Transmitted HIV Drug Resistance on the Rise in U.S.

March 21, 2012 By Tim Horn

New surveillance data from the U.S. Centers for Disease Control and Prevention (CDC) suggest that about two in 10 individuals infected with HIV in recent years involved strains of the virus harboring mutations conferring at least partial resistance to one ore more available antiretroviral (ARV). The report was presented Wednesday, March 7, at the 19th Conference on Retroviruses and Opportunistic Infections in Seattle.

The U.S. Variant, Atypical, and Resistant HIV Surveillance (VARHS) system, in which HIV specimens from newly diagnosed individuals are tested for drug-resistance mutations, was established by the CDC to provide the clearest picture to date of the scope and type of resistance in the United States.

The analysis reported at CROI included a total of 10,338 resistance profiles from eight U.S. regions; this consisted of 2,339 profiles from individuals with recent infections (confirmed using a specialized antibody test or a negative HIV test results within six months before diagnosis) and 7,999 profiles from individuals with confirmed long-standing HIV infection (individuals diagnosed with AIDS within six months of testing positive for the virus). Regions represented in the analysis were Seattle, Los Angeles, Chicago, Colorado, Michigan, Louisiana, New York and South Carolina.

The system uses standard genotypic resistance testing, which identifies specific viral mutations associated with drug resistance. Because neither the recently infected individuals nor the subjects with established infection included in the analysis had yet started treatment, the presence of any HIV drug resistance mutations in their blood would indicate that the resistant virus was transmitted to them at the time of their infection.

Overall, 15.2 percent of all samples included in the analysis had evidence of at least one transmitted drug resistance mutation.

Among the recently infected individuals, 19.1 percent had evidence of at least partial resistance to at least one drug in a particular ARV class, compared with 14.7 percent of the individuals with long-standing HIV infection. This difference was found to be statistically significant, meaning it was too great to have occurred by chance.

Resistance to drugs in just one class was documented in 15.4 percent of recently infected

individuals, compared with 12.5 percent of those with established infections. This difference between the two groups was statistically significant.

Resistance to drugs in two ARV classes was documented in 3.1 percent of those newly infected with HIV, compared with 1.7 percent of those with established infection. Here too the difference was statistically significant.

Rates of resistance to drugs in three classes were similar in the two groups: 0.6 percent.

HIV resistance to nucleoside reverse transcriptase inhibitors was somewhat more common among those with recent infection—7.6 percent versus 6.7 percent—though this difference was not statistically significant. The same held for resistance to protease inhibitors, found in 4.6 percent of those with recent infections and 4 percent of those with established infections.

Where there was a statistically significant difference was in the prevalence rates of HIV strains at least partially resistant to non-nucleoside reverse transcriptase inhibitors (NNRTIs). According to the presented data, 11.1 percent of the recent infection samples had mutations conferring NNRTI resistance, compared with 6.9 percent of the samples from those with established infections.

The report also noted statistically significant increases in key ARV mutations between 2006 and 2009 among recently infected individuals. Between these years, HIV strains with evidence of at least partial resistance to drugs in at least one ARV class increased by more than 5 percent annually. As for specific drug classes, the only statistically significant annual increase was for the NNRTI class—the prevalence of NNRTI mutations among recently infected individuals increased by more than 6 percent a year.

“In this analysis,” the authors concluded, “one in six newly diagnosed HIV infections contained one or more mutations associated with transmitted antiretroviral drug resistance,” adding that “the increasing trend in the prevalence of NNRTI [transmitted drug-resistance mutations] may adversely impact the use of population and effective NNRTI-based HIV treatment regimens.”

The researchers also reiterated that the prevalence of these mutations was 1.3 times higher among those with recent infection compared with those recently diagnosed with long-standing infections. However, they warned, a strict comparison between the two groups may not be entirely accurate, as transmitted strains of HIV with drug resistance mutations can be driven to undetectable levels and largely replaced by virus that appears to be drug sensitive in individuals with long-standing established infection.

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