Cystic fibrosis is the most abundant inherited autosomal recessive disease in Caucasian population. Cystic fibrosis is caused by a dysfunction of a transport channel which is responsible for the transport of chloride ions on the apical side of the plasma membrane. Despite the fact that the dysfunction of the transport channel is present in several organs, the most severely affected one is the respiratory system. Because of the ion imbalance, thick sticky mucus is produced on the surface of the airways which then prevents the removal of dust particles and bacteria. The main complications of cystic fibrosis are the bacterial infections of the respiratory system which become chronic during the patient´s life and thus are the most common causes of the respiratory failure and premature death. The most important agents causing these infections are Pseudomonas aeruginosa and Burkholderia cepacia (Bcc). Infections caused by those bacteria are practically untreatable and serious complications arise from the existence of epidemic strains which can be transfered from patient to patient. Precise and fast diagnostics of pathogenic strains is a critical step to avoid spreading bacterial infections as well as strictly followed anti-epidemic strategies mainly based on isolation of cystic fibrosis patients according to their microbiology diagnostic results.

The aim of this PhD thesis was to define the epidemiology of infections caused by P. aeruginosa a Bcc in cystic fibrosis patients of Prague Center for cystic fibrosis with focus on application of modern genotypisation techniques. This thesis follows up the previous work, mainly the establishment of molecular and genetic diagnostics of Bcc (Drevinek P.et al., 2002) and P. aeruginosa and the prevalence of the highly epidemic strain of Burkholderia cenocepacia CZ1 in the population of the cystic fibrosis patients in Czech Republic(Drevinek P.et al., 2005).