A safe and healthy future? Epidemiological studies on the health of asylum seekers and refugees in the Netherlands

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CHAPTER 2

DISEASES AND CONDITIONS
Section 2.1

Mortality and causes of death among asylum seekers in the Netherlands, 2002-2005

This study has been published as:

ABSTRACT

Background
The world’s growing population of asylum seekers faces different health risks from the populations of their host countries because of risk factors before and after migration. There is a current lack of insight into their health status.

Methods
A unique notification system was designed to monitor mortality in Dutch asylum seeker centres (2002 - 2005).

Results
Standardised for age and sex, overall mortality among asylum seekers shows no difference from the Dutch population. However, it differs between subpopulations by sex, age and region of origin and by cause of death. Mortality among asylum seekers is higher than among the Dutch reference population at younger ages and lower at ages above 40. The most common causes of death among asylum seekers are cancer, cardiovascular diseases and external causes. Increased mortality was found from infectious diseases (males, standardised mortality ratio (SMR) = 5.44 (95% CI 3.22 to 8.59); females, SMR=7.53 (95% CI 4.22 to 12.43)), external causes (males, SMR=1.95 (95% CI 0.52 to 2.46); females SMR=1.60 (95% CI 0.87 to 2.68)) and congenital anomalies in females (SMR=2.42; 95% CI 1.16 to 4.45). Considerable differences were found between regions of origin. Maternal mortality was increased (rate ratio 10.08; 95% CI 8.02 to 12.83) as a result of deaths among African women.

Conclusion
Certain subgroups of asylum seekers (classified by age, sex and region of origin) are at increased risk of certain causes of death compared with the host population. Policies and services for asylum seekers should address both causes for which asylum seekers are at increased risk and causes with large absolute mortality, taking into account differences between subgroups.
INTRODUCTION

Of the estimated 11.4 million refugees worldwide in 2007, 1 760,000 asylum seekers lived in Western countries. Presumably, both pre-migration and post-migration factors are risks to asylum seekers' health, as are genetic factors and stress factors before and during their flight from war-struck countries. Some authors mention limited access to healthcare as a negative factor. Asylum seekers are thought to be subjected to specific health problems, of which infectious diseases and mental health problems receive the most attention.

Little information on the health of asylum seekers in Europe is available. There is not much systematic research, and it is carried out on too small a scale or is limited to qualitative data. In quantitative studies, such as those based on national mortality statistics, it is impossible to distinguish asylum seekers from other migrants; however, given the specific situation of asylum seekers, overall data on migrants are unlikely to be applicable to them.

The aim of this study was to (a) determine differences in overall and cause-specific mortality between asylum seekers and the Dutch population, (b) relate these to available determinants such as age, gender and country of origin, and (c) identify possible subgroups at risk.

Learning more about the absolute number of deaths and mortality patterns may help healthcare providers plan adequate health provision, and data on increased mortality of asylum seekers from specific causes will help health authorities make choices about establishing specific prevention programmes to reduce health risks and inequalities in health.

METHODS

Study population

An asylum seeker is a person who has left his or her country of origin, has applied for recognition as a refugee in another country, and is awaiting a decision on his or her application. The present study population comprised all inhabitants of asylum seeker centres in the Netherlands (Box 2.1.1). Asylum seekers live in these centres until they receive a final decision about their asylum procedure. The average duration of residence in these centres had increased from 23 months on 1 January 2002 to 47 months on 1 January 2005. The reference population is the standard Dutch population for 2002-2005, as published by Statistics Netherlands.
Box 2.1.1 Health services for asylum seekers in the Netherlands in the period 2002-2005.

Asylum seekers in the Netherlands live in asylum seekers centres. They have freedom of movement, but they may only work a limited number of weeks annually. The Central Agency for the Reception of Asylum Seekers manages all asylum seeker centres and is responsible for the provision of several entitlements for asylum seekers, including healthcare. Asylum seekers are entitled to full access to healthcare with minor exceptions. The Central Agency for the Reception of Asylum Seekers has contracted the Community Health Services (CHS) for Asylum Seekers to provide preventive health services in all asylum seeker centres for:
- Health education, child healthcare, infectious disease control, hygiene and safety inspections, and specific nurse practitioner services.
- Referral of asylum seekers to mainstream healthcare professionals and institutions and coordination of care.

Data

The Community Health Services (CHS) for Asylum Seekers have managed a unique health notification system for asylum seekers since 2002, as mortality data on asylum seekers cannot be derived from other mortality registers. Medical staff at asylum seeker centres report all deaths to their regional office. A doctor (HK) verifies and forwards the data in an anonymous form to epidemiologists at the central office of the CHS for Asylum Seekers. Statistics Netherlands codes all causes of death according to the International Classification of Diseases, 10th revision, into 17 main primary cause-of-death groups based on the European shortlist.

The Central Agency for the Reception of Asylum Seekers provides monthly reference data on asylum seekers in centres by age and sex, including the numbers of births, stillbirths and deaths. Individual data on inflow and outflow are unavailable, so we used the annual average of the monthly number of residents (listed by age group, nationality and sex) who were present on the 1st day of each month. We summed the annual average occupations in the period 2002-2005 to obtain the denominators for our calculations.

The limited number of cases compelled us to merge countries of origin into regions (Box 2.1.2). In the absence of a standard classification for health reporting for asylum seekers, we used the regional classification of the United Nations High Commissioner for Refugees (UNHCR) to group countries of origin. Because of the study population size, some UNHCR regions were merged on the basis of geographical location and/or cultural similarities (appendix 1 available online).
Section 2.1

Box 2.1.1

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### Statistical analysis

Mortality of asylum seekers was compared with that of the Dutch resident population by using data from the national mortality register of Statistics Netherlands for the years 2002-2005. Different mortality measures were applied. Comparisons for all-age overall and cause-specific mortality were made using indirectly standardised mortality ratios (SMRs). These were estimated by dividing the observed number of deaths among asylum seekers by the expected number of deaths, the latter being calculated by applying national age-specific and sex-specific mortality to age-specific and sex-specific numbers of asylum seekers. SMR values above 1 indicate higher mortality among asylum seekers than among the Dutch population. Perinatal, infant and maternal mortality of asylum seekers was expressed in terms of number of deaths per 1000 or 100,000 births. These rates were compared with corresponding rates derived from the national mortality and birth registers. Mortality by region of origin was compared with that for the Netherlands by means of age-stratified and sex-stratified rate ratios. We obtained 95% CIs to SMR and mortality using SISA’s t-test procedure (http://www.quantitativeskills.com/sisa/).

For the analysis of three broad cause-of-death groups (infectious diseases, external causes, chronic diseases) by region of origin, ratios were estimated by means of Poisson regression analyses, with number of deaths as the dependent variable, number of person-years at risk as the offset variable, and region of origin as the independent variable. The Dutch population was taken as the reference group. The regression model was controlled for sex and age. In the cause-specific analysis, because of the small number of deaths, we used two broad age groups, divided in such way that the model showed the least error (eg, 0-39 vs 40+ years for chronic diseases). Poisson regression was applied using R software (http://www.r-project.org). CIs were derived from the standard errors to the regression coefficients.

### Box 2.1.2. Regions of origin of asylum seekers in the Netherlands

<table>
<thead>
<tr>
<th>Region of origin</th>
<th>Definition</th>
<th>Major contributing countries of origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>WCS Africa</td>
<td>West, central and southern Africa</td>
<td>Democratic Republic of Congo, Angola</td>
</tr>
<tr>
<td>NEH Africa</td>
<td>North, east and Horn of Africa</td>
<td>Somalia, Sudan</td>
</tr>
<tr>
<td>CES Europe</td>
<td>Central, eastern and southern Europe</td>
<td>Azerbaijan, former Yugoslavia</td>
</tr>
<tr>
<td>ME/SW Asia</td>
<td>Middle East and southwest Asia</td>
<td>Afghanistan, Iraq</td>
</tr>
<tr>
<td>CES Asia</td>
<td>Central, east and southern Asia</td>
<td>China, Sri Lanka</td>
</tr>
<tr>
<td>Other</td>
<td>Stateless persons, South and Middle America</td>
<td></td>
</tr>
</tbody>
</table>
RESULTS

Population characteristics

The CES Europeans and ME/SW Asians were the largest subgroups of asylum seekers (Table 2.1.1). There were considerably more male than female asylum seekers, but the sex distribution differed per region (Table 2.1.1). African populations were the youngest, followed by the ME/SW Asian population. The age distribution of the CES European population was more similar to the Dutch population.

Table 2.1.1 Characteristics of the asylum seeker population in the Netherlands in 2002–2005

<table>
<thead>
<tr>
<th></th>
<th>All asylum seekers</th>
<th>WCS Africans</th>
<th>NEH Africans</th>
<th>CES Europeans</th>
<th>ME/SW Asians</th>
<th>CES Asians</th>
<th>Other countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of person-years</td>
<td>222,217</td>
<td>49,963</td>
<td>24,672</td>
<td>59,454</td>
<td>68,970</td>
<td>12,040</td>
<td>7,118</td>
</tr>
<tr>
<td>Percentage of all asylum seekers</td>
<td>100</td>
<td>22.5</td>
<td>11.1</td>
<td>26.8</td>
<td>31.1</td>
<td>5.4</td>
<td>3.2</td>
</tr>
<tr>
<td>Number of deaths*</td>
<td>346*</td>
<td>80</td>
<td>34</td>
<td>84</td>
<td>95</td>
<td>13</td>
<td>41*</td>
</tr>
<tr>
<td>Percentage of total deaths</td>
<td>100</td>
<td>23.1</td>
<td>9.8</td>
<td>24.2</td>
<td>27.4</td>
<td>3.7</td>
<td>11.8</td>
</tr>
</tbody>
</table>

*Nine persons whose country of origin was unknown were included in the category "other countries"

In 2002-2005, 346 asylum seekers died and 28 stillborns (in 4327 deliveries) were reported. The sex of 15 people who died was unknown, and the cause of death was unknown for 39 cases. The overall crude mortality (156/100,000) of this young population was lower than that of the Dutch population, which was 859/100,000 inhabitants.

Cause-specific mortality: main primary cause-of-death categories

The standardised overall mortality among asylum seekers was similar to that of the host population for males and females (Table 2.1.2). The main causes of death of asylum seekers were cancer, cardiovascular diseases and external (Table 2.1.2). Mortality from infectious diseases, diseases of the blood, congenital anomalies and external causes was significantly higher in asylum seekers than in the host population. In contrast, asylum seekers had lower mortality for cancer, cardiovascular, respiratory, gastroenterological and neurological diseases.
With 36 cases, perinatal mortality in asylum seekers (8.32/1000 births) was similar to that of the Dutch population (rate ratio 1.16, 95% CI 0.84 to 1.61). Infant mortality (17 cases, 3.95/1000 live births) was not significantly different from that of the Dutch population (rate ratio 0.83, 95% CI 0.51 to 1.33). In 15 cases, it was not reported whether the baby was alive at birth. The maternal mortality ratio (69.33/100,000 births) was 10.08 times that of the Dutch population (95% CI 8.02 to 12.83) (results not in tables).

Differences by age, sex and region
Comparison of overall mortality between asylum seekers and the Dutch population showed differences between subgroups by age, sex and region of origin (figure 2.1.1). In the age groups < 1, 1-19 and 20-39 years, mortality was higher in females from WCS Africa than in Dutch females. Increased mortality was also found in the age group 1-19 years for males from WCS Africa and CES Europe, and in the age group 20-39 years for females from NEH Africa and males from CES Europe. In the age groups 40-64 and 65 years and over, mortality was lower than, or at the same level as, in the Dutch population for all regions of origin.

Poisson regression analysis, giving standardised rate ratios corrected for age and sex (figure 2.1.2), shows an increased risk of dying from infectious diseases for NEH and WCS Africans. WCS Africans and CES Europeans were at increased risk of dying from external causes, especially the young men (results not in the figures). The risk of dying from chronic diseases was significantly lower than for the host population for asylum seekers from all regions of origin, except for WCS Africa.

Mortality for subgroups of main primary cause-of-death categories
AIDS, hepatitis and tuberculosis are the most common causes of death from infectious diseases among both male and female asylum seekers (Table 2.1.2). Of 33 infectious disease deaths, 29 were asylum seekers from WCS and NEH Africa. Of the 16 AIDS related cases, 15 originated from these regions (results not in tables).

Table 2.1.2 shows that roughly half of the non-natural deaths resulted from accidents and injuries, predominantly of male asylum seekers. Deaths from accident or injury prevailed in male asylum seekers younger than 30 years (34 of 40 cases, results not in table). For accidents and injuries, there appear to be differences in mortality between regions of origin, but the numbers are too small to draw firm conclusions. Suicide mortality was highest in males from NEH Africa (results not in tables). The high SMR for drowning is noteworthy. Drowning occurred irrespective of season, and 16 of the 20 cases were younger than 20 years (results not in tables).
Table 2.1.2 Mortality of asylum seekers as compared to the total population of the Netherlands: numbers of deaths, crude death rates and standardised mortality ratios (2002-2005)

<table>
<thead>
<tr>
<th>Primary causes of death categories</th>
<th>Male Asylum seekers NL</th>
<th>Crude death rate / 100,000 person years</th>
<th>Male Asylum / NL SMR* 95% CI</th>
<th>Female Asylum seekers NL</th>
<th>Crude death rate / 100,000 person years</th>
<th>Female Asylum / NL SMR* 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>All causes</td>
<td>193</td>
<td>206.80</td>
<td>0.93</td>
<td>0.75-1.12</td>
<td>138</td>
<td>121.52</td>
</tr>
<tr>
<td>Infectious and parasitic diseases</td>
<td>18</td>
<td>13.40</td>
<td>5.44</td>
<td><strong>3.22-8.59</strong></td>
<td>15</td>
<td>17.07</td>
</tr>
<tr>
<td>- Tuberculosis</td>
<td>2</td>
<td>1.49</td>
<td>13.02</td>
<td><strong>1.61-48.16</strong></td>
<td>3</td>
<td>3.41</td>
</tr>
<tr>
<td>- Hepatitis</td>
<td>3</td>
<td>2.23</td>
<td>16.52</td>
<td><strong>3.44-48.70</strong></td>
<td>1</td>
<td>1.14</td>
</tr>
<tr>
<td>Neoplasms</td>
<td>26</td>
<td>19.36</td>
<td>268.37</td>
<td>0.42</td>
<td><strong>0.27-0.61</strong></td>
<td>27</td>
</tr>
<tr>
<td>Blood/blood-forming organs and immunological diseases</td>
<td>1</td>
<td>0.74</td>
<td>2.33</td>
<td>1.77</td>
<td>0.02-9.77</td>
<td>3</td>
</tr>
<tr>
<td>Endocrine, nutritional, metabolic diseases</td>
<td>3</td>
<td>2.23</td>
<td>22.67</td>
<td>0.59</td>
<td>0.12-1.71</td>
<td>5</td>
</tr>
<tr>
<td>Mental and behavioural disorders</td>
<td>4</td>
<td>2.98</td>
<td>22.67</td>
<td>1.39</td>
<td>0.78-7.37</td>
<td>0</td>
</tr>
<tr>
<td>Diseases of the nervous system</td>
<td>1</td>
<td>0.74</td>
<td>19.02</td>
<td>0.18</td>
<td><strong>0.00-0.98</strong></td>
<td>1</td>
</tr>
<tr>
<td>Diseases of the circulatory system</td>
<td>36</td>
<td>26.80</td>
<td>269.09</td>
<td>0.75</td>
<td>0.53-1.04</td>
<td>31</td>
</tr>
<tr>
<td>Diseases of the respiratory system</td>
<td>4</td>
<td>2.98</td>
<td>86.35</td>
<td>0.38</td>
<td><strong>0.10-0.98</strong></td>
<td>1</td>
</tr>
<tr>
<td>Diseases of the digestive system</td>
<td>2</td>
<td>1.49</td>
<td>29.81</td>
<td>0.29</td>
<td>0.04-1.05</td>
<td>0</td>
</tr>
<tr>
<td>Diseases of the genitourinary system</td>
<td>2</td>
<td>1.49</td>
<td>14.04</td>
<td>1.23</td>
<td>0.15-4.43</td>
<td>2</td>
</tr>
<tr>
<td>Complications of pregnancy, childbirth, and the puerperium#</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>3.41</td>
<td>0.16</td>
</tr>
<tr>
<td>Conditions originating perinatal period#</td>
<td>4</td>
<td>2.98</td>
<td>3.56</td>
<td>0.60</td>
<td>0.16-1.55</td>
<td>4</td>
</tr>
<tr>
<td>Congenital anomalies#</td>
<td>7</td>
<td>5.21</td>
<td>3.52</td>
<td>1.30</td>
<td>0.52-2.46</td>
<td>10</td>
</tr>
</tbody>
</table>
## Section 2.1
### Table 2.1.2
Mortality of asylum seekers as compared to the total population of the Netherlands: numbers of deaths, crude death rates and standardised mortality ratios (2002-2005)

<table>
<thead>
<tr>
<th>Primary causes of death categories</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Asylum seekers</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>Number of deaths</td>
<td>Crude death rate / 100,000 person years</td>
</tr>
<tr>
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<td>206.80</td>
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<td>Infectious and parasitic diseases</td>
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<td>13.40</td>
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<tr>
<td>- Tuberculosis</td>
<td>2</td>
<td>1.49</td>
</tr>
<tr>
<td>- Hepatitis</td>
<td>3</td>
<td>2.23</td>
</tr>
<tr>
<td>- AIDS</td>
<td>10</td>
<td>7.44</td>
</tr>
<tr>
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</tr>
<tr>
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<td>#</td>
<td>-</td>
</tr>
<tr>
<td>Conditions originating perinatal period</td>
<td>#</td>
<td>-</td>
</tr>
<tr>
<td>Congenital anomalies</td>
<td>7</td>
<td>5.21</td>
</tr>
<tr>
<td>Symptoms, signs, ill-defined conditions</td>
<td>15</td>
<td>10.42</td>
</tr>
<tr>
<td>External causes of injury/poisoning</td>
<td>70</td>
<td>52.11</td>
</tr>
<tr>
<td>- Accidents and injuries$</td>
<td>40</td>
<td>29.78</td>
</tr>
<tr>
<td>- Accidents: drowning</td>
<td>12</td>
<td>8.93</td>
</tr>
<tr>
<td>- Suicide</td>
<td>22</td>
<td>16.38</td>
</tr>
<tr>
<td>- Homicide</td>
<td>5</td>
<td>3.72</td>
</tr>
<tr>
<td>- Other external causes of death</td>
<td>3</td>
<td>2.23</td>
</tr>
</tbody>
</table>

*a* SMR standardised for age, 95% CI not including 1 in bold *Accidents including drowning. *# does not take into account the number of deliveries or births
Figure 2.1.1 Rate ratios by age group, sex and region of origin for asylum seekers in comparison with the Dutch standard population. 95% CIs not including 1 are considered significant. The numbers of deaths are: 0 years old (26 cases); 1-19 years old (44 cases); 20-39 years old (115 cases); 40-65 years old (83 cases); 65 years and more (64 cases); 15 cases of unknown sex not included in calculations.

(Bestaat uit 5 plaatjes met los legenda plaatje)
DISCUSSION

This is the first study reporting overall and cause-specific mortality among asylum seekers as compared with the host population. It shows high numbers of deaths from cancer, cardiovascular diseases and external causes. Whereas at younger ages mortality among asylum seekers was higher than among the Dutch population, it was lower above the age of 40. Mortality from cancer and cardiovascular disease was reduced, whereas mortality due to infectious diseases, pregnancy and childbirth, and external causes was increased. Important cause-of-death differences between regions of origin indicate that preventive health programmes for asylum seekers require a subgroup differentiated approach.

Methodological considerations

The advantage of this study is that it provides the first data specific to asylum seekers and identifies mortality patterns within the asylum seeker population, differentiated by
age, sex and region of origin. However, as a consequence of the limited size of the asylum population, although the study was carried out over 4 years, results for subgroups by region of origin and for cause-of-death categories need to be interpreted with caution.

Some of the deaths of asylum seekers may be included in the national mortality register. They are, however, not identifiable and can therefore not be extracted from the reference data. As the number is small in comparison with the reference population, the effect on the results is assumed to be limited.

Aggregation of data into UNHCR regions is chosen in the absence of a standard classification for asylum seekers and because of UNHCR’s involvement with the study population. As the classification influences the results, validation of regional classification for health studies among asylum seekers would be welcome and would facilitate international comparison.

In the multivariate analysis, because of the limited number of cases, data were aggregated into just two age groups. This reduced error, but may have allowed some effect of age differences to go unnoticed. It is unlikely that the risk differences we did find were the result of this procedure. The difference between the SMR and the rate ratio in the multivariate analysis for infectious diseases is notable. The SMR is very high because of the over-representation of younger age groups in the asylum population and because of a much higher infectious disease mortality among asylum seekers than among the Dutch in these age groups. The standardised rate ratio calculated with Poisson regression though is less influenced by the fact that the asylum seeker age distribution is skewed.

**Results in relation to other studies**

The way age affects asylum seeker mortality, with lower mortality in older age groups and higher mortality in younger groups, is similar to that reported in labour migrant studies.\(^\text{16-20}\) The cause-specific mortality of all asylum seekers combined matches other studies that show increased mortality from infectious diseases and external causes in migrants.\(^\text{16, 20, 21}\) Lower mortality from cancer matches other European studies on non-Western ethnic groups.\(^\text{16-19}\) More importantly, we should point out that analysis by region of origin showed considerable differences in mortality by cause of death between subgroups of asylum seekers.

The present study shows that the increased risk of infectious disease mortality among asylum seekers is primarily a result of AIDS deaths in Africans. AIDS is a leading cause of mortality world wide and the primary cause of death in sub-Saharan Africa.\(^\text{22}\) Statistics Netherlands has identified AIDS as a major cause of death for migrants.\(^\text{20}\) Tuberculosis
and hepatitis are important causes of excess risk for labour migrants, but low numbers of cases in our study make it difficult to draw conclusions about these diseases in asylum seekers. Infant mortality for all migrants living in the Netherlands has been reported to be increased by 35% in comparison with the Dutch population.

Infant mortality among asylum seekers in this study is similar to that of the general population. However, it may be underestimated because some of the 15 cases in which it was not reported whether the baby was alive at birth may also be infant death cases. Perinatal mortality did not differ from that of the Dutch population, but was also underestimated due to under-reporting of stillbirths and also because possibly some of the above 15 cases were stillbirths. Maternal mortality among asylum seekers was 10 times that of the general population of the Netherlands and twice that of the ethnic group with the highest risk (35/100,000 live births from Surinam/Antillean mothers). In this study, the three mothers who died from complications of pregnancy and childbirth originated from WCS Africa, where maternal mortalities of 905 (453-1480)/100,000 live births have been estimated. Home country risk factors for maternal mortality may still be present in women from this region. Added to the fact that WCS African asylum seekers also face many teenage pregnancies and induced abortions, we believe that WCS African asylum seeker mothers and babies are at increased risk with respect to issues of reproductive health and infancy.

The increased risk of accidents and injuries among asylum seekers adds to the evidence of increased injury risks among migrant groups. Moreover, the existence of differences in injury mortality between subgroups is also seen in ethnic minority groups in the Netherlands.

The risk of drowning among asylum seekers is twice that among all non-Western migrants in the Netherlands, for which a 4-8 times increased risk in comparison with the native Dutch population has been reported.

Suicide has been described as a risk factor for Iranians and Afghans in England, and for men from southern and eastern Europe in the Netherlands. This study showed increased suicide mortality in men from NEH Africa. Further subgroup analysis of suicide cases, especially when data from additional years are included, may show more differences between subgroups by sex, age and region of origin, and will be studied separately. Suicide among asylum seekers may be related to traumatic events in the countries from which they have fled and having to cope with an uncertain future. The suicide risk factor may also come from the country of origin. Suicide rates among young men in former Soviet states have risen substantially since the 1990s, and are the major
cause of death of young men. Homicide was reported to be a risk factor for African and west Asian immigrants in the Netherlands, but was not significantly increased among the asylum seeker population in our study.

The health advantage for older asylum seekers, particularly with regard to the major chronic diseases, has also been seen among migrants in general, and has been a topic of debate. The advantage may come from the ‘healthy migrant effect,’ where only the strongest and healthiest in a population are able to migrate. Given the young age of many asylum seekers and the relatively old age at which the advantage is first observed, it seems unlikely that the healthy migrant effect is an important factor in the relative health of the asylum population as a whole. Mortality differentials between migrants and the general Dutch population diminished in the period 2002-2006, influenced by acculturation among other things. Such a decrease is not to be expected for asylum seekers because of the continuous influx of new asylum seekers and outflow of asylum seekers after a decision on their asylum request. Health status at immigration will therefore remain an important health determinant for natural causes of death among asylum seekers.

**Implications for policy and practice**

The results of our study highlight important issues for asylum seeker health policies. It shows that, in addition to the often mentioned mental health and communicable disease problems among asylum seekers, other health problems are of importance.

The high absolute mortality from chronic diseases and external causes, and the excess mortality in comparison with the host population from infectious diseases, external causes and pregnancy and childbirth related causes, reflects the variety of the burden of ill health among asylum seekers. It also indicates the importance of full access to healthcare and prevention for the asylum population.

Preventive interventions should address the increased risk of certain subgroups with respect to specific causes. The birth-related mortality among WCS African mothers, combined with unfavourable reproductive health outcomes of this population, indicates that targeted interventions addressing reproductive and infancy health risks are required for this group. Drowning prevention interventions should be aimed at all parents and children. As many asylum seekers have limited knowledge about the dangers of open water, good safety education, and swimming lessons should be provided.
Future research
Collection of mortality data on asylum seekers in other host countries is important, as it is unclear whether the data presented here can be extrapolated to asylum populations in other countries. Variations between host countries in composition of the asylum population, reception conditions, access to healthcare, and other factors may influence asylum seeker health and, consequently, mortality. If mortality data for asylum seekers in other host countries become available, analysis of aggregated mortality and cause-of-death data from several countries may help to explain the risk differences between subgroups of asylum seekers. For causes of death with high relative risks but low absolute numbers, such as maternal mortality, aggregation of data from different host countries is essential to allow in-depth aetiological studies.

In addition to the need for more mortality studies, there is an international need for more insight into subgroup-specific morbidity. Combination of mortality and morbidity data may guide the development of screening and prevention policies and practices to reduce health risks for asylum seekers. Such policies and practices should also be based on insight into which preventive interventions work for which asylum seekers. There is a serious need for studies in this domain, as prevention is a further challenge for a population whose first concern is their asylum procedure.

ACKNOWLEDGEMENTS

We thank our colleagues from the Community Health Services for Asylum Seekers for reporting mortality data. We thank the Central Agency for the Reception of Asylum Seekers for providing denominator data, and Statistics Netherlands for coding the primary causes of death. We also thank A. Kunst and C. Schouten, who commented on the manuscript, and C. van Steenis and D. van der Schuit, who prepared the tables and figures. We thank M. Savage and S. van Roosmalen for correcting the English.
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Section 2.1


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Section 2.2

Suicide death and hospital-treated suicidal behaviour in asylum seekers in the Netherlands: a national registry-based study

This study has been published as:

ABSTRACT

Background
Several suicide and suicidal behaviour risk factors are highly prevalent in asylum seekers, but there is little insight into the suicide death rate and the suicidal behaviour incidence in this population. The main objective of this study is to assess the burden of suicide and hospital-treated non-fatal suicidal behaviour in asylum seekers in the Netherlands and to identify factors that could guide prevention.

Methods
We obtained data on cases of suicide and suicidal behaviour from all asylum seeker reception centres in the Netherlands (period 2002-2007, age 15+). The suicide death rates in this population and in subgroups by sex, age and region of origin were compared with the rate in the Dutch population; the rates of hospital-treated suicidal behaviour were compared with that in the population of The Hague using indirect age group standardization.

Results
The study included 35 suicide deaths and 290 cases of hospital-treated suicidal behaviour. The suicide death rate and the incidence of hospital-treated suicidal behaviour differed between subgroups by sex and region of origin. For male asylum seekers, the suicide death rate was higher than that of the Dutch population (N=32; RR=2.0, 95%CI 1.37-2.83). For females, the suicide death rate did not differ from the Dutch population (N=3; RR=0.73; 95%CI 0.15-2.07). The incidence of hospital-treated suicidal behaviour was high in comparison with the population of The Hague for males and females from Europe and the Middle East/South West Asia, and low for males and females from Africa. Health professionals knew about mental health problems prior to the suicidal behaviour for 80% of the hospital-treated suicidal behaviour cases in asylum seekers.

Conclusions
In this study the suicide death rate was higher in male asylum seekers than in males in the reference population. The incidence of hospital-treated suicidal behaviour was higher in several subgroups of asylum seekers than that in the reference population. We conclude that measures to prevent suicide and suicidal behaviour among asylum seekers in the Netherlands are indicated.
BACKGROUND

In 2008 an estimated 383,000 asylum applications were recorded in 51 Western countries, including most European countries, the USA and Canada. Asylum seekers are people who have left their country of origin, applied for protection as a refugee in another country, and are awaiting a decision on their application.

Recent reviews quite clearly identify mental disorders, such as depression, schizophrenia, substance use disorder, personality disorder and comorbid anxiety disorder, as the most prominent risk factors for suicide. Other risk factors for suicide are traumatic life events and psychosocial crisis. The stress-diathesis model for suicides, however, states that suicide is never the consequence of one single cause or stressor but also requires a predisposition for suicidal ideation, with psychiatric illness and psychosocial crises as proximal stressors. This means that most people will not have suicide ideation, even in very difficult circumstances. Risk factors for non-fatal suicidal behaviour include the number of stressful life events, family disruption, lack of social support, low income, unemployment, previous traumatic experiences. In people presenting with first-ever suicidal behaviours, the prevalence of psychiatric disorders may be rather low, whereas socio-economic deprivation (low education, low income, unemployment, poverty and divorce) is much more prevalent. A recent general review showed a moderate association between post-traumatic stress disorder (PTSD) and suicidal ideation, but no evidence for a link between PTSD and completed suicide.

It is known that several suicide and suicidal behaviour risk factors are highly prevalent in asylum seekers. However, data about the suicide death rate and the incidence of non-fatal suicidal behaviour among asylum seekers are very limited. To our knowledge, the only study that reports rates for suicide death and suicidal behaviour specifically for asylum seekers was conducted in Denmark (2001-2003), but it included only three cases of suicide. A UK study into suicide and self-harm among asylum seekers did not publish any rates, and concluded that the number of asylum seekers who die from suicide or have suicidal behaviour is still unknown. A study into the influence of country of birth on the risk of suicidal behaviour - conducted in Sweden - shows large differences between sexes and between countries/regions of origin, but does not provide specific data on asylum seekers. On the basis of differences in the suicide death rate and the suicidal behaviour incidence worldwide, we expected that suicide and suicidal behaviour risks are not evenly distributed between subgroups of asylum seekers.

Insight into the burden of suicide death and suicidal behaviour is necessary in order to determine whether extra preventive efforts with regard to these issues are required for
asylum seekers; such insight could also provide directions for prevention. The main objective of the current study was to assess the burden of suicide and hospital-treated suicidal behaviour in asylum seekers in the Netherlands and to identify factors that could guide prevention.

The specific steps taken were as follows:
- to assess the suicide mortality rate and the incidence of hospital-treated suicidal behaviour in asylum seekers, and compare it to the Dutch population and the population of The Hague;
- to assess the extent to which health staff were aware of the existence of mental health problems in asylum seekers prior to the date of hospital-treated suicidal behaviour and the extent to which these cases were under mental health treatment prior to the date of the hospital-treated suicidal behaviour;
- to determine which methods were used by cases of suicide death and of hospital-treated suicidal behaviour and what stressors were reported in cases of hospital-treated suicidal behaviour.

METHODS

Context of the study
Asylum seekers in the Netherlands are housed in residential reception centres, managed by the Central Agency for the Reception of Asylum Seekers (COA). Asylum seekers are free to leave the centres and are allowed to work for a limited number of weeks per year. They are entitled to full access to health care. Up until 2008, COA contracted a health insurance company to arrange curative health care for asylum seekers through access to mainstream health services, including inpatient and outpatient mental health services. COA also contracted local public health services (GGDs) to provide preventive health services and specific nurse practitioner services, collectively called Community Health Services for Asylum Seekers (MOA). MOA nurse practitioners working at the reception centres provided a bridge function between the asylum seeker and regular health care. Asylum seekers with mental health problems could be offered up to five consultations with a public health doctor specialized in refugee health care to clarify any mental health and other health problems and needs. Asylum seekers could be referred, with or without these consultations, to the mental health service and/or offered preventive interventions. Since January 2009 the health system for asylum seekers in the Netherlands has changed.
Section 2.2

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METHODS

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Since January 2009 the health system for asylum seekers in the Netherlands has changed.

Suicide and suicidal behaviour

We collected data on suicide deaths and hospital-treated suicidal behaviour that took place among asylum seekers living in reception centres in the Netherlands from 2002-2007. Under a national protocol, public health doctors and nurses at the MOA were required to complete a standard form for every case of death (general death notification form) and suicidal behaviour. Neither the protocol nor the form gave a definition of suicidal behaviour. As it is difficult to determine in self-injury cases whether there was an intent to die, this study does not further differentiate self-injury cases. In order to limit the study to cases with considerable injury, only cases of suicidal behaviour treated at a hospital were included. This categorisation was made on the basis of a question on the form on whether and where the asylum seeker was treated after the suicidal behaviour.

Repeated suicidal behaviour cases were included in the database as separate events if these were reported on different forms. Data about suicide deaths were extracted from the general asylum seeker mortality database. Statistics Netherlands (CBS) coded the cause of death using the ICD-10. We included all cases allocated ICD-codes X60-X84 or Y87.0.

We grouped countries of origin into regions according to the United Nations High Commissioner for Refugees (UNHCR) classification. Some regions were combined because of small numbers; data for regions with very small populations were not presented. The regions are as follows, in brackets the abbreviations used and the two most frequently encountered countries: West, Central, Southern Africa (WCS Africa; Angola, Democratic Republic of Congo), North, East, Horn of Africa (NEH Africa; Somalia, Sudan), Central, East and Southern Europe (CES Europe; Azerbaijan, former Yugoslavian countries), Middle East/South West Asia (ME/SW Asia; Afghanistan, Iraq).

The suicidal behaviour notification form included open questions on medical history, stressors and methods used. Classification of these variables was performed by SG and AK, who also classified the methods used in suicide deaths. The form also contained dichotomous questions on whether the health professional knew of any mental health problems in the asylum seeker prior to the suicidal behaviour (without any further specification) and whether the asylum was using mental health treatment prior to the suicidal behaviour. No further specification of mental health problems and treatment were included as the questions were included with an exploratory objective.

The COA provided data on the number of asylum seekers by sex, age group and country of origin on every first day of the month in the study period. These were used to calcu-
late estimates of the person years spent in reception facilities. These data are considered good estimates for the denominator.

Comparison of the suicide death rate in asylum seekers with that of the general population of the Netherlands was performed using 2002-2007 data from the CBS national mortality register. Suicidal behaviour data were compared with data from a study in the Dutch city of The Hague, as no national data were available. The study in The Hague covered all cases of hospital-treated suicidal behaviour cases in 2002-2004, based on data from the emergency departments of the city's four general hospitals.

**Statistical analysis**

The rates used – the suicide mortality rate and the incidence rate of hospital-treated suicidal behaviour - were calculated for the population aged 15 years and older per 100,000 person-years. The numerators were the reported number of suicide deaths and cases of hospital-treated suicidal behaviour. Person-years at risk were calculated on the basis of the occupancy numbers for asylum seeker centres on the first day of each month during the study period.

Rate ratios were calculated using indirect standardization. The observed numbers of suicide and hospital-treated suicidal behaviour were compared with the expected numbers based on the rates for the reference populations, specifically for age and sex. The expected numbers were obtained by multiplying the person-years at risk in each category by the age and sex-specific suicide death rates in the Netherlands, and hospital-treated suicidal behaviour incidence rates in The Hague respectively. Finally, the observed/expected (O/E) ratios and the 95% confidence intervals (CIs) were calculated using Byar's approximation of the exact interval for the Poisson distributed variables. This approximation is accurate even with small numbers.

To make comparisons across subgroups of asylum seekers, with regards to the percentage of people with hospital-treated suicidal behaviour known to have had mental health problems and the percentage receiving treatment for these problems, we calculated prevalence rate ratios and 95%CI with SISA's t-test procedure.

**RESULTS**

**Burden of suicide death and hospital-treated suicidal behaviour**

In total 35 cases of death from suicide were recorded (Table 2.2.1), resulting in a suicide mortality rate of 17.5/100,000/year. Mortality was much higher in males than females.
Comparison of the suicide death rate in asylum seekers with that of the general population of the Netherlands was performed using 2002-2007 data from the CBS national mortality register. 20 Suicidal behaviour data were compared with data from a study in the Dutch city of The Hague, as no national data were available. The study in The Hague covered all cases of hospital-treated suicidal behaviour cases in 2002-2004, based on data from the emergency departments of the city's four general hospitals. 21

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**RESULTS**

**Burden of suicide death and hospital-treated suicidal behaviour**

In total 35 cases of death from suicide were recorded (Table 2.2.1), resulting in a suicide mortality rate of 17.5/100,000/year. Mortality was much higher in males than females (risk ratio=7.3, 95% CI=2.2-23.7). Suicide mortality was more common in male asylum seekers than in males in the general population in the Netherlands. No difference was found between suicide mortality in female asylum seekers and in the female general population of the Netherlands (Table 2.2.1). Compared to the Dutch population, we found increased risk for suicide for males from WCS Africa, NEH Africa and CES Europe. The number of suicide deaths in females was too small to be able to draw any conclusions. No suicide deaths were recorded in asylum seekers under the age of 15 (data not shown).

There were 290 cases of suicidal behaviour treated in hospital (Table 2.2.2). Hospital-treated suicidal behaviour was more common in female asylum seekers than in male asylum seekers (RR=1.58; 95% CI=1.25-1.99). Compared to the population of The Hague, male and female asylum seekers from CES Europe and ME/SW Asia were at increased risk of hospital-treated suicidal behaviour; asylum seekers from NEH and WCS Africa were at lower risk of hospital-treated suicidal behaviour (Table 2.2.2). In the age group < 15 years we recorded 11 acts of hospital-treated suicidal behaviour in girls but none in boys (data not shown).
Section 2.2

Factors that could guide prevention

Mental health problems

In nearly 80% of cases of hospital-treated suicidal behaviour, the notifying health professional was aware of the existence of mental health problems and nearly three quarters of these asylum seekers were receiving some form of mental health treatment prior to the hospital-treated suicidal behaviour (Table 2.2.3). The table shows no significant differences between male and female cases with respect to health professionals’ knowledge.
Factors that could guide prevention

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Stressors

The most frequently reported stressor for hospital-treated suicidal behaviour was the asylum procedure (30.4%). The other stressors were: relationship issues (21.2%), loss of a family member (13.1%), transfer between centres (9.2%), substance abuse (9.2%) and living conditions (3.9%).

Methods used

The distribution of methods used differed considerably between cases of death from suicide and hospital-treated suicidal behaviour (Table 2.2.4). In suicide deaths, hanging was the most common method used and in hospital-treated suicidal behaviour cases, this was poisoning with drugs.

Table 2.2.3 Distribution of mental health problems and mental health treatment among hospital-treated suicidal behaviour cases

<table>
<thead>
<tr>
<th></th>
<th>% of suicidal behaviour cases for which health staff knew of the existence of mental health problems prior to the reported suicidal behaviour (absolute number of cases)#</th>
<th>Prevalence rate ratio (95% CI)</th>
<th>% of suicidal behaviour cases with known mental health problems that received mental health treatment prior to the reported suicidal behaviour (absolute number of cases)‡</th>
<th>Treatment rate ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>78.7 (222)</td>
<td></td>
<td>73.0 (162)</td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>74.5 (108)</td>
<td>1</td>
<td>66.7 (72)</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>83.2 (114)</td>
<td>1.12 (0.99-1.26)</td>
<td>78.9 (90)</td>
<td>1.18 (1.01-1.39)</td>
</tr>
<tr>
<td><strong>Age group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>64.6 (53)</td>
<td>1</td>
<td>64.2 (34)</td>
<td>1</td>
</tr>
<tr>
<td>25-34</td>
<td>82.4 (70)</td>
<td>1.27 (1.06-1.54)</td>
<td>72.9 (51)</td>
<td>1.14 (0.98-1.45)</td>
</tr>
<tr>
<td>&gt;=35</td>
<td>85.2 (98)</td>
<td>1.32 (1.10-1.57)</td>
<td>77.6 (76)</td>
<td>1.21 (0.96-1.52)</td>
</tr>
<tr>
<td><strong>Region of origin</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ME/SW Asia</td>
<td>78.0 (85)</td>
<td>1</td>
<td>72.9 (62)</td>
<td>1</td>
</tr>
<tr>
<td>WCS Africa</td>
<td>63.0 (17)</td>
<td>0.86 (0.58-1.53)</td>
<td>29.4 (5)</td>
<td>0.41 (0.32-2.05)</td>
</tr>
<tr>
<td>NEH Africa</td>
<td>75.0 (6)</td>
<td>0.96 (0.37-1.94)</td>
<td>33.3 (2)</td>
<td>0.38 (0.11-2.78)</td>
</tr>
<tr>
<td>CES Europe</td>
<td>83.8 (98)</td>
<td>1.06 (0.81-1.21)</td>
<td>80.6 (79)</td>
<td>1.14 (0.79-1.23)</td>
</tr>
</tbody>
</table>

# number of hospital-treated suicidal behaviour cases for which health staff were aware of the existence of mental health problems;
‡ number of hospital-treated suicidal behaviour cases for which health staff were aware of the existence of mental health problems and who were receiving mental health treatment
This study is, to our knowledge, unique in the length of the study period, the number of cases observed and the combination of suicide death and suicidal behaviour data. The suicide death rate was high in male asylum seekers compared with the reference population, whereas no conclusion could be drawn for females due to the small number of cases. The hospital-treated suicidal behaviour incidence was not homogenously distributed in the asylum seeker population. In several subgroups the rates were higher than in the reference population, but lower rates were also found. Among African asylum seekers, male suicide mortality was high, but male and female hospital-treated suicidal behaviour rates were low. Among Europeans, the suicide mortality rate was low for males and hospital-treated suicidal behaviour rates were high for both sexes. For Middle East/South West Asians, only hospital-treated suicidal behaviour rates were increased. Health professionals were aware of mental health problems existing prior to the hospital-treated suicidal behaviour in nearly 80% of the cases.

**Methodological considerations**

All suicide death notifications contained clear case descriptions, so we do not expect any overestimation with regard to suicide death. It is possible, as in other studies of this kind, that some suicide deaths have not been included because they may have been coded under other external causes of death. Cases of death in asylum seekers for which no cause has been reported can also hide suicides. However, because of the huge impact of a suicide death in an asylum seeker centre, we assume that virtually all cases considered suicide deaths were reported. For hospital-treated suicidal behaviour, on the other hand, we expect that our results are an underestimation as some of this behaviour may not have come to the attention of MOA staff. Moreover, the reporting
may have been incomplete. But due to the continuous presence of medical staff at the asylum centres, cases may have come to their knowledge that might have been missed in the general population.

The results of this study should be interpreted with caution because of the small number of cases, particularly for suicide death. No conclusion could be drawn with respect to suicide mortality among females because of the small number of cases. Comparison with data from other studies has to be done cautiously because of differences in data sources, particularly for the hospital-treated suicidal behaviour rate. The use of suicidal behaviour reference data for the city of The Hague may have influenced our results. The incidence rate in The Hague is 10-20% higher than estimates for the Netherlands. This implies that for the subgroups with increased hospital-treated suicidal behaviour rates, the difference with the general population of the Netherlands would be somewhat larger. For the African groups, for whom we observed lower rates, the difference would be somewhat smaller, but would still remain.

**Interpretation of results**

The current study suggests that suicide death is higher in male asylum seekers than in the general male population of the Netherlands. The incidence was higher than in the reference population for several regions of origin, despite supposed underreporting. As in many populations, in asylum seekers suicide was more prevalent in men and hospital-treated suicidal behaviour more prevalent in women. The male to female ratio for the number of suicide deaths in this study (10:1), however, was higher than generally found (between 3:1 and 7.5:1). Various hypotheses can be formulated for this gender difference. The higher risk for males could be related to the lower use of mental health services. Additional explanations are that males are at greater risk if they are forced to return to their country of origin, the supposed higher pressure to succeed, more negative consequences of not being allowed to work and a higher prevalence of drug use. Protective factors for women could be having children to care for and stronger social networks. The gender differences for hospital-treated suicidal behaviour varies between regions of origin, reflecting the general fact that the gender difference paradox in suicidal behaviour is not constant across countries.

The regional differences found in hospital-treated suicidal behaviour rates are fairly consistent with data from Sweden, where the rates showed considerable differences between countries and regions of origin, with the lowest risk among Africans. In general, rates in immigrants tend to co-vary with rates in the country of birth. It is uncertain whether the differences found between regions reflect suicide death and hospital-treated suicidal behaviour rates in countries of origin, as we had to group countries...
together and because suicide statistics for countries of origin were either unavailable or outdated.\textsuperscript{28}

The majority of asylum seekers with hospital-treated suicidal behaviour were known to suffer from mental health problems. A recent review states that evidence on a relationship between PTSD and suicide or suicidal behaviour among refugees is limited.\textsuperscript{26} In a retrospective case-control study in asylum seekers in the Netherlands, including 40 suicide deaths and 40 matched controls, PTSD was not associated with suicide, and mental health treatment in the home country was more prevalent in suicide cases than controls (unpublished study by Koeman M and Kerkhof AJFM, 2004).

The much lower treatment rate of mental health problems in people with hospital-treated suicidal behaviour from Africa, compared with people from ME/SW Asian and CES European origin, is a concern. Low mental health treatment rates in African asylum seekers and refugees have been reported in other studies in the Netherlands and the UK.\textsuperscript{30,31}

Hanging was the most common method in deaths from suicide in asylum seekers; it is also the most common method in deaths from suicide in the general population, according to a European study into suicide methods.\textsuperscript{32} However, the proportion of asylum seekers that used hanging (25\%) was lower than in the European study (50\%). This might be related to the housing situation; asylum seekers share their room with others and have little privacy. In cases of hospital-treated suicidal behaviour, poisoning by drugs was the most common method and cutting the second most common. This pattern is similar to that observed in both migrants and non-migrants in the WHO/EURO multicentre study on suicidal behaviour.\textsuperscript{33}

Relationship issues, loss of family members, and other stressful life events are associated with suicidal behaviour in the general population,\textsuperscript{3,5} and are also commonly reported in asylum seekers.

The asylum procedure, however, is a stressor specific for this population. Asylum procedure recognition rates may well influence suicide death and suicidal behaviour rates. As recognition rates and other factors, such as composition of the asylum population, reception conditions and accessibility of health care for asylum seekers vary between countries and over time,\textsuperscript{34,35} we expect that suicide death rates and suicidal behaviour will vary between host countries and may change over time. Comparative research in various host countries, including qualitative research, is required to assess how national
asylum policies influence the rate of suicide and suicidal behaviour in asylum seekers and which preventive interventions are effective.

Training physicians to recognize and treat depression and suicidal behaviour has already shown impressive effects in reducing suicide death rates in general populations and might contribute to reduction in asylum seekers as well. In parallel with suicide prevention in prisons, health professionals and reception centre personnel who are working with asylum seekers should be trained to recognize suicide ideation and to take appropriate action.

CONCLUSIONS

This study suggests that male asylum seekers are at increased risk of death from suicide in comparison with the population of the Netherlands. No conclusion could be drawn for females due to the small number of cases. For males and females the incidence of hospital-treated suicidal behaviour was higher for asylum seekers from ME/SW Asia and CES Europe than in the reference population and lower for asylum seekers from the African sub regions. The majority of people with hospital-treated suicidal behaviour from ME/SW Asia and CES Europe had received some form of mental health treatment prior to the hospital-treated suicidal behaviour. For asylum seekers from Africa the rate of mental health treatment seemed to be lower. On the basis of this study we conclude that targeted prevention of suicide death and suicidal behaviour in asylum seekers is indicated.

ACKNOWLEDGEMENTS

We thank the Central Agency for the Reception of Asylum Seekers (COA) for providing the denominator data and GGD The Hague for the reference data on suicidal behaviour. We also thank Hennie Nijsingh for proofreading the paper, Wim Busschers for his advice on statistical methods and Mandy Savage and Julie Box for the language editing.
REFERENCES


Section 2.3

High diabetes risk among asylum seekers in the Netherlands

This study has been accepted for publication in *Diabetic Medicine* as:

Goosen S, Middelkoop BJC, Stronks K, Agyemang Kunst AE. High diabetes risk among asylum seekers in the Netherlands
ABSTRACT

Aims
Migrants have been reported to be at increased risk for diabetes in comparison with host populations in Western countries. Data for new migrant groups including asylum seekers, however, are scarce. This study aimed to map the prevalence and incidence of recorded diabetes among asylum seekers by demographic factors and length of stay in the host country.

Methods
We used a nationwide database from the Community Health Services for Asylum Seekers. The study population consisted of all asylum seekers aged 20 to 79 years who arrived in the Netherlands between 2000 and 2008. Case allocation was based on codes of the International Classification of Primary Care (ICPC). Data from a general practice registry were used as reference population. Standardized prevalence (SPR) and incidence ratios (SIR) were calculated; Cox regression was used to explore association with length of stay.

Results
The study included 59,380 asylum seekers and 1,227 cases of recorded diabetes. The prevalence of recorded diabetes was higher among asylum seekers compared to the reference population among men (SPR=1.85; 95%CI 1.71-1.91) and women (SPR=2.26; 95%CI 2.08-2.45). The highest standardised prevalence ratios were found for asylum seekers from Somalia, Sudan and Sri Lanka. The standardised prevalence ratio was higher as of 30 years. Incidence rates were higher than in the reference population in all length-of-stay intervals.

Conclusions
Asylum seekers from the majority of countries of origin were at increased risk of diabetes compared to the general population in the Netherlands. Asylum seekers from Somalia were at particularly high risk. This emerging public health issue requires attention from policy makers and health care providers.
INTRODUCTION

Migrants from various non-Western countries of origin are reported to be at increased risk of diabetes in comparison with host populations of industrialized countries.1-7 However, available data mainly report on migrant groups with a relatively long migration history.1-7 Epidemiological data on diabetes for migrant groups that have arrived more recently, including asylum seekers, are scarce.

People who have fled their country of origin and are awaiting a decision on their asylum request are called asylum seekers. The United Nations High Commissioner for Refugees (UNHCR) estimates that 479,300 asylum applications were registered in the 44 industrialized countries in 2012.8 The top ten countries of origin were Afghanistan, Syria, Serbia, China, Pakistan, Russian Federation, Iraq, Iran, Somalia and Eritrea.8 The number of refugees, the persons who have been granted asylum, was estimated at two million in the 44 industrialized countries in 2011.9

The asylum population may face an accumulation of diabetes risk factors such as increased genetic susceptibility, early life exposures such as low birth weight, exposure to famine in childhood, a sweeping socio-economic change, acculturation stress, and lifestyle factors in the host country.2,3,7,10,11 On top of that some risk factors may be particularly prevalent among asylum seekers such as stress, depression, post-traumatic stress disorder (PTSD), and sleep disorders.12,13 We have reported earlier that asylum seekers with PTSD had a nearly one and a half times greater odds of diabetes diagnosis compared to other asylum seekers.14

In several countries of origin of asylum seekers the diabetes prevalence is higher than in the Netherlands (e.g. Iran, Iraq, Syria and Sudan). In conjunction with the risk factors that asylum seekers face this suggests that asylum seekers may be a high-risk group for diabetes.15 In order to know whether interventions aimed at prevention, early diagnosis and treatment of diabetes among asylum seekers are required policy makers and health professionals will need insight into the burden of diabetes among asylum seekers.

However, data on the diabetes prevalence among asylum seekers are scarce. A study in the United States of America (USA) based on health screenings shortly after arrival in the US, showed a low rate of diabetes among asylum seekers and refugees.16 Studies in the USA and Canada, however, found a one and half times higher diabetes risk for refugees compared to other migrants.6,17 Several studies report on migrants from the regions of origin of asylum seekers, but do not distinguish by residence status and provide results for only a few of the countries that asylum seekers originate from.1,5,6,12,13 These studies
found larger differences in women than in men for the diabetes risk in comparison with the host population, a lower age at onset of diabetes and a growing risk difference with increasing length of stay.\textsuperscript{1,5,6,12,13}

A database with health data on 59,380 asylum seekers in the Netherlands allowed for analysis of prevalence rates of recorded diabetes for asylum seekers from 17 countries of origin. Reference data for comparison with the Dutch population were also available. The database allowed for a unique analysis of the development of the incidence of recorded diabetes by length of stay. This gives an indication of how the risk difference between asylum seekers and the reference population developed with length of stay. The aim of this study was to assess the prevalence and incidence of diabetes among asylum seekers by country of origin, gender, age, and length of stay.

METHODS

Study population

The study population consists of 59,380 asylum seekers. Inclusion criteria were arrival in asylum reception between 1 January 2000 and 31 December 2008, at least three months stay in reception, and age on arrival between 20 and 79 years. Resettlement refugees were excluded as they were invited by the Dutch government to resettle in the Netherlands because of specific needs, which may include health problems.

Asylum seekers in the Netherlands live in asylum-seeker centres managed by the Central Agency for the Reception of Asylum Seekers (COA). Health care for asylum seekers in the Netherlands did not differ much from the health care provided to residents of the Netherlands.\textsuperscript{18} Primary curative care was provided by nurse practitioners of the Community Health Services for Asylum Seekers (MOA) and mainstream family physicians, who worked in close collaboration. Nurses and public health physicians of the Community Health Services for Asylum Seekers offered all asylum seekers a (non-mandatory) preventive health assessment in the first months after arrival. There was no routine screening for diabetes or other chronic diseases.

Data

We used data from an electronic database of the Community Health Services for Asylum Seekers. Staff of the Community Health Services for Asylum Seekers and family physicians recorded health and psychosocial data, based on their findings during preventive and curative consultations, in paper medical records. They used the ‘problem-oriented records’ (POR) method.\textsuperscript{19} Main and chronic health problems were recorded on the
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The diagnosis of diabetes followed the protocol in use in family practices in the Netherlands. The diagnosis required an elevated glucose level (fasting plasma glucose levels of 7.0 mmol/l, a fasting capillary glucose level of 6.0 mmol/l, or non-fasting plasma or capillary glucose level of 11.0 mmol/l) that was confirmed using a fasting glucose test a few days later. Data with respect to the type of diabetes were insufficiently complete for distinction between type 1 and type 2 diabetes.

For case status allocation a computerized search was done to select all asylum seekers with the ICPC code for diabetes (T90) or an open field description containing “diabe”, “DM”, “D.M”, or “suikerziekte” (Dutch for diabetes). SG manually checked all records. Fifty-nine asylum seekers with ICPC code T90 were not allocated case status because the open field descriptions did not contain any information indicating diagnosis of diabetes or only contained description of gestational diabetes. Seventy-four cases were allocated case status on the basis of open field descriptions.

Country of origin is the country that was documented by the Immigration Department; in general this was the nationality of the asylum seeker. Grouping into regions follows the World Bank classification (http://data.worldbank.org/about/country-classifications/country-and-lending-groups).

The Netherlands Information Network of General Practice (LINH) provided the reference data on diabetes in the general population.20 The database of the Netherlands Information Network of General Practice includes continuous family practice data on morbidity among more than 350,000 listed patients. Participating general practices are considered representative for all general practices in the Netherlands.20 Patients of the Netherlands Information Network of General Practice general practices are comparable to the general population of the Netherlands with respect to age, gender and health insurance type.20 LINH does not contain data on socioeconomic status or ethnicity of the patients, but there are no indications that LINH would not be representative in this respect (I. Stirbu, 20-2-2014, personal communication). Non-Western migrants constituted approximately 10% of the population in the Netherlands in 2005 and main countries of origin were Turkey, Morocco and Surinam.21
Analysis of the prevalence of recorded diabetes

We calculated the prevalence of recorded diabetes as the number of recorded cases of diabetes per 100 asylum seekers. As diabetes is a chronic condition this can be considered as point prevalence of diagnosed cases of diabetes at the end of reception period.

Comparison of the prevalence of recorded diabetes between asylum seekers and the population of the Netherlands Information Network of General Practice was done with standardized prevalence ratios (SPR) using the indirect method of standardization. Standardised prevalence ratios are ratios of the observed and the expected number of cases. The former represents the number of cases observed for the asylum seeker group. The latter represents the number of cases expected in the hypothetical case that this group would have the age-sex-specific diabetes prevalence rates of the patients of the Netherlands Information Network of General Practice. In these calculations asylum seekers were classified according to age at arrival in the Netherlands. Country-specific analysis of the reception-time prevalence was done for countries with more than 1,000 asylum seekers in the study population. We calculated 95 percent confidence intervals (95% CI) for the standardised prevalence ratio using the exact method proposed by Ulm.

Analysis of the association with length of stay

Cases of diabetes recorded in the first months after arrival in the host country were a combination of new diabetes diagnoses as well as cases that already had developed diabetes before arrival. Because of this catching-up process, it is not useful to compare incidence rates observed in the first months after arrival with incidence rates in the reference population. As it seemed likely that this catching-up process concentrated in the first months after arrival, we have calculated point prevalence rates at six months length of stay and incidence rates for the intervals as from six months length of stay. Like in any health care based study the incidence is not a ‘diabetes-onset’ incidence but an incidence of diagnosed diabetes.

The incidence of recorded diabetes was calculated as the number of newly recorded cases divided by the cumulative number of years spent in reception, multiplied by 1,000 to get the rate per 1,000 person years. For cases only the time spent in reception up to the date of diagnosis of diabetes was included in the denominator. Standardised incidence ratios (SIR) and 95% confidence intervals were calculated using the same methodology as for the standardised prevalence ratio.

For studying the association with length of stay, we divided the data for each asylum seeker into records per length-of-stay interval (0-5, 6-11, 12-23, 24-35, 36-47, 48-59 and 60-108 months). Details on the methodology that is based on multivariate Cox regres-
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Standardised prevalence and incidence ratios with 95% CI were calculated with Excel. Multivariate analyses were performed with Statistical Software SPSS (SPSS Inc., Version 20.0, Chicago, IL).

RESULTS

Socio-demographic characteristics of the 59,380 asylum seekers in the study are presented in Tables 2.3.1 and 2.3.2. Nearly two-thirds of the asylum seekers were men. Countries with the largest number of asylum seekers were Iraq (15.9%), Somalia (10.5%) and Afghanistan (9.1%). The study population was young, with an average age at arrival of 28.4 years for men and 30.5 for women. The average length of stay in reception during the study period was 2.5 years for men and 4.4 years for women. The average age at arrival and the average length of stay differed between countries of origin (Table 2.3.1 and 2.3.2).

The total number of diabetes cases recorded during the study period was 1,227 and the crude prevalence of recorded diabetes was 2.1%. The prevalence was higher for women (2.7%) than for men (1.7%) for almost all countries of origin. Crude country-specific prevalence rates ranged from and from 0.3% for women from Guinea to 11.7% for women from Sri Lanka (Table 2.3.2).

The standardised prevalence ratio indicated a two times higher prevalence for asylum seekers than for the reference population (SPR= 2.10; 95% CI 1.91-2.13). The standardised prevalence ratio in comparison with the reference population was higher for women (SPR=2.26; 95% CI 2.08-2.45) than for men (1.85; 95% CI 1.71-1.99). For most countries of origin the age-standardised prevalence ratios of recorded diabetes were higher than one for men and women (Table 2.3.1 and 2.3.2). For men and women from China and men from Turkey the diabetes prevalence was at comparable level as in the reference population (Table 2.3.1 and 2.3.2). Countries with the highest standardised prevalence ratios for men and women were Sudan, Sri Lanka and Somalia (Table 2.3.1 and 2.3.2).
Table 2.3.1 Characteristics of the study population, number of recorded diabetes cases, prevalence, and standardized prevalence ratio compared to the reference population (MEN)

<table>
<thead>
<tr>
<th>Region / country of origin</th>
<th>Number of persons in study</th>
<th>Mean age at arrival in years</th>
<th>Average length of stay in months*</th>
<th>Recorded cases of diabetes</th>
<th>Crude prevalence of recorded diabetes (%)</th>
<th>Standardised prevalence ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle East and North Africa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iran</td>
<td>2,077</td>
<td>30.6</td>
<td>38.4</td>
<td>31</td>
<td>1.5</td>
<td>1.32</td>
<td>0.90-1.85</td>
</tr>
<tr>
<td>Iraq</td>
<td>6,680</td>
<td>30.4</td>
<td>16.6</td>
<td>144</td>
<td>2.2</td>
<td>2.07</td>
<td>1.75-2.43</td>
</tr>
<tr>
<td>Syria</td>
<td>762</td>
<td>31.6</td>
<td>44.2</td>
<td>18</td>
<td>2.4</td>
<td>1.54</td>
<td>0.91-2.38</td>
</tr>
<tr>
<td>Sub Sahara Africa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angola</td>
<td>1,721</td>
<td>24.5</td>
<td>38.3</td>
<td>12</td>
<td>0.7</td>
<td>1.32</td>
<td>0.68-2.24</td>
</tr>
<tr>
<td>Burundi</td>
<td>972</td>
<td>26.7</td>
<td>22.4</td>
<td>12</td>
<td>1.2</td>
<td>2.43</td>
<td>1.25-4.11</td>
</tr>
<tr>
<td>DR Congo</td>
<td>888</td>
<td>28.6</td>
<td>34.7</td>
<td>13</td>
<td>1.5</td>
<td>1.88</td>
<td>1.00-3.12</td>
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<tr>
<td>Guinea</td>
<td>1,205</td>
<td>20.7</td>
<td>45.5</td>
<td>10</td>
<td>0.8</td>
<td>2.35</td>
<td>1.13-4.16</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>2,612</td>
<td>22.6</td>
<td>33.1</td>
<td>18</td>
<td>0.7</td>
<td>1.87</td>
<td>1.11-2.89</td>
</tr>
<tr>
<td>Somalia</td>
<td>3,695</td>
<td>28.0</td>
<td>15.3</td>
<td>82</td>
<td>2.2</td>
<td>2.86</td>
<td>2.28-3.54</td>
</tr>
<tr>
<td>Sudan</td>
<td>1,413</td>
<td>26.0</td>
<td>34.7</td>
<td>22</td>
<td>1.6</td>
<td>2.86</td>
<td>1.79-4.26</td>
</tr>
<tr>
<td>South Asia</td>
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<td></td>
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<tr>
<td>Afghanistan</td>
<td>3,457</td>
<td>30.5</td>
<td>37.8</td>
<td>66</td>
<td>1.9</td>
<td>1.43</td>
<td>1.10-1.80</td>
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<tr>
<td>Sri Lanka</td>
<td>570</td>
<td>29.7</td>
<td>27.0</td>
<td>28</td>
<td>4.9</td>
<td>4.05</td>
<td>2.69-5.76</td>
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<tr>
<td>Europe and Central Asia</td>
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<td></td>
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<td>Armenia</td>
<td>498</td>
<td>34.7</td>
<td>43.6</td>
<td>22</td>
<td>4.4</td>
<td>1.83</td>
<td>1.15-2.73</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>611</td>
<td>34.7</td>
<td>54.4</td>
<td>29</td>
<td>4.7</td>
<td>2.03</td>
<td>1.36-2.87</td>
</tr>
<tr>
<td>Former Yugoslavia</td>
<td>1,365</td>
<td>29.8</td>
<td>38.2</td>
<td>20</td>
<td>1.5</td>
<td>1.35</td>
<td>0.82-2.04</td>
</tr>
<tr>
<td>Turkey</td>
<td>1,215</td>
<td>28.1</td>
<td>31.1</td>
<td>9</td>
<td>0.7</td>
<td>0.87</td>
<td>0.40-1.58</td>
</tr>
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<td>East Asia and Pacific</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>China</td>
<td>571</td>
<td>27.2</td>
<td>34.5</td>
<td>5</td>
<td>0.9</td>
<td>1.13</td>
<td>0.37-2.49</td>
</tr>
<tr>
<td>Other countries**</td>
<td>8,746</td>
<td>28.7</td>
<td>31.8</td>
<td>128</td>
<td>1.5</td>
<td>1.65</td>
<td>1.38-1.96</td>
</tr>
<tr>
<td>All countries</td>
<td>39,043</td>
<td>28.4</td>
<td>30.2</td>
<td>670</td>
<td>1.7</td>
<td>1.85</td>
<td>1.71-1.99</td>
</tr>
</tbody>
</table>

* At departure from reception or 31st of December 2008 when still in reception  ** Other than the countries presented individually in table
### Table 2.3.2 Characteristics of the study population, number of recorded diabetes cases, prevalence, and standardized prevalence ratio compared to the reference population (WOMEN)

<table>
<thead>
<tr>
<th>Region / country of origin</th>
<th>Number of persons in study</th>
<th>Mean age at arrival in years</th>
<th>Average length of stay in months*</th>
<th>Recorded cases of diabetes</th>
<th>Crude prevalence of recorded diabetes (%)</th>
<th>Standardised prevalence ratio 95% CI</th>
<th>Comparison with reference population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Middle East and North Africa</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iran</td>
<td>1,094</td>
<td>31.5</td>
<td>43.1</td>
<td>19</td>
<td>1.7</td>
<td>1.51, 0.91-2.31</td>
<td></td>
</tr>
<tr>
<td>Iraq</td>
<td>2,756</td>
<td>34.5</td>
<td>22.9</td>
<td>101</td>
<td>3.7</td>
<td>2.18, 1.77-2.63</td>
<td></td>
</tr>
<tr>
<td>Syria</td>
<td>407</td>
<td>33.6</td>
<td>49.0</td>
<td>19</td>
<td>4.7</td>
<td>2.50, 1.50-3.82</td>
<td></td>
</tr>
<tr>
<td><strong>Sub Saharan Africa</strong></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Angola</td>
<td>1,048</td>
<td>25.7</td>
<td>39.7</td>
<td>16</td>
<td>1.5</td>
<td>2.86, 1.64-4.54</td>
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<td>Burundi</td>
<td>735</td>
<td>26.6</td>
<td>18.7</td>
<td>9</td>
<td>1.2</td>
<td>2.79, 1.28-5.09</td>
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</tr>
<tr>
<td>DR Congo</td>
<td>614</td>
<td>28.4</td>
<td>32.9</td>
<td>11</td>
<td>1.8</td>
<td>2.46, 1.23-4.26</td>
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</tr>
<tr>
<td>Guinea</td>
<td>302</td>
<td>20.8</td>
<td>40.9</td>
<td>1</td>
<td>0.3</td>
<td>1.25, 0.03-5.86</td>
<td></td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>686</td>
<td>22.8</td>
<td>33.1</td>
<td>7</td>
<td>1.0</td>
<td>2.80, 1.12-5.49</td>
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<tr>
<td>Somalia</td>
<td>2,525</td>
<td>29.0</td>
<td>16.6</td>
<td>85</td>
<td>3.4</td>
<td>3.71, 2.96-4.56</td>
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<tr>
<td>Sudan</td>
<td>426</td>
<td>26.5</td>
<td>37.3</td>
<td>12</td>
<td>2.8</td>
<td>5.19, 2.68-8.78</td>
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<tr>
<td><strong>South Asia</strong></td>
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<tr>
<td>Afghanistan</td>
<td>1,967</td>
<td>33.5</td>
<td>36.9</td>
<td>81</td>
<td>4.1</td>
<td>2.21, 1.76-2.73</td>
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<tr>
<td>Sri Lanka</td>
<td>231</td>
<td>38.1</td>
<td>31.7</td>
<td>27</td>
<td>11.7</td>
<td>3.75, 2.47-5.37</td>
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<tr>
<td><strong>Europe and Central Asia</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Armenia</td>
<td>480</td>
<td>35.0</td>
<td>49.7</td>
<td>27</td>
<td>5.6</td>
<td>2.43, 1.60-3.48</td>
<td></td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>619</td>
<td>35.4</td>
<td>60.5</td>
<td>33</td>
<td>5.3</td>
<td>2.35, 1.62-3.26</td>
<td></td>
</tr>
<tr>
<td>Former Yugoslavia</td>
<td>879</td>
<td>30.3</td>
<td>45.8</td>
<td>15</td>
<td>1.7</td>
<td>1.66, 0.93-2.67</td>
<td></td>
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<tr>
<td>Turkey</td>
<td>343</td>
<td>31.1</td>
<td>34.3</td>
<td>10</td>
<td>2.9</td>
<td>2.74, 1.31-4.86</td>
<td></td>
</tr>
<tr>
<td><strong>East Asia and Pacific</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>392</td>
<td>26.4</td>
<td>35.6</td>
<td>3</td>
<td>0.8</td>
<td>1.14, 0.24-3.05</td>
<td></td>
</tr>
<tr>
<td>Other countries**</td>
<td>4,863</td>
<td>30.2</td>
<td>35.0</td>
<td>81</td>
<td>1.7</td>
<td>1.60, 1.27-1.98</td>
<td></td>
</tr>
<tr>
<td>All countries</td>
<td>20,337</td>
<td>30.5</td>
<td>53.2</td>
<td>557</td>
<td>2.7</td>
<td>2.26, 2.08-2.45</td>
<td></td>
</tr>
</tbody>
</table>

* At departure from reception or 31st of December 2008 when still in reception  ** Other than the countries presented individually in table
Section 2.3

For Somali men and women the prevalence of recorded diabetes was higher than in the reference population as from the age group 20-29 (Table 2.3.3). For all other countries the standardised prevalence ratio was higher than one as from the age group 30-39 years, although the difference with the reference population was not for all subgroups statistically significant. Among asylum seekers aged 60-79 years the diabetes prevalence was 21% and the standardised prevalence ratio was nearly twice as high as in the reference population (men SPR=1.81; 95% CI 1.53-2.14 and women SPR=1.83; 95% CI 1.58-2.11; data not presented).

Figure 2.3.1 shows that the prevalence of recorded diabetes among asylum seekers was already higher than in the reference population within six months after arrival in men (all countries: SPR=1.35; 95% CI 1.24-1.48) and women (SPR=2.26; 95% CI 2.08-2.45) (data in online appendix). For men from Iraq, Somalia and the other countries group the standardised prevalence ratio six after arrival was higher than in the reference population (Figure 2.3.1a). The standardised incidence ratios as from six months after arrival for men were for all subgroups higher than one, but the difference with the reference population was only statistically significant in the other-countries group (Figure 2.3.1b). For women the standardised prevalence ratio six months after arrival and the standardised incidence ratio as from six months after arrival were significantly higher than one for all subgroups (Figure 2.3.1a and 2.3.1b). The highest ratios for these indicators were found
For Somali men and women the prevalence of recorded diabetes was higher than in the reference population as from the age group 20-29 (Table 2.3.3). For all other countries the standardised prevalence ratio was higher than one as from the age group 30-39 years, although the difference with the reference population was not for all subgroups statistically significant. Among asylum seekers aged 60-79 years the diabetes prevalence was 21% and the standardised prevalence ratio was nearly twice as high as in the reference population (men SPR=1.81; 95% CI 1.53-2.14 and women SPR=1.83; 95% CI 1.58-2.11; data not presented).

Figure 2.3.1 shows that the prevalence of recorded diabetes among asylum seekers was already higher than in the reference population within six months after arrival in men (all countries: SPR=1.35; 95% CI 1.24-1.48) and women (SPR=2.26; 95% CI 2.08-2.45) (data in online appendix). For men from Iraq, Somalia and the other countries group the standardised prevalence ratio six after arrival was higher than in the reference population (Figure 2.3.1a). The standardised incidence ratios as from six months after arrival for men were for all subgroups higher than one, but the difference with the reference population was only statistically significant in the other-countries group (Figure 2.3.1b). For women the standardised prevalence ratio six months after arrival and the standardised incidence ratio as from six months after arrival were significantly higher than one for all subgroups (Figure 2.3.1a and 2.3.1b). The highest ratios for these indicators were found...
for men and women from Somalia (Figure 2.3.1). Multivariate analyses showed that the increased risks for asylum seekers from Somalia cannot be explained by demographic and reception variables (online appendix 1).

Table 2.3.4 shows that an increased incidence of recorded diabetes in asylum seekers compared to the reference population was observed in all length-of-stay intervals, although it did not always reach statistical significance. In women an increase in the incidence was observed as from four years length of stay; in men this increase was not observed. The pattern of the relative risks by length-of-stay interval, calculated with the Cox regression analysis, is similar to the pattern of the standardised incidence ratios over the length-of-stay intervals (Table 2.3.4). This shows that the incidence patterns cannot be explained by changes over time in the composition of the asylum population by country of origin, age and calendar year.

### Table 2.3.4 Number of cases and incidence of recorded diabetes as of 6 months after arrival, standardised incidence ratios compared to the reference population and relative risk (RR) compared to the 6-11 month interval by gender and length of stay*

<table>
<thead>
<tr>
<th>Length of stay at start interval</th>
<th>Recorded cases of diabetes</th>
<th>Number of person years</th>
<th>Incidence per 1,000 person years</th>
<th>Comparison with reference population</th>
<th>Comparison with 6-11 months interval*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Standardised incidence ratio</td>
<td>Relative risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>95% CI</td>
<td>95% CI</td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-11 months (ref)</td>
<td>44</td>
<td>13,222</td>
<td>3.33</td>
<td>2.11</td>
<td>1.53-2.80</td>
</tr>
<tr>
<td>12-23 months</td>
<td>34</td>
<td>18,752</td>
<td>1.81</td>
<td>1.12</td>
<td>0.77-1.54</td>
</tr>
<tr>
<td>24-35 months</td>
<td>29</td>
<td>12,720</td>
<td>2.28</td>
<td>1.29</td>
<td>0.87-1.83</td>
</tr>
<tr>
<td>36-47 months</td>
<td>25</td>
<td>8,812</td>
<td>1.50</td>
<td>1.50</td>
<td>0.97-2.18</td>
</tr>
<tr>
<td>48-59 months</td>
<td>20</td>
<td>5,754</td>
<td>3.48</td>
<td>1.73</td>
<td>1.05-2.61</td>
</tr>
<tr>
<td>60-108 months</td>
<td>26</td>
<td>8,132</td>
<td>3.20</td>
<td>1.39</td>
<td>0.91-2.01</td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-11 months (ref)</td>
<td>30</td>
<td>7,062</td>
<td>4.25</td>
<td>2.34</td>
<td>1.58-3.29</td>
</tr>
<tr>
<td>12-23 months</td>
<td>45</td>
<td>10,274</td>
<td>4.38</td>
<td>2.35</td>
<td>1.72-3.12</td>
</tr>
<tr>
<td>24-35 months</td>
<td>22</td>
<td>7,403</td>
<td>2.97</td>
<td>1.52</td>
<td>0.96-2.27</td>
</tr>
<tr>
<td>36-47 months</td>
<td>18</td>
<td>5,505</td>
<td>3.27</td>
<td>1.61</td>
<td>0.96-2.50</td>
</tr>
<tr>
<td>48-59 months</td>
<td>19</td>
<td>3,695</td>
<td>5.14</td>
<td>2.39</td>
<td>1.44-3.66</td>
</tr>
<tr>
<td>60-108 months</td>
<td>31</td>
<td>5,773</td>
<td>5.37</td>
<td>2.39</td>
<td>1.63-3.35</td>
</tr>
</tbody>
</table>

* Cox regression model included country of origin, age (as continuous variable) and calendar year at start interval

### DISCUSSION

The risk of recorded diabetes in asylum-seeking men and women was approximately twice as high as in men and women in the reference population. Increased prevalence
rates were observed for most countries of origin and as of 30 years. The highest prevalence ratios were observed for asylum seekers from Somalia, Sudan and Sri Lanka. The prevalence was already higher among asylum seekers than in the reference population at six months after arrival. The incidence as from six months after arrival was higher than the incidence in the reference population. For men and women from Somalia particularly high prevalence and incidence ratios were observed. The incidence of recorded diabetes among asylum seekers was higher than in the reference population in all length-of-stay intervals.

**Strengths and limitations**

Unique features of this study are the size of the population, the availability of longitudinal data as from shortly after arrival in the host country and the nationwide coverage.

The study also has some limitations. The study has underestimated the actual prevalence of diabetes as it only includes diagnosed cases of diabetes, which is the case in all studies based on health care registries. The comparisons with the reference population could have been influenced by observation bias as the ratio of diagnosed and undiagnosed diabetes cases may have been different in asylum seekers and in the reference population. The medical intake shortly after arrival might have increased the chance of diagnosis of diabetes among asylum seekers. However, a relative overestimation of diabetes cases among asylum seekers is not to be expected. It is unlikely that physicians have ordered diabetes tests at high rates because the majority of asylum seekers was young and because most of physicians’ attention was in all probability drawn to predominant health problems such as PTSD, depression, anxiety and stress related somatic complaints. On the contrary, the rates among asylum seekers may have been underestimated as the diagnosis of diabetes among asylum seekers may have been hampered by communication difficulties, limited health literacy, different interpretations of symptoms, and the predominance of issues related to the asylum procedure.

Another limitation is that variations in the mean length of stay between countries of origin and between men and women may have influenced the prevalence ratios. As a consequence, standardised prevalence ratios may have been underestimated for the groups with relatively low average length of stay (e.g. men from Iraq with on average < 1.5 years length of stay) compared to groups with longer lengths of stay (e.g. men from Azerbaijan > 4 years). The multivariate analyses provide estimates for risk differences that have been corrected for length of stay, but this could for reasons of power only be done for the larger countries of origin.
Interpretation

The high diabetes prevalence and incidence ratios found for asylum seekers compared to the reference population may have been caused by the accumulation of risk factors such as genetic susceptibility, sweeping economic change, lifestyle factors and stress related to migration and the asylum context. Whereas among asylum seekers the diabetes prevalence was higher among men than among women, the diabetes prevalence is similar for men and women in the reference population. The finding that the risk differences with the reference population are larger for women than for men is in line with general migrant studies in Canada and Sweden. The increased risk as from the 30-39 year age group in comparison with the reference population adds to evidence from other studies with respect to a lower age at diabetes onset in migrants.

With respect to country of origin our study is the first to provide data for migrants in Western host countries for most countries of origin. The increased risks found for most countries of origin compared to the reference population can partly be explained by the prevalence rates in the countries of origin. The most recent estimates of the International Diabetes Federation (IDF) are only lower than the estimate for the Netherlands (5.9%) for the African countries of origin. Sudan is an exception among the African countries with an estimated rate of 9.1%. Other countries with an estimated prevalence more than 1.5 times higher than for the Netherlands are Iran (10.6%), Iraq (9.7%), Syria (9.6%) and China (8.8%). The high risks found for asylum seekers from Somalia in our study are striking as the IDF estimates for Somalia is only 3.9%. It has to be noted, though, that the IDF estimates have a considerable level of uncertainty due to limited availability of primary data, particularly in countries at war.

Other explanations for the high diabetes risk for asylum seekers from the majority of countries of origin may be sought in the factors associated with the diabetes prevalence such as exposure to famine in childhood, a sweeping economic change, life style factors and stress may differ between countries of origin.

The particularly high diabetes risk for asylum seekers from Somalia is noteworthy. For Somali men and women the standardised prevalence ratios of recorded diabetes within six months after arrival were higher than for the other countries. For Somali women the incidence as from six months after arrival was nearly twice as high as for women from other countries. The age as from which an increased diabetes risk was observed, was lower for asylum seekers from Somalia than for asylum seekers from other countries of origin. Several qualitative studies among Somali immigrants in Western host countries suggest that the increased diabetes risk in this population has already been noticed in practice.
Although the number of asylum seekers from Sudan was too small for the detailed analyses, the standardised prevalence ratios suggest that their diabetes risk may be at the same level as asylum seekers from Somalia. The results for the other African countries of origin suggest that the diabetes risk for asylum seekers from these countries is high, but not as high as for asylum seekers from Somalia and Sudan. The rather low prevalence for asylum seekers from Iran may be an example of selection mechanisms that may be associated with diabetes risk. Iranian asylum seekers have a relatively high educational level, which in general is associated with lower diabetes risk.33 The high diabetes prevalence for Sri Lankan men and women is in line with findings for Sri Lankan migrants in other Western host countries.34-36

The analysis of the incidence of recorded diabetes over the length-of-stay intervals showed that incidence rates were persistently higher than in the reference population. This implies that, with increasing length of stay, the difference in prevalence between asylum seekers and the reference population increased. The pattern observed in female asylum seekers of a decrease in the incidence ratio compared to the reference population after two years, followed by an increase as from four years after arrival that has been, is striking. This pattern may be related to a combination of factors such as catching-up of diabetes diagnosis in the first years after arrival, the possibility of varying stress levels over time, and effects of changes in lifestyle and overweight. A longitudinal study in the Netherlands showed that the diabetes risk may continue to increase after the granting of asylum status.37 The difference in prevalence with the host population may, in line with studies in general migrant groups, continue to increase long after arrival in the host country.5,17

Asylum populations in other Western host countries are also likely to be at high risk of diabetes as they largely originate from the same countries of origin as asylum seekers in the Netherlands and are likely to share diabetes risk factors. Nevertheless it has to be taken into account that the diabetes risk may be influenced by the demographic composition of the asylum population, conditions in the host country and distribution of length of stay.3 Furthermore, the ratio between diagnosed and undiagnosed diabetes cases may vary between host countries as this may be influenced by differences in the accessibility and quality of health care for asylum seekers.18

The high diabetes prevalence among asylum seekers shortly after arrival and the likelihood of further increase in risk over time suggest that diabetes among asylum seekers and refugees is a problem of considerable public health importance in Western host countries. The public health actions needed can be build upon the actions formulated for migrants in general.36 The essentials of these actions include raising diabetes awareness,
reducing stress and helping asylum seekers to develop a physically active lifestyle and healthy dietary habits in their new environment.\textsuperscript{36,38} Interventions aimed at increasing physical activity may have large effects as it will contribute to stress reduction, a risk factor for diabetes that is highly prevalent among asylum seekers. Policy makers may play an important role in the prevention of diabetes by creating the conditions that stimulate asylum seekers, adults and children, to be physically active as from shortly after arrival. More research is needed to provide insight into the possibilities for intervention and into the diabetes risk in refugee populations with longer lengths of stay.

In order to ensure early identification of diabetes cases health professionals should be aware of the high diabetes risks among asylum seekers. Evidence suggests that diabetes screening for recently arrived asylum seekers and refugees as from 35 years may be indicated.\textsuperscript{4}

**ACKNOWLEDGEMENTS**

We would like to thank Hennie Nijsingh for reading and commenting on draft versions of the manuscript. The Netherlands Association for Community Health Services funded the creation of the database of the Community Health Services for Asylum Seekers.
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In order to ensure early identification of diabetes cases health professionals should be aware of the high diabetes risks among asylum seekers. Evidence suggests that diabetes screening for recently arrived asylum seekers and refugees as from 35 years may be indicated.

ACknOwlEDGEMEnTS

We would like to thank Hennie Nijsingh for reading and commenting on draft versions of the manuscript. The Netherlands Association for Community Health Services funded the creation of the database of the Community Health Services for Asylum Seekers.

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(25) Thygesen LC, Ersboll AK. When the entire population is the sample: strengths and limitations in register-based epidemiology. Eur J Epidemiol. 2014;
(38) Bhopal RS. A four-stage model explaining the higher risk of Type 2 diabetes mellitus in South Asians compared with European populations. Diabet Med. 2013;30:35-42.
Section 2.4

Induced abortions and teenage births among asylum seekers in the Netherlands: analysis of national surveillance data

This study has been published as:

ABSTRACT

Background
Asylum seekers are assumed to be a vulnerable group with respect to sexual and reproductive health. The objective of this study was to quantify induced abortion and teenage birth indicators for this group.

Methods
The population comprised all female asylum seekers aged 15-49 in the Netherlands between September 2004 and August 2005. Information was collected about induced abortions from notification forms and electronic patient files. The central agency for the reception of asylum seekers provided population and birth data.

Results
Among asylum seekers the abortion rate (14.4/1000 women) and teenage birth rate (49.1/1000) were higher than average in the Netherlands (8.6/1000 and 5.8/1000). Great differences were found between subgroups. High abortion rates were seen among women who were pregnant on arrival or got pregnant in the first months after arrival at the reception facilities. Abortion and teenage birth rates were particularly high among asylum seekers aged 15-19 from specific parts of Africa and Asia. Abortion ratios were high among asylum seekers aged 30-49 from parts of Europe and Asia. Decreases in the abortion rate and teenage birth rate were observed as the length of stay increased.

Conclusion
 Abortions and teenage births were more common among asylum seekers than among the overall population of the Netherlands. Increased rates were a consequence of subgroups being at high risk. Abortion and teenage birth rates were very high among women who were pregnant on arrival or got pregnant in the first few months after arrival, but decreased as the length of stay increased.
INTRODUCTION

Insight into sexual and reproductive health indicators is considered to be crucial for policy and programmatic decisions concerning reproductive health services. Asylum seekers are assumed to be a vulnerable group with respect to sexual and reproductive health. By the end of 2004 European countries were host to more than 2,000,000 refugees and 270,000 asylum seekers. About a quarter of the refugees and internally displaced persons worldwide are women of reproductive age. Studies on fertility and contraceptive use in emergency phase camps revealed a mixed response to childbearing among those affected by war. Quantitative data about the sexual and reproductive health status of asylum seekers in industrialised countries are, however, very scarce. The asylum population is diverse in many factors that are known to be associated with abortions and teenage birth rates, for example age, country of origin, socioeconomic status and level of education. The sexual and reproductive health of asylum seekers may in addition be influenced by factors such as experiences in the country of origin and during their flight, the uncertainty of the asylum procedure, frequent transfers, absence of social structure, language and limited knowledge of the health system. A distinction can be made between asylum seekers becoming pregnant before or after arrival at the reception facilities. Conception after arrival could have been influenced by the reproductive health services available in the host country. So, indicators for this group give a particularly good indication of the groups that need to be targeted with policy and action aimed at preventing unwanted and teenage pregnancies in the host country.

The aim of the present study was to estimate the incidence of induced abortions and teenage births in asylum seekers in the Netherlands in 2004-2005. Abortion and teenage birth indicators were compared among asylum seekers and with indicators for the general population in the Netherlands. In addition, an attempt was made to find out whether the incidence of abortions and teenage births varies between subgroups by age, region of origin, and length of stay in the reception facilities.

METHODS

Data sources

Data were assembled on abortions and live births that took place between 1 September 2004 and 31 August 2005. Nurses from the community health services for asylum seekers (MOA, see box 2.4.1) were requested to report every abortion that came to their knowledge. They did this on a form similar to the Dutch national abortion registry form.
In addition, data were extracted from the MOA electronic database for records that contained the International Classification of Primary Care (ICPC) code W83 (induced abortion).

Data were obtained on live births in the reception facilities from the central agency for the reception of asylum seekers (COA). COA also provided data on the total population in the reception facilities on 1 April 2005 (mid-study), and these were used to estimate the total person years spent in reception facilities during the study period. For comparison with the population of the Netherlands, data were used from the Dutch abortion registry\textsuperscript{16} and Statistics Netherlands for 2005.\textsuperscript{17}

**Box 2.4.1 Health services for asylum seekers in the Netherlands**

Health services for asylum seekers are very similar to services available to other residents of the Netherlands. A health insurance company, through a special health insurance scheme, has contracted mainstream health care providers to provide these services. Public health services, including sexual and reproductive health promotion, are provided by regional associations of community health services (MOA) in all asylum seekers centres. MOA offers every newly arrived asylum seeker an initial consultation with a practice nurse and, if indicated, a public health doctor. The nurse will in most cases address sexual and reproductive health issues at that occasion as advocated for by Adams and colleagues.\textsuperscript{15}

MOA nurses are also the first point of contact for asylum seekers for health issues and are responsible for referral to mainstream health care. This includes referring pregnant women to a midwife and helping women to get access to abortion services if they want to terminate an unwanted pregnancy. Abortion and other sexual and reproductive health services are available free of charge, but asylum seekers aged 21 years and over have to pay for contraceptives themselves. Condoms, though, are available free of charge.

**Indicators and demographic variables**

The common reproductive health indicators were used: abortion rate, abortion ratio and teenage birth rate (Box 2.4.2).\textsuperscript{3} Age at abortion or delivery was calculated using the date of abortion or birth and the woman’s own date of birth. Length of stay in the reception facilities at the time of abortion or childbirth was calculated using the date of abortion or delivery and the date of registration at the reception facilities. For the denominator population age and length of stay were used at 1 April 2005. The countries of origin were first grouped according to the regions used by UNHCR.\textsuperscript{18} As the numbers were small, these were merged into five regions (see footnote Table 2.4.3), taking into account geographical location and differences in abortion indicators. Data about the few women from other regions and stateless women are included in all analyses except those by region.
Box 2.4.2 Indicators

- Induced abortion rate: number of abortions per 1000 women aged 15-49 - or per specific subgroup - per year.
- Induced abortion ratio (to live births): number of abortions per 1000 live births.
- Teenage birth rate: number of live births per 1000 women aged 15-19 at delivery per year.

Research report

Statistical analysis

Three length-of-stay groups were distinguished. The first group had a length of stay of less than three months. Three months was chosen as the cut-off point as the pregnancy duration at the time of abortion was less than 13 weeks for more than 95% of the notified abortions. Women in this group who gave birth or had an abortion were pregnant on arrival. The second group had a length of stay of between three and eight months. Women in this group who gave birth were pregnant on arrival, and women who had an abortion got pregnant after arrival in the reception facilities. The third group included women with a length of stay of nine months or longer. All women in this group who gave birth or had an abortion got pregnant after arrival in the reception facilities. Reproductive health choices of this group could have been influenced by services provided in the Netherlands. Women who had an abortion after a length of stay of between three and eight months could also have been influenced in their reproductive health choices by services provided in the Netherlands. These abortions were analysed separately to ensure clarity and consistency in abortion ratio calculations. Because of the limited numbers in the shorter length of stay groups, analysis by age and region of origin was only done for the group with length of stay nine months or longer.

Analyses were performed using the Statistical Package “R” (http://www.r-project.org) and the online statistical calculator SISA (http://www.quantitativeskills.com/sisa). For the tables, the Gamma measure was used as an indicator for ordinal association, chi-square for differences in distribution. The abortion rate is a proportional measure and the proportions were univariately compared using the risk ratio and multivariately using Poisson regression. The abortion ratio is in fact a rate ratio. In comparing the different abortion ratios, a measure was used which can be interpreted similar to the risk ratio, but the standard error was calculated on the basis of the odds ratio, using the odds of having an abortion against not having an abortion. The standard errors for the ratios were calculated according to the usual methods. For multivariate analysis, Poisson regression was used. If the value 1 was not in the confidence interval, the comparison was considered statistically significant. Significant differences are marked bold in the tables.
### Table 2.4.1 Abortion rate and abortion ratio for asylum seekers aged 15-49, comparing length of stay groups and with overall averages for the Netherlands (NL)

<table>
<thead>
<tr>
<th>Number of</th>
<th>N</th>
<th>Abortions</th>
<th>Live births</th>
<th>Abortion rate per 1000/year</th>
<th>Ratio vs NL (95% CI)</th>
<th>Ratio vs &lt;3 months (95% CI)</th>
<th>Abortion ratio per 1000 live births</th>
<th>Ratio vs NL (95% CI)</th>
<th>Ratio vs &lt;3 months (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netherlands total</td>
<td>3,337,665</td>
<td>28,738</td>
<td>187,910</td>
<td>8.6</td>
<td>1</td>
<td>n/a</td>
<td>152.9</td>
<td>1</td>
<td>n/a</td>
</tr>
<tr>
<td>Total asylum*</td>
<td>9,931</td>
<td>143</td>
<td>642</td>
<td>14.4</td>
<td>1.7 (1.4 to 2.0)</td>
<td>n/a</td>
<td>222.7</td>
<td>1.5 (1.2 to 1.7)</td>
<td>n/a</td>
</tr>
<tr>
<td>Asylum by length of stay:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 months</td>
<td>259</td>
<td>9</td>
<td>80</td>
<td>34.7</td>
<td>4.0 (2.1 to 8.1)</td>
<td>1</td>
<td>112.5</td>
<td>0.7 (0.4 to 1.5)</td>
<td>1</td>
</tr>
<tr>
<td>3-8 months**</td>
<td>454</td>
<td>15</td>
<td>63</td>
<td>33.0</td>
<td>3.8 (2.3 to 6.3)</td>
<td>1.0 (0.4 to 2.1)</td>
<td>238.1</td>
<td>1.6 (0.9 to 2.7)</td>
<td>2.1 (0.9 to 5.2)</td>
</tr>
<tr>
<td>&gt;= 9 months</td>
<td>9,218</td>
<td>116</td>
<td>498</td>
<td>12.6</td>
<td>1.5 (1.2 to 1.8)</td>
<td>0.4 (0.2 to 0.7)</td>
<td>232.9</td>
<td>1.5 (1.2 to 1.9)</td>
<td>2.1 (1.0 to 4.2)</td>
</tr>
</tbody>
</table>

* Numbers do not add up as for three abortions and one live birth the length of stay is unknown.

** Note that for this group the nominator of the abortion ratio reflects abortions for women that got pregnant after arrival in the reception facilities, whereas the denominator reflects births for women that were pregnant on arrival at the reception facilities.
RESULTS

The overall abortion rate and ratio for asylum seekers were about one and a half times higher (Table 2.4.1) and the teenage birth rate more than eight times higher than average for the Netherlands (Table 2.4.2).

**Table 2.4.2** Teenage birth rate for asylum seekers, comparing length of stay groups and with the average for the Netherlands (NL)

<table>
<thead>
<tr>
<th></th>
<th>Number of Abortions</th>
<th>Live births</th>
<th>Teenage birth rate per 1000/year</th>
<th>Ratio vs NL (95% CI)</th>
<th>Ratio vs &lt; 3 months (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netherlands 15-19</td>
<td>479,103</td>
<td>3,713</td>
<td>2,795</td>
<td>5.8</td>
<td>1 (n/a)</td>
</tr>
<tr>
<td>Asylum 15-19*</td>
<td>1650</td>
<td>39</td>
<td>81</td>
<td>49.1</td>
<td>8.4 (6.8 to 10.4) n/a</td>
</tr>
<tr>
<td>&lt; 3 months</td>
<td>72</td>
<td>3</td>
<td>13</td>
<td>180.6</td>
<td>30.9 (18.9 to 5.7) 1</td>
</tr>
<tr>
<td>3-8 months</td>
<td>87</td>
<td>6</td>
<td>25</td>
<td>287.4</td>
<td>49.3 (35.3 to 68.7) 1.6 (0.9 to 2.9)</td>
</tr>
<tr>
<td>&gt;= 9 months</td>
<td>1,491</td>
<td>29</td>
<td>43</td>
<td>28.8</td>
<td>4.9 (3.7 to 6.7) 0.2 (0.1 to 0.3)</td>
</tr>
</tbody>
</table>

* Numbers do not add up as for one abortion the length of stay is unknown.

**Comparison between length-of-stay groups**

The abortion rates were much higher for women who were pregnant on arrival or got pregnant in the first few months after arrival in the Netherlands than for asylum seekers with length of stay nine months or more (Table 2.4.1). The abortion ratio for women with length of stay less than three months was lower than for the other groups. The same patterns were seen for the rates and ratios in all age groups (data not shown). Very high teenage birth rates were considered for girls with length of stay less than three and between three and eight months (Table 2.4.2). For girls with length of stay nine months or more the birth rate was much lower, but still nearly five times higher than average in the Netherlands (Table 2.4.2).

**Length of stay nine months or more**

The abortion rate and the abortion ratio were strongly associated with age (rate t=2.169; df t 1840; p=0.03, ratio z=-2.093; p=0.04) with the highest rate among 15-19 year olds (Table 2.4.3). Among asylum seekers aged 15-19 and 30-49 the abortion rates were higher than average for the Netherlands in these age groups (Table 2.4.3). The abortion ratio was only half the average for the Netherlands among 15-19 year olds and twice the average for the Netherlands among 30-49 year olds.
<table>
<thead>
<tr>
<th>Age group</th>
<th>N</th>
<th>Abortions</th>
<th>Live births</th>
<th>Abortion rate per 1000/year</th>
<th>Ratio vs NL (95% CI)</th>
<th>Abortion ratio per 1000 live births</th>
<th>Ratio vs NL (95% CI)</th>
<th>Teenage birth rate per 1000/year</th>
<th>Ratio vs NL (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total 15-49</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands total</td>
<td>3,337,665</td>
<td>28,738</td>
<td>187,910</td>
<td>8.6</td>
<td>1</td>
<td>152.9</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total asylum</td>
<td>9,218</td>
<td>116</td>
<td>498</td>
<td>12.6</td>
<td>1.5 (1.2 to 1.8)</td>
<td>232.9</td>
<td>1.5 (1.2 to 1.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Of which**:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WCS Africa</td>
<td>1,744</td>
<td>42</td>
<td>174</td>
<td>24.1</td>
<td>2.8 (2.1 to 3.8)</td>
<td>241.4</td>
<td>1.6 (1.1 to 2.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEH Africa</td>
<td>906</td>
<td>10</td>
<td>63</td>
<td>11.0</td>
<td>1.3 (0.7 to 2.4)</td>
<td>158.7</td>
<td>1.0 (0.5 to 2.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CES Europe</td>
<td>3,060</td>
<td>30</td>
<td>98</td>
<td>9.8</td>
<td>1.1 (0.8 to 1.6)</td>
<td>306.1</td>
<td>2.0 (1.3 to 3.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M East/SW Asia</td>
<td>2,583</td>
<td>18</td>
<td>124</td>
<td>7.0</td>
<td>0.8 (0.5 – 1.3)</td>
<td>145.2</td>
<td>0.9 (0.6 to 1.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CES Asia</td>
<td>555</td>
<td>12</td>
<td>24</td>
<td>21.6</td>
<td>2.5 (1.4 to 4.4)</td>
<td>500.0</td>
<td>3.3 (1.6 to 6.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>15-19</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands total</td>
<td>479,103</td>
<td>3,713</td>
<td>2,795</td>
<td>7.7</td>
<td>1</td>
<td>1328.4</td>
<td>1</td>
<td>5.8</td>
<td>1</td>
</tr>
<tr>
<td>Total asylum</td>
<td>1,491</td>
<td>29</td>
<td>43</td>
<td>19.5</td>
<td>2.5 (1.7 to 3.6)</td>
<td>674.4</td>
<td>0.5 (0.3 to 0.8)</td>
<td>28.8</td>
<td>4.9 (3.7 to 6.7)</td>
</tr>
<tr>
<td>Of which**:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WCS Africa</td>
<td>321</td>
<td>14</td>
<td>29</td>
<td>43.6</td>
<td>5.6 (3.4 to 9.4)</td>
<td>482.8</td>
<td>0.4 (0.2 to 0.7)</td>
<td>90.3</td>
<td>15.5 (10.9 to 21.9)</td>
</tr>
<tr>
<td>NEH Africa</td>
<td>119</td>
<td>2</td>
<td>1</td>
<td>16.8</td>
<td>2.2 (0.5 to 8.6)</td>
<td>2000.0</td>
<td>1.5 (0.1 to 16.6)</td>
<td>8.4</td>
<td>1.4 (0.2 to 10.1)</td>
</tr>
<tr>
<td>CES Europe</td>
<td>466</td>
<td>7</td>
<td>5</td>
<td>15.0</td>
<td>1.9 (0.9 to 4.0)</td>
<td>1400.0</td>
<td>1.1 (0.3 to 3.3)</td>
<td>10.7</td>
<td>1.8 (0.8 to 4.4)</td>
</tr>
<tr>
<td>M East/SW Asia</td>
<td>412</td>
<td>2</td>
<td>2</td>
<td>4.9</td>
<td>0.6 (0.2 to 2.5)</td>
<td>1000.0</td>
<td>0.8 (0.1 to 5.3)</td>
<td>4.9</td>
<td>0.8 (0.2 to 3.3)</td>
</tr>
<tr>
<td>CES Asia</td>
<td>107</td>
<td>4</td>
<td>5</td>
<td>37.4</td>
<td>4.8 (1.8 to 12.6)</td>
<td>800.0</td>
<td>1.2 (0.3 to 4.4)</td>
<td>46.7</td>
<td>8.0 (3.4 to 18.9)</td>
</tr>
</tbody>
</table>
### Table 2.4.3
Numbers of abortions and births, abortion rate, abortion ratio, birth rates, and rate ratios (95% confidence interval) for asylum seekers with length of stay \( \geq 9 \) months in comparison with the Netherlands (NL) by age group and region of origin*

<table>
<thead>
<tr>
<th>Age group</th>
<th>N</th>
<th>Abortions</th>
<th>Live births</th>
<th>Abortion rate per 1000/year</th>
<th>Ratio vs NL (95% CI)</th>
<th>Abortion ratio per 1000 live births</th>
<th>Ratio vs NL (95% CI)</th>
<th>Teenage birth rate per 1000/year</th>
<th>Ratio vs NL (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>20-29</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands total</td>
<td>974,218</td>
<td>12,915</td>
<td>71,498</td>
<td>13.3</td>
<td>1</td>
<td>180.6</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total asylum</td>
<td>2,919</td>
<td>41</td>
<td>253</td>
<td>14.0</td>
<td>1.1 (0.8 to 1.4)</td>
<td>162.1</td>
<td>0.9 (0.6 to 1.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Of which*:</td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
</tr>
<tr>
<td>WCS Africa</td>
<td>841</td>
<td>22</td>
<td>94</td>
<td>26.2</td>
<td>2.0 (1.3 to 3.0)</td>
<td>234.0</td>
<td>1.3 (0.8 to 2.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEH Africa</td>
<td>345</td>
<td>5</td>
<td>39</td>
<td>14.5</td>
<td>1.1 (0.5 to 2.6)</td>
<td>128.2</td>
<td>0.7 (0.3 to 1.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CES Europe</td>
<td>776</td>
<td>6</td>
<td>45</td>
<td>7.7</td>
<td>0.6 (0.3 to 1.3)</td>
<td>133.3</td>
<td>0.7 (0.3 to 1.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M East/SW Asia</td>
<td>676</td>
<td>4</td>
<td>54</td>
<td>5.9</td>
<td>0.5 (0.2 to 1.2)</td>
<td>74.1</td>
<td>0.4 (0.1 to 1.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CES Asia</td>
<td>170</td>
<td>3</td>
<td>12</td>
<td>17.6</td>
<td>1.3 (0.4 to 4.1)</td>
<td>250.0</td>
<td>1.4 (0.4 to 4.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>30-49</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands total</td>
<td>1,884,344</td>
<td>12,110</td>
<td>113,452</td>
<td>6.4</td>
<td>1</td>
<td>106.6</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total asylum</td>
<td>4,808</td>
<td>46</td>
<td>202</td>
<td>9.6</td>
<td>1.5 (1.1 to 2.0)</td>
<td>227.7</td>
<td>2.1 (1.6 to 2.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Of which*:</td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
</tr>
<tr>
<td>WCS Africa</td>
<td>582</td>
<td>6</td>
<td>51</td>
<td>10.3</td>
<td>1.6 (0.7 to 3.6)</td>
<td>117.6</td>
<td>1.1 (0.5 to 2.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEH Africa</td>
<td>442</td>
<td>3</td>
<td>23</td>
<td>6.8</td>
<td>1.1 (0.3 to 3.3)</td>
<td>130.4</td>
<td>1.2 (0.4 to 4.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CES Europe</td>
<td>1,818</td>
<td>17</td>
<td>48</td>
<td>9.4</td>
<td>1.5 (0.9 to 2.3)</td>
<td>354.2</td>
<td>3.3 (1.9 to 5.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M East/SW Asia</td>
<td>1,495</td>
<td>12</td>
<td>68</td>
<td>8.0</td>
<td>1.3 (0.7 to 2.2)</td>
<td>176.5</td>
<td>1.7 (0.9 to 3.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CES Asia</td>
<td>278</td>
<td>5</td>
<td>7</td>
<td>18.0</td>
<td>2.8 (1.2 to 6.7)</td>
<td>714.3</td>
<td>6.7 (2.1 to 21.1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Region of origin explanation, per region the two most frequent countries are included. WCS Africa (West, Central, Southern Africa): Angola, Democratic Republic of Congo; NEH Africa (North, East, Horn of Africa): Somalia, Sudan; CES Europe (Central, East, Southern Europe): Azerbaijan, Former Yugoslavia; M East/SW Asia (Middle East and South West Asia): Afghanistan, Iraq; CES Asia (Central, East, Southern Asia): China, Sri Lanka (complete overview online).

** Numbers do not add up as the region code for some abortions is unknown.
The abortion rate differed significantly between regions of origin, even after correction for age differences (dependent variable abortion rate, covariates age group and region of origin entered simultaneously: \( \text{Chi}^2=23.6, \text{df}=4, p<0.01 \)). The highest rates were found among women from WCS Africa and CES Asia. Abortion ratios also differed between regions (\( \text{Chi}^2=19.9, \text{df}=4, p<0.01 \)), but these differences were no longer significant after correction for age (dependent variable abortion ratio, covariates age group and region of origin entered simultaneously: \( \text{Chi}^2=9.3, \text{df}=4, p=0.05 \)).

Stratified analysis by age and region of origin showed that specific subgroups are at increased risk. In the age group 15-19 the abortion and teenage birth rates for asylum seekers from WCS Africa and CES Asia were significantly very high in comparison with Dutch indicators for this age group (Table 2.4.3).

In the 20-29 age group there were just slight differences in abortion rates and ratios, and only women from WCS Africa had a significantly higher abortion rate in comparison with the Dutch average. Among 30-49 year olds a significantly higher abortion rate and ratio was found for women from CES Asia and a significantly higher abortion ratio for women from CES Europe.

**Length of stay**

The abortion rate decreased considerably as the stay lengthened (Table 2.4.4). This decrease was not explained by age or region of origin. The birth rate also decreased.

<table>
<thead>
<tr>
<th>Length of stay in reception facilities</th>
<th>N 15-49</th>
<th>Number of abortions 15-49</th>
<th>Number of live births 15-49</th>
<th>Abortion rate per 1000 aged 15-49 / year*</th>
<th>Abortion Ratio 15-49**</th>
<th>N 15-19</th>
<th>Number of teenage births / year ***</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 to 12 months</td>
<td>174</td>
<td>5</td>
<td>34</td>
<td>28.7</td>
<td>147.1</td>
<td>35</td>
<td>7</td>
</tr>
<tr>
<td>1 to 2 years</td>
<td>921</td>
<td>19</td>
<td>70</td>
<td>20.6</td>
<td>271.4</td>
<td>228</td>
<td>11</td>
</tr>
<tr>
<td>2 to 3 years</td>
<td>852</td>
<td>15</td>
<td>60</td>
<td>17.6</td>
<td>250.0</td>
<td>168</td>
<td>11</td>
</tr>
<tr>
<td>3 to 4 years</td>
<td>1467</td>
<td>28</td>
<td>102</td>
<td>19.1</td>
<td>274.5</td>
<td>197</td>
<td>10</td>
</tr>
<tr>
<td>4 to 5 years</td>
<td>2133</td>
<td>24</td>
<td>104</td>
<td>11.3</td>
<td>230.8</td>
<td>303</td>
<td>3</td>
</tr>
<tr>
<td>5 years or more</td>
<td>3671</td>
<td>25</td>
<td>128</td>
<td>6.8</td>
<td>195.3</td>
<td>560</td>
<td>1</td>
</tr>
</tbody>
</table>

Results of Poisson regression with the average value of length of stay intervals in the model as covariate:

* Dependent variable abortion rate, covariates length of stay and age: \( z=-4.258, p<0.01 \); controlling for region: \( z=3.418, p<0.01 \).
** Dependent variable abortion ratio, covariate length of stay: not significant; covariates length of stay and age: not significant; covariates length of stay and region of origin: not significant.
*** Dependant variable teenage birth rate, covariate length of stay: \( z=5.454, p<0.01 \).
with length of stay (number of births per 1000 women per year, data not presented). No clear pattern was observed for the abortion ratio. The teenage birth rate was very high for girls with length of stay of between nine and twelve months and decreased in groups with longer stays.

**DISCUSSION**

The abortion rate and the teenage birth rate among asylum seekers were higher than average for the Netherlands. Great differences were found between the subgroups by age, region of origin, and length of stay at the reception facilities. Looking at age group and region, 15-19 year olds from WCS Africa and CES Asia had the highest abortion and teenage birth rates. Pregnancies among 30-49 year olds from CES Asia, and to a lesser extent CES Europe, were aborted proportionally much more often than is seen on average in this age group in the Netherlands. Looking at the length of stay, the groups at highest risk of an abortion and of a teenage birth were asylum seekers with a length of stay less than three months and between three and eight months. Abortion and teenage birth rates decreased with increasing length of stay.

**Limitations**

The birth statistics are assumed to be complete, but some abortions may not have come to the knowledge of MOA staff or may not have been reported, causing an underestimate of the total number of abortions. This does not seem to affect the conclusions, however, as this underestimation is unlikely to be related to the variables analysed. The mid-study population data used are an accurate estimate of the person years spent at reception facilities: the number of women aged 15-49 on 1 April 2005 (9,931) is similar to the average monthly population (9,895). Comparison of the mid-year population for various groups by age and region of origin with monthly averages did not reveal great differences either. Indicators for unaccompanied minor asylum seekers (UMAs) could not be calculated due to incompleteness of the UMA-status variable.

**Interpretation and comparison with results from other studies**

For the group with a length of stay less than three months the high abortion rate may relate to unwanted pregnancies conceived shortly before or during the flight. An unknown number of these women got pregnant because they were raped or forced to have sex with police, border guards or other people who took advantage of their vulnerability, had sex in exchange for safety or passage, or simply had a ‘normal’ sex life during the long journey. It is assumed that the low abortion ratio shortly after arrival is mainly a consequence of the fact that, for some women in this group, their pregnancy...
is in a stage where abortion is no longer an option. It may, however, also mean that
women who recently arrived at the reception facilities were less aware of the availability
of abortion services.

The high abortion rate for women with a length of stay of three to eight months implies
a high incidence of unwanted pregnancies and therefore unprotected or insufficiently
protected sex in the first few months after arrival at the reception facilities. Specific ap-
proaches and methods may need to be developed to increase effective prevention of
unwanted pregnancies among newly arrived asylum seekers, especially teenagers, as
for most of them their first concerns are the asylum procedure and practical issues in
their new situation. To do so, more insight is required into why contraceptives are not
used or used incorrectly, the needs of the women concerned, and what they think of the
information and services provided.

The overall abortion rate for asylum seekers with a length of stay of nine months or more
(12.6/1000) is lower than the recent estimate by Sedgh and colleagues for the entire
world (29/1000) and close to the estimate for Western Europe (12/ 1000).14 The abortion
ratio of 232.9 per 1000 live births is lower than the estimate for the world (310/1000) and
at the same level as Western Europe (230/1000). The assumption that the reproductive
health status of asylum seekers is poor is not reflected in the abortion indicators for
female asylum seekers who have been at the reception facilities for a while. This may
be a consequence of the fact that the Netherlands grants asylum seekers full access to
reproductive health services.

The abortion rate and ratio are, as expected, associated with age, but the finding that the
15-19 age group had the highest abortion rate is striking, as the highest abortion rates
are in general found in women in their 20s.8,13 An explanation may be that socioeconom-
ic disadvantage, disrupted family structure, social isolation, and mental vulnerability,
which are known to be risk factors for teenage pregnancy in the general population in
Europe,23,24 affect a large proportion of teenage asylum seekers. In addition, young girls
are assumed to be especially vulnerable to sexual abuse, and prostitution.25 The high
teenage birth rates may also be a consequence of the incorrect belief that women who
give birth after arriving in the host country will be granted a residence permit. For UMAs,
the desire to ‘have something of their own’ may be a reason for the high birth rates.26

In line with the existence of worldwide variations in abortion indicators at a regional
or subregional level,14 considerable differences were found in abortion rates and ratios
between asylum seekers from different regions of origin. But the pattern was not consis-
tent across groups by age, region, or length of stay. Some subgroups of asylum seekers,
especially those with longer lengths of stay, had lower abortion and teenage birth rates than women in the countries of origin. This is also seen among labour migrants in Europe and women in refugee camps in the regions of origin.12 Whereas Eastern Europe is the region with the highest abortion rate and ratio worldwide,14 the abortion rate found among asylum seekers from this region was relatively low and the abortion ratio only high among 30-49 year olds. The highest abortion and teenage birth rates were found among teenage asylum seekers from WCS Africa and CES Asia. These are also the regions with the highest teenage birth rates in the world.27 But although the teenage birth rate for girls in NEH Africa and M East/SW Asia is high, the abortion and birth rates for asylum seekers were relatively low. One explanation may be that childbearing among unmarried adolescents is more common in sub-Saharan Africa than in NEH Africa and M East/SW Asia.27

The decrease of the abortion rate as the length of stay at reception facilities increased implies that asylum seekers benefit from the reproductive health education and services offered in the Netherlands. But the results in the Netherlands cannot automatically be extrapolated to other countries as only very few countries provide asylum seekers with full access to sexual and reproductive health services.7,9,28 It is worth investigating the reproductive health outcomes among asylum seekers in other countries.

CONCLUSIONS

The present study identified subgroups with high abortion and teenage birth rates: recently arrived women, especially young girls from WCS Africa and CES Asia, are at increased risk. More insight should be generated into why the rates in these groups are so high and good practices should be developed to address the reproductive health needs of these groups. The considerable overlap between asylum seeker populations in different host countries calls for international collaboration in this field.

ACKNOWLEDGEMENTS

We thank the nurse practitioners from the Community Health Services for Asylum Seekers (MOA) who provided the study data and the Central Agency for the Reception of Asylum Seekers that provided the population data and the live birth data. We also thank Chris Schouten, Irene van Oostrum, Mirjanne Kessels (Community Health Services for Asylum Seekers) and Mandy Savage who commented on the manuscript.
REFERENCES


Section 2.5

HIV prevalence among pregnant asylum seekers in the Netherlands; a nationwide study based on antenatal HIV tests

This study has been submitted as:

Goosen S, Hoebe JPA, Waldhofer Q, Kunst AE. HIV prevalence among pregnant asylum seekers in the Netherlands; a nationwide study based on antenatal HIV tests.
ABSTRACT

Background
Migrants are a key population for tackling HIV/AIDS in Europe. Data on the HIV prevalence among asylum seekers, however, are scarce. The aim of this study is to map the HIV prevalence among pregnant asylum seekers in the Netherlands.

Methods
We used a nationwide electronic medical records database from the community health services for asylum seekers (MOA). The study population consisted of 4,854 women who delivered in asylum reception between 2000 and 2008. Case allocation was based on ICPC-codes and health problem descriptions.

Results
The number of women that was HIV positive during their last pregnancy was 80, of which 79 originated from sub-Saharan Africa. The prevalence for women from this region of origin was 3.4%. Among women from all other regions of origin, the prevalence was 0.04%. The highest HIV prevalence rates were found for women from Rwanda (17.0%) and Cameroon (13.2%). HIV prevalence rates were higher among women who arrived in reception without partner (RR=1.82; 95%CI 0.75-4.44) and unaccompanied minors (RR=2.59; 95%CI 0.79-8.49) compared to women who arrived in reception with partner.

Conclusions
We conclude that the HIV prevalence is high among pregnant asylum seekers from sub-Saharan Africa and at the same level as in the host population for asylum seekers from other regions. The high HIV prevalence among sub-Saharan African asylum seekers underlines the importance of offering all newly arriving sub-Saharan African asylum seekers a voluntary HIV test.
INTRODUCTION

The European Action Plan for HIV/AIDS 2012-2015 of the World Health Organization (WHO) asserts that there is a pressing need to tackle the public health challenge of HIV in Europe.¹ Migrants are identified as a key population at high risk.¹ In Western Europe between 20 and 40% of the reported HIV infections concerns migrants.² Ninety-three percent of the 5,429 recorded cases of HIV cases among migrants in 2006 originated from sub-Saharan Africa.²

In the Netherlands in 2007, the overall antenatal HIV prevalence was 0.05% and 67% of the women with a positive antenatal HIV test originated from countries with a generalised HIV epidemic, mainly sub-Saharan Africa.³ Ninety-one percent of the children born HIV positive in the Netherlands had one or both parents originating from an HIV endemic country.⁴

High HIV prevalence rates among migrants are attributed to a combination of the HIV epidemiology in the countries of origin, specific vulnerabilities associated with the migration process, and inequalities in access to HIV prevention and treatment in the host country.⁵ Asylum seekers may be particularly affected by HIV as their displacement may have resulted in reduced access to HIV prevention services, disruption of social networks, and increased exposure to sexual violence and sex in return for food and shelter.⁶ Studies in the regions of origin show that the relationship between displacement and HIV infection may vary depending on the context.⁷

Understanding the distribution and the determinants of HIV/AIDS in Europe’s migrant population is crucial for developing appropriate preventive and healthcare services, and informing public health policy.⁸ Nevertheless, very few countries have data on HIV prevalence among migrant populations.⁹ A recent review concluded that countries should improve the availability of HIV prevalence data for migrants, especially for groups that may be particularly vulnerable.¹⁰

Asylum seekers constitute a large population potentially at risk for HIV/AIDS. The number of asylum requests in the 27 European Union countries was just over 300,000 in 2011. (Eurostat, accessed 16 Dec 2013). The few European studies that reported HIV prevalence rates among asylum seekers are based on small samples. In a UK study 11 out of 288 asylum seekers were HIV positive (3.9%), in Italy 8 out of 529 (1.5%).¹¹,¹² In the United States the HIV prevalence among 17,013 resettled refugees was 1.0%.¹³ In the Netherlands the age standardised mortality ratio (SMR) due to AIDS for asylum seekers compared to the general population was 14.04 for males (95%CI 6.75-25.90) and 39.99 for females (95%CI 14.68-87.06).¹⁴ Nearly all cases in these studies originated from Africa.
Other studies did not provide data by for example age, country of origin, and family composition although it is likely that considerable differences in HIV prevalence exist within the asylum population.\textsuperscript{15}

The aim of this study is to map the prevalence of HIV among pregnant asylum seekers by age, country of origin, family composition, and the migration phase at the time of conception.

**METHODS**

**Context**

Asylum seekers in the Netherlands are provided accommodation in centres managed by the Central Agency for the Reception of asylum seekers (COA). They have similar health-care entitlements as residents of the Netherlands.\textsuperscript{16} From January 2000 until December 2008 COA contracted the MOA for providing public health services and nursing care for all asylum seekers in the Netherlands. MOA nurses and public health physicians worked in close collaboration with family practitioners who were contracted by a health insurance company. Family practitioners referred pregnant asylum seekers to mainstream midwives, who offered antenatal services in line with the Dutch standards.

MOA offered all asylum seekers a non-mandatory health assessment within six weeks after arrival. HIV-counselling and testing were offered in case of risk factors, e.g. sexual violence, paid sex. MOA also offered health promotion on HIV and Sexually Transmitted Infections (STIs).

The antenatal HIV screening policy in the Netherlands up to 2004 was aimed at women at increased risk of HIV, the so called targeted-selective-screening.\textsuperscript{17} As of January 2004 the policy changed to universal antenatal HIV testing.\textsuperscript{3,17} This means that at the first antenatal visit, preferably before the 13th week of pregnancy, every woman was offered an HIV test according the opt-out principle.\textsuperscript{3,17} The national participation rate for HIV screening between 2006 and 2008 was 99.8\%.\textsuperscript{3} No coverage data are available for asylum seekers.

**Study population and case definition**

The MOA database contains nationwide longitudinal health care data of MOA and family practitioners, and demographic and reception data of COA for the period 2000-2008.\textsuperscript{18} We selected all women who arrived in the Netherlands between 1 January 2000 and 31 December 2008 who gave birth to at least one child during their stay in reception.
MOA staff and family physicians used the problem-oriented record (POR) method. In the POR method, main and chronic health problems are recorded on the problem list along with the International Classification of Primary Care (ICPC) code, date of diagnosis, and a short open field description. MOA staff entered problem list data from paper medical records in the electronic medical record system. The dataset contains a family number that allows linkage between family members.

HIV case attribution started with identification of HIV status based on ICPC-code B90 or open field descriptions with the text ‘HIV’ or ‘AIDS’. The consistency between the ICPC-code and the open field description was manually checked. For 7 women their medical record contained ICPC-code B90 but the open field text referred to a negative HIV test without any further indication of HIV status. These women were not allocated case status. The records of 6 women did not include B90 but the open field description contained a clear description of HIV diagnosis. These women were allocated case status.

The total number of HIV positive women was 81. For 75 of these women the date of diagnosis was before the date of their last delivery in reception; they were allocated case status. For 3 women the date of HIV diagnosis was within two months after delivery; they were also allocated case status. For 3 women the time between delivery and recording of HIV status was longer. For 2 of these women, their child was also recorded to be HIV positive with a diagnosis date around the same date as the mother (4 and 7 months after delivery). These women were allocated case status because of the likelihood that they were HIV positive during pregnancy. The third woman was diagnosed four years after delivery and was not allocated case status.

A dataset was also made for the children who were born in reception in order to calculate the mother-to-child-transmission rate (MTCT). HIV case status allocation followed the same approach as for the mothers.

**Independent variables**

Family composition distinguishes the women in the study at two levels. Firstly it distinguishes whether at arrival the woman was an unaccompanied minor asylum seeker (UMA: a child who has been separated from both parents and relatives, and are not being cared for by an adult who, by law or custom, is responsible for doing so). Secondly, for the non-UMA women it distinguishes women who arrived in reception with partner from women who arrived without partner. The migration phase at the time of conception measures when the woman got pregnant: before arrival in the Netherlands, in the first year after arrival in the Netherlands or longer after arrival.
Section 2.5

The HIV testing policy at first antenatal consultation distinguishes pregnancies for which the first antenatal consultation theoretically fell before and after the implementation of universal antenatal HIV testing in the Netherlands. It was based on delivery before and after 1 July 2004 as the first consultation preferably takes place before 13 weeks of pregnancy.

‘Country of origin’ is the country recorded by the immigration department; in general, this is the country of nationality. Only countries with 30 or more women in the study population were analysed separately. Regions were grouped following the World Bank classification (http://data.worldbank.org/about/country-classifications/country-and-lending-groups).

Analysis

HIV-prevalence rates were calculated in percentages. Binary logistic regression was used to calculate odds ratios (OR) that express associations with the likelihood of HIV/AIDS for age, family composition, country of origin, migration phase and HIV testing policy after correction for the other variables. Statistical Software SPSS (IBM Inc., Version 20.0, Somers, NY, USA) was used for all analyses.

RESULTS

The study population consisted of 4,854 women who delivered during their stay in reception. Demographic characteristics of these women are presented in Table 2.5.1. The total number of HIV positive women was 80; the overall HIV prevalence for asylum seekers at the time of the last delivery in reception was 1.6%. Seventy-nine of the HIV positive women originated from sub-Saharan Africa (98.8%). The HIV prevalence among the 2,308 women from sub-Saharan Africa was 3.4%. One HIV positive woman was recorded among the 2,546 women from the other regions of origin (prevalence 0.04%). The main countries of origin of these women were Afghanistan (454 women), Iran (129), Iraq (470), China (242), countries of the former Soviet Union (518) and Syria (96).

Because of the concentration of the cases in sub-Saharan African women, further analyses were restricted to this group (Table 2.5.2). The HIV prevalence tended to be higher among women who arrived in reception without partner (3.4%) and among UMAs (4.5%) than among women who arrived with partner (1.7%). The differences were however, not statistically significant (Table 2.5.2).
**Table 2.5.1** Characteristics of asylum seekers who delivered during their stay in asylum reception in the Netherlands, 2000-2008

<table>
<thead>
<tr>
<th>Number of women who delivered in reception</th>
<th>% of all women</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All women</strong></td>
<td>4,854</td>
</tr>
<tr>
<td><strong>Age group at delivery</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;= 19</td>
<td>831</td>
</tr>
<tr>
<td>20-29</td>
<td>2,654</td>
</tr>
<tr>
<td>30-49</td>
<td>1,369</td>
</tr>
<tr>
<td><strong>Family composition</strong></td>
<td></td>
</tr>
<tr>
<td>Woman who arrived with partner*</td>
<td>1,178</td>
</tr>
<tr>
<td>Woman who arrived without partner*</td>
<td>2,250</td>
</tr>
<tr>
<td>Unaccompanied minor asylum seeker</td>
<td>826</td>
</tr>
<tr>
<td><strong>Region of origin</strong></td>
<td></td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>2,308</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>871</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>753</td>
</tr>
<tr>
<td>South Asia</td>
<td>504</td>
</tr>
<tr>
<td>East Asia and Pacific</td>
<td>255</td>
</tr>
<tr>
<td>Latin America and Caribbean</td>
<td>20</td>
</tr>
<tr>
<td>Stateless and unknown</td>
<td>143</td>
</tr>
<tr>
<td><strong>Migration phase at time of conception</strong></td>
<td></td>
</tr>
<tr>
<td>Before arrival in the Netherlands</td>
<td>2,028</td>
</tr>
<tr>
<td>Within 1 year after arrival</td>
<td>1,267</td>
</tr>
<tr>
<td>As of 1 year after arrival</td>
<td>1,559</td>
</tr>
<tr>
<td><strong>HIV testing policy at 1st antenatal consultation</strong></td>
<td></td>
</tr>
<tr>
<td>Selective</td>
<td>3,145</td>
</tr>
<tr>
<td>Universal</td>
<td>1,709</td>
</tr>
</tbody>
</table>

* Excluding UMAs

Before the implementation of universal HIV testing in 2004, the HIV prevalence was 3.3%. After implementation the prevalence was 3.6%. After correction for the demographic variables, the small prevalence difference was not statistically significant (Table 2.5.2). Only small prevalence differences were observed in relationship to time of conception (Table 2.5.2).

The HIV prevalence for women from sub-Saharan Africa ranged from 1.1% for women from Nigeria to 17.0% for women from Rwanda (Table 2.5.2). The highest prevalence rates were found for women from Rwanda, Cameroon, and Burundi. The lowest rates were found for women from Angola, Nigeria, Somalia and Sudan (Table 2.5.2). The multivariate analysis shows that differences between the countries cannot be explained
Table 2.5.2 HIV prevalence and association with demographic and pregnancy related variables among women from sub-Saharan Africa

<table>
<thead>
<tr>
<th></th>
<th>Number of HIV-positive women</th>
<th>Total number of women</th>
<th>HIV prevalence (%)</th>
<th>Odds ratio*</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>*<em>Age at delivery</em> **</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-19</td>
<td>24</td>
<td>551</td>
<td>4.4</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>20-29</td>
<td>37</td>
<td>1,308</td>
<td>2.8</td>
<td>0.89</td>
<td>0.36-2.18</td>
</tr>
<tr>
<td>30-49</td>
<td>18</td>
<td>449</td>
<td>4.0</td>
<td>1.36</td>
<td>0.47-3.95</td>
</tr>
<tr>
<td><strong>Family composition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woman who arrived with partner**</td>
<td>6</td>
<td>347</td>
<td>1.7</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Woman who arrived without partner**</td>
<td>46</td>
<td>1,367</td>
<td>3.4</td>
<td>1.82</td>
<td>0.75-4.44</td>
</tr>
<tr>
<td>Unaccompanied minor asylum seeker</td>
<td>27</td>
<td>594</td>
<td>4.5</td>
<td>2.59</td>
<td>0.79-8.49</td>
</tr>
<tr>
<td><strong>Country of origin</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angola</td>
<td>9</td>
<td>497</td>
<td>1.8</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Burundi</td>
<td>9</td>
<td>108</td>
<td>8.3</td>
<td>4.58</td>
<td>1.70-12.30</td>
</tr>
<tr>
<td>Cameroon</td>
<td>5</td>
<td>38</td>
<td>13.2</td>
<td>7.63</td>
<td>2.40-24.28</td>
</tr>
<tr>
<td>DR Congo</td>
<td>8</td>
<td>254</td>
<td>3.1</td>
<td>1.64</td>
<td>0.62-4.34</td>
</tr>
<tr>
<td>Eritrea</td>
<td>1</td>
<td>44</td>
<td>2.3</td>
<td>1.19</td>
<td>0.15-9.81</td>
</tr>
<tr>
<td>Guinea</td>
<td>6</td>
<td>154</td>
<td>3.9</td>
<td>1.76</td>
<td>0.60-5.21</td>
</tr>
<tr>
<td>Ivory Coast</td>
<td>4</td>
<td>51</td>
<td>7.8</td>
<td>3.65</td>
<td>1.04-12.79</td>
</tr>
<tr>
<td>Liberia</td>
<td>4</td>
<td>69</td>
<td>5.8</td>
<td>3.04</td>
<td>0.89-10.42</td>
</tr>
<tr>
<td>Nigeria</td>
<td>1</td>
<td>87</td>
<td>1.1</td>
<td>0.60</td>
<td>0.08-4.88</td>
</tr>
<tr>
<td>Rwanda</td>
<td>8</td>
<td>47</td>
<td>17.0</td>
<td>11.84</td>
<td>4.25-32.95</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>10</td>
<td>257</td>
<td>3.9</td>
<td>1.95</td>
<td>0.77-4.93</td>
</tr>
<tr>
<td>Somalia</td>
<td>7</td>
<td>401</td>
<td>1.7</td>
<td>0.94</td>
<td>0.33-2.66</td>
</tr>
<tr>
<td>Sudan</td>
<td>3</td>
<td>180</td>
<td>1.7</td>
<td>0.99</td>
<td>0.26-3.74</td>
</tr>
<tr>
<td>Togo</td>
<td>2</td>
<td>49</td>
<td>4.1</td>
<td>1.86</td>
<td>0.38-9.02</td>
</tr>
<tr>
<td>Other sub-Saharan countries</td>
<td>2</td>
<td>72</td>
<td>2.8</td>
<td>1.42</td>
<td>0.30-6.79</td>
</tr>
<tr>
<td><strong>Migration phase at time of conception</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before arrival in the Netherlands</td>
<td>34</td>
<td>1,056</td>
<td>3.2</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Within one year after arrival</td>
<td>22</td>
<td>588</td>
<td>3.7</td>
<td>1.15</td>
<td>0.66-2.01</td>
</tr>
<tr>
<td>As of one year after arrival</td>
<td>23</td>
<td>664</td>
<td>3.5</td>
<td>0.96</td>
<td>0.52-1.77</td>
</tr>
<tr>
<td><strong>HIV testing policy at time 1st antenatal consultation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selective</td>
<td>50</td>
<td>1,506</td>
<td>3.3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Universal</td>
<td>29</td>
<td>802</td>
<td>3.6</td>
<td>1.13</td>
<td>0.66-1.93</td>
</tr>
</tbody>
</table>

* Based on multivariate model including all variables in this table
** Excluding UMAs
by the other variables in the model like family composition and migration phase (Table 2.5.2).

Among the UMAs the highest prevalence rates were found for girls from Democratic Republic of Congo, Sierra Leone and the ‘Other countries’ group (Table 2.5.3). The highest prevalence was found among the UMAs who got pregnant in the first year after arrival in the Netherlands (Table 2.5.3). The prevalence in this group (8.3%) was three times higher than in UMAs that were pregnant at arrival (95%CI 1.17-7.75).

Among the 384 sub-Saharan Africa women who gave birth to more than one child during their stay in reception, 13 were HIV positive at the last delivery in reception (3.4%). Four of these women (30.8%) were not recorded HIV positive at their first pregnancy in reception.

Six of the children born to an HIV-positive mother were recorded to be HIV positive at birth. They were all born before the implementation of the universal antenatal HIV screening in July 2004. During this period of the study 62 children were born to an HIV positive mother; the MTCT rate was 9.8%.

| Table 2.5.3 HIV prevalence and association with demographic and pregnancy related variables among unaccompanied minor asylum seekers from sub-Saharan Africa |
|--------------------------|--------------------------|------------------|------------------|
|                          | Number of HIV-positive women | Number of women | HIV prevalence (%) | Odds ratio* | 95% CI    |
| **Country of origin**    |                          |                 |                  |            |           |
| Angola                   | 2                        | 130             | 1.5              | 1          | 0.92-29.68 |
| DR Congo                 | 4                        | 56              | 7.1              | 5.22       | 0.19-10.03 |
| Guinea                   | 2                        | 97              | 2.1              | 1.36       | 0.73-18.97 |
| Sierra Leone             | 6                        | 107             | 5.6              | 3.72       | 0.52-4.38  |
| Other countries          | 13                       | 204             | 6.4              | 4.59       | 1.00-20.99 |
| **Migration phase at time of conception** | | | | | |
| Before arrival in the Netherlands | 8 | 260 | 3.1 | 1 | - |
| Within one year after arrival | 11 | 132 | 8.3 | 3.00 | 1.17-7.75 |
| As of one year after arrival | 8 | 202 | 4.0 | 1.50 | 0.52-4.38 |
| **HIV testing policy at time 1st antenatal consultation** | | | | | |
| Selective                | 20                       | 401             | 5.0              | 1          | -           |
| Universal                | 7                        | 193             | 3.6              | 0.68       | 0.26-1.83  |

* Based on multivariate model including all variables in this table
DISCUSSION

The prevalence of HIV among pregnant women from sub-Saharan Africa who gave birth during their stay in asylum reception was 3.4%. Among women from all other regions the prevalence was 0.04%. Of all women who were HIV positive, 98.8% originated from sub-Sahara Africa. The HIV prevalence among sub-Saharan African women was higher among those who arrived in reception without partner and especially among UMAs. The prevalence of HIV ranged from between 1% and 2% for women from Nigeria, Somalia and Sudan to more than 10% for women from Cameroon and Rwanda.

Strengths and limitations

Strengths of this study are the large number of women that could be included in the study, the nationwide coverage, the availability of demographic and pregnancy data, and the availability of data under a policy of universal antenatal HIV testing during the second half of the study.

This study also has certain limitations. The results for subgroups (e.g. by country of origin) have to be interpreted with caution in light of the wide confidence intervals. The recording of HIV diagnoses on the medical problem list may have been incomplete because results from antenatal screening may not always have been communicated to MOA or the family physician. This may have resulted in underestimation of HIV prevalence rates.

Furthermore the HIV prevalence rates may have been influenced by the absence of data for pregnancies that were not carried to term. The induced abortion rate among asylum seekers in the Netherlands has been reported to be 222 per 1,000 live births in 2004-2005. HIV positive women might have terminated their pregnancy more often than other women. The influence of induced abortions may have differed between countries of origin and age groups because of variations in abortion ratios.

The change in HIV testing policy in July 2004 from selective to opting-out policies may in theory have influenced the results. However, the data suggest that the uptake of HIV testing was already high before 2004.

Rates of HIV infection among women attending antenatal care are generally considered to be a proxy for the HIV prevalence in the general population. However, it is uncertain whether this also applies to asylum populations. Women may be particularly vulnerable to HIV infection in times of war and during their flight towards other countries. In addition, asylum seekers are relatively young and more often male and single. The association between the antenatal care and HIV prevalence may therefore be different in this population compared to what is generally reported.
Interpretation

The HIV prevalence among women from sub-Saharan Africa (3.4%) was much higher than the overall antenatal HIV prevalence in the Netherlands (prevalence 0.04%; OR=82.5; 95%CI 63.7-106.7). For the other regions of origin, the antenatal prevalence was similar to the Netherlands (OR=0.92; 95%CI 0.13-6.52) although the number of deliveries was too small to obtain a precise estimate of the HIV prevalence.

Table 2.5.4 shows the HIV prevalence rates we found for the sub-Saharan African countries together with prevalence rates for the countries of origin (for national populations and for refugees from these countries in refugee camps in sub-Saharan Africa) as far as available in the international literature. Although the size of this study is too small for strong conclusions results in table 2.5.4 suggest that the prevalence rates among asylum seekers in the Netherlands are similar or somewhat higher than the prevalence rates found in the countries of origin and in the refugee camps.

The mechanisms that may have caused the differences between prevalence rates in the countries of origin and those found in our study can be manifold. Rwanda is a good illustration. There is large difference between the prevalence found for Rwandese asy-
lum seekers in the Netherlands (17.0%) and for Rwanda (4.6%). The Rwandese asylum seekers in our study arrived in 2000 and 2001 whereas the comparative data are for 2003-2004. The difference may therefore reflect the strong decrease in HIV prevalence observed in Rwanda between 1998 and 2003. In addition, urban-rural differences in HIV prevalence may have played a role: in 2002 the antenatal HIV prevalence was 13% in Kigali whereas it was 3% in rural settings.

The prevalence rates also show variations between refugee camps. Overall, however, there is little support for the assertions that conflict, forced displacement, and wide-scale rape increase the HIV prevalence in affected populations.

For regions of origin other than sub-Saharan Africa, the antenatal HIV prevalence rate was at the same level as in the Dutch population. The number of women in the study was too small to obtain precise estimates. However, for countries from which most of the asylum seekers originated (Afghanistan, Iran, Iraq, and Syria) the HIV prevalence estimates for the population aged 15-49 years in 2006 were 0.2% or less, which is similar to or lower than the estimate for the Netherlands (0.2%). Only the estimated prevalence in the Russian Federation was higher: 1.1%.

Among women who got pregnant after arrival, HIV prevalence rates were slightly higher than among women who were pregnant at the time of arrival. Although the difference was not statistically significant, the results suggest a higher HIV prevalence among UMAs, which may be a consequence of their particular vulnerability.

The high HIV prevalence among sub-Saharan African UMAs and women who arrived in reception without partner in combination with the high rate of women in these groups who get pregnant shortly after arrival, suggests that as of shortly after arrival interventions aimed at preventing unprotected sex are needed.

The decrease in the MTCT rate from 9.8% before the implementation of universal HIV testing to 0% after implementation in 2004 suggests that this screening policy that was shown to be effective in the general population was also effective in the asylum population.

With respect to the generalisability of the findings to other host countries it has to be taken into account that the composition of the asylum population may differ from the population in this study and that differences between host countries in e.g. reception conditions and health care for asylum seekers may also have an effect on the HIV prevalence in the asylum population.
CONCLUSIONS

The HIV prevalence among pregnant asylum seekers from sub-Saharan Africa is high compared to the host population. Women from this region are a risk group with respect to HIV transmission as of shortly after arrival in the host country. The HIV risk in pregnant asylum seekers from other regions did not differ from the general antenatal population in the Netherlands.

The high HIV prevalence among sub-Saharan African asylum seekers underlines the importance of offering all newly arriving sub-Saharan African asylum seekers a voluntary HIV test.
REFERENCES


(6) United Nations High Commissioner for Refugees. Policy statement on HIV testing and counseling in health facilities for refugees, internally displaced persons and other persons of concern to UNHCR. Geneva; 2009.


