



## Migrant health: the Apulian model

### Lo stato di salute degli immigrati: il modello pugliese

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#### Abstract

**Introduction.** Since the 1990s Puglia has been totally involved in the reception and assistance of refugees. The prevention of infectious diseases among migrants, especially those residing in communities, is an important concern for public health authorities, since infectious diseases eliminated in Europe may still be widespread in the migrants' countries of origin, and other diseases may have a higher incidence than in European countries. Thus immigrants may contribute to the burden and spread of infectious diseases.

**Objective.** We describe the Apulian model of management and prevention of infectious disease among the population of Asylum Seeker Centres (CARA). It consists of a number of activities: surveillance of Poliovirus circulation, tuberculosis screening, seroprevalence studies of viral hepatitis and HIV, an immunization program for children, and syndromic surveillance. All the activities are organized and carried out by the Regional Observatory for Epidemiology among refugees hosted in the Bari Palese CARA.

**Results.** Surveillance of Poliovirus circulation has been carried out periodically since 2008 by assessing the presence of wild poliovirus or Sabin-like poliovirus in stool samples and seroprevalence studies. Data did not show circulation of poliovirus and indicated a good level of immunization against polio among refugees. Seroprevalence studies of viral hepatitis and HIV were carried out in 2008 and involved 529 refugees; 44 individuals (8.3%) were HBsAg positive, 24 (4.5%) were anti-HCV positive, 8 (1.5%) were HIV positive. Tuberculosis screening started in 2009 after a refugee's death due to tuberculosis and has been ongoing since then. The Mantoux tuberculin skin test is used and cutipositive migrants are examined by chest X-ray. Around 50% of migrants have been found to be cutipositive and 10% showed TB sequelae. Syndromic surveillance and an immunization program began in 2011 because of the significant increase in migration flow following civil unrest in North Africa; respiratory tract infection and diarrhoea were the most frequent notified syndromes. The immunization program involved 129 children coming from 23 countries: all received the appropriate vaccinations. The program also includes an annual special session to vaccinate all refugees against flu.

**Conclusions.** The results confirmed some traditional concerns about migrant health and especially about the control of infectious diseases among these populations and the need, from our point of view, to strengthen screening to aid the development of trust between migrants and resident population.

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**Parole chiave:** health surveillance, infectious diseases, syndromic surveillance

#### Riassunto

**Introduzione.** Dagli anni Novanta la Puglia è in prima linea nell'accoglienza e assistenza dei migranti. La prevenzione delle malattie infettive tra i migranti, soprattutto residenti in centri di accoglienza o comunità, è cruciale per le autorità di sanità pubblica, perché nei Paesi d'origine dei migranti potrebbero circolare malattie infettive eliminate in Europa o altre patologie con un'incidenza superiore a quella dei Paesi europei. Per questo gli immigrati possono contribuire al carico e alla diffusione delle malattie infettive.

**Obiettivo.** Il lavoro descrive il modello pugliese di gestione e prevenzione delle malattie infettive nella popolazione che risiede nei centri per richiedenti asilo politico (CARA), che si compone di diverse attività: sorveglianza della circolazione di poliovirus, screening della tubercolosi, studi di sieroprevalenza di epatite virale e HIV, programma di vaccinazione per i bambini e sorveglianza sindromica. Tutte le attività sono organizzate e svolte dall'Osservatorio epidemiologico regionale presso il CARA di Bari Palese.

**Risultati.** La sorveglianza della circolazione di poliovirus viene effettuata periodicamente dal 2008 attraverso la valutazione della presenza di poliovirus selvaggio o di poliovirus di tipo Sabin in campioni di feci e con studi di sieroprevalenza. I dati non hanno mostrato circolazione del poliovirus e indicano un buon livello di immunizzazione per la poliomielite tra i rifugiati. Gli studi di sieroprevalenza di epatite virale e HIV sono stati effettuati nel 2008 e hanno coinvolto 529 profughi; 44 (8,3%) sono risultati HBsAg positivi, 24 (4,5%) anti-HCV positivi, 8 (1,5%) sono risultati HIV positivi. Le attività di screening della tubercolosi sono iniziate nel 2009 dopo la morte per tubercolosi di una rifugiata e, da allora, sono effettuate routinariamente. Viene utilizzato il test di Mantoux e per i cutipositivi è prevista l'esecuzione della radiografia del torace. Circa il 50% dei migranti è risultato cutipositivo e il 10% degli immigrati ha mostrato sequele di tubercolosi. La sorveglianza sindromica e il programma di immunizza-

zione sono stati avviati nel 2011 a causa dell'importante aumento del flusso migratorio seguente disordini in Nord Africa; le infezioni delle vie respiratorie e la diarrea sono le sindromi più frequentemente notificate. Il programma di immunizzazione ha coinvolto 129 bambini provenienti da 23 Paesi, tutti hanno ricevuto le vaccinazioni appropriate. Il programma prevede anche una seduta annuale di vaccinazione contro l'influenza per tutti i rifugiati.

**Conclusioni.** I risultati hanno confermato alcuni assunti già consolidati sulla salute dei migranti, soprattutto per il controllo delle malattie infettive, e la necessità di implementare l'utilizzo di questi screening che servono a garantire la salute pubblica e a favorire lo sviluppo di un rapporto di fiducia tra i migranti e residenti.

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**Key words:** sorveglianza sanitaria, malattie infettive, sorveglianza sindromica

## INTRODUCTION

Italy was historically and until the 1970s a country of emigrants; beginning in the last thirty years of the 20th century, an important demographic change occurred, and the number of immigrants has grown exponentially since then.<sup>1</sup> According to the National Bureau of Statistics (Istat), in 2014 there were nearly 5 million foreign nationals legally residing in Italy, and this number had more than doubled compared to 2007. These are only a part of a multitude of «migrants lacking a regular status» that include undocumented migrants, asylum seekers, and irregular migrants.<sup>2,3</sup>

Puglia region (also known as Apulia, a region in the South of Italy) has been considered a «border region» because it is wholly involved in the reception and assistance of migrants. In the 1990s, Puglia became the prime transit point for illegal immigrants from Albania arriving in Apulian ports by sea. At that time the Italian Government established three centres located along the Apulian coasts to ensure «first aid» and contrast clandestine migration due to the large number of landings. This was the first Italian experience of a large migratory flow, following which other immigration reception centres were founded and recognized by law in Italy.<sup>4</sup> Since then, Puglia has remained one of the primary European entry points for immigrants, especially asylum seekers from Africa and Asia. In particular, in the past few years another large flow of refugees has been arriving from North Africa due to the Arab Spring.<sup>5</sup> The refugees are normally received in ports equipped for the purpose and, following an initial registration and health assessment, are transferred to reception centres for asylum seekers located across the country. They stay in these centres until their migration status is cleared. All immigration centres, whether managed by private or public organizations, are provided with internal, self-managed, outpatient services.<sup>2</sup> Currently, there are 10 asylum seeker centres (CARAs) in Italy. Three of them are located in Puglia. Illegal migrants or people who commit crimes are transferred to special detention centres (Centres for Identification and Expulsion, CIE) and, after a period of detention, they are repatriated.

The prevention of infectious diseases among migrants, especially those residing in communities, is an important concern for public health authorities; refugees often come from areas where the prevalence of infectious diseases and standards of healthcare might be different compared with their host countries. In their countries of origin, infectious diseases eliminated in Europe

(such as poliomyelitis) could still be circulating, while other diseases (such as tuberculosis, hepatitis C, HIV) may have a higher incidence than in European countries.<sup>6,7</sup> Immigrants may contribute to the burden and spread of infectious diseases.

Assistance is complicated because migrants are a highly heterogeneous population, with different socio-economic and cultural backgrounds. Moreover, living conditions within semi-open communities, such as immigration centres, could expose them to communicable disease.<sup>8</sup>

Since 2008, the Regional Observatory for Epidemiology (OER) has managed and organized prevention and screening of communicable diseases in the immigration centres in Puglia.<sup>9-12</sup>

Aim of this paper is to describe the activities (surveillance of Poliovirus circulation, tuberculosis screening, seroprevalence studies of viral hepatitis and HIV, immunization program) that are being carried out in the region's biggest CARA, located in Bari Palese, which houses an average of 1,500 refugees. The paper also describes the epidemiological surveillance system of infectious diseases in all Apulian CARAs.

## METHODS

### Surveillance of poliovirus circulation

In Apulian centres for asylum seekers, we registered many refugees coming from countries where poliovirus circulation is endemic or sporadic cases and outbreaks of poliomyelitis are notified. A main objective of refugee health surveillance was to assess the possible circulation of poliovirus among asylum seekers and the seroprevalence of poliomyelitis, as recommended by WHO.<sup>13</sup> The presence of wild *poliovirus* or Sabin-like poliovirus was evaluated in stool samples periodically collected from refugees on a voluntary basis. Two surveys were carried out in September 2008 and March 2011. Faecal samples were analyzed for the presence of enterovirus by nested-polymerase chain reaction (PCR).<sup>14</sup> In 2008 and 2014, two studies were carried out to evaluate the poliomyelitis immunization level by titration of the neutralizing antibody. Signed informed consent to the study was obtained from each participant. A 10 ml blood sample was obtained by venipuncture and the serum was separated by centrifugation. Each serum sample was coded and stored at -20°C. The immunity against poliomyelitis was evaluated as described previously.<sup>15</sup>

### Tuberculosis screening

On March 9, 2009, the corpse of a 24-year-old Nigerian

woman who resided at the Bari Palese CARA was found on the roadside near the city of Bari. The police investigation revealed that the woman was a prostitute who worked in the countryside around the city. The results of the post-mortem examination indicated that the death was due to worsening of pulmonary tuberculosis (TB). In response to this finding, systematic screening of centre residents was undertaken, to evaluate possible contagion.

Immigrants living in the CARA were screened for TB by the Mantoux method with 5 UI of lyophilized biocine PPD. The population to be screened was identified through the centre's records. The test was evaluated after 72 hours and a subject with an induration >10 mm was considered positive. Cutipositive migrants were examined by chest X-ray. From then on, systematic TB screening is ongoing: a session of screening is organized 4 times a year and involves the newly arrived migrants.

### Seroprevalence of viral hepatitis and HIV

Refugee populations are more at risk of having HBV, HCV, HIV, and sexually transmitted infections (STIs), either because they come from countries that are highly endemic for these infections, or because of lack of information on STI prevention directed to the migrant communities in the host country, the predominance of younger and more sexually active persons, the breaking up of couples and other family ties, and the exclusion from normal society, exacerbated by the barriers of language, culture, and socioeconomic conditions. Thus, assessing the prevalence of viral hepatitis among refugees is necessary for the planning of health control measures in primary and secondary prevention.<sup>16-17</sup>

The study was carried out in the period May-July 2008 and recruited only voluntarily enrolled healthy refugees. Adhesion was completely voluntary and signed informed consent, written in the immigrants' mother tongue, was obtained. Each migrant was tested for the hepatitis B virus surface antigen (HBsAg), the hepatitis B virus core antibody (anti-HBc), the hepatitis C virus antibody (anti-HCV), and antibodies to HIV (anti-HIV), and underwent venereal Disease Research Laboratory (VDRL) syphilis screening.<sup>11</sup> Test results were communicated to refugees and positive cases were treated in the Infectious Disease Unit of the Local Hospitals. Data were stored according to the Italian laws on privacy. Demographic data from the Asylum Centre database and the laboratory exam results were analyzed using the STATA MP11 statistical software.

### Syndromic surveillance

Since spring 2011, in the light of the crisis in the Mediterranean and the resulting increase in population movements, the Ministry of Health and the National Institute of Health (ISS), in collaboration with the regions, have set up an ad hoc syndromic surveillance system in all active immigration centres receiving migrants from North Africa, aiming at early detection of potential health emergencies in order to establish appropriate control measures.

According to the protocol, migration centres or regional health authorities must notify daily any cases fitting the case definitions, and also provide details of the population residing in each

centre, stratified by age group, filling in a specific form via email or fax to the ISS, who enters and analyzes the data. The 13 syndromes are:

1. respiratory infection with fever
2. suspected pulmonary tuberculosis
3. bloody diarrhoea
4. gastroenteritis and diarrhoea without blood
5. fever with rash
6. meningitis, encephalitis, or encephalopathy
7. lymphadenitis with fever
8. botulism-like syndrome
9. sepsis or unexplained shock
10. fever and hemorrhage affecting at least one organ or system
11. acute jaundice
12. infestations
13. death from undetermined causes.<sup>18</sup>

Puglia, with the coordination of the OER, was the first region in Italy to start surveillance activities. All CARAs send the forms to the OER, which collects the data and provides the transmission to the ISS.

In the present work, we analyzed the database of the syndromic surveillance system of Apulian centres from 2011 to 2015.

### Immunization program

Since 2011, the Ministry of Health has recommended that all refugees under 18 years receive the appropriate vaccinations.<sup>19</sup> OER established a protocol for children residing in Bari Palese. The OER established a protocol for children residing in Bari Palese. According to this protocol, health care workers, in collaboration with cultural mediators, examined the health documentation of the children and asked parents about previous vaccinations. The immunization schedule of the country of origin, retrieved from the WHO website, was also studied. Then, a specific schedule was arranged for each child. In case of doubt, serological tests for hepatitis B, measles, rubella, and varicella were carried out. HIV and HCV tests were also performed.

The results of the tests and the vaccinations administered were registered in standardized forms and computerized in a File-MakerPro database. Data were analyzed using STATA MP11. Asylum seeker centres are also at major risk of transmission of respiratory infectious diseases, such as influenza. Thus, in December, the OER organizes a special session of immunization against flu for all refugees housed in the Bari Palese CARA. Cultural mediators are involved in vaccine promotion and acquisition of informed, written consent.

## RESULTS

### Surveillance of poliovirus circulation

We collected 152 stool samples (76 in 2008 and 76 in 2011), of which 11 samples (5 in the 2008 survey and 6 in 2011) belonged to female subjects. The mean age of participants was 20.8±5.5 years for the survey conducted in 2008 and 23.5±6.3 years in 2011. All stool samples were negative for enterovirus. The serological survey carried out in 2008 involved 573 refugees, 520 (90.8%) males and 53 (9.2%) females coming from Africa (546; 95.3%) and Asia (27; 4.7%). In particular,

20 residents (3.5%) were from Afghanistan and 67 (11.7%) from Nigeria, where poliovirus is still endemic. The average age of the population sample was  $24.3 \pm 5.4$ . An antibody titer  $\geq 1:8$  was found in 571 subjects (99.6%) for *poliovirus* type 1, in 572 subjects (99.8%) for *poliovirus* type 2, and in 570 subjects (99.5%) for *poliovirus* type 3. All subjects with an antibody titer of less than 1:8 were males from Africa: specifically, a 20-year-old Nigerian with an antibody titer less than 1:4 for the three types of *poliovirus*; two Somalis, aged 26 and 20, had antibody titres of 1:4 and 1:8, respectively. The second serological survey carried out in July 2014 involved 172 males. An antibody titer  $\geq 1:8$  was found in 169 subjects (98.3%) for *poliovirus* type 1, in 160 subjects (93.0%) for *poliovirus* type 2, and in 138 subjects (80.2%) for *poliovirus* type 3.

### Tuberculosis screening

In March 2009, when a refugee of the CARA died of tuberculosis, there were 1,007 residents at the Bari Palese CARA; of these, 145 (14.4%) were females. Almost all of the migrants came from Africa, and average age was  $25 \pm 5.8$  years. Screening with the Mantoux test was undergone by 982 (97.5%) migrants; of these, 596 (60.7%) were positive. The proportion of cutipositive subjects was 20% of those aged <6 years, 41.4% of those aged 6-18 years, 62.4% of those aged 19-35 years and 61.4% of those aged >35 years (chi-square=17.1;  $p < 0.001$ ). Chest X-rays were performed in 554 of the 596 cutipositive subjects. Active pulmonary TB was diagnosed in 7 migrants (1.3%) and TB sequelae were diagnosed in 99 others (17.9%).

### Seroprevalence of viral hepatitis and HIV

A total of 529 refugees (71.1% of the 744 admitted to the CARA in May-July 2008), 442 males and 87 females, aged between 7 and 52 years (average=23.9; SD=6.7 years), were studied. Forty-four individuals (8.3%) were HBsAg positive and 241 (45.6%) anti-HBc positive. The prevalence of HBsAg positive subjects was significantly higher in males (9.7%) than in females (1.1%;  $p=0.008$ ). The proportion of anti-HBc positive individuals was also higher in males (48.4%) than in females (31%;  $p=0.002$ ).

A total of 24 (4.5%) individuals, 23 males (5.2%) and 1 female (1.1%), were anti-HCV positive. Three males from Africa were found to be HBsAg/ Anti-HCV positive.

Eight refugees (1.5%), 6 males (1.4%) and 2 females (2.2%), all from Africa, were HIV positive. Two African male refugees were HIV/Anti-HCV positive.

Four individuals from Africa of the 269 tested (1.5%) were positive to the VDRL test.

### Syndromic surveillance

The results of the syndromic surveillance system are shown in table 1.

### Immunization program

From May 2011 to December 2013, 14 immunization sessions were performed. In 2014, the immunization program for children stopped because no families with children were housed in

Number of cases per syndrome	Years				
	2011*	2012	2013	2014	2015**
syndrome 1	633	484	163	47	14
syndrome 2	17	12	18		20
syndrome 3	15	28	45	14	0
syndrome 4	421	334	116	35	21
syndrome 5	11	1	7	21	0
syndrome 6	1	2	0	0	0
syndrome 7	9	4	0		00
syndrome 8	0	0	0		00
syndrome 9	0	0	0		00
syndrome 10	0	0	0		00
syndrome 11	0	1	0		00
syndrome 12	171	236	208	264	46
syndrome 13	4	0	0	0	0
<b>total person-days of observation</b>	<b>625,617</b>	<b>715,291</b>	<b>741,577</b>	<b>894,205</b>	<b>313,768</b>

\*the surveillance started on 11/04  
\*\*until 15 May

Table 1. Syndromic surveillance in the Puglia region, 2011-2015.

Tabella 1. Sorveglianza sindromica nella Regione Puglia, 2011-2015.

the Bari Palese CARA. In the program, we took care of 129 children coming from 23 countries, with an average age of 7 years; 51.9% (n=67) were female.

Fifty-two (40.3%) children came from the North of Africa, 42 (32.6%) from the South of Africa, and 35 (27.1%) from Asia. Only two children showed their certification of immunization. Serological tests were performed on 70 children aged >3 years: 38.6% (n=27) showed an anti-HBs titre <10 UI and 3 (4.3%) presented an HBV infection; no child was affected by HCV infection and 1 (1.4%) child was HIV-positive; 28.6% (n=20) were susceptible to measles and 34.3% (n=24) to varicella. All migrants received appropriate vaccination, according to our Regional Immunization Schedule.<sup>20</sup>

In December 2011, 2012, 2013, and 2014 we carried out four special immunization sessions to vaccinatee against flu, achieving high coverage; results are shown in table 2.

### DISCUSSION

The results of our model confirmed some traditional concerns about migrant health and especially about the control of infectious diseases among these populations. Even though the risk of poliovirus re-introduction related to migration seems negligible, refugees are at major risk of tuberculosis, hepatitis B, HCV, and HIV. The prevalence of TB sequelae and people with markers of HBV/HCV/HIV infection is higher than in the Italian and European populations.<sup>21</sup>

Season	Number of refugees	People vaccinated	Immunization coverage (%)
2011-2012	1,193	712	59.7
2012-2013	1,296	628	48.5
2013-2014	1,487	646	43.4
2014-2015	1,626	580	35.7

Table 2. Vaccination against flu in the Bari Palese CARA, 2011-2015.

Tabella 2. Vaccinazione antinfluenzale nel CARA di Bari Palese, 2011-2015.

Syndromic surveillance highlighted that CARA populations are affected by communicable diseases typical of a semi-open community with high-density crowds. Diarrhoea, respiratory tract infections, and infestations (in particular skin infestations, such as scabies) are the most frequent syndromes notified.

Serological tests of migrants showed a lack of immunization: around a third of children missed at least a vaccination appointment in their native country. In relation to their entry into European countries, this is a very important concern, because if their vaccination status is unchecked, migrant children could attend schools and other social communities and cause an outbreak of vaccine-preventable diseases (e.g., measles or varicella).<sup>22</sup>

An important strength of our model is the availability of a trained, skilled working group that can speak English and French, and of cultural mediators that speak other languages. The principal limitation of the model is the voluntary nature of participation and the high mobility of refugees. Asylum seekers are free to move in and around the CARA; often they are not present on the days of the screening or it is impossible to reach them and explain the results of the tests. Finally it was not possible to check vaccination history because the great majority of refugees lacked documentation for recommended immunizations; this is a matter of concern both for TB screen-

ing (TST could be falsely positive in subjects who received BCG)<sup>23</sup> and for the immunization program.

Under Italian law, asylum seekers have to undergo mandatory medical check-ups only for scabies and dermatophytosis on arrival; no screening takes place for infectious diseases of sexual and parenteral transmission, neither when they are housed in reception centres nor when they have gained permission to live in Italy or Europe. In other countries, such as the USA, systematic screening on arrival is mandatory for public health protection. Because Italy is the gate of Europe, especially for people coming from the «South of the world», the European Union needs to provide in its regulations a specific law about the screening for infectious diseases among migrants (mandatory showing of immunization schedule or serological tests), following, for instance, the recommendations of the Centres for Disease Control and Prevention protocols, considered key documents by several international health authorities.<sup>24,25</sup>

Today, there is an important debate on a possible discrimination resulting from this screening but, in our opinion, screening could aid in developing a relationship of trust between migrants and resident population.<sup>26</sup>

**Conflicts of interest:** none declared

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