

HIV is spread most by people with medium levels of HIV in blood, says study

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Viral load is a count of how many viral particles are in a person's blood, and it varies hugely between individuals.

People with medium levels of HIV in their blood are likely to contribute most to the spread of the virus, according to new research published today in the journal *Proceedings of the National Academy of Sciences*.

The study, by researchers from Imperial College London, looked at several groups of HIV-positive people in Europe, the USA and sub-Saharan Africa. It found that those with a high viral load are the most infectious group, but have only limited time to infect others, because they generally progress to AIDS quite quickly.

Viral load - a count of how many viral particles are in a person's blood – varies hugely between individuals. The higher the viral load, the more infectious a person is but the shorter their life expectancy. As a result, the study found, those with a high viral load do not contribute the most in the long run to the spread of HIV.

Those with a medium viral load are moderately infectious but remain asymptomatic for a period of about six to eight years before progressing to the symptoms of AIDS. This means they can be unaware that they have HIV for a long period of time, during which they can transmit the virus to a number of different sexual partners, and hence contribute most to the epidemic.

Dr Déirdre Hollingsworth, one of the authors of the paper from the Department of Infectious Disease Epidemiology at Imperial College, said: "Just being highly infectious isn't enough, you have to live long enough to pass the virus on. This long-term view should inform public health policy."

Despite much recent progress, effective treatment is still not widely available across sub-Saharan Africa, where most infected individuals live. One idea which has been put forward is that treatment should target the most infectious people, with high viral loads, in order to limit transmission. The results of the new study suggest that this would not be an effective plan, as the largest number of new infections is caused by people with medium viral loads.

Those with a medium viral load form the largest, most common group amongst those not receiving treatment. One reason for this could be that the virus has evolved to achieve the optimal balance between infectiousness and virulence, in order to maximise its chances of getting passed on.

Dr William Hanage, another of the authors from the same department at Imperial, commented: "It's certainly very striking that the viral loads we see most in nature are just right to make sure the virus gets transmitted as much as it can before it kills its host, which is what you would expect from evolution."

Dr Christophe Fraser, lead author of the study from the Department of Infectious Disease Epidemiology at Imperial College, added: "We now want to see whether the virus has adapted in order to allow it to infect the most people, which seems plausible given the results of our study. This would have serious implications for public health policy, because if it is true then some strategies to prevent transmission could end up making the virus more virulent by accident. While it is too early to sound the alarm, more research to prove or disprove this theory is urgently needed. That is what we are focusing on now."

Source: UCL

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