

European Academies
Science Advisory
Council

For further information

Fiona Steiger
EASAC Secretariat
The Royal Society
6–9 Carlton House Terrace
London, SW1Y 5AG
Tel: +44 (0)20 7451 2697
Fax: +44 (0)20 7925 2620
fiona.steiger@royalsoc.ac.uk

Impact of migration on infectious diseases in Europe

Summary

Most migrants to the EU are healthy but in population terms may bear a disproportionate burden of infectious disease. Communicable diseases will vary in the extent to which a migrant might be infected before entry to the EU (for example, HIV/AIDS) or afterwards, within the Member State and linked to vulnerable socio-economic status (for example, tuberculosis (TB)). Comprehensive data on infectious disease burdens of migrants are currently lacking.

The public health implications of migration have received comparatively little attention in EU policy development, but it is important not to generalise about migrants or infectious disease. The approach to screening and management is likely to differ for those diseases that spread relatively slowly (TB, HIV) from those that may pose an acute threat (for example, severe acute respiratory syndrome (SARS)). Detection of disease on screening must not be used as a reason to deny entry to the EU, for that would deter migrants coming to screening and the identification of high-risk patients. Migrants need to be offered the same access to healthcare services as the rest of the population. It is also important for Member States to do more in tackling infectious disease in developing countries in order to reduce the global burden of disease.

Among the key challenges for healthcare systems are:

- Improving evaluation and sharing of information on current screening practices across the EU.
- Facilitating healthcare access and improving healthcare follow-up of migrants after the initial contact, as part of a general need to enhance primary care services in some Member States.
- Developing information and communication systems to improve awareness and support interaction between patients and the healthcare system.
- Co-ordinating strategies for screening and follow-up practices for high-risk groups across the EU.
- Developing consensus on those infectious diseases most relevant to migration.
- Progressing research to clarify issues where currently there is uncertainty. In particular, well-designed research studies are needed to determine: (i) burden of infectious disease in migrant groups; (ii) nature of health inequalities – including vaccination status – between migrants and the rest of the population; (iii) nature and degree of net public health risk attributable to migration; (iv) efficacy of alternative screening approaches – it is essential to do better in assessing the benefits of screening and to include the evaluation of approaches based on surveillance and sentinel systems in the strategic analysis of the options for managing infectious disease-related migration problems.

In summary, the priorities for research and policy development require improved collection of epidemiological data, increased sharing and implementation of good practice in screening systems, and establishment of mechanisms for access to healthcare. We recommend further discussion, as part of the Portuguese EU Council Presidency priority theme, with the goal of devising a standardised set of protocols for testing and healthcare provision.

Introduction

Previous work by EASAC¹, in reviewing strategic scientific issues in combating infectious disease, has examined European priorities for public health and innovation associated with disease surveillance and control, infrastructure and skills, and support for research and development of novel products and services. Each of the three EASAC reports has noted that there are issues for public health associated with increasing levels of international travel. As the Vaccines Report (2006) noted, '*... the increasing internal movement of goods and people encourages the spread of infection.*'

The effects of globalisation in exacerbating the risk of spreading infectious diseases (Weiss and McMichael, 2004)² are mediated not only through the movement of people but also by the increased mobility of disease vectors, livestock and other animals that may host zoonoses, as well as the greater propensity for food-borne disease in consequence of increasing legal and illegal trade.

The objective of the present, short EASAC paper is to concentrate on those scientific issues relating to infectious disease and public health that may be associated with the movement of people across the borders of the EU, with particular reference to migration. There are many reasons for travel across EU borders, including tourism, business and pilgrimage, but these are outside the scope of the present discussion. This paper focuses on migration in order to serve as an input to the forthcoming Portuguese Presidency of the European Council priority theme of 'Migration and Health'. A Portuguese Presidency conference '*Health and migration in the EU: better health for all in an inclusive society*' will provide demographic analysis of migratory flows in the EU, analysis of health challenges and determinants of migration, a review of Member State health policies and evaluation of the impact of these policies.

The Presidency's aim is to promote debate and understanding about the connections between

health and migration in order to develop effective health policies and strategic programmes for migration. Migrants are a very diverse group in terms of their reasons for migration and their country of origin. Many are students or holders of work permits; a much smaller number are asylum seekers. For the present purpose, we consider migration in terms of crossing the borders of the EU rather than from one Member State to another, except where that represents onward movement of a migrant arrived in the EU.

Comprehensive discussion of some of the general issues for migration and health in the EU is provided in the background reports commissioned by the Presidency conference organisers.

It is not the purpose of the present paper to recommend specific screening programmes but rather to identify what further information is needed in order to be able to make decisions on screening and management.

Global background

- According to the US National Intelligence Council study (2000)³ of factors affecting the spread of global infectious disease, two million people each day travel across borders, including one million each week between developing and developed countries. The US Institute of Medicine (2006)⁴ observed that over the past two centuries, the average distance and speed of human travel have increased a thousand-fold but incubation times for infectious diseases have remained the same: '*No nation is immune to the growing global threat that can be posed by an isolated outbreak of infectious disease in a seemingly remote part of the world.*' Previous EASAC reports have documented the potential risk for EU countries from the global spread of infection, exemplified by the threat from SARS (EASAC, 2005) and H5N1 pandemic influenza (EASAC, 2006).
- The joint Science Academies G8 statement on infectious disease (2006)⁵ called for reinforcement

¹ EASAC (2005) *Infectious diseases – importance of co-ordinated activity in Europe*; EASAC (2006) *Vaccines: innovation and human health*; EASAC (2007) *Tackling antibacterial resistance in Europe*.

² Weiss, R.A. and McMichael, A.J. (2004) Social and environmental risk factors in the emergence of infectious diseases. *Nature Medicine* **10**, S70–S76.

³ National Intelligence Council USA (2000) The global infectious disease threat and its implications for the United States, at www.dni.gov/nic/special_globalinfectious.html.

⁴ Institute of Medicine (2006) *The impact of globalization on infectious disease emergence and control*.

⁵ Joint Science Academies (2006) Avian influenza and infectious disease, accessed via The Royal Society website at www.royalsoc.ac.uk/document.asp?tip=0&id=4823.

of global surveillance as the fundamental instrument for control of infectious disease, indicating that a new, independent, evidence-based study is needed to identify key elements for the further development of global surveillance capabilities.

- A recent UN High-level Dialogue on International Migration and Development⁶ noted that migration now accounts for 75% of population growth in developed countries. In 2004, in the EU-15, net documented migration was 1.8 million in a total population of 460 million.
- With regard to undocumented (illegal) migration, an estimated 400,000 people cross EU borders each year without the necessary travel documents⁷. The EU Hague Programme on Justice, Freedom and Security sets out an agenda to fight illegal migration and recent Council Presidencies have prioritised further development of shared European responsibilities on border controls. The public health implications of migration have received comparatively less attention at the political level. It might be supposed that tighter border controls would help the control of movement and the tracking of people entering the EU. However, tighter border controls may also increase trafficking and worsen the conditions of migration and settlement, in particular for access to care. In this sense, the Hague Programme might have unintended and deleterious consequences for migrants' health.

Migration and infectious diseases: analysis of the evidence

A recent report on the situation in the UK (Health Protection Agency, 2006)⁸ noted that most migrants are healthy young adults but in population terms bear a disproportionate burden of infectious disease; approximately 70% of newly diagnosed cases for

each of the diseases TB, HIV and malaria were in patients born outside the UK.

A recent press release from the European Society for Clinical Microbiology and Infectious Diseases (ESCMID)⁹ observed that TB represents an emerging epidemic in many large European cities (for example in Spain and Greece) as it is strongly related to increasing migration from Asia, Africa and Latin America. Many of the migrants develop the infection in consequence of their socio-economic status in the host countries¹⁰. ESCMID also noted both the vulnerability of the EU to the re-introduction of malaria during migration because of re-colonisation by *Anopheles* mosquitoes of their previous habitats in the Balkans, and potential health issues related to migration from Latin America, for example Dengue fever in Spain. Further consideration of these infectious disease challenges will also need to take account of the potential influence of climate change that may encourage vector populations for diseases previously eradicated in European countries (for example malaria, leishmaniasis) or not previously present in Europe (for example, Dengue fever). Thus, in considering the broader issues for the spread of infectious disease in Europe, it is essential to take account of changes in vector migration as well as human migration: these issues will be discussed in further detail in a forthcoming EASAC report on zoonotic infections.

Evidence presented at a conference organised by the Federation of European Academies of Medicine in 2006¹¹ described problems for Portugal (migrants from Latin America and Africa have comparatively high rates of HIV and TB), Hungary (HIV as a problem for migrants from neighbouring countries), Greece (migrants from East Africa bear a substantial proportion of the HIV burden) and France (migrants with TB)¹² An editorial in *The Lancet* (2006)¹³

⁶ September 2006: www.un.org/esa/population/hldmigration/.

⁷ 'Countries try to get to grips with recent immigration crisis' 25 July 2006, www.euractiv.com.

⁸ Health Protection Agency (2006) Migrant Health. Infectious diseases in non-UK born populations in England, Wales and Northern Ireland. At www.hpa.org.uk/publications/2006/migrant_health/default.htm.

⁹ ESCMID press release 31 March 2007, www.escmid.org/sites/index_f.aspx?par=3.6.

¹⁰ As TB is traditionally associated with poverty, the living conditions in the country of origin explain part of the high prevalence, related to poor housing, nutrition and access to care. However, conditions in the host country may also play a role as migrants often experience deprivation through exclusion and poverty (Ponticello, A., Sturkenboom, M.C., Simonetti, A., Ortolani, R., Malerba, M. and Sanduzzi, A. (2005) Deprivation, immigration and tuberculosis incidence in Naples, 1996–2000. *European Journal of Epidemiology* **20**, 729–734).

¹¹ Conference, November 2006 'Vaccination against infectious diseases, animal and human'. Slide sets at www.feam.eu.com for Hungary, Portugal and France.

¹² Evidence collected in France by the Agence Nationale de l'Accueil et des Migrations (ANAEM) shows that the prevalence of TB in migrants was approximately 20-fold greater than the French overall prevalence.

¹³ Anon. (2006) Migration and health: a complex relation. *The Lancet* **368**, 1039.

concluded that the most pressing health problem for migrants is increased vulnerability to communicable diseases, perhaps particularly HIV/AIDS. In aggregate, in 2005, approximately one quarter of those diagnosed with HIV in the EU were non-EU citizens (mostly from sub-Saharan Africa) and most of them are believed to have been infected in their country of origin¹⁴.

The initial conclusion reached by the Working Group on reviewing the evidence is that significantly more research is needed to quantify the situation in different Member States and to account for apparent differences in the prevalence data for the major communicable disease threats. The experience of the Working Group members also indicates that there may be additional, newly emerging pathogens related to human transcontinental migration. For example, there is an increasing problem of *Taenia solium* neurocysticercosis occurring in the USA, which may also become a problem for Europe, *Entamoeba histolytica* amoebiasis has established autochthony (cycles of transmission) in some European countries and leishmaniasis is increasing in prevalence in the more northern regions of Europe. Antimicrobial-resistant micro-organisms are also not only a local problem: they can spread rapidly throughout the world in humans, animals, vectors and food. Growing drug resistance is becoming a particular problem for TB. As discussed in the recent EASAC report on Antibacterial Resistance (EASAC, 2007), it is expected that levels of resistance will change according to the pattern of migration and other movement.

These examples are illustrative and, although comprehensive data are lacking, it can be concluded that where a study has been made, problems have been found. There is urgent need for more research to collect data and for more evaluation of the research output to determine the quality of the data already available in the absence of conventional peer review or other formal quality assessment. It is important not to generalise about migrants or infectious diseases. The implications for screening and management of certain infectious diseases that

could spread rapidly and may pose acute threats to healthcare systems (for example, SARS, smallpox, Ebola fever) will differ from the chronic communicable diseases such as HIV and TB. However, the public health issues for the category of acute diseases are not specific for migrants and should be considered within the broader context of travel medicine.

The implications of screening

There is relatively little evidence to show that screening by Member States is useful, but that is mainly because there have been few attempts to collect the evidence. Where migrant screening programmes are available, for example for TB, there is some evidence that tests are not always sensitive (missing cases) or applied consistently (for example, only on first entry, not on return to the EU after a visit to the country of origin). In the particular example of TB, tuberculin skin testing as a method for screening migrants is unreliable, and alternative approaches have not yet been well validated for screening.

The Working Group observed that pre-departure screening (in the country of origin) is not generally efficient or effective and may not indicate disease status on arrival in the EU. Moreover, this approach may be discriminatory and encourage illegal migration. A recent editorial in the journal *Lancet Infectious Diseases*¹⁵ provides a good critique of the problems created by those countries requiring pre-departure screening with denial of entry to migrants who test positive for HIV or TB: '*It is imperative that public-health policies in relation to migrants are based on rational arguments and a sound evidence-base, not political agendas.*'

Most migrants are healthy and, in the consensus view of the Working Group, detection of disease at screening on arrival in the host country must also not be used as a reason to deny entry to the EU. Migrants identified as having a transmissible disease must have full access to medical treatment and be accessible to public health measures (such as contact tracing), not only for ethical reasons but also because public health measures to prevent further

¹⁴ Hamers, F.F., Devaux, I., Alix, J. and Nardone, A. (2006) HIV/AIDS in Europe: trends and EU wide priorities. *Eurosurveillance* at www.eurosurveillance.org/ew/2006/061123.asp. The evidence from France, consistent with this aggregated HIV analysis, shows also that (i) most of this group are female, and (ii) the proportion of newly diagnosed HIV-positive cases from sub-Saharan Africa has perhaps decreased during the past two years.

¹⁵ Anon. (2007) Old habits die hard. *Lancet Infectious Diseases* **7**, 369.

spread of disease cannot otherwise be enacted. Denying entry to the EU because of detected infections will not prevent, but rather propagate, the spread of disease because infected migrants might become inaccessible to the public health service but still remain in contact with susceptible populations within the EU. The political issues for rationing healthcare resources are beyond the scope of this paper.

What are the key issues for healthcare systems?

- There is need to do more to evaluate and share the information available on current practices in European countries, identifying good practice to implement more broadly. For example, in Italy, screening for communicable disease is not mandatory but offered as part of migrant access to the healthcare system and in association with national attempts to inform migrant communities on what care is available. Working Group discussion of experience in other European countries (for example, Portugal, Greece, the Netherlands, France, UK, Sweden and Switzerland) highlighted the various approaches to providing free healthcare for communicable diseases.
- There is difficulty in ensuring healthcare follow-up of migrants after the initial contact. However, the challenge of follow-up and provision of appropriate treatment is not confined to migrants, and there is a general case to be made to improve primary care in some Member States. It is crucial to understand better the barriers in access to care among migrant populations, including the reasons for lower adherence to treatment and difficulties in follow-up. Information and communication systems are needed at the primary-care level to create awareness and support interaction between patients and healthcare professionals.
- There is need to distinguish between infectious diseases in considering the policy options, although this is complicated by the challenge of co-infection. TB is commonly screened by Member States but HIV/AIDS is not, and some tropical diseases that were previously screened are not now, despite their recurrence. It would be valuable to compile a database of those infectious diseases most relevant to migration and travel medicine

generally, including the (re-)emerging diseases where there is risk of re-initiating cycles of transmission in European countries.

- Communicable diseases will vary in the extent to which a migrant is infected before entry to the EU or afterwards. For those two infectious diseases that are of the greatest importance for migration, as noted previously, TB infection is judged frequently to occur within the Member State and is linked to vulnerable socio-economic status whereas HIV/AIDS may present the greater problem in some countries of origin. More research is required to document and elucidate these epidemiological differences in order to examine the potential social determinants of disease. There is also very little information on the extent to which the host population is at risk from infection by migrants – the risk is assumed to be low but there is need for better research studies, for example by typing pathogen strains and characterising antibiotic resistance patterns.
- It is important to co-ordinate screening and follow-up practices for high-risk groups across the EU. In addition to screening, additional tools are needed, including surveillance and sentinel systems, depending on the infectious agent. Before policy options can be fully informed, there are some major areas of scientific uncertainty to resolve in terms of the impact of infectious disease on migrants, the secondary impact on their contacts and public health systems and the cost-benefits of screening and treatment. The evidence cannot be derived from case reports alone because of the lack of denominator – there is need for well-designed research to define risk, and track trends – but even in the absence of definitive studies there is value in doing more to collect narrative data more systematically. An improved evidence base would be highly useful to counter ‘media scare stories’ as well as to inform the future policy decisions on screening strategies (for example, deciding the relative merits of risk-based or whole-population approaches). There is, of course, a particular challenge in ascertaining the health status of undocumented migrants, and the research community must consider further the appropriate research tools.

Conclusions and recommendations

1 Relevance of health to consideration of EU migration strategy We conclude that the public health implications of communicable disease are very important elements for development of the broader strategy to manage migration issues for the EU. We agree with the organisers of the Portuguese Presidency conference that the priorities for further research and policy development cover:

- (i) improved collection of information;
- (ii) assessing, sharing and implementing best practice in screening;
- (iii) establishing mechanisms of access to healthcare.

2 Clarifying what is known/not known and filling information gaps The European Commission and Member States need to collect better statistics to quantify the impact of migration on health and health systems – partly by building on current EU and international (World Health Organization) efforts and partly by supporting new joint initiatives with neighbouring and developing countries for fact-finding and interpretation. In particular, additional validated data are required to determine:

- (i) burdens of infectious disease in migrants;
- (ii) nature of health inequalities between migrants and other groups in the population;
- (iii) nature and degree of public health risk attributable to migration;
- (iv) efficacy of screening and alternative approaches, including surveillance and sentinel systems;
- (v) vaccination status of migrants – to establish healthcare system priorities to assure access to immunisation schedules;
- (vi) modelling of disease transmission to estimate public health impacts, what is an effective intervention and what is cost-effective;
- (vii) barriers in access to treatment and follow-up.

3 Screening, surveillance and treatment strategies The efficacy of screening depends on disease prevalence, available test methods, their sensitivity and predictive value, and the provision of healthcare measures to respond to the test result. It is essential to do better in assessing the efficacy of screening programmes. And it is of the greatest importance to use the new knowledge collected to inform systematic evaluation of the facilities and procedures available to migrants at their point of entry to the EU. Currently, it must be assumed that many cases of infectious disease are missed at this early contact stage and there is need to share the examples of good practice in Member States for reception centres and initial presentation to the healthcare system.

We recommend that the agenda of the Portuguese Presidency discussions should include this review of good practice with a goal of devising a standardised set of protocols for testing and healthcare provision, which can be implemented according to local circumstances. Standardisation of practice in screening and care approaches would also provide the basis for collecting better data to inform future policy choices. Efforts to standardise at the European level will be dependent on good networking between Member States and must be augmented by support for training locally and by improved provision of information to communities of migrant patients.

The European Centre for Disease Prevention and Control (ECDC) must continue to develop its key role in EU-wide surveillance of current and emerging infections, and in co-ordination to ensure that Member State authorities provide standardised and detailed surveillance statistics in compiling the evidence base. We welcome the current ECDC activity, in response to a request for guidance from the European Commission, on evaluation of the options for migrant access to HIV prevention and care. We agree that it is necessary to explore a wide range of issues in this evaluation, covering social integration (relating to stigma, socio-economic and legal status), epidemiology (transmission and risk factors), surveillance (definition of high risk groups) and the barriers to accessing prevention and care services (at institutional, provider and client level).

4 Global co-ordination The EU must take a leadership role in strengthening public health capacity in newer Member States and in developing countries. The European Commission and Member States must also continue to explore how they can help implement the recommendations from the joint Science Academies Statement on Infectious Disease (2006)¹⁶. Not only must Member States assist in the cost of diagnosis and treatment for migrants under the provisions available to EU citizens, it is also important for Member States to tackle infectious disease in developing countries in order to reduce the global burden of disease.

Appendix: Expert consultation

This paper was prepared by consultation with a group of experts, acting in an individual capacity, and was reviewed and approved by EASAC Council. We are grateful to all who contributed to the Working Group:

Volker ter Meulen (Chairman), President of the German Academy of Sciences Leopoldina, Germany

Ana Fernandes, National School of Public Health, New University of Lisbon, Portugal

Bruno Gottstein, Institute of Parasitology, Vetsuisse Faculty and Faculty of Medicine, University of Berne, Switzerland

Gerard Krause, Robert Koch Institute, Berlin, Germany

Miriam Lichtner, Department of Infectious and Tropical Disease, La Sapienza University, Rome, Italy

Angela McLean, Department of Zoology, University of Oxford, UK

Mihai Netea, Department of General Internal Medicine, Radboud University Nijmegen, the Netherlands

Julian Perelman, National School of Public Health, New University of Lisbon, Portugal

Gianluca Russo, Department of Infectious and Tropical Disease, La Sapienza University, Rome, Italy

George Saroglou, Department of Internal Medicine, University of Athens, Greece

Alain-Jacques Valleron, INSERM, Hospital Saint Antoine, Paris, France

Robin Fears (secretariat), EASAC, UK

A draft of the Working Group output was discussed with Francoise Hamers (ECDC) and Robin Weiss (University College London, UK): we are also grateful for their review.

¹⁶ See footnote 5 for citation of the Joint Science Academies statement. The issues for global co-ordination have also been discussed in previous EASAC reports, particularly 2005, 2006 (see footnote 1).

EASAC

EASAC – the European Academies Science Advisory Council – is formed by the national science academies of the EU Member States to enable them to collaborate with each other in providing advice to European policy-makers. It thus provides a means for the collective voice of European science to be heard.

Its mission reflects the view of academies that science is central to many aspects of modern life and that an appreciation of the scientific dimension is a pre-requisite to wise policy-making. This view already underpins the work of many academies at national level. With the growing importance of the European Union as an arena for policy, academies recognise that the scope of their advisory functions needs to extend beyond the national to cover also the European level. Here it is often the case that a trans-European grouping can be more effective than a body from a single country. The academies of Europe have therefore formed EASAC so that they can speak with a common voice with the goal of building science into policy at EU level.

Through EASAC, the academies work together to provide independent, expert, evidence-based advice about the scientific aspects of public policy to those who make or influence policy within the European institutions. Drawing on the memberships and networks of the academies, EASAC accesses the best of European science in carrying out its work. Its views are vigorously independent of commercial or political bias, and it is open and transparent in its processes. EASAC aims to deliver advice that is comprehensible, relevant and timely.

EASAC covers all scientific and technical disciplines, and its experts are drawn from all the countries of the European Union. It is funded by the member academies and by contracts with interested bodies. The expert members of project groups give their time free of charge.

EASAC's activities include substantive studies of the scientific aspects of policy issues, reviews and advice about policy documents, workshops aimed at identifying current scientific thinking about major policy issues or at briefing policy-makers, and short, timely statements on topical subjects.

The EASAC Council has 25 individual members – highly experienced scientists nominated one each by the member national science academies, the Academia Europaea and ALLEA. It is supported by a professional secretariat based at the Royal Society in London. The Council agrees the initiation of projects, appoints members of project groups, reviews drafts and approves reports for publication.

For further information

Fiona Steiger, EASAC Secretariat

The Royal Society, 6–9 Carlton House Terrace, London, SW1Y 5AG

Tel: +44 (0)20 7451 2697 | Fax: +44 (0)20 7925 2620 | email: fiona.steiger@royalsoc.ac.uk