Asthma has a high prevalence worldwide, and causes a significant socioeconomic burden. Asthma symptoms are caused by an allergic airway inflammation that leads to reversible airway obstruction. High-throughput analysis of microRNA (miRNA) profiles released from the airway could lead to better understanding of pathophysiology, diagnosis and treatment of allergic asthma. In fact, some miRNAs were already shown to modulate the inflammatory processes, but the collection of miRNAs from airway in human patients is too invasive to be feasible. To address this challenge, I aim to evaluate the presence and miRNA profile of extracellular vesicles (EV) released from the airway into easily-sampled fluids such as an exhaled breath condensate and nasal lavage. Such noninvasive method of collection will be particularly important for a paediatric population, which is particularly heavily affected by allergic asthma. I will obtain these fluids, extract the EV, and measure the miRNA profiles within these EV, explore the functional pathways of altered miRNA. I will correlate these profiles to the clinical severity of asthma to obtain a simple biochemical test for asthma diagnosis and staging, and to uncover pathways underlying increased asthma severity.

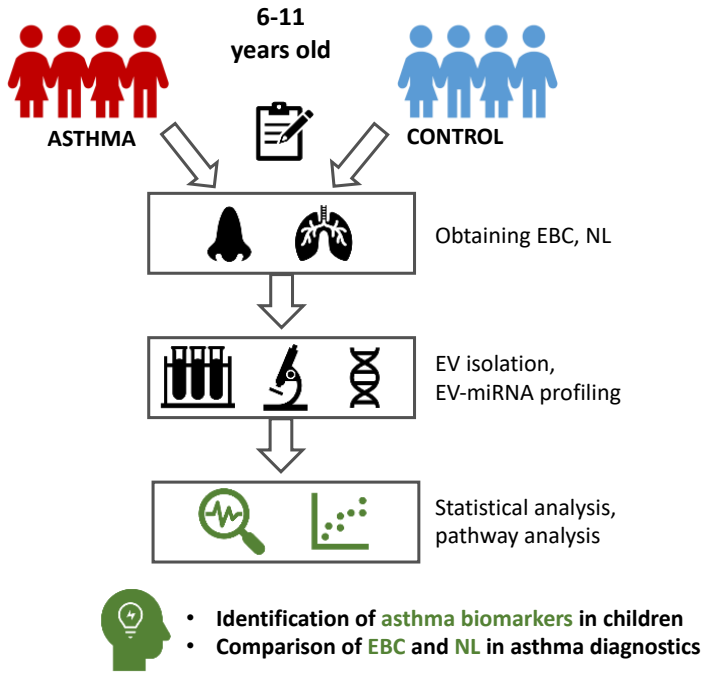

Fig.1 Graphical abstract of the project. *EBC- exhaled breath condensates, NL- nasal lavages, EV- extracellular vesicles, miRNA- microRNA*