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## Introduction

Morrison defined screening as the application of a diagnostic test to an asymptomatic population in order to detect a disease at a stage when intervention may improve outcome and natural history.<sup>1</sup> Advances in treatment and the need for early detection has increased the potential of screening for viral hepatitis to prevent complications and associated morbidity and mortality. Migrants born in endemic countries are an important risk group.

The EU Hepatitis B and C Summit Conference 2010 called for integration of screening into existing practice whenever possible, adding that screening criteria should be simplified, i.e. birth-place-based for HBV, age-based for HCV, to provide clear guidance for primary care, and that dissemination of best practice for case finding should be reinforced.<sup>8</sup> Although prevalence of chronic viral hepatitis differs widely between EU countries, in many cases migrants from endemic countries will have a significantly higher risk of being infected than the native population. In the Netherlands for example, 58% to 72% of all individuals chronically infected with HBV are first generation migrants (FGM) and birth in an endemic country has overtaken injecting drug use (IDU) as main risk factor for HCV.<sup>9,10</sup> It is also estimated that up to 80% of those infected with viral hepatitis are unaware of their condition.<sup>11</sup> Finding those at risk through screening is therefore a prerequisite to decreasing the burden of viral hepatitis.

Different countries have different approaches to screening immigrants. Screening has recently been conducted in two comprehensive campaigns in the USA screening thousands of migrants for viral hepatitis.<sup>2,3</sup> Large-scale initiatives to tackle viral hepatitis in European Union (EU) Member States include two national plans in France and Scotland, a supra-regional project in mosques, and a multi-centre screening study in Paris.<sup>4-7</sup> Guidelines in the USA and some European countries have clear recommendations about migrant screening.<sup>12-15</sup> Although there is movement towards more recognition of viral hepatitis in the EU's health policy, recommendations from European institutions have not been made. However, a substantial number of local screening campaigns have targeted migrants in the past.

The aim of this study was to perform an in depth review of five recent successful European projects to collate lessons learned and to identify successful communication strategies which could be applied to screening campaigns in the EU.

## Selection of campaigns

While it was not the aim of this review to extract large strata of data, as done in a systematic literature review, this analysis goes more in-depth and focuses on a few significant aspects. Thus, while not claiming completeness, it does go more in-depth than some literature reviews. Five campaigns (Table 1) were selected based on timeliness, success, variety of ethnicities targeted, and comparability of locations and countries. Published articles about the campaigns were reviewed and, if applicable, data was completed with information from the authors.

**Table 1: Overview of the five selection screening campaigns**

| Author and publication year     | Country | HBV/HCV   | Ethnicity   | Participants |
|---------------------------------|---------|-----------|-------------|--------------|
| Natha, 2009 <sup>16</sup>       | UK      | HBV       | Chinese     | 269          |
| Uddin, 2010 <sup>6</sup>        | UK      | HBV + HCV | South Asian | 4998         |
| Richter, 2011 <sup>17</sup>     | NL      | HBV + HCV | Turkish     | 709          |
| Jafferbhoy, 2011 <sup>18</sup>  | UK      | HBV + HCV | Pakistani   | 170          |
| Veldhuijzen, 2012 <sup>19</sup> | NL      | HBV       | Chinese     | 1090         |

## Type of screening approach

Different approaches of screening exist: outreach-based, opportunistic screening or case finding, extending existing screening and systematic invitation based population screening. The reviewed campaigns all used outreach strategies. Screening for viral hepatitis is mostly performed on a 'targeted screening' basis, an example being antenatal HBV screening in pregnancy, which is widely applied across Europe. Targeted population screening can enhance opportunistic screening.<sup>20</sup> All five reviewed screening campaigns used targeted screening by definition as they targeted migrants. However, targeted screening will always miss patients. For example, even using simple methods like a GP register would exclude patients not registered with a GP, which in one study was estimated to be 7% (19/269).<sup>16</sup>

## Enabling access and overcoming barriers to screening programs

### a) Community Involvement

This is one of the basic preconditions for a successful campaign. Members of the migrant community were involved in all the campaigns, outlined in Table 2. In the mosque-based campaigns, religious leaders (Imams) were involved, who saw it as their task to care for community health issues. This can be regarded as key in religious communities where people might be afraid of stigmatisation through infectious diseases and will feel reassured if screening campaigns have been sanctioned or even advertised by the spiritual leadership.

Community engagement can be useful on different levels, ideally including campaign staff of the same ethnicity. Of course, every approach to a community via key community members is naturally biased as only the subgroup selected by the key community member is reached.

Table 2: Details of community involvement in selected studies

| Campaign    | Community Involvement   |
|-------------|---|
| Natha       | ▶ Doctors and nurses of Chinese origin, Chinese National Healthy Living Centre  |
| Uddin       | ▶ Physician of South Asian origin   |
| Richter     | ▶ Imam  |
| Jafferbhoy  | ▶ Imam  |
| Veldhuijzen | ▶ Volunteers from Chinese community organisations, Chinese speaking employee of the Municipal Public Health Service, Chinese hepatologist |

**A Champion**

All campaigns were able to enlist the help of a more or less prominent ambassador for their project. These could be either religious leaders again or a local politician or well-known community representatives. Champions are commonly used to enhance charity campaigns.

Table 3: Details of community champion in each selected study

| Campaign    | Champion   |
|-------------|--|
| Natha       | ▶ Commissioner from the Primary Care Trust   |
| Uddin       | ▶ Local religious leaders<br>▶ Community representatives                                     |
| Richter     | ▶ Two female Turkish health educators  |
| Jafferbhoy  | ▶ Imam   |
| Veldhuijzen | ▶ President of Wah Fook Wui Foundation for Chinese Welfare<br>▶ Pastor of the Chinese church |

**b) Creating Awareness**

All campaigns used advertisement to raise awareness, ranging from announcements (in mosques) to more elaborate methods, including newspaper, radio and online advertising (Table 4). Two campaigns are worth mentioning for their choice of point in time: one advertised the campaign between teaching and Friday prayer at mosques and the other used the celebrations around the Chinese New Year to organise awareness and testing sessions.

Table 4: Media and methods used to raise awareness of viral hepatitis screening offer

| Campaign    | Awareness raising media   |
|-------------|---|
| Natha       | ▶ UK based Chinese newspapers, European Chinese TV channel  |
| Uddin       | ▶ Internally (in mosques)   |
| Richter     | ▶ Turkish newspapers, local Dutch newspaper, websites, local radio, brochures in Turkish shops, barbers, community centres, video documentary |
| Jafferbhoy  | ▶ Internally in mosques for some weeks  |
| Veldhuijzen | ▶ Flyer, poster and campaign website.<br>▶ Advertisements in Chinese newspapers   |

### c) Location of Testing and Follow-up

The testing sites in the selected studies included GPs practices, community and women’s centres, bazaars and mosques (Table 5). Mobile laboratory teams were used in the Richter study in Arnhem. In general, testing was performed in outreach locations, clear preference for testing away from medical institutions like hospitals.

Table 5: Location of testing and follow up/treatment

| Campaign    | Testing  | Follow up/treatment   |
|-------------|--|---|
| Natha       | Hepatitis B clinic in NHS sexual health service                          | GP, hospital  |
| Uddin       | 52 different sites (e.g. community centres)                              | GP (local treating physician)   |
| Richter     | Community centres, mosques, bazaar, GP practice (mobile laboratory team) | GP or hospital according to referral criteria                           |
| Jafferbhoy  | Three mosques and a Pakistani women’s centre                             | Hospital  |
| Veldhuijzen | Various outreach locations   | GP, hospital (Municipal Public Health Service provided contact tracing) |

### d) Language support

As language can be a significant barrier when screening among migrant communities, all campaigns took care to address this issue. Most had on-site interpreters available and had an informational talk or video in the appropriate language (Table 6). All provided translated information material and most had health care personnel speaking the same language.

Table 6: Availability of language support services in selected screening campaigns

| Campaign    | Information talk or video in foreign language | Information materials in foreign language | Interpreters available at testing site | Health personnel of same ethnicity |
|-------------|---|---|--|------------------------------------|
| Natha       | ?   | ?   | X                                      | (X)                                |
| Uddin       | X   | X   | X                                      | X                                  |
| Richter     | X   | X   | X                                      | X                                  |
| Jafferbhoy  | X   | X   | X                                      | (X)                                |
| Veldhuijzen | X   | X   | X                                      | X                                  |

#### e) A lack of health insurance coverage

This makes it important to arrange for funding not only for tests but also for treatments before the campaign starts as it is not good practice to test participants positive (infected) and then deny them treatment due to cost issues. Immigrants with unauthorised residential status might be afraid to participate in case their data gets passed on to authorities. The Rotterdam (Veldhuijzen) campaign collected data on those who had no health insurance and found that 9% of their participants but 25% of those tested positive had no health insurance, underlining the urgent need for these people to find access to screening programmes.

#### f) Stigma

Besides language difficulties, fear of discrimination and stigma is a major cultural barrier.<sup>21</sup> Viral hepatitis in itself can be considered “dirty” by community members and the context of other sexually transmitted diseases may add to this perception. As there can be considerable pressure on community members to comply with cultural or religious norms it is extremely helpful if a champion as e.g. an Imam relieves them of doubts about taking part in a screening campaign. The Arnhem (Richter) campaign actually expressed this in the paper saying that “stigma decreased in the course of study by minimising the role of sex since transmission is mainly vertical or during early childhood.” The question whether HIV testing alongside HBV/HCV enhances or decreases participation in a screening is yet to be answered.

#### g) Community Availability of Follow-up and Care

It is to be expected that there is a loss of patients during follow-up or referral to treatment, i.e. at the interface of primary and secondary/tertiary care. Table 7 shows the information from the included studies. The Rotterdam approach to delegate monitoring of simple cases (HBeAg negative with normal ALT) to GPs, following flow-chart guidance, has two advantages: It is easier accessible and cheaper. Presumably, it also has a lower threshold than a hospital.

[Table 7: Follow up of chronic viral hepatitis cases](#)

| Parameter                           | HBV-infected | HCV-infected |
|-------------------------------------|--------------|--------------|
| Rate followed-up (if available)     | 86% (58-100) | 88% (76-100) |
| Rate under treatment (if available) | 22% (0-43)   | 71%          |

### First Generation Migrants (FGM) and Second Generation Migrants (SGM)

That first generation migrants have a viral hepatitis prevalence similar to their countries of origin has been shown,<sup>17-18</sup> but also challenged due to conflicting data.<sup>6</sup> Until further data becomes available it has to be regarded as an assumption. The differing prevalence in migrants from their home country could partly be explained by the ‘healthy migrant effect’ which implies that people who migrate are generally healthier than the average population of the country they leave. Another assumption is that the exposure risk decreases after migration to a low endemic country.

[Table 8: Proportion of FGM among all screened and among cases](#)

| Campaign            | FGM among all screened | FGM HBV+      | FGM HCV+     |
|---------------------|------------------------|---------------|--------------|
| Natha               | not available          | not available | not tested   |
| Uddin               | 4381/4833 (91%)        | 56/57 (98%)   | 73/75 (97%)  |
| Richter             | 544/647 (84%)          | 17/18 (94%)   | 2/2 (100%)   |
| Jafferbhoy          | 159/170 (94%)          | 1/1 (100%)    | 7/7 (100%)   |
| Veldhuijzen         | 945/1090 (89%)         | 85/88 (97%)   | not tested   |
| <b>Mean (range)</b> | 89% (84 – 94)          | 97% (94-100)  | 99% (97-100) |

As the focus of especially the Dutch campaigns was on FGM they tended to be overrepresented in the baseline population of the campaigns we analysed, ranging from 84 to 94% (mean 89%) while the mean is 71% overall in the 27 member states of the EU.<sup>22</sup> Participants who tested positive were mostly FGM (mean of 97% with a range of 94-100% for HBV and 99% with a range of 97-100% for HCV). Data comparing prevalence in FGM and SGM tend to report a lower prevalence of viral hepatitis in SGM than in FGM. Although the number of SGM participants was low, the two campaigns in the Netherlands found the HBV prevalence in SGM to be higher (1% and 2.5%) than that in the general population (0.2%).<sup>23</sup> It should be considered that both FGM and SGM who travel to their country of origin and undergo medical procedures there (e.g. dialysis, dental treatment, blood transfusions) can be at increased risk of infection.

### Sex

Men were overrepresented in the HBV-infected in two of the studies (Table 9). Among the Chinese in Rotterdam this was also the case, although the total population screened was

2/3 female.<sup>19</sup> The studies conducted in mosques tested more male participants because more men were present at the time of testing (e.g. Friday prayer). While 53% of all participants were male (median, range 34–85%) and 56% of HBV-infected were male (median, range 41-75%), more HCV-infected cases were male (median 71%, range 50-100%).

**Table 9: Proportion of males among all screened and among cases**

| Campaign            | Males (all screened) | Males (HBV+) | Males (HCV+) |
|---------------------|----------------------|--------------|--------------|
| Natha               | 115/269 (43%)        | 33/56 (41%)  | not tested   |
| Uddin               | 2970/4833 (61%)      | 43/57 (75%)  | 48/75 (64%)  |
| Richter             | 263/647 (41%)        | ?            | 1/2 (50%)    |
| Jafferbhoy          | 145/170 (85%)        | ?            | 5/5 (100%)   |
| Veldhuijzen         | 364/1090 (34%)       | 48/92 (52%)  | not tested   |
| <b>Mean (range)</b> | 53% (34-85)          | 56% (41-75)  | 71% (50-100) |

### Method of testing

A sensitive and specific method of testing needs to be applied to avoid re-testing (and loss of patients). Serologic testing fulfils these criteria but can cause discomfort through phlebotomy. Serology for HCV is distinct but algorithms for HBV testing can vary. Most projects used HBs-Antigen (HBs-Ag) but some started with Anti-HBc-IgG (Table 10). Only one campaign used oral fluid testing and amended the procedure during the study to eliminate false positives.

**Table 10: Primary and confirmatory methods of testing.**

| Campaign    | Primary method of testing                        | Confirmation method of testing                            |
|-------------|--|---|
| Natha       | Blood (?): HBsAg, anti-HBc                       | ?   |
| Uddin       | Oral fluid: HBsAg, anti-HCV, later also anti-HBc | Blood: anti-HCV, HCV RNA, HBsAg, HBeAg/ anti-HBe, HBV DNA |
| Richter     | Blood: HBsAg, anti-HBc, anti-HCV                 | Blood: anti-HBs, HBV DNA, vaccination booster reaction    |
| Jafferbhoy  | Blood: HBsAg, anti-HCV                           | Blood: HCV RNA, anti-HBc, HBeAg, HBV DNA                  |
| Veldhuijzen | Blood: anti-HBc                                  | Blood: HBsAg, anti-HBs, HBeAg/anti-HBe                    |

## Combination with screening for other sexually transmitted infections (STI)

Transmission routes are different in migrant and native populations. While risk factors typically include sexual transmission for HBV and injecting drug use for HCV this is different in immigrants where HBV is typically transmitted during birth or early childhood and a possible route for HCV transmission would be by blood transfusion or medical procedure. Richter et al. found in the Arnhem study that the risk factors named in different HCV campaigns in the Netherlands did not play a role in the majority of their patients with an active infection.<sup>17</sup>

As outlined above it is unclear whether combination of testing for viral hepatitis to HIV increases or decreases uptake of invitation to get tested, and this may also apply to other STIs. But more than one risk factor may apply and care must be taken to offer immigrants the appropriate tests

## Conclusions

- ▶ Screening has to be adjusted to the local target population. Key success factors are a favourable location, a favourable point in time, language (interpreters available on site), community involvement, efficient awareness campaigns, community availability of follow-up care and de-stigmatisation.
- ▶ A sensitive and specific testing method is important to avoid re-testing and loss of patients to follow-up.
- ▶ First Generation Migrants (FGM) and men are overrepresented among the infected.
- ▶ The disease burden of Second Generation Migrants (SGM) remains unclear and warrants further investigation.
- ▶ Referral pathways need to be well developed as information on follow-up and treatment is lost in a percentage of infected migrants.

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