

## **Molecular epidemiology and infectious disease**

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Infectious disease epidemiology has always used laboratory microbiology to advance its understanding of the aetiology, transmission and prevention of infectious diseases. A simple example is the ability to identify a virus or bacterium as the cause of an outbreak of gastroenteritis and link it to contaminated food. Infectious disease molecular epidemiology is a powerful tool that uses molecular biology techniques to exploit the genetic diversity between and within various subtypes of micro-organisms to help determine patterns of transmission, spread and evolution of the infection under study. Different styles of epidemiological studies - e.g. cross sectional, case control and cohort studies - can be used in conjunction with molecular biology to do this. In turn, the information gained from molecular epidemiology can inform our public health responses to disease.

An example of molecular epidemiology contributing to the development of public health interventions is a case control study of ethnic Vietnamese drug users conducted in Melbourne, Australia. This study found ethnic Vietnamese IDUs in Australia were more likely to be infected with HIV CRF01\_AE compared with non-Vietnamese IDUs. HIV CRF01\_AE is typically found in Vietnam, suggesting that ethnic Vietnamese IDUs may become infected when travelling "home" to Vietnam or after injecting with someone who has travelled home. This suggests that public health programs need to focus on educating ethnic Vietnamese IDUs and the Vietnamese community more broadly about the risk of travelling home to Vietnam (commonly but erroneously regarded as a way to eliminate drug dependence). The results also suggest we need to better understand the cultural and social barriers that lead the ethnic Vietnamese community to under utilise drug treatment programs in Australia.

This paper will highlight several examples where molecular epidemiology has been used to better understand the patterns of blood borne virus transmission in Australia and overseas. It will discuss how this knowledge can inform the development of public health education and prevention programs or contribute to drug and vaccine development.