ABUNDANT EPIDEMIOLOGY

ODESSA, UKRAINE—Abundant epidemiologic evidence shows that the HIV epidemic that has startled Eastern Europe traces back to this charming Black Sea city in the early 1990s, right on the heels of the fall of the Soviet Union and the resultant economic, cultural, and political upheaval. Without question, injecting drug users (IDUs) drove it. And detailed molecular analyses later revealed that HIV strains isolated in Belarus, Russia, Kazakhstan, and other countries in the former Soviet Union evolved from the southern Ukrainian strains (see graphic). But the factors behind the explosion of HIV in this region remain elusive.

Part of the confusion revolves around the drugs that people inject, their networks, and the way drugs are prepared and shared. HIV typically piggybacks on heroin, which has played a major role in the Russian epidemic. But here in southern Ukraine, heroin was not popular 15 years ago.

In Ukraine, Russia, and other Eastern European countries, people have long injected liquid poppy straw, or chernaya, a homemade opiate cooked from the cheap remains of plants harvested for their seeds, which are used in food or pressed for oil. According to several IDUs interviewed here, people started to sell syringes pre-filled with chernaya in the early ‘90s, which were convenient but introduced new opportunities for HIV to spread. One commonly voiced thesis is that the Roma, a “gypsy” community in Odessa that prepares and sells the pre-filled syringes, picked up used syringes off the street.

Social psychologist Robert Booth of the University of Colorado, Denver, has interviewed IDUs and dealers in Ukraine since 1998, and he doesn’t believe that Romas kick-started the epidemic. “I’m sure there are some cases where people got used syringes, but it’s more dangerous if they go to a dealer,” says Booth.

Many dealers are users themselves. Booth contends that the way they prepare chernaya and a widely used ephedrine-based drug called vindrt may indeed have spread HIV. In a 2003 study, Booth and his colleagues reported that dealers typically cook poppy straw with chemicals to make a solution of drug, draw it into their own syringes, and then squirt it into a buyer’s syringe, or directly fill the user’s syringe from the batch. “You have numerous syringes going into a common container and pulling out the solution,” says Booth. “If anyone has HIV or hepatitis C, you’re passing the virus through the solution.”

Interview-based research does not provide hard evidence of routes of transmission, however. Epidemiologist Robert Heimer of Yale University School of Public Health has gone to considerable lengths to assess whether these chernaya practices spread HIV. Working with Andrei Kozlov’s team at the Biomedical Center in St. Petersburg, Russia, and Jean-Paul Grund at the Center for Addiction Research in Utrecht, the Netherlands, Heimer manufactured chernaya in his lab (with permission from the U.S. Drug Enforcement Administration). The researchers then spiked the chernaya with HIV-infected blood to simulate the contamination of the solution by a dirty syringe or by directly adding blood (a method used to remove impurities). In another test, they drew HIV-infected blood into syringes, discarded most of it, and then filled the syringes with chernaya or a saline control.

As the researchers reported in the May 2006 issue of Addiction, if HIV-infected blood contaminated the chernaya solution, heat and chemicals killed the virus. In the HIV-contaminated syringes, those rinsed with saline had viable HIV, whereas only 43% of those with chernaya did. So the drug reduced the risk of HIV being transmitted through a dirty needle. “It’s completely impossible for contaminated chernaya to have been the root of the epidemic,” says Heimer.

Sharing of syringes filled with chernaya may initially have spread HIV in southern Ukraine, but Heimer and co-author Grund say the epidemic fully blossomed in Russia with the increased supply of plentiful and potent heroin from Afghanistan. “It’s the free-market system acting in the most open way in a completely unregulated market,” says Heimer. Heroin and opium seizures in Russia charted by the United Nations Office on Drugs and Crime indeed show a steep increase that begins in 1994.

Heimer says the novelty of heroin in Russia contributed to HIV’s spread there in the ‘90s, and its popularity is now on the wane, with his research showing a steadily increasing age of the average user. But he warns that IDUs are still being infected with HIV at a high rate and adds that this is no time to be complacent. “All of these epidemics of drugs follow the same cyclical patterns,” says Heimer. “The question is, What will happen if the pattern recreates itself?”

J.C.