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Expert Opinion on the public health needs of irregular migrants, refugees or asylum seekers across the EU's southern and south-eastern borders

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Executive summary

Background

On 6 August 2015 ECDC was requested by the European Commission (Directorate-General for Health and Food Safety) to produce scientific advice on the main health needs of certain migrant populations, and the options for addressing these, in relation to the prevention and control of communicable diseases.

The Commission asked ECDC to focus on migrants entering the EU, particularly those who may be irregular or are applying for asylum or refugee status and who originate from Africa or the Middle East. The options to address health needs of migrants should concentrate on actions which can be taken at the point of entry or after arrival. The Commission asked ECDC to include information on recent health threats addressed in ECDC Rapid Risk Assessments (diphtheria, meningococcal meningitis, louse-borne relapsing fever) as well the prevention and control of other relevant communicable diseases.

Methods

ECDC conducted interviews with experts from Member States and a non-systematic (due to the limited time available) review of available evidence including a selection of relevant ECDC Risk Assessments and publications suggested by internal and external experts.

Main conclusions

Needs of the addressed populations

Expert interviews and the review of selected literature highlighted the overall needs of the population in question:

- **Reception centres/systems** for newly arrived migrants in order to assure health assessments immediately upon arrival
- **Adequate shelter** to avoid crowding and ensuring good sanitation and hygienic conditions
- **Health education and health promotion** emphasising the benefits of screening, immunisation and other measures
- **Screening** for communicable diseases according to their country of origin and countries transited during migration

Options for public health action

Overall, public health measures to consider include the following:

- **Disease screening.** According to a recent survey in EU/EEA countries, screening for communicable diseases among migrants is currently directed predominantly towards tuberculosis (TB). The TB screening can be performed at different time points upon migrating to a new country (i.e. upon arrival in a country or post-arrival). However, there are a number of key factors to take into account when deciding whether to implement TB disease screening in a setting of irregular migrants (described in detail below). Other diseases for which some Member States currently screen, and which could be considered, include hepatitis B, hepatitis C, HIV, sexually transmitted diseases, vaccine-preventable diseases, cholera, malaria, helminths, intestinal protozoa and Chagas disease. Any screening should be connected to a process of diagnosis and treatment. Screening for infestation with lice, although not belonging to disease screening per se, should be considered.
- **Syndromic surveillance.** According to EU Member State experience, syndromes to consider include: respiratory tract disease, suspected pulmonary tuberculosis, bloody diarrhoea, watery diarrhoea, fever and rash, meningitis/encephalitis or encephalopathy/delirium, lymphadenitis with fever, botulism-like illness, sepsis or unexplained shock, haemorrhagic illness, acute jaundice, parasite skin infection, unexplained death. However, general screening should be done regardless of the presence of symptoms. ECDC has initiated a project, to commence in autumn 2015, that will develop a protocol to assist the implementation of syndromic surveillance at migrant reception centres.
- **Public health follow-up.** A system to track migrants for health purposes including vaccinations, treatment outcome monitoring, access to medication, and chronic disease management.
- **Vaccination.** Vaccinations to consider among migrants include: measles (mass immunisation preferentially with MMR vaccine to be considered, prioritising children up to 15 years old); poliomyelitis (vaccination should be considered for children and adults coming from countries currently exporting poliovirus, such as Afghanistan and Pakistan, infected countries, such as Nigeria and Somalia, or countries which remain vulnerable to international spread, including Cameroon, Equatorial Guinea, Ethiopia, Iraq, Israel, and Syria);

meningococcal disease (preferably with vaccines against meningococcal serogroups A, C, W-135 and Y; or, if a country does not use the quadrivalent vaccines, with vaccines against serogroups A and/or C, if they are available); and diphtheria (a review of individuals' vaccination status should be considered for both adults and children and vaccination with diphtheria-tetanus-pertussis be offered in accordance with national guidelines).

- **General hygiene measures and preventing or minimising overcrowding** in reception centres for migrants. These measures are particularly important to prevent occurrence of louse-borne relapsing fever (LBRF), trench fever, epidemic and endemic typhus, scabies, and other vector-, air-(meningococcal disease), and food-borne diseases. An ECDC project, begun in September 2015, seeks to support migrant reception centre preparedness with a tool for establishing reception centre needs related to communicable disease control during sudden influxes of migrants.
- **Health education and health promotion**. Health education and health promotion sessions need to emphasise the positive aspects of the health assessment and stress the benefits of screening, immunisation and treatment of communicable diseases for a healthy productive life in the host country.
- **Access to healthcare, free of charge,** for the diagnosis and treatment of communicable diseases including primary and emergency healthcare.
- **Other measures.** These include empirical anti-helmintic treatment to be considered for gastrointestinal parasitic infections.

This is an Expert Opinion developed within a limited time scope to address urgent health needs related to the influx of migrants into the EU. More comprehensive guidance on screening for communicable diseases among migrants and related preparedness among EU Member States is being prepared by ECDC in collaboration with external experts.

Background

Source and date of request

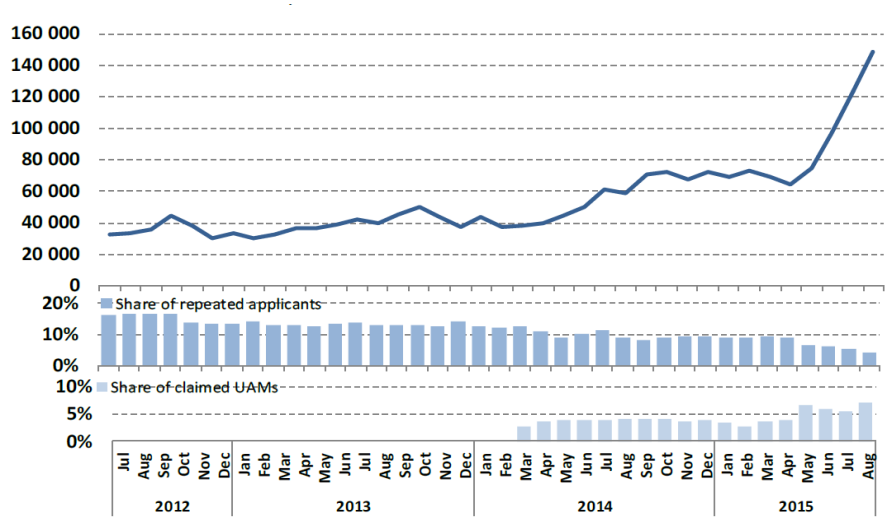
Requested by the European Commission (Directorate-General for Health and Food Safety, Health Threats Unit) on 6 August, 2015.

Scope

Definitions applicable to the addressed populations

This document primarily concerns the needs of irregular migrants or individuals that are applying for asylum or refugee status [1] and who originate from Africa or the Middle East. There has been a recent increase in asylum applications in the EU (Figure 1). No universally accepted definition for the term 'migrant' exists at the international level [2]. The International Organization for Migration (IOM) defines irregular migration as a 'movement that takes place outside the regulatory norms of the sending, transit and receiving countries' and states that 'there is no clear or universally accepted definition of irregular migration. From the perspective of destination countries it is entry, stay or work in a country without the necessary authorization or documents required under immigration regulations' [2]. According to the United Nations the term 'migrant' can be understood as 'any person who lives temporarily or permanently in a country where he or she was not born, and has acquired some significant social ties to this country' [3]. A long-term migrant can be regarded as a 'person who moves to a country other than that of his or her usual residence for a period of at least a year' [4]. Overall, the conclusions of this report may apply to short-term rather than long-term migrants, displaced persons [5], those who seek asylum [6] or have requested or plan to request refugee status [1] and are vulnerable, disenfranchised, and/or homeless.

Figure 1. Number of applications for international protection in the EU-28 plus Norway and Switzerland, August 2015



Source: European Asylum Support Office. Latest Asylum Trends - August. Valetta: EASO; 2015. Available from https://easo.europa.eu/wp-content/uploads/Latest-Asylum-Trends-Snapshot-September2015.pdf
Note: The share of repeated applicants is the proportion of repeated applicants in the total number of applicants for international protection. The share of UAM (unaccompanied minors) represents the proportion of asylum applicants claiming to be below the age of 18 years in the total number of applicants rather than those assessed to be such after an age assessment has been carried out.

Addressed diseases

This report was prompted by recent isolated cases of louse-borne relapsing fever, meningococcal meningitis, and cutaneous diphtheria among migrants newly arrived in EU Member States [7,8]. While these cases do not represent a significant disease burden (based on the available data), the diseases do pose a potential threat due to their epidemic potential. Other communicable diseases considered in this report are TB, malaria, gastroenteritis, other louse- and flea-borne diseases and vaccine-preventable diseases [9]. The diseases were chosen by expert consensus.

Geographic areas

The request concerned migrants from African and Middle Eastern countries. However, its conclusions may apply to migrants arriving from other areas.

Objectives

To describe the health needs of irregular migrants arriving in the EU Member States in terms of treatment, prevention and control of communicable diseases; and to outline options for public health action to address those needs.

Methods

The methods employed were (a) interviews with experts from Member States who are knowledgeable of and/or dealing with prevention and control of communicable diseases among migrants arriving in the EU Member States; and (b) a non-systematic (due to the limited time available) review of published peer-reviewed and grey literature, a review of ECDC Rapid Risk Assessments addressing the issue of prevention and control of communicable diseases among migrants arriving in the EU Member States, and a review of available national and international guidelines on this issue.

Results

Needs of the addressed population

Box 1. Excerpt from a statement by Dr Zsuzsanna Jakab, WHO Regional Director for Europe, 2 September 2015

'In spite of a common perception that there is an association between migration and the importation of infectious diseases, there is no systematic association. Communicable diseases are primarily associated with poverty. Refugees and migrants are exposed mainly to the infectious diseases that are common in Europe, independently of migration. The risk that exotic infectious agents, such as Ebola virus or Middle East respiratory coronavirus (MERS-CoV), will be imported into Europe is extremely low, and experience has shown that, when it occurs, it affects regular travellers, tourists or healthcare workers rather than refugees or migrants.'

Source: World Health Organization Regional Office for Europe. Population movement is a challenge for refugees and migrants as well as for the receiving population. [Internet]. Copenhagen: WHO; 2015. Available from: http://www.euro.who.int/en/health-topics/health-determinants/migration-and-health/news/news/2015/09/population-movement-is-a-challenge-for-refugees-and-migrants-as-well-as-for-the-receiving-population

ECDC assessed the needs and disease burden in migrant populations through a systematic literature review [9]. Two searches were performed, one in PubMed/Medline, Web of Science, Cochrane Library, Google Scholar, websites of key organisations and one of the grey literature to identify how economic changes affect migrant populations and infectious disease. However, there is only limited information available and Box 2 summarises some of those findings [9].

Box 2. Changing modes of transmission in recent years [9]

In 2012, sub-Saharan Africa was identified as the origin of 13.8% of all HIV diagnoses in the EU/EEA, 35.0% of heterosexually acquired infections and 38.3% of mother-to-child transmissions, consistent with other studies in Spain and the UK. Data from 2012 show that the majority of new cases of HIV in sub-Saharan African migrants were attributed to heterosexual transmission, while the majority of new cases (whether among the native-born population or migrants from Latin America, Eastern Europe and East Asia) were in men who have sex with men (MSM). In addition, recent evidence from the United Kingdom suggests that a growing number of migrants are being infected after arrival in the country: 2011 data reveal that 48% of heterosexuals with HIV that were born abroad contracted the virus after arrival in the UK. Further evidence suggests an increased rate of post-migration HIV transmission among some immigrant groups, as reported in Norway and the UK.

Surveillance data on sexually transmitted infections also suggest differences in the mode of transmission between migrants and non-migrants. Between 2000 and 2010, cases of syphilis in migrants were most likely to be acquired through heterosexual transmission (57%), unlike in non-migrant cases, most of which were transmitted through MSM contact (65%). Between 2004 and 2010, cases of gonorrhoea among migrants were mostly acquired through heterosexual transmission, whereas heterosexual and MSM transmission accounted for

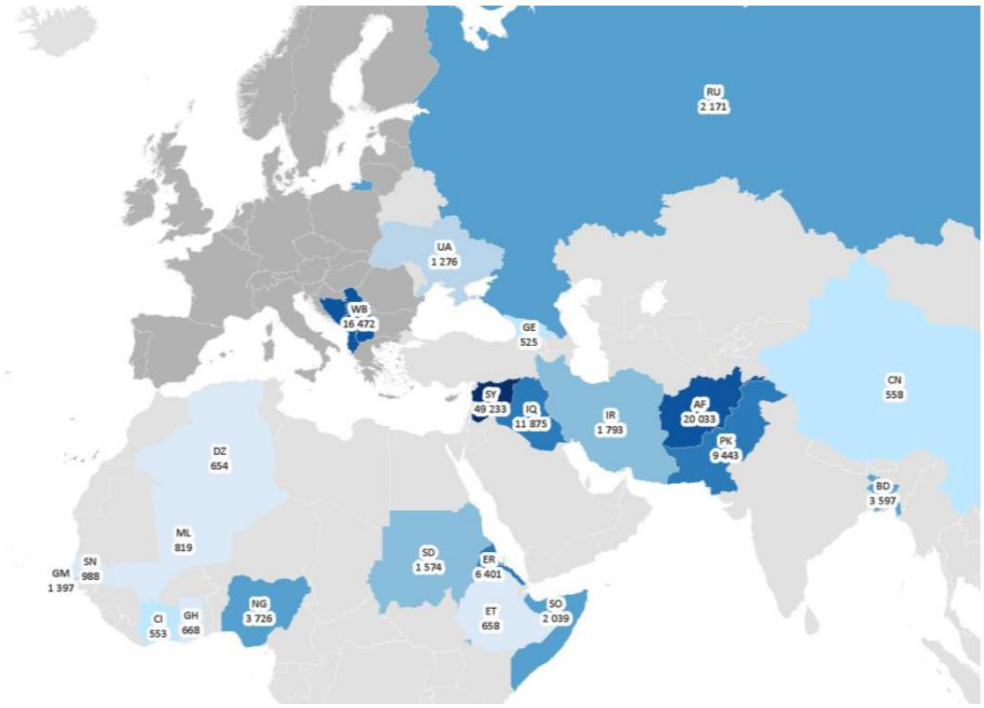
broadly similar shares of cases in non-migrants. In 2011, the majority of cases of hepatitis B in migrants were classified as mother-to-child-transmission (72.7%). Hepatitis B in non-migrants was more likely to be acquired through heterosexual transmission or injecting drug use.

There is mixed evidence on the transmission of TB cases in migrant groups and how it compares with natives in the EU/EEA. In Germany, a low probability of TB transmission between migrants and natives has been reported, with authors noting how fear of migrants increasing the risk of TB was unjustified. In Denmark, TB transmission was 2.5 times more likely to occur from non-migrants to migrants than vice versa. Data from 2002 to 2003 from Barcelona suggest that transmission among Spanish-born and migrant populations, and bidirectional transmission between Spanish-born and foreign-born populations were issues of concern.

Source: Kentikelenis A, Karanikolos M, Williams G, Mladovsky P, King L, Pharris A, et al. How do economic crises affect migrants' risk of infectious disease? A systematic-narrative review. Eur J Public Health. 2015 Aug 28. pii: ckv151.

It is important to note that these populations are not a homogenous group but have diverse health needs. Thus, screening should be performed based on country of origin. The main countries of origin of asylum applicants in the EU-28 plus Norway and Switzerland in July 2015 are illustrated in Figure 2. ECDC is in the process of developing a tool for needs assessments at migrant reception centres and a tool for monitoring infectious diseases through syndromic surveillance at reception and detention centres.

Figure 2. Main countries of origin of applicants in the EU-28 plus Norway and Switzerland in August, 2015



Source: European Asylum Support Office. Latest Asylum Trends - August. Valetta: EASO; 2015. Available from: https://easo.europa.eu/wp-content/uploads/Latest-Asylum-Trends-Snapshot-September2015.pdf
Note: The map displays the main country of origin groups for applicants registered in August 2015.

Information from the interviews

Reception area system for newly arrived migrants [10]. A recurrent theme across all the expert consultations conducted by ECDC was the need to establish a reception system for newly arrived migrants. In the primary reception centres, a health assessment should be carried out immediately upon arrival [11]. Equipping these reception areas with primary care and public health services facilitates screening, vaccination, and treatment of individuals (if need be) free of charge [12-16]. A number of tools are available that might be useful to tailor the resources to the needs of the relevant populations [11,17-20]. They provide descriptions of best practice and the integrated priority actions required for a rapid and effective response to critical events based on an all-hazards approach. Specifically, the organisers of reception areas should consider adequately stocking them with rapid tests for malaria and providing instant treatment and care to patients. Such rapid interventions are the best course of action to detect cases of communicable disease and deal with a number of communicable disease issues with potential for transmission. As immigrants speak different languages and have different cultural backgrounds,

involving community health agents (that originate from the same area) in the health assessments should be considered.

Shelter conditions. Interviewees emphasised the importance of adequate housing conditions for newly arrived migrants. Reception facilities can provide temporary homes for asylum-seekers and refugees, both as individuals and families [21]. Reception facilities provide housing, food, and basic healthcare for their inhabitants. Avoiding or minimising crowded living conditions in the reception centres and ensuring basic sanitation for proper hygiene can avoid or reduce transmission of diseases such as respiratory infections, gastroenteritis, meningococcal meningitis, scabies, etc., within the host country. Experts also stressed that eventually integration into the national healthcare system, and society at large, should be accelerated, not only to prevent exacerbation of existing health problems, but also for outbreak control [12-15]. Moreover, integration [22] into the EU can prevent stigmatisation and political backlash against these populations.

Health education and health promotion. The interviewed experts spoke of the importance of health education and health promotion that can be provided through lectures and outreach to the migrant population and their community leaders [12-15]. These interventions should be tailored linguistically and culturally to the target populations and ideally involve the target population in the design, implementation and evaluation of the programme [23,24]. There is evidence that culturally adapted education can be beneficial for health-related risk factors [25]. The role of cultural mediators should be stressed as vital for this type of activity (although they are needed for all contacts and communication). Health literacy is another vital element for migrant groups in order to better understand health-related issues and to help them navigate the healthcare system. Lessons can be learned from other successful health education and health promotion programmes that have targeted other underserved groups, e.g. Roma [26-28].

Screening for communicable diseases. Screening can be defined as the systematic practice of medical examination, involving laboratory or other diagnostic testing, to search for and identify cases of a specific infectious disease in a target population [16]. Although most of the migrants newly arriving are healthy, expert consultations pointed out the importance of conducting migrant screening for communicable diseases according to their country of origin, since prevalence rates differ considerably by country of origin [29]. Monitoring the communicable disease burden in these populations can identify certain infected individuals in need of treatment. Moreover, rapid medical intervention can potentially intercept further onward transmission in the destination country. A recently published survey summarises current practices in terms of screening for infectious diseases among asylum seekers and refugees in the EU/EEA countries [16].

Vaccination. Experts stressed the importance of ensuring adequate capacity for vaccination of migrants in the host country [12-15]. The routine vaccination services might have to be reinforced to accommodate the special needs of these populations.

Public health follow-up system. Experts also emphasised the usefulness of a system to track migrants from their first point of entry to primary and secondary reception centres and their eventual final destination [12-15]. Such a follow-up system would be essential to ensure follow up of vaccinations and booster shots (e.g. tetanus and diphtheria toxoid boosters), treatment supervision and outcome monitoring (e.g. TB), access to medication (e.g. HIV) although setting it up might be challenging due to the transit of migrants to further countries [6]. Interviewed experts also emphasised that such a tracking system would also enable follow-up on chronic diseases (e.g. diabetes), although addressing chronic diseases was not within the scope of this Expert Opinion.

Syndromic surveillance. The experts suggested alternative measures that could be considered to generate alerts to initiate a timely public health response, such as syndromic surveillance systems. An example of such a system is described in more detail below. In the coming months, ECDC will evaluate the existing protocols for syndromic surveillance of communicable diseases in Europe.

Appendix 1 contains detailed information from the interviews.

Information from other reports and publications

The European Asylum Support Office (EASO) registered a 21% rise of official asylum applicants in August 2015 for the EU countries (plus Norway and Switzerland), compared with the previous month, the highest ever recorded, with Syria as the most common country of origin of applications followed by the western Balkans[i] and Afghanistan (Figures 1 and 2) [30]. However, this does not take unregistered migrants into account. In Greece alone, a record number of migrants arrived in July 2015, according to Frontex[ii] [31]. Many migrants from outside the EU come

[i] Western Balkan countries include Albania, Bosnia Herzegovina, the former Yugoslav Republic of Macedonia, Kosovo*, Montenegro and Serbia.

* This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo Declaration of Independence.

[ii] The European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union.

from countries where prevention and control of communicable diseases is inadequate and the risk of exposure to these diseases is higher than in most EU countries [9,15]. Coverage with childhood vaccination programmes in these countries is sometimes lower and there are still outbreaks of childhood diseases that have been largely controlled in the EU.

Other reviewed publications included recent related ECDC Rapid Risk Assessments [32-34].

Options to address the needs

Overall measures

Screening for communicable diseases. Based on a survey of country experts from EU/EFTA countries, over 50% of these countries have established national or sub-national screening programmes at migrant centres for newly arrived migrants [16]. The majority of these countries have established national guidelines for screening. The screening was widely considered useful by these experts and was directed predominantly towards TB [16]. Screening for other infectious diseases included hepatitis B, hepatitis C, HIV, sexually transmitted diseases, vaccine-preventable diseases, cholera, and malaria and has been put in place by only one third or fewer countries (diseases screened for varied by country). These programmes were specifically tailored to subgroups of newly arrived migrants, most often asylum-seekers at the holding centres. Screening for TB is addressed in more detail below under 'disease-specific measures'. Screening for infestation with lice, although not belonging to disease screening per se, should be considered.

Syndromic surveillance. An exemplary syndromic surveillance system for migrants was established in Italy [35,36]. Syndromic surveillance should be considered in reception centres but should complement, and not substitute, the mandatory infectious disease notification system. Syndromes to consider include respiratory tract disease, suspected pulmonary tuberculosis, bloody diarrhoea, watery diarrhoea, fever and rash, meningitis/encephalitis or encephalopathy/delirium, lymphadenitis with fever, botulism-like illness, sepsis or unexplained shock, haemorrhagic illness, acute jaundice, parasite skin infection, unexplained death. Based on statistically significant differences between the observed and expected incidence of each syndrome (e.g. using the moving average of the previous seven days), a threshold can be set to trigger an alert. ECDC has initiated a project, beginning September 2015, to produce an evidence-based protocol for conducting syndromic surveillance at migrant reception centres.

ECDC also compiles national surveillance data on reportable diseases in Europe, but despite efforts to harmonise data collected on migrant-specific variables such as 'country of birth', the type and quality of data collected still varies between EU/EEA countries. Unfortunately, reporting on migrant-specific variables is poor for the majority of diseases, with the exceptions of HIV and TB. For example, it is it is difficult to obtain an accurate picture of prevalence and incidence of Chagas disease as it is not systematically monitored or reported [37].

General hygiene measures. The interaction of a number of factors, such as poor access to healthcare, low educational attainment, inadequate nutrition and poor personal and food hygiene contribute to a vulnerability to infections [38]. The lack of environmental sanitation and a safe water supply make personal hygiene very difficult. Thus, ensuring an adequate water supply, sanitation and hygiene promotion programmes can be seen as a cohesive agenda to prevent the spread of communicable diseases in these settings. ECDC has initiated a project to assist needs assessment at migrant reception centres. The output will be a check-list for establishing quick and flexible reception centre needs related to communicable disease control in instances of sudden influxes of migrants.

Health education and health promotion. Migrants tend to suffer from poor self-reported health and appropriate educational programmes should be considered to mitigate this [39]. Health education and health promotion sessions need to emphasise the positive aspects of the health assessment and stress the benefits of screening, immunisation and treatment of communicable diseases for a healthy productive life in their host country. In the secondary reception centres, or in a decentralised system, a 'community agent' could liaise between the migrants and the healthcare system and ensure access to care and other services (housing, language training, employment opportunities, etc.). Stronger referral agreements should be considered between shelters, reception centres and health centres in the search for new strategies to ensure compliance with medical visits.

Disease-specific measures

Vaccine-preventable diseases

Assessment of vaccination status and the need for further vaccination according to the national guidelines of the hosting country, should be considered as an integral part of the general health assessment offered to migrants upon arrival.

Specific vaccination strategies are often necessary for displaced populations and refugees in order to protect both children and adults from infectious diseases, prevent spread of infection due to crowded conditions and ensure continuity of childhood immunisation schedules. In addition, attention also should be paid to healthcare workers'

immunisation status for their own protection and as they can play an important role in introducing highly contagious infectious diseases into vulnerable populations or can transmit infections prevalent among migrants into the host country. Among the vaccine-preventable diseases, measles, poliomyelitis and meningococcal disease present a potential risk in emergencies such as during population displacements. Immunisation with measles-containing vaccine should be considered a priority as part of the initial response [40]. Special attention has to be given to the risk of introducing wild poliovirus. Measles, rubella and polio are diseases targeted for elimination and should therefore be considered a priority [41][42]. Immunisation should be considered in accordance with the national immunisation guidelines of the hosting country. If immunisation documents are presented, continuity of the childhood immunisation schedule according to national guidelines should be considered as much as possible. In general, only written documentation should be accepted as evidence of previous immunisation. When in doubt, and in line with national guidelines, a person with unknown or uncertain immunisation status should be either tested or considered susceptible [43] and the schedule should be initiated from scratch, starting with the first dose at the initial health assessment. The time needed for completing the primary series should be taken into account in relation to the logistics of potential transfers to other camps or other settings. Updating vaccination might not be possible at the point of entry and refugees are unlikely to keep any vaccination records when they plan to request asylum status in another country, so follow-up could be challenging [6]. At secondary retention centres, or after arrival in the country where asylum status has been requested, it may be more feasible (but less timely) to complete vaccination schedules.

In crowded settings such as reception centres the risk for communicable disease outbreaks is increased and depends on factors like length of stay and sanitary conditions. Outbreak-prone communicable diseases in these settings include measles, diphtheria, pertussis, varicella, influenza, and other respiratory infections. The risk of an outbreak of vaccine-preventable diseases largely depends on the susceptibility of the population. See below for more details of some of these diseases that could pose a risk for outbreaks in crowded settings.

Measles outbreaks are common among refugee and displaced populations, especially in camps, and refugees have been recognised by WHO as one of the highest risk groups for measles outbreaks [40]. Mass immunisation, preferably with the measles–mumps–rubella (MMR) vaccine is one of the first actions that should be considered in a refugee situation [40], prioritising children up to 15 years old.

Poliomyelitis is a highly infectious disease caused by the wild poliovirus. The mode of transmission is person-to-person, both via the faecal–oral and the oral–oral routes. Population displacement is a factor favouring the circulation of the poliovirus and overcrowded settings present the risk for poliovirus transmission. Temporary recommendations are in place to reduce the international spread of wild poliovirus: polio vaccination should be considered for children and adults coming from countries currently exporting poliovirus (Afghanistan, Pakistan), infected countries (Nigeria, Somalia) or countries which remain vulnerable to international spread (Cameroon, Equatorial Guinea, Ethiopia, Iraq, Israel, Syria) [41].

Meningococcal disease outbreaks could be expected in any refugee setting where overcrowding (especially if sharing dormitory), poor hygiene, and sometimes limited access to medical care are contributing factors [40]. Meningococcal carriage rate has been shown to be higher in members of overcrowded settings and most cases are acquired through exposure to asymptomatic carriers [44]. Meningococcal disease has usually been reported in children, but is still a leading cause of both meningitis and sepsis in young adults (adolescents) and adults, particularly in densely populated settings such refugee camps [45,46]. Vaccination against serogroups A, C, W-135 and Y may help protect individuals and reduce the spread of bacterial carriage and disease. If a country does not use the quadrivalent vaccines, vaccines against serogroups A and/or C should be considered, if they are available.

Awareness also needs to be raised of the risk for cutaneous **diphtheria** among asylum seekers and refugees [47] arriving in Europe. A large proportion of them originate from diphtheria-endemic countries and commonly travel under conditions that increase the risk of acquiring cutaneous diphtheria. They may continue to be exposed to over-crowded and poor hygiene conditions upon arrival in the EU. Such conditions may increase the risk of transmission. Awareness of cutaneous diphtheria is important to ensure rapid diagnosis and treatment. Vaccination is the only form of protection, and thus a review of individuals' vaccination status should be considered (both adults and children) and vaccination with diphtheria-tetanus-pertussis be offered in accordance with national guidelines.

Other vaccine-preventable diseases will also be relevant in this population and national guidelines for vaccination should therefore be followed to ensure this population is protected.

Through an Urgent Inquiry made via the ECDC Epidemic Intelligence Information System for vaccine-preventable diseases, ECDC performed a mapping of the measures in place (options for prevention and control) in EU Member States for mitigating health concerns among migrants. Several EU Member States reported having dedicated sections on vaccine-preventable diseases in their national guidance/guidelines for migrant health and/or having dedicated sections on migrant health in their national vaccination guidelines. Examples of these may be accessed on the dedicated websites [48-56].

Louse-borne (and flea-borne) diseases: relapsing fever, trench fever, epidemic typhus, murine typhus

Poor living conditions, crowded shelters and refugee camps provide ideal conditions for the spread of lice and fleas, which can carry diseases. Homeless populations in Europe face similar situations [57,58].

Three body-louse-borne bacterial diseases are of potential concern: louse-borne relapsing fever (LBRF) caused by the spirochete *Borrelia recurrentis* [59], trench fever caused by *Bartonella quintana* [60,61], and the epidemic typhus (or typhus exanthematicus) caused by *Rickettsia prowazekii* [61].

Only very limited numbers of cases of louse-borne bacterial diseases have been reported in recent years in the EU/EFTA, mainly among the homeless [59,62].

In July 2015, two cases of LBRF in asylum seekers were reported by the Netherlands and another case by Switzerland [63]. Following the report from the Netherlands, ECDC published a risk assessment [8]. In August 2015, the Netherlands reported two cases of trench fever in asylum seekers.

Globally, the geographical distribution of LBRF has decreased in scope due to improvements in living standards. Currently, the disease is primarily found in limited endemic foci in Ethiopia but also in Somalia and Sudan as well as in homeless communities worldwide. These diseases can be successfully treated with antibiotics but relapses have been reported after treatment.

Louse-borne relapsing fever is caused by *Borrelia recurrentis* which is transmitted from human to human by the body louse *Pediculus humanus humanus*. Transmission occurs when the louse is crushed and the infected haemocoel is released onto the human skin. *Borrelia recurrentis* is able to penetrate intact mucosa and skin. There is no direct transmission from human to human. The incubation period is usually between four and eight days (range: 2–15 days) [59].

Trench fever is caused by *Bartonella quintana.* Epidemics were reported during the two World Wars. In recent decades it has reappeared in both developing and developed countries in populations living in poor conditions, such as homeless people. It has also been observed among immunocompromised persons. The incubation period is generally 5 to 25 days. *Bartonella quintana* is transmitted by the body louse through the faeces. The pathogen appears in the louse's faeces 6–10 days after an infective blood meal. The pathogen can remain viable in the dry louse faeces for many months causing possible transmission after elimination of the lice.

Epidemic typhus is caused by *Rickettsia prowazekii* and could result in a high mortality rate among untreated cases as reported in Burundi and Russia in the 1990s. Only very few cases have been reported in recent years among the homeless in Europe [61]. Under certain stressful conditions, individuals may relapse and develop Brill–Zinsser disease, a milder but bacteraemic form of typhus. Transmission occurs via the faeces of the louse and the pathogen remains viable in the dry faeces for several months. The incubation period is between 7 and 14 days (usually 12 days).

Among other vectors, fleas may bite humans and occasionally transmit diseases e.g. **murine typhus** (also named endemic typhus) transmitted by *Xenopsylla cheopis* (which is also a vector of plague) [57]. Murine typhus is caused by *Rickettsia typhi* and present in the Mediterranean basin [64].

Options to consider for the prevention and control of louse-borne diseases include the following [8]:

- Prevent or minimise overcrowding in reception centres for migrants, and promote and provide adequate hygiene facilities for migrants including the possibility to wash clothes.
- Raise awareness among migrants, particularly at the point of entry into the EU, about lice infestation and possible louse-borne diseases.
- Check for signs of lice infestation during medical screening of migrants and carry out delousing as required. As the detection of infestation might not be very sensitive, preventive delousing can be considered.
- Raise awareness among clinicians of the possibility of louse-borne relapsing fever, epidemic typhus or trench fever among recently arrived migrants that might have been exposed to the disease during their journey, and vulnerable population groups who share the same living environment, including awareness of available diagnostic services.
- Trace sources and investigate contacts of patients diagnosed with louse-borne relapsing fever in the EU, to identify other exposed persons and apply control measures and treatment in a timely manner.
- Warn clinicians about the risk of the potentially fatal Jarisch–Herxheimer reaction when treating patients with louse-borne relapsing fever with antibiotics, which requires supportive care for monitoring fluid balance.
- Remind clinicians (and patients) about the risk of possible delayed relapse of these louse-borne diseases months or years later (which may serve as foci for new outbreaks in louse-infested communities).

Tuberculosis

Tuberculosis screening can be performed to identify active TB or latent TB infection. From a public health perspective identifying active TB and implementing adequate treatment is of key importance as it cuts the transmission chain. As per the WHO/UNHCR guidelines 'TB care and control in refugee and displaced

populations' [65], implementing TB screening programmes should not be the priority in the acute phase of an emergency; care and control of other infectious diseases and challenges are the priority. TB care and control should not be implemented if movement from a reception centre is expected in the near future.

Tuberculosis screening can be done by symptom screening or using chest X-ray [66]. Upon suspicion of active TB, conclusive TB diagnosis should be based on microbiological confirmation in a quality assured laboratory. Drug susceptibility testing should preferably follow directly after culture confirmation, especially if drug resistance is suspected.

All patients diagnosed with active TB need adequate treatment free of charge. Completion of the full treatment is essential to cure the patient and to avoid development of drug resistance. A full treatment has a duration of six months or more, depending on the type of TB. Supporting patient adherence can improve treatment outcome and may include an assessment of factors that might hamper adherence. Adherence should be promoted with incentives and health education. Measures may also include directly observed treatment (DOT) enhanced with the innovative use of new technologies. If TB patients under treatment are moved within the country or move to another country, measures to ensure continuation of treatment need to be implemented. 'The European Union Standards for Tuberculosis Care' [67] and the interagency field manual 'Tuberculosis care and control in refugee and displaced populations' [65]are useful resources.

TB screening will be especially effective among migrants coming from countries with a high incidence of TB. In addition to a screening programme the healthcare system in the host country needs to be easily accessible to asylum seekers and migrants to allow for early detection of active TB through passive case finding.

Other diseases to consider

Gastroenteritis. Migrants could suffer from acute bacterial or viral gastrointestinal infections acquired during their travel (and therefore imported) or due to sub-optimal hygiene conditions in reception centres. The migrants may have acquired parasitic (mainly intestinal protozoa like Giardia) infections in their country of origin or while travelling.

A number of measures can be considered to improve conditions. Anthelmintic treatment could be considered for all newly arrived migrants. For migrants suffering from gastrointestinal symptoms and having fever, sufficient fluid therapy through the oral route should be provided. In addition, access to microbiology and virology diagnostics and not only to clinical diagnosis, should be available in order to provide the subject with the correct treatment.

Malaria. The risk for vector-borne diseases, such as malaria is very limited to non-existing in the Middle East and North African countries, but should be considered for persons originating from sub-Saharan African countries or Asia (India, Pakistan).

In a range of studies, recent immigrants accounted for between 5% and 35% of reported malaria cases. Malaria in recent immigrants is often asymptomatic; the parasites may persist for up to 28 months after arrival. Vulnerable groups include pregnant women and children. In children, malaria can be easily confused with common childhood illnesses, particularly vomiting and fever, which may delay the correct diagnosis.

The possible concern is the re-introduction of *Plasmodium vivax* into areas where competent *Anopheles* mosquito vectors are present and transmission sustainable as observed in Greece in 2009–2011 [68]. Autochthonous cases might occur after a re-introduction of the parasite, especially during the summer months when conditions are favourable to sustain vector activity.

Medical attention should be paid to the following symptoms: Patients presenting with high fever (>38.5°C) that cannot be explained through other symptoms (e.g. symptoms of acute respiratory infection) should be referred to the hospital for further examination. Rapid diagnostic tests for malaria can be a useful first-line tool with good sensitivity and specificity for detection in symptomatic patients. Experience in Greece shows that, as is mentioned above for TB, malaria cases in areas receptive and vulnerable for malaria should be treated promptly, preferably under a DOT protocol.

Antimicrobial resistance

Testing for faecal carriage of multidrug-resistant Gram-negative bacteria (MDR GNB) upon admission should be considered for migrants requiring hospitalisation, in accordance with the relevant national guidelines for testing persons with risk of carrying MDR GNB. This is based on the high frequency of faecal carriage of MDR GNB in healthy travellers returning from Asia and Africa [69].

Other ECDC work in this area

This is an Expert Opinion developed within a limited timeframe to address urgent needs related to the influx of migrants into the EU and concern about their health needs. More comprehensive guidance on screening for communicable diseases among migrants and related preparedness among EU Member States are being prepared by ECDC in collaboration with external experts.

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