum biochemistry, and basic urine tests.	López-Vélez et al., 2003.
(Scotland)	2009	Pakistani FGM and SGM	With support of Pakistani community representatives, speaches in three mosques following the imam's Friday teaching were arranged; a short talk about risk factors, prevalence, lack of symptoms, slow progressive nature of disease, complications and the existence of treatment for HCV was delivered in English and Urdu; a talk was also given at the Pakistani women's center; both concluded with an offer to set up short-term, outreach testing clinics.	Jafferbhoy et al., 2012.
UK	2009	FGM and SGM from the Indian subcontinent	Local religious leaders and community representatives were contacted to identify potential testing sites, public meetings were held at the sites to inform and to invite to participate, testing sessions were advertised internally and arranged according to interest and request (3 to 6), volunteers recruited and consented study participants at the sessions.	Uddin et al., 2010.
France	2006 - 2008	All patients consulting the French Doctors of the World Reception Centers of care and orientation (Caso)	Screening is proposed systematically to all new patients after medical consultation or special prevention consultation.	Pauti et al. 2008.
	2003 - 2004	Underprivileged individuals without any social insurance	Patients consulting 43 GPs from 8 health centers in Lyon region, who had been trained in HCV infection and screening	Sahajian et al., 2006.
USA	n.a.	All willing and volunteering fair attendees age 18–65 years	An exhibit booth was set up at an annual 2-day Asian Culture Festival to promote awareness about HBV and HCV and also provide free screening for a local Floridian community. Recruitment was conducted in various languages by physicians and nurses who specialize in hepatology.	Woo et al., 2013.
	2006 - 2008	Asian Americans in Michigan visiting a health fair where free HBV screening was offered	Collaboration with local community or health service organizations and inclusion of coordinators for each Asian group. Recruiting methods for health fairs included adverts in local Asian news media, flyers posted in Asian markets and restaurants, announcement and/or flyers distributed during large gatherings or local events, personal recruitment through friends and family members and referral from past health event participants. For 2,5 years free HBV screening was offered on 8 health fairs as a community service.	Lee et al., 2010.
	2006 - 2007	Adult Chinese immigrants, age >18 years	Patients who had at least one office visit to a Chinatown internal medicine practice were offered screening.	Cotler et al., 2009.
	2006	Immigrants from the Former Soviet Union living in Brooklyn and Queens	Adverts and announcements in Russian cable television was used to invite immigrants from the FSU to come for free HCV testing and counseling.	Batash et al., 2008.
	2004 - 2008	Asian Americans, African and Caribbean immigrants	A multimedia campaign was developed with assistance from a NewYork–based advertising agency that focused on reaching Asian Americans. The campaign was then refined in focus	Pollack et al., 2011.

			groups. Advertisements appeared in ethnic newspapers, posters and fliers were distributed in the community, along with radio spots and announcements on Korean cable television. Educational workshops were developed and implemented at community screenings, and a website was established to host information about screenings and educational materials. Free HBV screening was offered.	
	2001 - 2006	Asian American adults (18 years and above)	Advertisements in newspapers, on radio and TV in Chinese and English for free HBV screening at community-based events, like street fairs, cultural festivals, and clinics held at community-based organizations and churches in six areas, and at a screening clinic.	Lin et al., 2007.
	1997 - 2009	Migrants, who crossed international borders for the purpose of resettlement and underwent systematic protocol-based health screening	Migrants resettled internationally and were seen at GeoSentinel clinics to undergo systematic protocol-based health screening.	Barnett et al., 2013.
Worldwide	1997 - 2009	Migrants seen at GeoSentinel clinics, resettled internationally for the purpose of immigration and evaluated for specific health concerns, other than protocol-based screening	Migrant patients at 41 GeoSentinel clinics on 5 continents and in 19 countries were evaluated for specific health concerns, other than protocol-based screening, and screened for HBV and HCV.	McCarthy et al., 2013.

n.a. = not available

Figure 9: Proposal for a cultural tailored hepatitis B and/or C screening approach



Source: Own illustration

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