

flip," he explains. "Glutamic acid is associated with flu-virus replication in birds, and lycine is in primates."

The Turkey strains are the first in which the polymerase and receptor-binding mutations have been found together. They could make it easier for humans to catch the virus from poultry. But they might also favour human-to-human transmission. This is because the polymerase change helps the virus to survive in the cooler nasal regions of the respiratory tract, and the haemoagglutinin mutation encourages the virus to target receptors in the nose and throat, rather than lower down in the lungs. The virus is thought to be more likely to spread through droplets coughed from the nose and throat than from infections lower down.

Hay points out, however, that it is difficult to predict how the mutations will actually influence the virus's behaviour. He adds that just two changes are unlikely to create efficient human-to-human transmission on their own.

Establishing what effects these changes are having on the epidemiology of the current outbreak is a top priority for research teams working in Turkey. "We must learn more about the mild cases and be absolutely sure of whether these viruses are behaving differently from those we have seen elsewhere," says Hay. "It is early days in terms of what we know about the viruses causing these infections."

Researchers are sequencing more strains from the Turkey cases, to see whether they share the mutations and to check for further changes. Samples were expected to arrive in London on 18 January, after being held up for more than a week in Turkey because of the Eid ul-Adha holiday period.

**Declan Butler**