A refugee camp in the centre of Europe: clinical characteristics of asylum seekers arriving in Brussels

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ABSTRACT

Background: In the summer of 2015, the exodus of Syrian war refugees and saturation of refugee camps in neighbouring countries led to the influx of asylum-seekers in European countries, including Belgium. This study aims to describe the demographic and clinical characteristics of asylum seekers who arrived in a huddled refugee camp, in the centre of a well-developed country with all medical facilities.

Methods: Using a descriptive cross-sectional study design, physicians of Médecins du Monde prospectively registered age, gender, origin, medical symptoms and diagnoses of all patients presenting to an erected field hospital in Brussels in September 2015. Diagnoses were post hoc categorised according to the International Classification of Diseases.

Results: Of 4037 patients examined in the field hospital, 3907 were included and analysed for this study. Over 11% of patients suffered from injuries, but these were outnumbered by the proportion of patients with respiratory (36%), dental (9%), skin (9%) and digestive (8%) diagnoses. More than 49% had features of infections at the time of the consultation.

Conclusions: Asylum seekers arriving in a refugee camp in Brussels after a long and hazardous journey suffer mostly from respiratory, dental, skin and digestive diseases. Still, one in seven suffers from injury. These findings, consistent with other reports, should be anticipated when composing emergency medical teams and interagency emergency health or similar kits to be used in a field hospital, even in a Western European country.

Trial registration number: ISRCTN13523620.

INTRODUCTION

Background/rationale

Persons fleeing their home country are considered ‘asylum seekers’ until a contract- ing state is willing to provide the official status of ‘refugee’ as disclosed in the Geneva Convention on Refugees.1

The continuing exodus from Middle East countries, driven by the Syrian civil war and overcrowding of refugee camps in neighbouring countries, forced asylum seekers using any conveyance fleeing towards the European Union. In the summer of 2015, the number of asylum seekers in Belgium increased considerably.2

People applying for asylum need to register at the Belgian Immigration Office in the centre of Brussels, a necessary step before being entitled to shelter, clothing, food and (medical) assistance. A high daily influx of asylum seekers and a limitation to a maximum of 250 registrations per workday created an accumulation of hundreds, not yet included in the asylum procedure, camping in a park in front of the Belgian Immigration Office. In a spontaneous humanitarian response, volunteers of the ad hoc ‘Belgian Civilian Platform’ organised an improvised shelter camp and provided clothing and food.

The Belgian branch of the independent international non-governmental organisation Médecins du Monde (MdM) erected a field hospital, 3907 were included and analysed for this study. Over 11% of patients suffered from injuries, but these were outnumbered by the proportion of patients with respiratory (36%), dental (9%), skin (9%) and digestive (8%) diagnoses. More than 49% had features of infections at the time of the consultation.

Conclusions: Asylum seekers arriving in a refugee camp in Brussels after a long and hazardous journey suffer mostly from respiratory, dental, skin and digestive diseases. Still, one in seven suffers from injury. These findings, consistent with other reports, should be anticipated when composing emergency medical teams and interagency emergency health or similar kits to be used in a field hospital, even in a Western European country.

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Strengths and limitations of this study

- This study includes a considerable number of well-documented complaints and physicians’ diagnoses in asylum seekers arriving in Western Europe.
- A literature search reveals that epidemiological studies on health problems of asylum seekers in Europe are very scarce, and have not been reported in such detail before.
- The study included only patients self-presenting or referred by outpatient assistance teams to the field hospital in the autumn of 2015, preventing extrapolation to all asylum seekers, and other seasons.
- A number of diagnoses remained tentative, since laboratory and imaging tests were unavailable, and patient anonymity prevented longitudinal follow-up.
- The lack of uniform standards to collect symptoms and diagnoses makes comparison with other data sets challenging.
hospital in the camp. MdM provided free medical care, psychological and social support, and sanitary facilities to over 4000 asylum seekers in September 2015.

Of 5512 requests for asylum registered at the Belgian Immigration Office in September 2015, 482 (9%) were from unaccompanied minors and only 628 were granted asylum. The other applicants were either formally rejected (5526 cases), postponed (748 cases) or definitively refused (610 cases). The latter received an order to leave the territory. Belgium accepted 0.8% of all asylum seekers reaching Europe in 2015.3

A prerequisite to adopting any evidence-based approach in humanitarian assistance is to assemble solid evidence from results of relevant empirical studies.4 Collecting reliable data will always be difficult in emergency situations, as healthcare providers prioritise treating patients over documenting and control groups are usually not available.4–6

Reports on refugee camp patients vary widely in methodology, points of interest and are often expert opinions or undocumented statements. Most focus on communicable diseases (vector-borne, airborne, foodborne, blood borne and waterborne diseases and infections) such as tuberculosis, malaria and HIV/AIDS, or elucidate immediate effects of disasters (estimated numbers of dead, injured and displaced) and late consequences such as outbreaks, epidemics and mental health problems.6–10

As in every refugee or internally displaced persons camp around the world—usually in third world countries—specific patterns of pathology are to be expected (especially respiratory, gastrointestinal and skin infections), secondary to poor sanitary conditions and overcrowding, as well as increase of non-communicable diseases (malnutrition, cancer, chronic lung diseases) and comorbidities (especially diabetes and hypertension) imposing vulnerability due to interruption of care, and psychosocial disorders following violence, journeys in austere circumstances, and the settlement in a new, sometimes hostile environment.8 11–15 A literature search reveals that epidemiological studies on health problems of asylum seekers in Europe are scarce, and that they have been conducted in a wide variety of settings (hospital, asylum home, refugee camp, governmental structures) and have highlighted different issues (hygiene, infectious diseases, chronic health problems, mental health, unaccompanied minors), but never provided a comprehensive and complete overview.8 9 14–17 Yet it is estimated that one in six refugees has a physical health problem severe enough to affect their life, and two-thirds have experienced anxiety or depression.18

Objectives
This study aims to document demographics of asylum seekers who arrived in a refugee camp in Brussels in September 2015; to describe symptoms, comorbidities, diagnoses and diagnosis categories of patients presenting to a field hospital in a refugee camp, set up in a Western European capital; and to formulate recommendations for future relief operations.

MATERIALS AND METHODS
Study design
A retrospective descriptive cross-sectional sample analysis was performed on prospectively obtained medical records, collected by MdM from 5 September to 5 October 2015. This time interval corresponds to the period that the refugee camp and field hospital were present in Brussels.

Setting
Within the refugee camp, MdM erected a level I medical field hospital, consisting of units for 24/7 ambulatory healthcare and psychosocial support.19 The MdM volunteer team comprised over 400 certified physicians, nurses, pharmacists, logisticians and interpreters. MdM registered all volunteers and verified their diploma and license to work in Belgium. An outpatient assistance team with a physician, a nurse and an interpreter provided on-the-spot healthcare for patients not able to leave their tents, or referred them to the field hospital for further care when necessary.

Registration on admission and basic triage in urgent and less urgent patients was performed by trained nurses. Each patient was subsequently interviewed and examined by physicians, with competent interpreters present during all clinical encounters. Diagnoses were based on the patients’ complaints, symptoms and physical examination, as MdM had limited access to diagnostic capability. Patients were treated on the spot if appropriate, vaccinated when needed and received explanations in their own language. Supplies were retrieved from the MdM stockpile and donations. Patients requiring emergency care, laboratory tests, medical imaging or hospitalisation were transferred to hospitals in the Brussels area. Patients requiring follow-up were requested to re-present to the field hospital or referred to primary or dental care facilities, or newborn consultations, with referral letters.

Participants
All patients presenting spontaneously to the field hospital or examined by the outpatient assistance teams were eligible for inclusion. Patients with missing date of presentation, chief complaint or single primary diagnosis were excluded afterwards. Patients in Belgium are legally considered ‘minor’ when younger than 18 years and ‘child’ when younger than 15 years.

Variables
A prospectively designed template was used to register data for all patients: age, gender, country of origin (the country the patient was born in, or lived in before fleeing home for the first time), date of arrival in Belgium, whether and when patients had requested or
received an appointment at the Belgian Immigration Office or were already officially registered as asylum seeker, location of shelter, all physical and mental symptoms, the ‘chief complaint’ and all pre-existing comorbidities.20 21 One primary diagnosis per patient was recorded according to a list of 50 possible diagnoses, adapted from case descriptions in the WHO ‘Communicable disease control in emergencies’ field manual, the Sphere Project Handbook and a template used in previous humanitarian operations.20 22 23 Post hoc, trained physicians classified these diagnoses into categories, adapted from International Classification of Diseases Tenth Edition (ICD-10) as described in table 2.24 All patients with clinical signs of local or generalised infection were classified as a subgroup of ‘infectious diseases’. Finally, referral was recorded.

Data sources
MdM trained all personnel in collecting data, which were anonymised according to the Helsinki Declaration, and introduced in an Excel database.5 A data sharing and research collaboration agreement was signed between MdM and the Research Group on Emergency and Disaster Medicine, Vrije Universiteit Brussel, Belgium.

Bias
Data were recorded by different healthcare providers, and the anonymous records did not allow distinguishing patients possibly inserted twice, potentially introducing a sampling bias. Diagnoses were classified post hoc, possibly introducing a categorisation bias.

Statistical methods
Patients with missing or unreadable data were excluded. Descriptive statistics for discrete outcome variables were presented as frequencies (n), proportions (%) and for quantitative variables (age, number of patients) as measures of central tendency and dispersion (median, range, IQR). The analyses were broken down for age categories (<5, 5–14 and >15 years), gender and period (weeks).

Multiple logistic regression analysis was performed to identify factors associated with the asylum seekers’ health problems, by using ‘infection’ as an outcome variable, by using origin (other vs Syria, Iraq, Morocco and Afghanistan), age category (0–15, >15 years), gender, arrival time in Belgium, asylum state and shelter location as predictors. Analyses were carried out by using IBM SPSS V.23.0. All tests were performed using an α-level of 0.05.

RESULTS
Participants
MdM examined 4037 patients in total, with a median of 137 per day (range 23–199) as shown in online supplementary figure S1. After exclusion of 130 incomplete forms, 3907 patients were included and analysed.

Descriptive data
Of all included patients, 3355 (86%) were male, 510 (13%) female and the gender of 42 (0.8%) was unknown. Median age was 28 years (range 0–93; IQR 12). As figure 1 and online supplementary figure S2 illustrate: 78% (n=3049) were adult men, 9% (n=355) adult women and over 10% (n=391) minors, of whom 303 were children (8%), including 149 (4%) aged 5–14 and 153 (4%) aged under five. The age of 86 (2%) adults and children was unknown. The outpatient

![Figure 1](https://example.com/figure1.png)

Age distribution of patients by gender.
assistance teams provided care to 46 patients (1.18%) of whom two had to be referred for advanced care. The region of origin is presented in figure 2. Patients came from 63 different countries (as presented in online supplementary figure S3), but most were from Iraq (n=1950; 3778; 52%), Syria (n=737; 20%), Morocco (n=365; 10%), Afghanistan (n=117; 3%) and Palestine (n=96; 3%). Some 1% (n=42) were stateless or came from other continents. The time interval between arrival in Belgium and consultation, the state of asylum procedure and location of shelter are presented in table 1.

**Outcome data**

A total of 5768 symptoms (106 different types) were recorded: 2486 patients (64%) had one single symptom, 1039 (27%) expressed two, 320 (8%) three and 61 (2%) four or more symptoms. The most common symptoms were: cough (n=619/3907; 16%), sore throat (n=590; 15%), tooth pain (n=406; 10%), rhinorrhoea (n=397; 10%), headache (n=374; 10%), limb pain (n=248; 6%), skin wounds (n=236; 6%), influenza-like symptoms (n=154; 4%), accidental trauma (n=151; 4%), lack of chronic medication (n=138; 4%) and abdominal pain (n=130; 3%). Some 3% reported fever (n=101), 2% anxiety (n=82) and more than 3% (n=126) re-presented for follow-up. Categorised according to ICD-10, 56% of all patients expressed respiratory symptoms (n=2198), 12% had digestive symptoms (n=482), 12% had musculoskeletal symptoms (n=458), 11% were injured (n=429), 11% had neurological symptoms (n=427), 10% had skin problems (n=406) and 10% expressed dental symptoms (n=406).²⁴ All other categories represented <5% of all patients.

More than 7% of patients reported comorbidities (n=279), most commonly arterial hypertension (n=103) and/or diabetes (n=96). Patients also reported asthma (n=19), old fractures (n=15), epilepsy (n=14), rheumatism (n=10), recent delivery (n=7), neoplasms (n=6), gastrointestinal (n=5), genitourinary (n=4) or mental disorders (n=3).

Of patients with interrupted maintenance treatment (n=138), 72 had comorbidities: diabetes (24), hypertension (14), asthma (12), epilepsy (8), psychiatric disorders (2) and withdrawal (2). Seven reported lost eyewear, while six infants lacked paediatric formula.

**Main results**

As represented in figure 3 and table 2, the most common primary diagnoses consisted of upper respiratory tract infections (31%), dental caries (8%), skin infections (8%), gastroenteritis (7%), skin wounds and burns (6%), musculoskeletal disorders (6%) and accidental trauma (6%). Mental disorders were present in 2%. No patient died, one was resuscitated and 35 (1%) were victims of intentional violence in their country of origin, or during the journey to Brussels. Two women had just delivered, and five parents presented with newborn babies.

**Figure 2** Countries and regions of origin of asylum seekers.
actual medical or mental diagnosis, but the patient requested personal attention or sought assistance for social problems.

Analysis of the distribution of diagnostic categories per week did not reveal any considerable changes over time.

Subgroup analyses
Features of infection were found in 1900 (49%) patients, with an even higher frequency (63%) in children younger than 5 years.

The multiple logistic regression analysis in Table 3 shows that asylum seekers from Syria and Iraq, and children have a higher risk for infection. We did not detect any other significant risk factors.

Children aged under 5 years represented 4% of the population, with equally distributed gender and a median age of two (range 0–5; IQR 3). The majority originated from Middle East countries (n=118; 77%), median time in Belgium was 3 days (range 0–1500; IQR 9) and most took shelter in tents (n=94;61%). The distribution of diagnostic categories indicates that 50% had respiratory diseases (n=76), 20% digestive disorders (n=30), 14% skin disorders (n=21) and 7% suffered from injuries (n=10). Five (3%) were newborns of whom one had to be hospitalised for bronchiolitis with severe dyspnoea.

Patients were asked to re-present for follow-up in 3% cases (n=121) to the field hospital, and in 4% (n=152) to ambulant consultations, mainly for arterial tension and blood glucose measurements. Referrals were organised for 412 patients (11%): 205 to dentists (5%), 117 (3%) to emergency departments, 70 to psychotherapists (2%) and 20 (0.5%) to mother and newborn care consultations. Children younger than 5 years were referred 27 times (18% of young children): 15 to ambulant follow-up, 6 to newborn consultations and 2 each to emergency departments, dentists and psychiatrists.

DISCUSSION
Key results
Most asylum seekers arriving in Brussels were young men, in contrast to the usual population distribution in internally displaced persons and refugee camps (50% children, 30% women and 20% men). The shortest route between Syria and Brussels is 4000 km, unsuited for children, women and older men, who rather remained in refugee camps near their country of origin.

Almost half of the asylum seekers, and two-thirds of children younger than 5 years suffered from infections. The multiple logistic regression analysis suggests that asylum seekers from Syria and Iraq, and children have a higher risk of infection. Also, the Immigration Office registration delay postponed entitlement to shelter, food and (medical) assistance, and the encampment in austere conditions possibly contributed to the large proportion of infections.

The overwhelming presence of (mostly upper) acute respiratory infections (ARI) is consistent with existing reports as visualised in Table 4.
| Category          | n   | Per cent | Primary diagnosis                      | n   | Per cent | Case descriptions                                      |
|-------------------|-----|----------|----------------------------------------|-----|----------|--------------------------------------------------------|
| No diagnosis      | 19  | 0.5      | No medical diagnosis                   | 19  | 0.5      | Social problem, attention seeker                       |
| Respiratory       | 1388| 35.5     | Upper respiratory tract infection      | 1199| 30.7     | Ear, nose, throat, sinus, larynx infections, influenza (upper ARI) |
|                   |     |          | Lower respiratory tract infection      | 120 | 3.1      | Dyspnoea, and raised respiratory rate, signs of lower ARI |
|                   |     |          | Asthma exacerbation                    | 69  | 1.8      | Wheezing and/or respiratory oppression                  |
| Eye and Adnexa    | 67  | 1.7      | Eye disorder                           | 65  | 1.7      | Eye infection and irritation                             |
|                   |     |          | Vision problem                         | 2   | 0.1      | Diminished or troubled vision, blindness                |
| Dental            | 372 | 9.5      | Dental abscess                         | 56  | 1.4      | Clinical suspicion of dental abscess                    |
|                   |     |          | Dental caries                          | 316 | 8.1      | Caries with or without pain                              |
| Digestive         | 303 | 7.8      | Watery diarrhoea/abdominal              | 281 | 7.2      | Loose stools, vomiting, abdominal pain, intestinal parasitosis |
|                   |     |          | Bloody diarrhoea                       | 5   | 0.1      | Loose stools with visible blood (suspicion of dysentery) |
|                   |     |          | Malnutrition                           | 15  | 0.4      | Clinical, weight/height >70% or MUAC <110/160 (child/adult) |
|                   |     |          | Cholera                                | 0   | 0.0      | Severe dehydrating diarrhoea/confirmed case in a non-endemic area |
|                   |     |          | Jaundice                               | 2   | 0.1      | Acute onset of icterus (skin, conjunctivae, urine)      |
| Neurological      | 142 | 3.6      | Suspected meningitis                   | 1   | 0.0      | Fever and clinical signs of meningeal irritation         |
|                   |     |          | Flaccid paralysis                      | 0   | 0.0      | Paralysis in children of ≥1 limb, incl. Guillain-Barré or any polio suspicion |
|                   |     |          | CVA, headache, convulsions             | 141 | 3.6      | Headache, convulsions, stroke, coma                     |
| Genitourinary     | 97  | 2.5      | Sexual transmittable disease           | 19  | 0.5      | Suspected STD, vaginal infections with fluor, genital infection |
|                   |     |          | Urinary tract infection                | 59  | 1.5      | Dysuria, alergia, pollakisuria, with/without fever, flank pain, or + dipstick |
|                   |     |          | Gynaecological disorder                | 19  | 0.5      | Irregular menses, breast problems, vaginal bleeding, abortion |
| Peripartum        | 28  | 0.7      | Neonatal illness                       | 1   | 0.0      | Newborns with problems                                  |
|                   |     |          | Neonatal tetanus                       | 0   | 0.0      | Neonate not sucking/crying normally, rigidity, convulsions |
|                   |     |          | Healthy newborn baby                   | 4   | 0.1      | Healthy baby <3 weeks old                               |
|                   |     |          | Delivery                               | 2   | 0.1      | Mother: imminent delivery or postpartum (<3 weeks)      |
|                   |     |          | (presumed) pregnant                    | 21  | 0.5      | Suspected or confirmed pregnancy                        |
| Skin              | 335 | 8.6      | Skin infection                         | 294 | 7.5      | Redness, pain, abcedation with signs of local infection |
|                   |     |          | Skin affection                         | 41  | 1.0      | Redness, xerosis, urticaria, psoriasis without infection |
| General           | 154 | 3.9      | Surgical cases other than trauma       | 24  | 0.6      | Herniations, swollen testicles, cysts, haemorrhoids,…   |
|                   |     |          | Fever of unknown origin                | 9   | 0.2      | >37.5°C axillary or > 38.0°C rectal, without specific diagnosis |
|                   |     |          | Malaria                                | 0   | 0.0      | Confirmed or suspected malaria, simple or serious        |
|                   |     |          | Measles                                | 0   | 0.0      | Fever and clinical suspicion of measles (vaccinated or not) |
|                   |     |          | Clinical anaemia                       | 3   | 0.1      | History, pallor, weakness                               |
|                   |     |          | Diabetes                               | 70  | 1.8      | Diabetes as main problem, or crisis/ketoacidosis         |
|                   |     |          | Other                                  | 35  | 0.9      | All that is not classified elsewhere                    |
|                   |     |          | Intoxication                           | 8   | 0.2      | Suspected or confirmed substance abusus                  |
|                   |     |          | Neoplasm                               | 5   | 0.1      | Suspected or confirmed oncological disease               |
| Mental            | 76  | 1.9      | Mental disorder                        | 76  | 1.9      | PTSD, insomnia, stress, suspicious aspecific symptoms    |
| Violence          | 35  | 0.9      | Trauma from aggression                 | 34  | 0.9      | Trauma due to intentional individual injury including rape |
|                   |     |          | CBRN                                   | 1   | 0.0      | Injury from chemical/biological/radiological/nuclear assaults |
| Injury            | 454 | 11.6     | Accidental trauma                      | 213 | 5.5      | Accidental trauma from incident, accident (non-violent trauma) |
|                   |     |          | Acute wounds                           | 241 | 6.2      | Non-intentional acute skin wounds, burns                 |
| Musculoskeletal   | 239 | 6.1      | Musculoskeletal disorder               | 239 | 6.1      | Non-traumatic pain (muscles, back, pelvic belt, joints), rheumatic |
| Circulatory       | 71  | 1.8      | Hypertension/cardiac disorder          | 71  | 1.8      | Symptomatic hypertension, palpitations, angina pectoris  |

Continued
This carries a possible burden, as ARIs are a major cause of morbidity and mortality among displaced people.30

Contrarily, the same conditions did not result in a similar spread of intestinal, genitourinary or eye infections, as is usually seen in internally displaced persons or refugee camps.15 20 28 29 This was possibly owing to appropriate management of sanitary facilities by MdM.

The important share of dental problems is unusually high for any refugee camp, but consistent with other reports on Syrian refugees.11 16 31 It must be considered that most patients were Iraqi who already fled their country after the 2002 invasion to become refugees in Syria, where access to dental or any healthcare was limited.11 32 Their long, exhausting travel with limited healthcare facilities might have contributed to transform caries into dental abscesses.

While undertaking their journey, many of the asylum seekers halted in several different camps along the way, sleeping in any fleabag they could find, possibly resulting in the many scabies infections observed.8 14 15 28 The proportion of skin infections is consistent with available European reports, but higher than seen in other internally displaced persons and refugee populations analysed the same way.8 15 20

Violent trauma, injuries and musculoskeletal problems were present in almost 20% of the asylum seekers, with a wide variety of causes: accidental trauma was usually from falls, not always related to the journey; acute wounds were either blisters on feet from walking long distances, or infected wounds caused by barbed wire.33 The musculoskeletal issues—back and limb pain in young men—were often related to the journey as well.8 12 15 25 The number of war-related injuries was limited; most had been treated long before arrival in Brussels.25

The proportion of mental disorders was rather low (2%), in contrast to other studies reporting incidences of up to one-third.8 12 15 24 34 Even though MdM provided a separate tent (with sufficient privacy and constant availability of interpreters), it is still possible that language barriers, limited time per consultation and the fact that most patients were young men from Middle East countries—not easily expressing emotions to strangers in tents—might have contributed to this low proportion. We do suspect under-reporting of mental problems, as MdM recorded more use of secondary psychological consultations in the field hospital than was registered in this study.

We did not detect a changing pattern of diagnostic categories over time, possibly because the population of the camp was replaced regularly with new arrivals.

Referral to EDs was needed in 3% of the consultations, for varying reasons: suspected fractures, stitches (as stitching in field hospitals encompasses risks of wound infection), pneumonia, confusion and convulsions or syncope, oncological patients who ran out of maintenance treatment. Many referrals were made to dentists’ offices, as well as to psychiatrists-psychologist

### Table 2

| Category               | n       | Per cent | Case descriptions                                      |
|------------------------|---------|----------|--------------------------------------------------------|
| Fatality               | 1       | 0.0      | Any condition requiring resuscitation of vital functions |
| Follow-up cases        | 126     | 3.2      | Follow-up wound dressings and casts cases              |
| Total                  | 3907    | 100      | All cases with features of infection                   |
| Subanalysis            |         |          | +, positive; ARI, acute respiratory infection; CBRN, chemical-burns-radiological-nuclear incidents; CVA, cerebrovascular accident; MUAC, middle upper arm circumference; PTSD, post-traumatic stress disorder; STD, sexually transmitted disease. |

van Berlaer G, et al. BMJ Open 2016;6:e013963. doi:10.1136/bmjopen-2016-013963
when signs of post-traumatic stress disorder were present. Referrals to ambulant consultations were ordinarily for deregulated diabetes and arterial hypertension.

The prevalence of 7% of non-communicable chronic diseases (mainly diabetes, hypertension and asthma) found in this study population was lower than the range in earlier reports, possibly due to the limited number of aged asylum seekers. Some 138 patients (4%) lacked maintenance treatment medication, of whom 72 had chronic comorbidities like diabetes and hypertension, and were therefore at risk for deregulation of their clinical condition. For these patients, MdM provided all necessary medication and materials (like insulin, β-blockers, puffs, blood glucose meters, urine ketone strips) and provided follow-up or referral.

Nineteen patients (0.5%) did not get a specific medical diagnosis, but were categorised as seeking attention for their distressing situation or looking for non-medical support.

Long-term conditions (including vector-borne and blood borne infections such as leishmaniasis, malaria, hepatitis B and Helicobacter pylori) may have been under-presented or under-diagnosed, as healthcare providers focused more on identifying acute conditions.

It is difficult to draw conclusions from this study about the importation of communicable diseases, one of the mythical concerns raised about immigrants. Belgium screens asylum seekers for tuberculosis, but not for HIV, measles, polio or pertussis, diseases usually quoted in the context of refugees. Whenever suspicion was raised, patients were transferred to hospitals for investigation. None of these tests yielded positive results in September 2015.

Limitations and strengths
This study has several limitations. The study included only patients self-presenting or referred by outpatient assistance teams to the field hospital in the autumn of 2015, preventing extrapolation to all asylum seekers, and other seasons. A number of diagnoses remained tentative, since laboratory and imaging tests were unavailable. Patient anonymity prevented longitudinal follow-up. The lack of uniform standards to collect symptoms and diagnoses makes comparison with other data sets challenging.

The strength of this study is the considerable number of well-documented symptoms and physician diagnoses in asylum seekers arriving in Western Europe. To the best of our knowledge, this has not been reported in such detail before. Since Belgium registered 5512 asylum seekers in September 2015, this study sample is of considerable proportion.

Interpretation
Asylum seekers arriving in a refugee camp in Brussels after a long and hazardous journey suffer mostly from respiratory, dental, skin and digestive diseases, and one of seven is injured. Half of this population shows

### Table 3 Predictive factors for infectious diseases from a multiple logistic regression analysis

| Origin (reference: other countries) | OR Lower | OR Upper | p Value |
|------------------------------------|----------|----------|---------|
| Syria                              | 1.91     | 1.54     | 2.38    | <0.0001 |
| Iraq                               | 1.85     | 1.54     | 2.21    | <0.0001 |
| Morocco                            | 0.99     | 0.76     | 1.29    | 0.95    |
| Afghanistan                        | 1.42     | 0.95     | 2.12    | 0.09    |
| Gender (reference: male)           |          |          |         |         |
| Female                             | 0.77     | 0.63     | 0.95    | 0.01    |
| Age (reference ≥15 years)          |          |          |         |         |
| <15 years                          | 1.64     | 1.28     | 2.10    | <0.0001 |
### Table 4 Comparison of proportional ranges found in other studies on RC and IDP populations (%)

| Study               | Situation          | Respiratory | Eye and adnexa | Dental | Digestive | Genitourinary | Skin | Mental | Violence | Injury | Musculoskeletal | Circulatory | Infectious cases | NCD | Number |
|---------------------|--------------------|-------------|----------------|--------|-----------|---------------|------|--------|----------|--------|----------------|-------------|-----------------|------|--------|
| This study          | RC in Brussels     | 35.5        | 1.7            | 9.5    | 7.8       | 2.5           | 8.6 | 1.9    | 0.9      | 12.5   | 6.1            | 1.8         | 48.6            | 7.0  | 3907   |
| Ranges in literature|                    | 3–56        | 2–12           | 4–21   | 4–12      | 3–8           | 2–9 | 0–38   | 0–3      | 1–39   | 0–15          | 1–22        | 6–90            | 2–50 |        |
| Alberer et al15     | RC in Germany      | 23.0        | 3.6            | 3.5    | 9.7       | 5.3           | 7.7 | 1.1    | 7.7      | 2.2    | 39.9          | 2.6         | 548             |      |        |
| Marquard et al6     | Refugee minors in Germany | 20.6 | 20.6       | 3.6    | 8.7       | 5.3           | 7.7 | 1.1    | 7.7      | 2.2    | 23.5          | 7.7         | 48.8            | <2.0 | 102    |
| Bischoff et al6     | Refugees in Switzerland | 14.1 |            | 8.8    | 13.7      | 8.6           | 14.5 | 4.4    | 6.3      | 4.4    | 979           |            |                 |      |        |
| Escobio et al25     | MSF on Balkan route | 25.0        |                |        | 3.0       | 3.0           | 1.3 | 3.4    | 9.0      | 22.0   | 7.0           |            | 30.0            | 122  | 3500   |
| Mateen et al14      | Refuges in Jordan  | 11.0        | 10.0           | 12.1   | 3.0       | 3.0           | 1.3 | 3.4    | 9.0      | 22.0   | 7.0           |            | 3500            |      |        |
| McKenzie et al34    | Refuges in Jordan  | 1.8         |                |        | 1.8       | 1.8           | 1.8 |        |          |        |               |            |                 |      |        |
| Doocy et al36       | Refuges in Jordan  | 14.5        |                |        | 4.4       | 4.4           | 4.4 |        |          |        |               |            |                 |      |        |
| Gammoh et al27      | Jordan RC          | 29.5        |                |        |           | 29.5          | 29.5|        |          |        |               |            |                 |      |        |
| UNHCR28             | RC in Jordan       | 29.7        | 2.2            | 2.7    | 5.6       | 3.5           | 1.3 | 0.5    | 4.3      | 5.3    | 72.1          | 21.8       | 694 280        |      |        |
| UNHCR28             | RC in Iraq         | 56.4        | 3.3            | 11.7   | 4.7       | 4.8           | 0.5 | 0.2    | 2.2      | 3.2    | 89.6          | 7.4        | 127 401        |      |        |
| UNHCR28             | RC in Lebanon      | 27.1        | 4.5            | 3.0    | 4.6       | 4.6           | 1.4 | 0.1    | 0.9      | 2.0    | 89.3          | 8.3        | 52 060         |      |        |
| North and Pfefferbaum | Review mental health*  | 11–38      |                |        |           |               |      |        |          |        |                 |            |                 |      |        |
| Bellos et al36      | Review ARI in crises*      | 3–55        |                |        |           |               |      |        |          |        |                 |            |                 |      |        |
| Calvasina et al31   | Immigrants in Canada*       | 9.4         |                |        |           |               |      |        |          |        |                 |            |                 |      |        |
| van Berlaer et al40 | FH and IDP in Haiti*  | 16.5        | 4.2            | 10.7   | 6.8       | 4.0           | 2.5 | 0.0    | 38.7     | 1.7    | 37.8          | 3.3        | 2795           |      |        |

*Studies on IDP and refugees not from the Syrian crisis.
ARI, acute respiratory infections; FH, field hospital; IDP, internally displaced persons; MSF, Médecins Sans Frontières; NCD, non-communicable diseases; RC, refugee camp.
features of infection, with asylum seekers from Syria and Iraq, and children being most vulnerable.

The high proportion of respiratory diseases, as in any internally displaced persons or refugee camp worldwide, urges to take ARI preventive measures: adequate shelter, overcrowding reduction, malnutrition prevention and treatment, and scaling up vaccination coverage, in order to meet the Health 2020 policy framework goals. Adequate sanitary facilities are imperative to prevent the spread of infections. Early and resolute healthcare may avoid short-term and long-term complications of infectious, dental, mental and mother and child problems, which otherwise could lead to higher healthcare expenditure for the hosting population.

In emergency medical teams treating asylum seekers, there is an early role for general and emergency physicians, paediatricians, gynaecologists, midwives, dentists and interpreters. Scaling up with diabetes and hypertension specialists and psychologists is recommended. However, in order to meet the specific and changing needs of asylum seekers arriving in Europe, more research is needed to compare and confirm our findings.

The development of a standardised template to prospectively collect and subsequently analyse and report health might make a substantial contribution to provide the evidence base for the effectiveness and efficiency of the preparation, management and mitigation of humanitarian emergencies.

Generalisability
The results of this study can help to better organise healthcare for asylum seekers residing in camps, particularly with respect to the composition of the medical assistance teams and the medical resources. However, in order to meet the specific and changing needs of asylum seekers arriving in Europe, more research is needed to compare and confirm our findings.

The development of a standardised template to prospectively collect and subsequently analyse and report health might make a substantial contribution to provide the evidence base for the effectiveness and efficiency of the preparation, management and mitigation of humanitarian emergencies.

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Contributors
GvB, FBC, SM and RB conceived and designed the study. GvB, FBC, SM, XdB acquired the data. RB, GvB, XdB and SM analysed and interpreted the data. GvB, FBC, SM, XdB and RB drafted the article. GvB, FBC, SM, XdB, RB, MD and IH revised the article. GvB, FBC, SM, XdB, RB, MD and IH approved the final version of the article to be published.

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None declared.

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