Academic Newsletter
September 2012:
Infectious Disease

1. Hot Topics in Paediatric Infectious Disease
   a. Meningococcal vaccination – changes to come

Ontario has offered universal vaccination against meningococcus serogroup C in infancy for about a decade and started immunizing all grade 7 students with the quadrivalent meningococcal vaccine (Men-ACWY) in 2010. The meningococcus, also known as Neisseria meningitidis, can cause devastating bacterial sepsis or meningitis in normal hosts (especially those with increased exposure, such as travellers on the Hajj), but is even more problematic in those with complement deficiency, primary antibody deficiency, or hyposplenia/asplenia.

In April 2011, the United States Food and Drug Administration approved Men-ACWY for children aged 9-23 mos.; it previously had only been indicated for children aged > 2 y. This was quickly followed by a recommendation by the US Advisory Committee on Immunization Practices to give it to high-risk infants. Later that year, the American Academy of Pediatrics recommended booster doses for all American teenagers at 16 years – in addition to their routine immunization at 11 years – to maintain good coverage in young adults. Though Health Canada approved Men-ACWY for use in children aged 9-23 mos. in June of this year, official recommendations from Canadian advisory bodies have not yet been made, but we in the Division of Infectious Disease would support the administration of this vaccine to infants at higher risk and older teenagers.

Meningococcus serogroup C used to be the most common circulating serogroup in Canada; after the introduction of the Men-C vaccine, its incidence dropped, and now serogroup B is responsible for the most disease in Canada. Development of a vaccine against serogroup B was hampered by the fact that its membrane glycoproteins were poorly immunogenic, but reverse vaccinology has led to the production of two new Men-B vaccines which have both made it through phase III trials (JAMA 2012; 307(6): 573-82, Lancet 2012; 379(9816): 617-24, Lancet Infect Dis 2012; 12(8): 597-607). We may see the introduction of these vaccines in Canada over the next couple of years.

b. Pertussis on the rise again.

The number of pertussis (whooping cough) cases recorded in Washington State in 2012 was 1300% higher than during the same period in 2011; New Brunswick had recorded over one thousand cases by July of this year and rates in southwestern Ontario had also been higher than normal. Though normally only bothersome to adults and older children, pertussis is substantially more dangerous in young infants, with hospitalization rates of >90% and case-fatality rates of up to 1%. In the Washington epidemic, the vast majority of younger children had received the appropriate immunizations, though fewer teenagers were up-to-date with their pertussis boosters. It is now being suggested that the acellular pertussis vaccine – adopted in the 1990s because of higher rates of adverse reactions with the older whole-cell vaccine – may not confer the same degree of protection that the older vaccine did. Many provinces now recommend that adolescents receive a combination tetanus-diphtheria-pertussis (Tdap) booster between 14-16 years to maintain immunity; it is possible that Tdap boosters will become routine for all Canadian adults every 10 years in an effort to prevent pertussis outbreaks.

2. About the Division of Infectious Disease (Inpatient, Outpatient clinics, Travel clinic, Clinical pathways development)

The Division of Infectious Disease (ID) in the Department of Pediatrics at McMaster is relatively new, having been established in 2009 with the arrival of Dr. Jeffrey Pernica, though Dr. Martha Fulford (primary appointment in the Department of Medicine) has been providing pediatric ID care at our institution for over 10 years. Dr. David Goldfarb spends half his time at McMaster Children’s and half his time working at Princess Marina Hospital in Gaborone, Botswana, as an adjunct senior lecturer at the University of Botswana and a member of the Bostwana-UPenn Partnership.

Due to the nature of the specialty, the majority of new
ID consultations are requested for inpatients, and the inpatient service is always busy, something that is greatly appreciated by all the pediatric residents. Thankfully, there is a pharmacist dedicated to the ID service, Melani Sung, who plays an important role in coordinating all care related to the provision of antimicrobials. The outpatient pediatric ID clinic started in late 2009 and quickly outgrew its confines; in early 2012, our allotted clinic space was doubled, which greatly improved our ability to provide quality, timely care. Dr. Fulford has been instrumental in reviving the McMaster Travel Clinic; while officially under the aegis of the Department of Medicine, we are proud to offer pediatric-specific pre- and post-travel care, something that is not readily available in the community. We are now working to develop a Home Intravenous Medication Clinic with the goal of streamlining care for all children who are discharged home on intravenous antimicrobials – stay tuned!

(Top Row, from left: Drs. Jeff Pernica, David Goldfarb, Martha Fulford. Bottom Row: Melani Sung)

3. Highlights of Academic Activities

a. Diarrhoeal diagnostics project

Diarrheal disease is a leading cause of morbidity and mortality in children worldwide. Hundreds of thousands of children die from diarrheal disease in sub-Saharan Africa alone. Prompt and accurate identification of the causative pathogens is important in order to minimize the effect of disease at both the individual and population level. Fortunately, in recent years, a number of new diagnostic techniques have been developed and refined to complement traditional culture- and microscopy-based techniques, including antigen detection and nucleic acid amplification technologies. However, no matter how good the diagnostic test is, no results can be obtained if an adequate stool sample is not available. David Goldfarb is leading a team of collaborators at University of Pennsylvania, University of Botswana and McMaster University that plans to design and evaluate a flocked swab and transport media combination (transport system) that is easy to use maximizes specimen collected, maintains nucleic acid/antigen used for detection as long as possible, and inactivates stool-borne pathogens. The flocked swab transport system will then be tested in a clinical study in order to compare its performance with bulk stool sent for reference testing. Funding for the project is from Grand Challenges Canada. This novel, user- and patient-friendly point of care sample collection method combined with more recent highly sensitive detection techniques will for the first time allow for truly point of care diagnostics for diarrheal disease. This could have immediate impact in much of the world were diarrheal disease remains deadly and for the large part undiagnosed.

b. Short-course pneumonia therapy

Community-acquired pneumonia is a common infection and is responsible for a substantial amount of morbidity in Canadian children. Despite this, there is a remarkable paucity of evidence underlying current recommendations regarding the appropriate duration of antimicrobial therapy for pneumonia. Dr. Pernica is leading a group of collaborators in a planned pilot randomized double-blind clinical trial to compare five days to ten days of amoxicillin for previously healthy children who present to the Emergency Department with uncomplicated pneumonia. The researchers will also be documenting the most common causes of community-acquired pneumonia in the study participants using the most up-to-date molecular methods refined by Dr. Marek Smieja and others in the Department of Pathology and Molecular Medicine. The data from this pilot trial will be instrumental in designing a multicentre RCT to properly determine whether short-term antimicrobial courses are adequate to treat children with pneumonia.

4. Evolving Partnership Between McMaster and the University of Botswana

In addition to several research projects, there have been further collaborative links established between McMaster University and the University of Botswana. Several faculty members from the Division of Infectious Diseases have visited Gaborone and have been involved in trainee education and providing clinical service. Several McMaster residents and medical students have also arranged electives and faculty and students from University of Botswana have also visited McMaster for education related activities. Any faculty or students interested in possibly becoming involved should contact David Goldfarb (goldfarb@mcmaster.ca).