Bats play important roles as reservoir hosts in many emerging zoonotic viruses. Researchers focused on the ecological causes of spill over events between bats and humans or domestic animals. They found spill over events were most likely to occur at areas of high human population density and expansion of urban areas. Research has shown that bats can shed virus in “pulses” where viral shedding in an area is greatly increased during a certain period of time. The researchers present two hypotheses for this. The episodic shedding hypothesis states that when bats are stressed, their immune system is weakened and they shed a greater number of virus particles. The transient epidemics hypothesis states that as immunity to a certain virus decreaces over time, a new pool of bats become infected and shed the virus. Restoration of bat habitat, limiting domestic animal’s contact with bat excretions, will decrease the chance of spillover.

Researchers looked at the origin of HIV and SIV viruses, the factors that enabled cross-species transmission of the viruses, and the host related barriers to cross-species transmission. HIV-1 group M, the strain causing the gloabal aids pandemic, originated from a chimpanzee SIV virus in southeast Cameroon. While there is evidence that SIV viruses have been present in primates for over 30,000 years, HIV originated in the early 1900s. HIV-1 emerged at a time when urban populations were expanding. There are several barriers to to cross-species transmission, including the host restriction factor tetherin. SIV viruses attack tetherin’s cytoplasmic domain. Because that method is ineffective in humans, HIV-1 evolved to attack tetherin’s membrane spanning domin. HIV-1 M’s ability to fully attacked tetherin in this way may be why it is the only group to achieve pandemic status.