

University of Oxford news release

Strictly embargoed until 0001 UK time on Wednesday 15 June 2016

Scientists map the global spread of HIV – through the Western world and beyond – for the first time

For the first time, an international team of scientists from the European Society for Translational Antiviral Research (ESAR: esar-society.eu) has mapped the spread of the HIV virus around the globe after it reached the United States in the early 1970s.

The major study, published in the *Journal of Molecular Epidemiology and Evolutionary Genetics of Infectious Diseases (MEEGID)*, finds that HIV travelled from the US to Western Europe on a number of occasions, whereas Central and Eastern Europe remained isolated for the most part of the early epidemic.

Analysis of thousands of genome sequences shows that geopolitical events such as the fall of the Iron Curtain had a big impact on human migration patterns within Europe and thus the spread of the virus through the continent.

Co-lead author Dr Gkikas Magiorkinis, of the Department of Zoology at Oxford University (UK), said: 'The story of HIV up to its arrival in the US is already known. What happened after that, however, has been unclear. We wanted to see how HIV spread in the Western world.'

'One of our main findings is that North America was spreading the virus much more than importing it, whereas Europe was absorbing the infection.'

Co-lead author Assistant Professor Dimitrios Paraskevis, of the Department of Hygiene, Epidemiology and Medical Statistics at the National and Kapodistrian University of Athens (Greece), said: 'Another striking finding is the clear segregation between Eastern and Western Europe in the early days of the virus, which probably has to do with the political situation on the continent. These distinct strains in Eastern and Western Europe were able to connect again in the 1990s once movement became less curtailed.'

Human immunodeficiency virus type 1 (HIV-1) was discovered in the early 1980s, when the virus had already established a pandemic. For at least three decades the epidemic in the Western world has been dominated by subtype B infections as part of a sub-epidemic that travelled from Africa through Haiti to the US. However, the pattern of the subsequent spread still remains poorly understood.

The researchers analysed almost 9,000 genomes of globally representative HIV-1 subtype B strains to map their spread around the world over the past 50 years and to highlight any significant spread patterns. They show that subtype B travelled from North America to Western Europe on different occasions, while Central and Eastern Europe remained isolated for the most part of the early epidemic.

Looking at Europe in more detail, the study shows that the UK, France and Switzerland all exchanged viral isolates more often with non-European countries than with European ones. The observed pattern is likely to mirror geopolitical landmarks in the post-World War II era – namely, the rise and fall of the Iron Curtain – and traditional links between countries as a result of European colonialism.

HIV-1 therefore spread along specific migration routes that are consistent with geopolitical factors that affected human activities during the past 50 years, such as migration, tourism and trade. The researchers say their findings support the argument that epidemic control policies should be global and incorporate political and socioeconomic factors.

Dr Magiorkinis added: 'Viral dynamics are influenced by host ecology, and human ecology is defined by geopolitics. It is not surprising that a country's influence is strongly linked to its role in spreading the virus – HIV simply followed the natural cultural flows of the second half of the 20th century, moving from North America to Europe. In this study, we can also see the effects of the traditional links of the UK and France with non-European countries.'

Assistant Professor Paraskevis said: 'This study shows how important it is that policies to prevent the spread of infections are set up on a global scale, and that we understand how – much like in economics – an epidemic in an influential country is likely to have an effect in almost every other part of the world.'

ENDS

For further information, please contact the University of Oxford press office at news.office@admin.ox.ac.uk or on +44 (0)1865 280528.

**Dr Gkikas Magiorkinis: gkikas.magiorkinis@zoo.ox.ac.uk
Assistant Professor Dimitrios Paraskevis: dparask@med.uoa.gr**

Notes to editors

The paper 'The global spread 1 of HIV-1 subtype B epidemic' will be published in the *Journal of Molecular Epidemiology and Evolutionary Genetics of Infectious Diseases (MEEGID)* on Wednesday 15 June 2016. It will be available to view at <http://www.sciencedirect.com/science/article/pii/S1567134816302234>

The study was a major international collaboration involving researchers from 40 institutions across Europe via the European Society for Translational Antiviral Research (ESAR). ESAR unites scientists and clinicians throughout Europe to expand knowledge on viruses: info@esar-society.eu.