Latent tuberculosis infection screening and treatment among asylum seekers recently arrived in Switzerland. A pilot study in Vaud County

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Conflict of interest: none
Background

► The majority of tuberculosis cases notified in Switzerland are observed among patients born in foreign countries, mostly in young adults, who stay in the country for several months or years.

► The prevalence of latent tuberculosis infection (LTBI) is higher in migrants than in the local population.
► LTBI is asymptomatic therefore not detected by the current border screening.

Source: SFOPH
Detection of LTBI among asylum seekers with a high risk of infection and possible reactivation may prevent future cases of tuberculosis.

Detection of LTBI with Interferon Gamma Release Assays (IGRA) is sensitive, specific, effective but expensive.

Screening all migrants without consideration of the risk factors may not be cost effective.

A more efficient approach would be to assess the risk factors associated with LTBI among the asylum seekers arriving in the host country.

Such an approach would improve the feasibility and the cost effectiveness of screening and preventive treatment.
A two step approach

• Screening for LTBI using IGRA
  - Assess the prevalence of LTBI
  - Assess factors associated with LTBI

• Treat LTBI with appropriate preventive treatment (4R/9INH)
  - Assess completion rates
Methods

POPULATION: asylum seekers referred to Vaud county after border screening

INTERVENTION:
Voluntary screening by IGRA
Preventive treatment prescription in migrants with positive IGRA

DESIGN: prospective cross-sectional study

SETTNGS: Two Asylum Seekers Host Centers (Sainte – Croix, Crissier)

TIMING: September 2009 to July 2010

PROCEDURE:
• Questionnaire and blood sampling for IGRA (T-SPOT. TB) in volunteers by CSI Nurse.
• IGRA +: medical assessment and preventive treatment prescription
Methods

Sainte – Croix Host Center

Crissier Host Center
Study flowchart

788 asylum seekers all ages

639 asylum seekers >16y

393 (61%) agreed screening

295 IGRA – (75%)

98 IGRA + (25%)

5 Active TB
## Collective Screened

<table>
<thead>
<tr>
<th></th>
<th>screened</th>
<th>not screened</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSU</td>
<td>20</td>
<td>33</td>
<td>53</td>
</tr>
<tr>
<td>Balkan</td>
<td>62</td>
<td>45</td>
<td>107</td>
</tr>
<tr>
<td>Asia</td>
<td>127</td>
<td>50</td>
<td>177</td>
</tr>
<tr>
<td>Africa</td>
<td>184</td>
<td>118</td>
<td>301</td>
</tr>
</tbody>
</table>
IGRA spots distribution

![Distribution of Spots]

- 50-100: 17
- 10-50: 71
- 6-9: 10
# Statistical Analysis

(factors associated with positive IGRA)

## Table 1 Univariate analysis

<table>
<thead>
<tr>
<th>Factors</th>
<th>Negative n(%)</th>
<th>Positive n(%)</th>
<th>Odd ratio</th>
<th>(95% Conf. interval)</th>
<th>p&lt;0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean(sd)</td>
<td>29.09</td>
<td>27.63</td>
<td>1.02</td>
<td>0.99 , 1.04</td>
<td>0.179</td>
</tr>
<tr>
<td>Age (by 10 years)</td>
<td>29.09</td>
<td>27.63</td>
<td>1.18</td>
<td>0.93 , 1.49</td>
<td>0.179</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>214</td>
<td>72</td>
<td>1.05</td>
<td>0.62 , 1.76</td>
<td>0.858</td>
</tr>
<tr>
<td><strong>Origin</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>balkanic origin (ref)</strong></td>
<td>54</td>
<td>8</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
</tr>
<tr>
<td>FSU</td>
<td>12</td>
<td>8</td>
<td>4.5</td>
<td>1.41 , 14.4</td>
<td>0.011</td>
</tr>
<tr>
<td>Asia</td>
<td>110</td>
<td>17</td>
<td>1.04</td>
<td>0.42 , 2.57</td>
<td>0.927</td>
</tr>
<tr>
<td>Africa</td>
<td>119</td>
<td>65</td>
<td>3.69</td>
<td>1.65 , 8.22</td>
<td>0.000</td>
</tr>
<tr>
<td>Ground transit</td>
<td>109</td>
<td>60</td>
<td>2.49</td>
<td>1.54 , 4.02</td>
<td>0.000</td>
</tr>
<tr>
<td>Married</td>
<td>124</td>
<td>48</td>
<td>1.34</td>
<td>0.84 , 2.12</td>
<td>0.219</td>
</tr>
<tr>
<td>Siblings</td>
<td>243</td>
<td>73</td>
<td>0.53</td>
<td>0.30 , 0.92</td>
<td>0.025</td>
</tr>
<tr>
<td>Offspring</td>
<td>111</td>
<td>46</td>
<td>1.45</td>
<td>0.91 , 2.32</td>
<td>0.116</td>
</tr>
<tr>
<td>Congregate settings</td>
<td>96</td>
<td>34</td>
<td>1.1</td>
<td>0.68 , 1.78</td>
<td>0.695</td>
</tr>
<tr>
<td>Addictions</td>
<td>138</td>
<td>54</td>
<td>1.4</td>
<td>0.88 , 2.21</td>
<td>0.154</td>
</tr>
<tr>
<td>Immunosuppresion</td>
<td>19</td>
<td>7</td>
<td>1.3</td>
<td>0.46 , 2.78</td>
<td>0.79</td>
</tr>
<tr>
<td>Prev. TB exposure</td>
<td>12</td>
<td>9</td>
<td>2.38</td>
<td>0.97 , 5.84</td>
<td>0.057</td>
</tr>
<tr>
<td>Cough</td>
<td>17</td>
<td>12</td>
<td>2.3</td>
<td>1.05 , 5.01</td>
<td>0.036</td>
</tr>
</tbody>
</table>

## Table 2 Multivariate logistic regression

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Odds ratio</th>
<th>(95% Conf. interval)</th>
<th>p&lt;0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (by 10 years)</td>
<td>1.37</td>
<td>0.99 , 1.88</td>
<td>0.054</td>
</tr>
<tr>
<td>Origin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>balkanic (ref)</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
</tr>
<tr>
<td>FSU</td>
<td>12.54</td>
<td>2.02 , 77.9</td>
<td>0.007</td>
</tr>
<tr>
<td>Asia</td>
<td>2.63</td>
<td>0.49 , 14.12</td>
<td>0.26</td>
</tr>
<tr>
<td>Africa</td>
<td>26.11</td>
<td>5.04 , 135.43</td>
<td>0.000</td>
</tr>
<tr>
<td>Ground transit</td>
<td>2.42</td>
<td>1.34 , 4.37</td>
<td>0.003</td>
</tr>
<tr>
<td>Married</td>
<td>2</td>
<td>1.01 , 3.82</td>
<td>0.038</td>
</tr>
<tr>
<td>Prev. TB exposure</td>
<td>1.94</td>
<td>0.65 , 5.72</td>
<td>0.233</td>
</tr>
<tr>
<td>Cough</td>
<td>8.08</td>
<td>2.63 , 24.87</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**FSU: Former Soviet Union**
Predictive score

\[
\begin{align*}
\text{African} & : 7^+ \\
\text{Asian} & : 3^+ \\
\text{FSU} & : 9^+ \\
\text{Balkan} & : \text{n.a.}^* \\
\end{align*}
\]

\[
\text{Age (years)/10 + 3\alpha + 6\beta + 2\gamma + 2\delta} \left\{ \begin{array}{l}
>13 \text{ perform IGRA screening} \\
<13 \text{ no IGRA screening} \\
\end{array} \right.
\]

\[
\begin{align*}
\alpha & = \text{ground transition: yes} = 1, \text{no} = 0 \\
\beta & = \text{cough: yes} = 1, \text{no} = 0 \\
\gamma & = \text{married status: yes} = 1, \text{no} = 0 \\
\delta & = \text{previous TB exposure: yes} = 1, \text{no} = 0 \\
\end{align*}
\]

* Balkan asylum seekers demonstrate similar LTBI/TB prevalence as native population
ROC – Cutoff of 13

Area under ROC curve = 0.8140
Preventive treatment completion

**fig. 1: Preventive treatment completion flowchart**

639
Adult asylum seekers attributed to Vaud county after border screening

393
Screened by T-SPOT.TB

98 (24.9%)
IGRA +

87
Medical examination and Chest X-ray

75
Started preventive treatment (74: 4R, 1:9H)

60 (80%)
Completed preventive treatment

246
Not screened

295
Negative

11
No Medical Examination (disappeared)

5 anti-TB treatment (3 confirmed by culture)
2 previous treated TB
2 counter-indication to preventive treatment
3 other diseases

13 non adherent
2 discontinuation for substance abuse
Drop out evolution

fig. II. Follow up evolution

T spot + 98
To 87
4R or 9H 75
1st check 70
2nd check 67
3rd check 60

60/75 = 80%
Limitations

Limited sample of asylum seekers
But representative!

Two Immigration host centers
The biggest of Vaud County!

Vaud County
Host to 9% of the total asylum seeker population, random selection!

Highly volatile population, drop-outs before the medical examination
But we made it!
Conclusions

• LTBI is frequent in the migrant population (reactivation will take place in this group)
• Travel conditions increase the risk of LTBI (recent infection probably in young migrants)
• Factors associated with LTBI can be defined
• Preventive treatment is possible with a high rate of completion
• Screening a selected population of migrants with high risk of development of TB could be considered

Factors associated with latent tuberculosis among asylum seekers in Switzerland: a cross-sectional study in Vaud County

Apostolos Sarivalasis¹*, Jean-Pierre Zellweger², Mohamed Faouzi³, Oscar Daher⁴, Charlotte Deslarzes⁵ and Patrick Bodenmann¹

High rate of completion of preventive therapy for latent tuberculosis infection among asylum seekers, Switzerland

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