Contemporary infectious disease research in India is currently traversing the intersection between traditional basic and clinical research spheres of activity; an intersection that requires input not only from bench to bedside, but also from bedside to bench and from community to clinic. Under this broad framework, our group aims to accumulate knowledge and gain insights into the infectious diseases problems that are a major health burden in India, particularly child health. We aim to reverse the morbidity and mortality of infections in children by establishing clinical cohorts of individuals with specific diseases, and by developing targeted, feasible, cost-effective interventions that are directed to specific infections. As part of the NCBS-St Johns Collaboration, we plan to continue our work on infectious diseases.

I. Adult and pediatric HIV science

Young people have been described as being at the center of the HIV epidemic worldwide; as a result of a large proportion of new infections occurring among youth aged between 15 and 24 years, as well as the impact of ART and improved survival of perinatally-infected children. In order to enhance our knowledge on pathogenesis and treatment of HIV, we established one of the first pediatric biobanked cohorts in the country to assess viral and host factors of disease progression in HIV-infected children. Specific viral factors (viral nef and env variability and co-receptor tropism) and host factors (CCR5, CCR2 and SDF-1) are being studied. Our studies on viral polymorphisms and drug resistance mutations provide a deeper understanding on mechanisms of viral evolution which impact response to therapy and disease outcome. We are also studying co-receptor tropism using bioinformatics in order to predict the effectiveness of the CCR5 antagonists drugs; so far our results indicate that 19% of children harboured X4 or R5/X4 strains although the prevalence among adult sequences was found to be 3.2%. The high prevalence of X4 and R5/X4 tropic strains among children with HIV-1 subtype C in India suggest that co-receptor transition can occur with longer duration of infection and greater disease progression in this population of perinatally infected children living with HIV-1 subtype C.

II. Emerging infectious diseases in children

Rickettsial Infections: Massive environmental changes have led to the evolution of a myriad of tick and vector-borne diseases. Rickettsial infections are vector-borne illnesses that pose a major threat to public health in India. The situation is compounded by the
paucity of accurate diagnostic methods to characterize these vector-borne infections. In St. John’s hospital alone, in 2007-10, there were over a hundred children admitted per year for rickettsial infections. To address the need for better characterization of these illnesses, we are in the process of conducting a prospective study to understand the epidemiology, clinical features and outcome of children presenting with these illnesses. The prospective rickettsial study was begun in 2010 and will continue till 2013, and acute and convalescent samples are available for assessment of various serological and molecular tests for accurate diagnosis.

**Dengue infections:** Dengue fever is the most rapidly spreading mosquito-borne viral disease in the world, and is one of the leading causes of pediatric morbidity and mortality in Southeast Asia. Children and young adults are the populations that are most affected. Despite advances in diagnostic modalities and treatment strategies, there is limited published Indian data on dengue fever in the paediatric population. Severity of the illness is determined by various risk factors such as age, pre-existing illness, infecting serotype, secondary dengue infection. A second infection with a different serotype leads to more severe form of the disease than the primary infection. We are conducting a prospective, observational study on children aged between 1 month and 18 years of age hospitalized at St. John's Medical College Hospital with a diagnosis of dengue fever in order to understand clinical outcomes, immune responses and viral molecular characterization.

**III. Pediatric respiratory infections of viral etiology**

Acute respiratory infections constitute a major cause of death among young children throughout the world. Respiratory syncytial virus (RSV) is a major viral pathogen causing acute lower respiratory tract infection among infants and young children. Understanding the burden of RSV in India infection can help planning for therapeutic and prevention strategies and may also help towards reduction of the use of antibiotics. Our pilot study, conducted between 2009 and 2010 found that RSV infection was responsible for 22% of children under 2 years of age who were hospitalized for acute bronchiolitis. This study was conducted using nasopharyngeal wash and direct fluorescent antigen detection. Sequencing result showed similarity of our strains to Cambodian RSV group B strains. In addition we are also studying the role of viral pathogens in causing nosocomial infections among hospitalized children.

**Join us!**

Applications are invited from bright young scientists with a clinical background who would like to be part of this movement to advance the field of infections in young people. Interested candidates can apply directly to:

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