



Graduate Diploma in Health Research PROGRAM – 2018 SUPERVISOR & PROJECT INFORMATION FORM

Please complete and return via email only (gdipl.hres@utoronto.ca) by **September 4, 2018**
(forms received after this date will not be posted).

Supervisor Information

Name: Felix Ratjen

Email: felix.ratjen@sickkids.ca

Degree(s): MD/PhD

SGS Department: IMS

Academic Rank: Professor

Field of Research: Cystic Fibrosis

Research Institution Affiliation (if applicable):

Sick Kids Research Institute

Allocation of student contact time: 1 hour per week

(number of hours per week YOU are available to the student for any concerns or to review progress)

Project Information (for posting on GDipHR website)

Title:

Description (max 500 words):

Patients born today with Cystic Fibrosis can expect to live well into adulthood. There are now new therapies that correct the underlying cause of disease which will further improve the prognosis for patients. Nonetheless, half of all patients die before their 30th birthday, typically as a result of repeated pulmonary infections. Monitoring lung function, and early detection of pulmonary disease remains the hallmark of CF care. However, with rapid improvement of outcomes in this population, traditional lung function tests remain normal for many patients, highlighting the need for more sensitive tests to detect early pathological changes in the lung. My research investigates how we can use the multiple breath washout (MBW) test to identify patients with lung disease, monitor their disease progression and determine if treatments have been effective (<http://lab.research.sickkids.ca/ratjen/>).

The multiple breath washout test measures how efficiently the lungs can clear an inert tracer gas. Patients with greater abnormalities in the lungs, specifically the peripheral airways, have greater ventilation inhomogeneity, and therefore require more lung turn overs to clear the tracer gas. Previous studies have shown that the primary outcome of the MBW test, the lung clearance index (LCI), is more sensitive at detecting early pathological changes in the lung; correlated to structural lung changes identified using imaging studies, and is able to predict future lung function.

In 2012 we established a cohort of preschool children with cystic fibrosis and have measured their pulmonary function using the MBW test as well as with conventional pulmonary function tests. Initial studies from this cohort have shown the LCI deteriorates over time in young children and is elevated during episodes of pulmonary exacerbations. Since bacterial infections are the primary cause of pulmonary exacerbations in young children, the aim of this research project is to

investigate the association between infection with bacterial pathogens and deterioration of lung function, as measured by MBW outcomes. The follow-up of this cohort is ongoing allowing for secondary questions to be answered.

If human subjects are involved, have the appropriate Research Ethics Board approvals been obtained?

xYES

Do you expect this work will be published within the 20 months?

xYES

Student's roles and responsibilities (please be as specific as possible):

The student will be required to complete training (eLearning, 1 day hands on training) to understand the MBW test, how it is measured, and interpreted. Data collection is complete for the preschool cohort, but ongoing follow-up will provide student to allow participate in primary data collection. The primary activities will be to analyze the study data, present preliminary findings to the research team, and write up results for publication. As the project requires substantial data analysis, the student will be required to learn data cleaning/programming/statistical analysis independently. The analysis will require use of hierarchal models; therefore, some basic statistics knowledge would be an asset. Biostatistical support is available, but it is expected that the student will conduct analysis independently.

Please indicate who will serve as the student's direct report for daily oversight (PI, PhD student, technician, etc...):

Students will be supervised by Dr. Felix Ratjen and Dr. Sanja Stanojevic (Senior Research Associate/Biostatistician). Students will work together with the CF Clinical Research team, including research nurses, coordinators, respiratory therapist.