Refugee health: the infection implications.

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Where refugees are and come from.
Europe and refugees (UNHCR/FT)

- Refugees not evenly distributed across Europe.

- Historical and linguistic ties mean strong geographical biases / concentrations of particular groups.
Often highly concentrated within a country (HPA)

- Clustering within urban centres, and often specific areas.

The map shows the areas of London in which the eight largest foreign-born nationalities in the capital are most prevalent according to the 2011 Census. Census output areas are shaded according to the most prevalent country of birth other than the UK.* The 20 biggest first-generation communities are from (in order of size): India, Poland, Ireland, Nigeria, Pakistan, Bangladesh, Jamaica, Sri Lanka, France, Somalia, Kenya, United States, Ghana, Italy, Turkey, South Africa, Germany, Australia, Romania and the Philippines.

*Shaded districts are built-up areas excluding roads, parks and bodies of water but including non-residential buildings.
Source: Office for National Statistics, Ordnance Survey, FT research
Non-infectious health issues which may be more common among refugees.

- Psychological distress common - although does not necessarily translate into mental illness.
- Physical effects of war, torture, deprivation.
- Physical effects of the journey.
- Poverty - may be new.
- Lack of planning.
- Social networks.
- Language.
Mental health needs to be taken into account in management.

• Systematic review in children: prevalence of post-traumatic stress disorder from 19 to 54%, depression from 3 to 30%. (Brontein & Montgomery 2011).

• Evidence base is quite weak, often more advocacy or anecdote than science.
Some UK notifiable diseases

- Acute encephalitis
- Acute infectious hepatitis
- Acute meningitis
- Brucellosis
- Cholera
- Diphtheria
- Enteric fever (typhoid or paratyphoid fever)
- Food poisoning
- Infectious bloody diarrhoea
- Invasive group A streptococcal disease
- Legionnaires’ disease
- Leprosy
- Malaria
- Measles

- Meningococcal septicaemia
- Mumps
- Plague
- Rabies
- Rubella
- Severe Acute Respiratory Syndrome (SARS)
- Scarlet fever
- Tetanus
- Tuberculosis
- Typhus
- Viral haemorrhagic fever (VHF)
- Whooping cough
- Yellow fever
Refugee-producing countries vary in their infectious risks.
What may differentiate refugees from other migrants- refugee camps.

Refugee camps are generally crowded and difficult environments. Possible effects:

• Respiratory- especially tuberculosis.
• Sanitation- including diarrheal diseases, scabies.
• Sexually transmitted infections, including HIV?
• Vector-borne diseases- typhus, malaria.
Malnutrition and mortality patterns among internally displaced and non-displaced population living in a camp, a village or a town in Eastern Chad.

Guerrier et al PLoS One 2009

- Crude Mortality Rate among the camps, NDPs living in a village and 4073 NDPs living in a town surveyed was 1.8, 0.3, 0.3 per 10,000 per day, respectively.

- The U5MR was 4.1, 0.5 and 0.7 respectively.

- Acute malnutrition rates in children were 20.6%, 16.4%, and 10.1% respectively.
Recent data on refugee camps compared to reference populations

• **TB** (systematic review): incidence or prevalence ratios were 2 or higher for 11 of 15 reports. *(Kimbrough et al 2012, Lancet ID)*

• **HIV** (systematic review): Whilst multiple increased risk factors for HIV, no good evidence that prevalence is higher than the general population in most studies. Of 12 sets of refugee camps, 9 had a lower prevalence of HIV infection, 2 a similar, and one a higher prevalence than their host communities. *(Spiegel et al 2007, Lancet)*

• **Diarrhoeal diseases** (review). Diarrhoeal disease incidence higher, but mortality lower, in refugee camps in Africa. *(Cronin et al J Water Health 2009)*
What may differentiate refugees from other migrants - long overland or sea routes.

- Prolonged exposure to rural environments in the open.
- Malaria, trypanosomaisis, strongyloides, leshmaniasis.
- Malnutrition - eg TB, measles.
What may differentiate refugees from other migrants- marginalised groups.

- In prolonged conflicts (eg Darfur, DRC) marginalised groups less likely to have preventive medical services (active or passive).
- Vaccine-preventable diseases.
- Sanitation.
- Sexual violence.
When do the (infectious) effects of being a refugee wane? Some examples.

- Not until diagnosed or treated: HIV, strongyloides.
- Potentially not for many years: TB, Hepatitis B/C, leishmaniasis.
- Within a few months: malaria
- Within a few weeks: acute bacterial and viral infections eg typhoid.

- Refugees may do very well in society over time.
Infectious disease mortality compared to Danish population. HR 29,139 refugees, 27134 immigrants. *(Norredam et al 2012.)*

<table>
<thead>
<tr>
<th>Origin</th>
<th>Female refugee</th>
<th>Female immigrant</th>
<th>Male refugee</th>
<th>Male immigrant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>0</td>
<td>0.8</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Iraq</td>
<td>2.3</td>
<td>0</td>
<td>0.5</td>
<td>0</td>
</tr>
<tr>
<td>Middle East</td>
<td>0</td>
<td>0</td>
<td>0.7</td>
<td>1.3</td>
</tr>
<tr>
<td>North Africa</td>
<td>18.4</td>
<td>2.9</td>
<td>9.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>195.7</td>
<td>22.5</td>
<td>8.1</td>
<td>10.2</td>
</tr>
</tbody>
</table>
Data on refugees in Europe not always available. Some North American data useful. Minnesota and Dakota *(Swanson et al NEJM 2012)*

<table>
<thead>
<tr>
<th>Intestinal parasite</th>
<th>Africa (1655) (%)</th>
<th>Southeast Asia (2755) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ascaris</td>
<td>3.7</td>
<td>3.4</td>
</tr>
<tr>
<td>Hookworm</td>
<td>6.7</td>
<td>10.7</td>
</tr>
<tr>
<td>Trichurius</td>
<td>17.2</td>
<td>3.2</td>
</tr>
<tr>
<td>Strongyloides</td>
<td>0.7</td>
<td>3.8</td>
</tr>
<tr>
<td>Any nematode</td>
<td>24.5</td>
<td>18.6</td>
</tr>
<tr>
<td>Multiple nematodes</td>
<td>3.4</td>
<td>2.9</td>
</tr>
<tr>
<td>Schistosoma</td>
<td>5.6</td>
<td>0</td>
</tr>
<tr>
<td>Giardia</td>
<td>7.4</td>
<td>11.7</td>
</tr>
<tr>
<td><em>E Histoytica/dispar</em></td>
<td>0.4</td>
<td>1.1</td>
</tr>
</tbody>
</table>
UK data- systematic review asylum seekers and refugees (Clark & Mytton 2007)

• 3 studies TB, prevalence 1.3-10.4 / 1000
• 3 studies Hep B 57-118 / 1000
• 1 study HIV 38.2 / 1000

• All in selected populations

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Studies</th>
<th>Unadjusted OR (95% CI)</th>
<th>P Value</th>
<th>Adjusted OR (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immigrant Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immigrant</td>
<td>36</td>
<td>Reference</td>
<td></td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>Refugee</td>
<td>53</td>
<td>1.71 (1.18 to 2.49)</td>
<td>0.005</td>
<td>1.42 (1.01 to 1.99)</td>
<td>0.042</td>
</tr>
<tr>
<td>Region of Origin&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latin America</td>
<td>16</td>
<td>Reference</td>
<td></td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>35</td>
<td>2.32 (1.99 to 2.69)</td>
<td>&lt;0.001</td>
<td>2.29 (1.97 to 2.67)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Middle East</td>
<td>15</td>
<td>1.34 (1.14 to 1.58)</td>
<td>&lt;0.001</td>
<td>1.34 (1.14 to 1.58)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>31</td>
<td>6.71 (5.84 to 7.71)</td>
<td>&lt;0.001</td>
<td>6.68 (5.81 to 7.68)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>South Asia</td>
<td>9</td>
<td>3.72 (2.72 to 5.10)</td>
<td>&lt;0.001</td>
<td>3.76 (2.75 to 5.15)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>East Asia</td>
<td>39</td>
<td>10.8 (9.45 to 12.3)</td>
<td>&lt;0.001</td>
<td>10.8 (9.44 to 12.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Decade of Study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980s</td>
<td>29</td>
<td>Reference</td>
<td></td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>1990s</td>
<td>24</td>
<td>0.81 (0.50 to 1.32)</td>
<td>0.40</td>
<td>1.58 (1.03 to 2.43)</td>
<td>0.035</td>
</tr>
<tr>
<td>2000s</td>
<td>36</td>
<td>0.59 (0.38 to 0.92)</td>
<td>0.02</td>
<td>1.17 (0.80 to 1.74)</td>
<td>0.41</td>
</tr>
</tbody>
</table>

Three studies of the 110 total studies were dropped because they did not report separate estimates for refugees and immigrants, and a further 18 studies were dropped because they did not report separate estimates for the different region of origins within that study. A total of 89 studies were included in the random-effects logistic regression. CI = Confidence Interval. OR = Odds Ratio.

<sup>a</sup>The sum of the total number of studies for each origin is greater than 89 because several studies reported more than one origin.

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Hepatitis B migrants W Europe (Rossi et al)
Refugee infectious diseases in London very difficult to generalise.

- Depends on many factors including:
  - Country of origin
  - Length of time since arrival
  - Age
  - Previous socio-economic status and travel
  - Access to healthcare

Most infectious problems of refugees are self limiting or easily treatable if diagnosed. Risk to general population is usually minimal or can be rapidly contained.