A global non-profit initiative against HIV drug resistance

PRESS RELEASE

Clinical studies by expert HIV clinicians suggest that HIV-TRePS may have clinical and economic benefits

Free web-based service helps physicians select optimum combination of HIV drugs

LONDON, UK and VANCOUVER, BC; 18th January 2011. Two multinational clinical studies indicate that the HIV Resistance Response Database Initiative (RDI's) system for predicting how HIV and AIDS patients will respond to different drugs could be a useful tool with potential clinical and economic benefits. The studies, published in the January issue of AIDS Patient Care and STDs, involved highly experienced physicians in the USA, Canada and Italy who used the system to help them select the optimum combination of HIV drugs for patients whose therapy was failing.

The HIV Treatment Response Prediction System (HIV-TRePS) harnesses the power of complex computer models that have been trained with data from thousands of patients around the world. In these studies, physicians entered their patient's data and their selection of the next combination of HIV drugs, via the Internet. A prototype version of HIV-TRePS predicted how the patient would respond to hundreds of alternative combinations of HIV drugs. Within seconds, the physician received a report listing the drug combinations that the models predicted were most likely to work. Having reviewed the report, the physicians recorded their final treatment decision and completed an online evaluation.

The results demonstrated that use of the system was associated with a change of treatment decision in one-third of cases to combinations with fewer drugs overall, which were predicted to result in better virological responses. Evaluations indicated that the physicians found the system to be easy and useful. Based on these findings, use of the system could potentially improve patient outcomes and reduce the overall number – and therefore cost – of drugs used. An improved version of HIV-TRePS is now available free of charge over the Internet (via the RDI web site) as an experimental tool.

"HIV-TRePS is an innovative and important tool to improve the health of people living with HIV, and the BC Centre for Excellence in HIV/AIDS (BC-CfE) is proud to contribute to its development," commented Dr. Julio Montaner, Past President of the International AIDS Society and Director of the BC-CfE, based in Vancouver, Canada. "These promising results are the first to be published from a clinical evaluation of such a system. I would encourage people to try the system and enter follow-up data and evaluations to help the RDI to continue to refine and improve the system."

BC-CfE physicians have been testing HIV-TRePS to optimize treatments for HIV and AIDS patients throughout British Columbia, Canada for the past year. The system has proven to be user friendly and has further shown a real potential to assist less experienced prescribers to select the best drug combinations, helping to enhance patient care while saving health-care resources.

Selecting and changing treatments for patients with HIV and AIDS in order to keep the virus suppressed is complex and challenging. There are approximately 25 HIV drugs available, from which physicians normally choose a combination of three or more to suppress the virus. However, mutations occurring in the viral genetic code can cause resistance to the drugs used against it. The physician then has to select a new combination of drugs to overcome this resistant strain.

The computational models within HIV-TRePS, called "Random Forests," base their predictions on a range of more than 80 different variables including mutations in the viral genetic code, the drugs used to treat the patient in the past, CD4 cell counts (a type of white blood cell that is attacked by HIV) and the amount of virus in the bloodstream. The models estimate the probability of each combination of drugs reducing the amount of virus to below the limit of detection in the blood (50 copies HIV RNA/ml) based on what the system has 'learned' during its training with thousands of real clinical cases. The system's overall accuracy during development and testing was approximately 80%.

"We are very pleased to see the results of these studies published," said Dr Brendan Larder, Scientific Chair of the RDI. "It is gratifying to see evidence that the years of technical development have resulted in a system that is likely to produce clinical benefits and that physicians are keen to use."

The RDI is already working on a version of HIV-TRePS for use in resource-limited settings where there are fewer treatment options and health care workers do not have access to all the information that this initial system requires. The RDI's approach could also have potential benefit in other diseases, most obviously where drug resistance can be a problem such as Hepatitis.

The RDI is an independent, not-for-profit research group set-up in 2002 with the mission to improve the clinical management of HIV infection through the application of bioinformatics to HIV drug resistance and treatment outcome data. Over the eight years since its inception, the RDI has worked with many of the leading clinicians and scientists in the world to develop the world's largest database of HIV drug resistance and treatment outcome data, containing information from approximately 70,000 patients in more than 15 countries.

Note: HIV-TRePS is an experimental system intended for research use only. The predictions of the system are not intended to replace professional medical care and attention by a qualified medical practitioner and consequently the RDI does not accept any responsibility for the selection of drugs, the patient's response to treatment or differences between the predictions and patients' responses.

More information can be found at: www.hivrdi.org.
The publication can be found at: http://www.liebertonline.com/doi/full/10.1089/apc.2010.0254

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