

News

Autumn 2009

# The Slate

*The Office of Pediatric Surgical Evaluation and Innovation*



## SPECIAL ISSUE

DEDICATED TO MEDICAL  
STUDENT RESEARCH

### PEDIATRIC UROLOGY



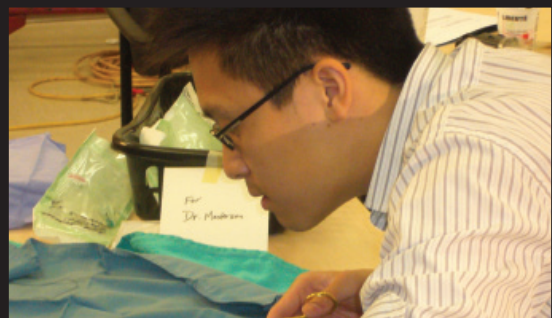
### INTERNATIONAL SURGERY



### PEDIATRIC NEUROSURGERY







Partnership  
Integrity  
Curiosity  
Enthusiasm  
Achievement  
Service



## SUMMER, STUDENTS, AND SURGERY: MEDICAL STUDENTS MAKING A DIFFERENCE

**Apart from the fantastic record weather conditions** in Vancouver this last summer, the Departments of Pediatric Surgery and Pediatric Anesthesia set a record in terms of summer studentships with 34 medical students engaged in a wide variety of clinical research and education projects at the BC Children's Hospital Campus. In this issue, we are delighted to share the achievements of our summer students and their faculty mentors.

You will read about medical students contributing to studies and initiatives which evaluate and improve patient care such as tourniquet cuff pressure selection in pediatric patients conducted in Pediatric Orthopedics, a safe sharp handling study undertaken in Pediatric General Surgery, and an evaluation of seizure outcomes of children who underwent epilepsy surgery within Pediatric Neurosurgery - just to name a few!

### **The goals of the summer student program are to:**

- Evaluate and improve the care we provide to children and families
- Foster a new generation of researchers and promote participation early in training
- Inspire student curiosity and leadership in evidence-based medicine.
- Model careers in clinical research through providing undergraduate learners with appropriate mentorship, encouragement, and support

I would like to take this opportunity to congratulate all of our summer students for their tremendous energy and hard work. Their work is making a tangible contribution to the provision of high-quality clinical care for our pediatric patients at our hospital. I would also like to especially thank our surgeons and anesthesiologists for their commitment to mentor students each summer.

We are very proud to publish the third issue of the Slate, and we warmly welcome articles from our hospital and university community.

With best regards,

Damian J. Duffy  
Executive Director  
Office of Pediatric Surgical Evaluation and Innovation



"I would like to take this opportunity to congratulate all of our summer students for their tremendous energy and hard work. Their work is making a tangible contribution to the provision of high-quality clinical care for our pediatric patients at our hospital."



# CONTENTS

AUTUMN 2009

Issue 3



## 1 *Overview*

From The Executive Director . . . . . 3

## 2 *Research Environment*

Pediatric Anesthesiology . . . . .	6
Pediatric Cardiac Surgery. . . . .	9
Pediatric General Surgery . . . . .	12
Pediatric Neurosurgery . . . . .	14
Pediatric Ophthalmology . . . . .	18
Pediatric Orthopedics . . . . .	20
Pediatric Plastic Surgery . . . . .	22
Pediatric Urology . . . . .	24
International Surgery Research Awards . . . . .	28
OSPEI Summer Research . . . . .	30

EDITORS: Damian Duffy  
Debbie Bertanjoli

Email: [dduffy@cw.bc.ca](mailto:dduffy@cw.bc.ca)



**Imagine where a Clinical Research Project  
in Pediatric Surgery could take you.**



- Partnership
- Skill
- Discovery
- Service
- Achievement

**The Office of Pediatric Surgical Evaluation & Innovation  
at BC Children's Hospital  
is a proud supporter of Medical Student Research.**

***[www.opsei.bc.ca](http://www.opsei.bc.ca)***



# PART The Pediatric Anesthesia Research Team

Dr. Mark Ansermino and Mr. Jeremy Daniels



*"Involvement in ongoing research projects and encouragement in designing and developing new research projects helps to foster students' interest in research in pediatric anesthesiology."*

# HOW WELL DO PARENTS UNDERSTAND DISCHARGE INSTRUCTIONS WHEN LEAVING BC CHILDREN'S HOSPITAL SURGICAL DAYCARE?

**By: Jeremy Daniels**

This summer I worked on three projects as a member of the Pediatric Anesthesia Research Team (PART). My main project for the summer was to answer some questions about how well parents understand discharge instructions when leaving BC Children's Hospital Surgical Daycare. Myself, Mark Ansermino, and Eleanor Reimer (Pediatric Anesthesia) teamed up with Ellen Balka and Beth Elston (Simon Fraser University, Healthcare Communications) to design and administer a questionnaire (January – July) to study where parents misunderstand instructions or have beliefs that could lead to a compromise of patient safety in the post-discharge period. This work will be submitted to the *Joint Commission Journal on Quality and Safety*.

I analyzed new data and performed edits on a publication our group has submitted to the *Journal of the American Medical Informatics Association* concerning the Bedside Observer project, which is currently underway on ward 3R. This project is studying the effect and benefit of an electronic system designed here at BC Children's Hospital that allows parents / guardians to report safety concerns during inpatient hospital visits.

Lastly, I completed a literature review and wrote the manuscript for an invited paper in *Current Opinion in Anesthesiology*, titled "Introduction of New Monitors into Clinical Anesthesia", due to be published this Fall 2009.

I found the learning experience very valuable. I have been working with PART for 4.5 years so I knew the basics of writing protocols and consent forms and was able to devote more time into refining my study domain and research question. I learned a lot about psychometry and questionnaire design (still don't know a lot!), and emerging technologies for clinical monitoring – particularly with respect to the new onslaught of cardiac output and awareness monitoring devices.

My future plans at this point are amorphous. I do plan to work in pediatrics and be my hospital's patient safety director and am thinking strongly about working in either pediatric anesthesia or intensive care (but maintain quasi-flirtatious thoughts about cardiology, radiology, lab medicine, and orthopedic surgery). I also plan to work in an academic setting and research the best way to have a 0% preventable adverse event rate within a

realistic budget, and with a workforce that does not feel the joy has been crushed out of them by automated machines and checklists!

Thanks to all of the team who has helped me so much. If you have any questions, send me an email at [danielsj@interchange.ubc.ca](mailto:danielsj@interchange.ubc.ca).



"I do plan to work  
in pediatrics and be  
my hospital's patient  
safety director and  
am thinking strongly  
about working in either  
pediatric anesthesia or  
intensive care."



Mr. Eugene Choo and Dr. Carlyne Montgomery

## PROSPECTIVE, RANDOMIZED CONTROLLED TRIAL, INVESTIGATING THE INCIDENCE OF EMERGENCE DELIRIUM (ED) WHEN USING TWO DIFFERENT ANESTHESIA TECHNIQUES

By: Eugene Choo

I'm a second year medical student at UBC, having returned for my second summer working with the Pediatric Anesthesia Research Team (PART) at BC Children's Hospital. I had such a fantastic experience working with the team of anesthesiologists, nurses and research assistants last summer that it was tough to give up an opportunity to come back for a second round! I have always been impressed by the positive attitude to research displayed by the staff at BCCH. The physicians and nurses have been extremely accommodating and are frequently interested in the results of studies taking place, offering their support and suggestions.

The project I did this summer is a prospective, randomized controlled trial, investigating the incidence of emergence delirium (ED) when using two different anesthesia techniques. Emergence delirium is a side effect which can occur when someone wakes up from anesthesia. Someone who is experiencing ED can be extremely restless and agitated and prone to

hurting themselves. Our study compares the use of inhalational anesthesia with sevoflurane to total intravenous anesthesia (TIVA) with propofol. TIVA is commonly used in pediatric anesthesia at BC Children's Hospital, but less so in other pediatric hospitals. We hypothesize that the use of TIVA has a lower incidence of emergence delirium, and thus may reduce the risk of post-operative complications and potentially shorten the duration of stay in the recovery room. It's exciting to be involved with a project that has the potential to impact the way we practice anesthesia.

PART has supported my learning in many ways and has encouraged me to take an active role in research. The team has provided me with quality mentorship and numerous opportunities to present at conferences and rounds. I feel fortunate to have been a part of such a phenomenal research team. I hope to continue to contribute to the medical community in teaching and research as an anesthesiologist in the future.



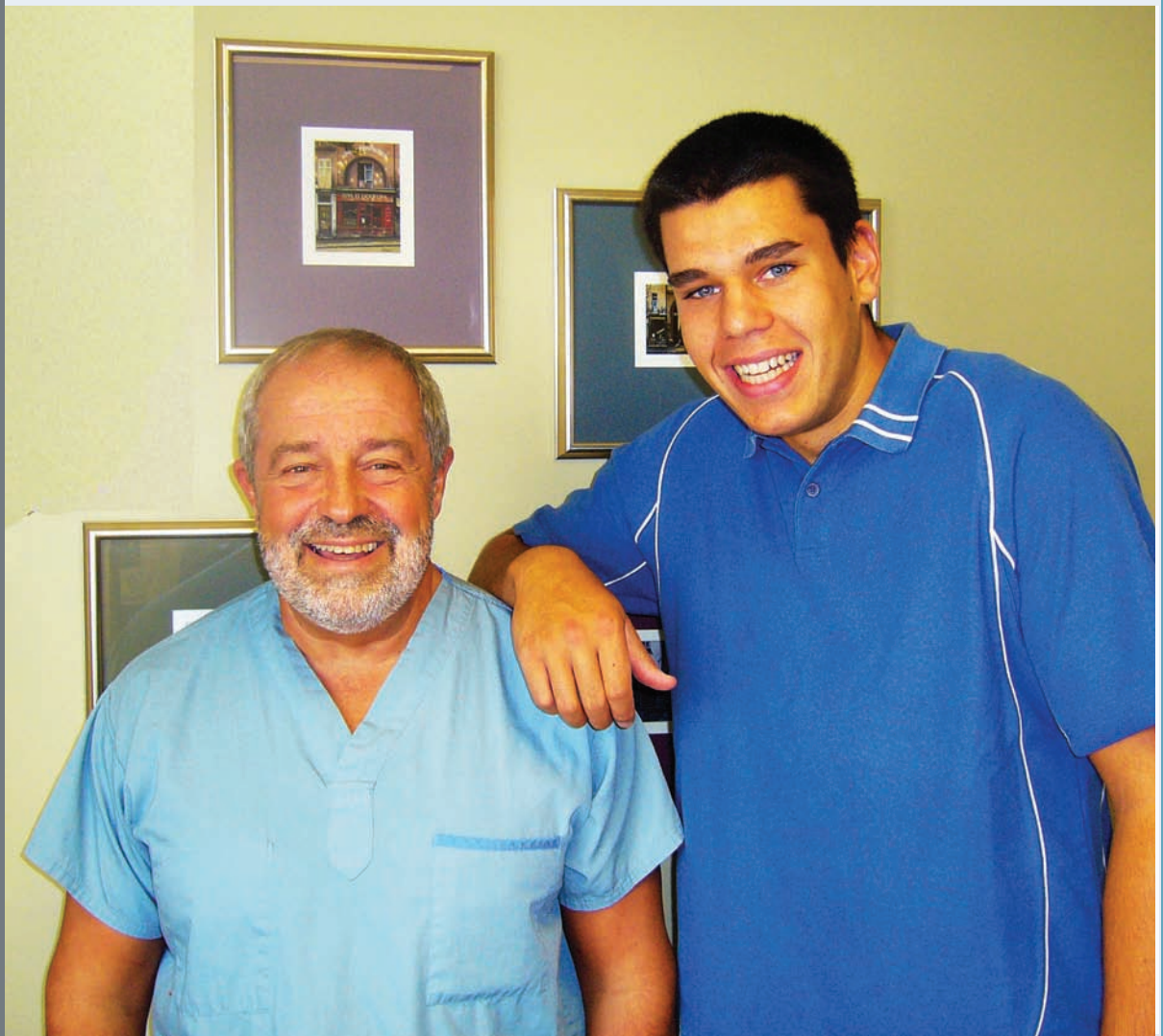
"The Pediatric Anesthesia  
Research Team

has supported my learning  
in many ways and has  
encouraged me to take an  
active role in research."



# The Summer Research Experience in Pediatric Cardiac Surgery

Dr. Jacques LeBlanc and Mr. Tin Jasinovic



# TETRALOGY OF FUN-OT

By: Tin Jasinovic

It all started one Tuesday afternoon in late April when I received an email from Dr. Jacques G. Leblanc, pediatric cardiac surgeon at BCCH, inviting me to help him work as a medical student on a summer project he had constructed. All I recall previously knowing about such a project was a few sentences spoken over a dinner sometime in the previous year. As I was 18 at the time and had just finished my first year of science undergraduate degree at UBC, the words summer “medical student” were slightly intimidating and seemed like they carried a lot of burden on their shoulders. However I knew that this project had a lot of potential in it, in terms of learning new things in a field I, at the time, was possibly interested in pursuing, and in filling up my extra-curricular resume and summer, which were then quite barren.

As the weeks passed, Dr. Leblanc and I kept in touch and eventually I was called in for a meeting one Friday in late May to discuss the details of the project. Although the meeting was quite short, I came out of there with all the details of the project along with the anatomy, physiology, and surgical correction of tetralogy of Fallot (TOF), which the project revolved around. The organization and paperwork I was given were extremely helpful as well, and clearly stated all expectations and details that I was expected to do in the 6-8 weeks the project was supposed to take. Even though there was a lot of work to be

done, it was below my initial expectations for the title of a “medical student”.

The following week I came in and commenced my job, which vastly consisted of filling up an extensively detailed Excel spreadsheet with information extracted from medical charts in Health Records. Since the project was a retrospective study that will show in great detail how BCCH is doing in comparison to other centers around the world, there were many categories which needed to be examined. These ranged from palliation specifics to open-heart surgery aspects and finally extensive details of complications following open-heart surgery. In total around 150 patients’ charts needed to be examined so it can be determined whether they fit the criteria of the study. This criteria consisted of open-heart surgery being performed in the new millennium, that is following January of 2000, and the diagnosis stating either simple TOF, TOF with double outlet right ventricle or TOF with pulmonary atresia, all other forms were excluded.

It took me about 5 weeks to get through all these charts and in the end there was 121 patients included in the study. Now it was around the first week of July and I was thinking “that went by fast, what do I do for the next 3-4 weeks?”. Little did I know that

luckily Dr. Leblanc had more in store for me, ranging from statistical analysis to actually writing the publication. This looked like a lot of work at first but after going through 150 patients’ charts, with some patients having as many as 18 volumes, relatively this was going to be a breeze.

Over the following few weeks, all pieces of the puzzle fell into place and I finished everything with the aid of some very kind and helpful BCCH staff. Lastly since Dr. Leblanc was so sure the project we did was going to be accepted to the Western Student Medical Research Forum held annually in Carmel, California, we consequently made a powerpoint presentation that hopefully I am to present in late January pending the approval from Carmel.

Although the events above might’ve seemed grueling they were actually quite fun as I got to learn plenty of medical terms and expand my knowledge by reading the charts and medical literature associated with the project. However over the month of August once most of the project was complete the real fun occurred when I was invited to watch an actual correction that I’ve been learning about the whole summer. Throughout the surgery I became interested in such things as artificial valves and re-operations and how they differed from repair of TOF, so Dr. Leblanc would keep on calling me back



to the OR over the following 10-15 days. In total I ended up watching about 7-8 procedures with each one getting more interesting than the previous. Amongst all those cases there was even a rare trauma case that I got to witness, although unfortunately it was quite fascinating.

Putting this whole summer into a few words is very hard, because so much happened and the events that unraveled really changed my views on the medical profession, especially surgery. Before the summer I wasn't really sure whether I wanted to go to medical school or if I wanted to pursue something else, but after all I have accomplished and seen this summer, there is no doubt in my mind that I'm going to medical school and hopefully specializing in a division of surgery. Now I just have to go back to school and make sure I do everything in my will to achieve that result.

In conclusion I'd like to thank Lolita Sarmiento, Angie Kennedy, Ruth Milner, and the staff at both Health Records and the Cardiac Surgery Office for making my job that much easier over the past 3 months.

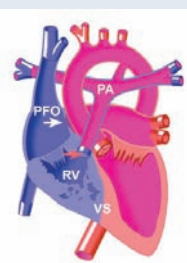
Lastly I can't thank Dr. Leblanc enough for this rare opportunity in allowing me to be a part of his project, passing over a small portion of his vast knowledge and really getting me involved and interested in the medical profession.



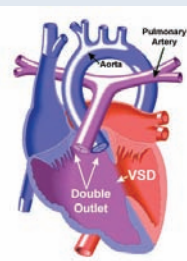
Mrs. Angie Kennedy, Mr. Tin Jasinovic, and Dr. Jacques LeBlanc



is a "simple" tetralogy with 1=VSD 2=Pulmonary Stenosis 3=Aortic Override and 4= RV Hypertrophycom)



is pulmonary atresia



is Double Outlet Right Ventricle

#### Publication:

**A clinical review of Tetralogy of Fallot and its variants: assessment of peri-operative outcomes**

Jasinovic T., LeBlanc J.G.

Division of Cardiovascular and Thoracic Surgery,  
British Columbia Children's Hospital, Vancouver,  
Canada



"Before the summer I wasn't really sure whether I wanted to go to medical school or if I wanted to pursue something else, but after all I have accomplished and seen this summer, there is no doubt in my mind."

# Pediatric General Surgery

## ASSESSING SHARPS HANDLING OF SURGICAL RESIDENTS

By: David Tso

I had the opportunity this past summer to work with Dr. Sonia Butterworth, a Pediatric General Surgeon at BC Children's Hospital, to investigate sharps handling practices among junior surgical residents. This project involved analyzing videos taken of residents performing inguinal hernia repairs and evaluating their handling of sharp instruments such as injection needles, scalpels, and suture needles.

The literature has shown that surgical residents are at higher risk of sustaining percutaneous injuries during operations, with suture needles being the most prevalent mechanism of injury. With an increase in patients with HIV and Hepatitis C infections being treated at urban teaching hospitals, surgical residents are at increased risk for exposure.

Safe sharps handling include using forceps to angle the suture needle, the use of a neutral hands-free zone for passing sharp instruments, and protecting the sharp point of the needle while tying sutures. Interactions among the surgical team members were also assessed, specifically on the passing of sharps and the use of verbal notification.

We will be looking at the results to see if there is a correlation between surgical experience and safe sharps handling, and determine whether team interactions



Dr. Sonia Butterworth and Mr. David Tso

plays a role. We also had an opportunity to create an educational video aimed at surgical residents about safe and unsafe sharps handling. The video has been selected to be presented at the Canadian Healthcare Safety Symposium in Montreal this October. This project has given me an opportunity to observe

various pediatric surgeries, and learn more about inguinal hernia repair in children. I want to thank Dr. Butterworth and Mr. Damian Duffy for this great summer experience. I look forward to contributing to the field of pediatric surgery and clinical research.



✓  
✓

"This project has given me an opportunity to observe various pediatric surgeries, and learn more about inguinal hernia repair in children."



# Pediatric Neurosurgery

## RESOLUTION OF SYRINGOMYELIA FOLLOWING CHIARI I DECOMPRESSION IN THE PEDIATRIC POPULATION

By: **Britteny Turko**

Chiari I malformation (CM1) is characterized as the caudal displacement of 5 mm or more of the cerebellar tonsils through the foramen magnum and into the cervical spinal canal. Syringomyelia (SM) is a co-morbidity of CM1 reported in 20-75% of patients. Patients with SM have a fluid-filled cavity called a syrinx within the spinal tissue or expansion of the central canal of the spinal cord. Scoliosis is the typical presentation.

The treatment for CM1-associated SM involves suboccipital decompression with or without duroplasty and with or without shrinkage of the herniated cerebellar tonsils in an attempt to create free flow of cerebrospinal fluid across the craniospinal junction and from the fourth ventricle. It has been previously reported that 44-100% of CM1-associated SM cases will demonstrate shrinkage of the syrinx post surgical decompression. In one centre, approximately 55% of cases experienced at least a 20% reduction in syrinx diameter following surgery, and 70% experienced some reduction. It was also previously demonstrated that the

median time to radiographic improvement was 14 months after surgery.

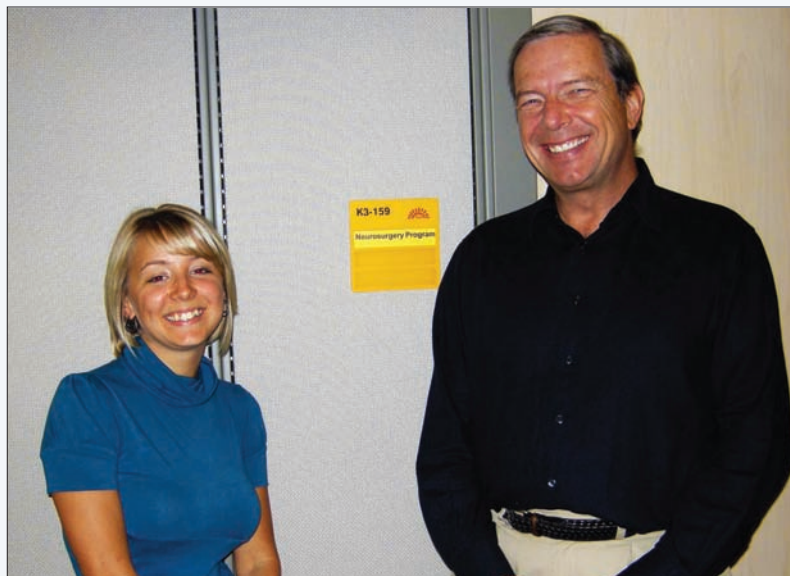
Under the guidance of neurosurgeon Dr. Doug Cochrane, we undertook a study to analyze the experience of Chiari I decompression at BC Children's Hospital. We wanted to determine the magnitude of and time to syrinx shrinkage in the pediatric population treated at BCCH. Differences in these outcome parameters were compared based on the surgical treatment the patient received. This involved a retrospective chart and pre- and post-operative MRI review of 29 patients who met the criteria. Surgical interventions were classified into three categories: decompression only (D), decompression + duroplasty (DD), and decompression + duroplasty + tonsillar reduction (DDT).

Decompression is the bony removal of the C1 arch and the rim of the foramen magnum. Duroplasty is the patching or relaxation of the dura to expand the intradural space. Tonsillar reduction is the resection or coagulation of the tonsillar

tissue to increase the subarachnoid space at the craniospinal junction.

The results showed that the eventual syrinx size was similar regardless of the surgical technique employed. However, the average decrease in maximal syrinx size was greatest in those that underwent DDT. We suspect that this may be due to a treatment selection bias with patients undergoing DDT having larger maximal syrinx sizes to begin with. From our patient cohort, the average size of syrinx following successful operation was 6 mm (+/-1 mm), reached within 24 months of the operation. The failure of the syrinx to reduce in size within 2 years should prompt reassessment of the primary surgical procedure.

I had a great time this summer working with the Division of Pediatric Neurosurgery. I would like to thank my supervisor, Dr. Cochrane, for guiding me through this project. Seeing the surgeons perform these procedures was fascinating and the first-hand experience has been invaluable to my medical education.



Ms. Britteny Turko and Dr. Doug Cochrane





Dr. Paul Steinbok and Mr. Andrew Battison

## LESIONAL EPILEPSY SURGERY: ECOG OR NOT?

**By: Andrew Battison**

This summer, Dr. Paul Steinbok took me on as a student in the Division of Pediatric Neurosurgery at BC Children's Hospital. My project looked at the surgical complications and seizure outcome of children who underwent epilepsy surgery assisted by electrocorticography (ECoG). ECoG is a technique that measures brain wave activity directly from the surface of the brain and can be used to identify areas of abnormal cortex. ECoG is analogous to the well-known electroencephalogram, or EEG, except that its spatial resolution is much higher because the signal is not attenuated by the skull.

There is ongoing debate about the optimal surgical treatment for intracerebral lesions such as tumours,

vascular malformations, and cysts. It is generally accepted that epileptic discharges arise not from the lesion itself, but from the irritated brain tissue surrounding it. Therefore, the simple excision of the lesion might reduce the irritation and lead to satisfactory seizure control. On the other hand, the lesion may cause more permanent damage to the adjacent cortex and better results may be obtained by resecting this area as well.

For our study, we hypothesized that the use of ECoG would lead to better outcomes in children with epilepsy caused by a cortical lesion. All of the surgeries resulted in the lesion being excised. However, in about half the cases ECoG was used to define areas

of residual epileptogenic tissue. If the ECoG showed epileptiform activity, further resection was carried out to remove the abnormal focus as long as it was not in regions of eloquent cortex, such as the motor or language areas.

The results showed that ECoG is an effective tool that can contribute to the success of epilepsy surgery. We first compared the seizure outcomes in children who had ECoG to those who did not. Nearly 80% of children who had ECoG in surgery were seizure free at the most recent follow-up, while only 60% of those who had a simple lesionectomy alone were seizure free. We also compared the results of those who had further cortical resection to those who did not. The children who had further resection guided by ECoG became seizure free 85% of the time, while only 64% of those who did not undergo any further cortical excision became seizure free. Morbidity was comparable between those who underwent ECoG or a simple lesionectomy, with the ECoG patients actually having a slightly lower incidence of surgical complications. Pre-surgical variables were also examined, such as lesion type and location, seizure type and frequency, duration of epilepsy and age at surgery, and preoperative EEG results to see if there were any associations to outcome. None of these were found to be associated with seizure outcome. This supports the use of ECoG in all patients undergoing surgery for lesional epilepsy.

The promising results of this preliminary study will provide

pilot data to involve other centers in Canada in a larger study via the Canadian Pediatric Neurosurgery Study Group, the Canadian Pediatric Epilepsy Network and the Canadian

Epilepsy Surgery Study Group. The opportunity to work closely with the incredible epilepsy surgery team at BC Children's was amazing. This has been an invaluable learning experience and I

am glad I was able to contribute to the extensive research undertaken at BC Children's. We are currently preparing a manuscript for submission and hope to present the results this winter.

## NATURAL HISTORY OF ASYMPTOMATIC ARACHNOID CYSTS

**By: Daria Krivosheya**

I had the pleasure of working this summer at the BC Children's Hospital Department of Neurosurgery with Dr. Ash Singhal on a project aimed to better characterize the natural history of intracranial arachnoid cysts.

Arachnoid cysts are CSF-filled cavities enclosed by an arachnoid membrane and are believed to arise during development secondary to the alteration of the CSF flow. While some arachnoid cysts present with neurological symptoms in the emergency department and require immediate management,

many are incidentally discovered during imaging studies done for reasons or symptoms unrelated to the arachnoid cyst. Management of these asymptomatic cysts remains highly controversial as little is known of the natural history of these brain lesions. While it is considered that most arachnoid cyst remain stable over time, some are reported to change over time, either expanding or resolving spontaneously.

In the absence of neurological symptoms directly attributable to the

arachnoid cyst location and size, many neurosurgeons elect a conservative "watchful waiting" approach where the patient is followed for a number of years with serial imaging to determine whether the cyst is changing in size or remains stable. The aim of the present study is to determine whether asymptomatic arachnoid cysts expand over time thus justifying the need for repeated imaging studies.

To address this objective, a retrospective analysis of 51 pediatric patients at the BC Children's Hospital Neurosurgery



Ms. Daria Krivosheya and Dr. Ash Singhal



Clinic with a diagnosis of an asymptomatic intracranial arachnoid cyst was performed. The study included 13 girls and 38 boys with an average and median age at diagnosis of 5.5 years. The average time of follow up was 3.5 years. Initial assessment of the arachnoid cyst behavior was compiled from review of radiological reports, and identified 10 patients in whom increase in size of the arachnoid cyst was noted, 3 patients were documented to have their arachnoid cyst decrease in size, and 38 patients were concluded to have no change. In summary, 20% of asymptomatic arachnoid cyst discovered incidentally on imaging studies eventually increased in size. Next, we wanted to further characterize growing arachnoid cysts in order to determine any cyst characteristics that could potentially predict its behavior. To address this objective, the growth of arachnoid cysts in 10 patients was first quantified by estimating the volume of the cyst in serial imaging studies. We then looked at the following parameters to determine whether they correlated with cyst growth: cyst size, cyst location, changes in signs and symptoms in patients over time, the age when the diagnosis was made, and the time interval until the cyst growth was first noted. Interestingly, only the age of diagnosis correlated strongly with the tendency of the cyst to expand over time

with 90% of patients diagnosed with an asymptomatic arachnoid cyst within the first year of life (9/10 patients). Moreover, among all patients included in our study, arachnoid cysts that were diagnosed within 1 year of age had a 53% likelihood to grow (9/17 patients), compared to a 3% chance of increase in cyst size if the diagnosis was made after 1 year of age (1/34 patients) ( $p < 0.0001$ ).

In conclusion, our study suggests that the age of diagnosis of the arachnoid cyst correlates strongly with the probability of the cyst growth, with the highest rate of incidence of cyst expansion if the diagnosis was made within the first year of life. Therefore, our findings suggest that it may be that close serial imaging is justified in the younger child diagnosed with an asymptomatic arachnoid cyst, while less frequent imaging is indicated in the older child. Currently, we are preparing a manuscript that describes the results of this study for publication and will present our findings at upcoming research conferences and symposiums. Moreover, I will have an opportunity to attend and present this project at the annual Medical Student Conference in Carmel, CA.

Overall, I very much enjoyed my experience at the Division of Pediatric Neurosurgery this summer. Completing this project allowed me to advance my knowledge of CNS anatomy and

physiology, develop an approach to addressing clinical research questions, as well as gave me an opportunity to get an amazing first-hand experience in the field of Pediatric Neurosurgery.

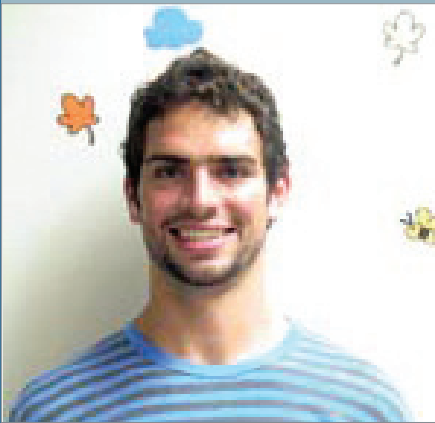


“Currently, we are preparing a manuscript that describes the results of this study for publication and will present our findings at upcoming research conferences and symposiums.”

# Pediatric Ophthalmology

## AMBLYOPIA (LAZY EYE)

By: Jake Hayward



Mr. Jake Hayward

✓  
✓  
We hope that carefully designed diagnostic tests like those used in our lab will help ophthalmologists determine the most effective course of treatment for amblyopic patients .

Amblyopia (lazy eye) is a visual disorder characterized by poor vision in an eye that is otherwise healthy and physically normal. The other (fellow) eye is considered to be unaffected because visual acuity is normal. Amblyopia occurs in approximately 3% of the general population and, during the first 45 years of life, causes preventable loss of vision in more people than all other ocular diseases and trauma combined.

The standard treatment for amblyopia is occlusion therapy, or patching. The fellow eye is covered-up for several hours each day to force the brain to process information from the amblyopic eye. This usually improves visual acuity in the amblyopic eye, but not all children

respond well to patching therapy. In one-third of cases, patching fails to restore visual acuity in the amblyopic eye. Also, in up to 25% of cases there is a decrease in visual acuity ("slippage") after the completion of therapy. Furthermore, wearing an eye-patch is unpopular with both children and parents.

In our lab, in addition to determining the neural correlates of amblyopia, we are developing tests that will help to identify which amblyopic children may not respond to patching treatment. We attempt to isolate specific aspects of visual perception, such as motion perception and selective attention, and to evaluate the response of these specific





Dr. Debbie Giaschi is surrounded by her keen group of students in the Pediatric Ophthalmology Lab

elements of visual perception to patching therapy. We test amblyopic children before, during and after patching therapy, tracking their progress over time. We hope that carefully designed diagnostic tests like those used in our lab will help ophthalmologists determine the most effective course of treatment for amblyopic patients. If cases that will not respond to patching are identifiable, alternative treatments can be explored.

While studying amblyopia I have been struck by the fragility of human development. At times, I still catch myself subscribing to the belief that the biological system develops according to a deterministic set of biological instructions impervious to

external influence. Yet amblyopia is a strong demonstration that neural development is fragile and complex, serving as a reminder that we are the result of a delicate interplay between the body and its environment. In cases of amblyopia, the brain is tuned to process an imperfect visual world, and when presented with the corrected version it must be coaxed to undergo an arduous process of re-calibration. With so many variables at play, the elegance of successful neural development is astounding.

I have also found myself questioning the role of the clinical researcher. For the inexperienced undergrad like myself, it can be frustrating that solutions are

rarely immediate in the research world. Treatments are not changed within days and patients are not cured during a visit to the lab. Satisfaction is slowly realized through a convoluted process of design, failure, re-design, results and so on.

Yet researchers show an impressive determination to ask questions and create hypotheses. I have been deeply impressed by the infectious passion with which professors harness the power of the scientific method to tackle complex problems.

Researchers maintain continuity and generate progress, linking an evolving history of questions with future solutions.

# Pediatric Orthopedic Surgery

## MINIMIZING TOURNIQUET PRESSURE IN PEDIATRIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTIVE SURGERY

By: Lise Leveille

I started my research project the summer after my first year of medical school. Having completed a degree in biomechanical engineering, I knew early on I was interested in pursuing a career in orthopaedic surgery and learning more about medical device development. Working at BCCH on a research project with Dr. Reilly and Dr. Mulpuri, in the division of pediatric orthopaedics, and Dr. McEwen, at a local medical device development firm, was a great mix of both areas of interest.

The focus of the research project was tourniquet cuff pressure selection in pediatric patients. Tourniquet cuff pressures are commonly set based on surgeon experience or preference. However, this can result in cuff pressures that are too high, increasing the risk of tourniquet related injuries, or too low, compromising the quality of the surgical field.

Evidence in adult literature suggests that safer, more effective cuff pressures can be achieved by calculating limb occlusion pressure (LOP) and using a wider, contoured cuff. LOP is the

minimum pressure required to occlude arterial blood flow into a limb. It can be calculated manually using a Doppler ultrasound or automatically with a commercially available plethysmographic tourniquet system. Once LOP has been calculated the cuff pressure is set to the LOP plus a margin of safety. Wider cuffs have been shown to occlude blood flow at significantly lower pressures. Contour cuffs are designed to better fit the conical shape of most lower extremities. Our primary objective was to evaluate if a difference in tourniquet cuff pressure could be achieved in a pediatric population by calculating a LOP and using a wide contoured cuff. Patients undergoing anterior cruciate ligament repair by Dr. Reilly at the BCCH were recruited to participate. Patients were randomized into either the control group or the experimental LOP group.

A standard cylindrical cuff inflated to 300 mm Hg was used in the control group. A wide contour cuff inflated to the LOP plus a standard margin of safety was used in the LOP group. The surgeon was blinded to cuff selection

and pressure and was asked to rank the quality of the surgical field using a visual analogue scale (VAS) at the completion of the procedure. Data was collected on 21 subjects: 11 subjects in the control group and 10 subjects in the LOP group.

The average tourniquet cuff pressure in the LOP group was 151 mm Hg. This is a statistically significant difference ( $p < 0.001$ ) from the tourniquet cuff pressure of 300 mm Hg used in the control group. The average VAS scores were 9.0 in the control group and 9.5 in the LOP group. This is not a statistically significant difference with a  $p$  value of 0.053.

These results suggest that the use of tourniquet instruments capable of automatic LOP measurement in combination with the use of wide contour cuffs can significantly reduce mean tourniquet cuff pressure in pediatric patients compared with the typical practice of 300 mmHg. There was no significant difference between the VAS scores, which suggests that this technique had little effect on the quality





"I am excited about the clinical and academic challenges ahead and look forward to doing more work with the Pediatric Orthopaedic Surgery group at BCCH."

of the surgical field. However, this study was not powered to conclude non-inferiority.

My research experience at BCCH helped me develop skills that I will use for the rest of my professional career. I was actively involved in each stage of the research process: study design, ethics approval, data collection, data analysis, and manuscript composition. In the fall of my 4th year of medicine the manuscript was accepted for publication in the Journal of Pediatric Orthopedic Surgery. Later that year, I had the opportunity to present the project as a podium presentation at the Canadian Orthopaedic Association Annual Meeting in Whistler and as an e-poster at the Pediatric Orthopaedic Society of North America Annual Meeting in Boston, Massachusetts. With a publication, a podium presentation, and an e-poster under my belt, I started my residency in Orthopaedic Surgery here at UBC on July 1st. I am excited about the clinical and academic challenges ahead and look forward to doing more work with the Pediatric Orthopaedic Surgery group at BCCH.



Dr. Lise Leveille, Dr. Chris Reilly, Mr. Alan Jones and Dr. Kishore Mulpuri

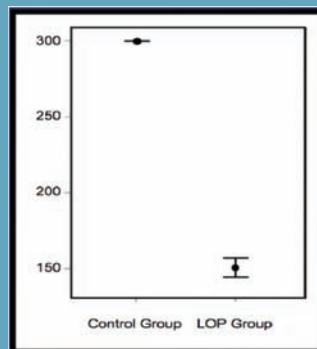


Fig 1. Average tourniquet cuff pressure was significantly lower in the LOP group (151 mmHg) compared to the control group ( $p < 0.001$ ).

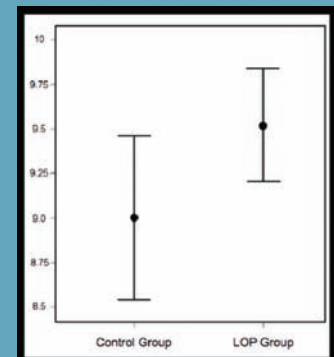


Fig 2. Average VAS scores were not significantly different in the LOP group in comparison with the control group ( $p = 0.053$ ).

# Summer Research in Pediatric Plastic Surgery

## COMPLEX NEUROFIBROMAS OF THE SCALP

By: Karan Grewal



Dr. Doug Courtemanche and Mr. Karan Grewal

Neurofibromas of the scalp are relatively rare lesions even in patients with neurofibromatosis who display a greater propensity for development of neurofibromas. This past summer, I worked with Dr. Douglas Courtemanche, Division of Plastic Surgery, conducting a retrospective chart review of patients with scalp neurofibromas. There have only been a few isolated case reports describing scalp neurofibromas; therefore, these patients are of a particular clinical interest and worthy of a focused review with a goal to synthesizing the clinical, imaging, and operative management.

Our study highlights the importance of considering neurofibromas during the differential diagnosis of patients presenting with scalp lesions. The patients in our study presented with obscure scalp lesions that were mistakenly diagnosed as arteriovenous malformation, lipoma, dermoid, T-lymphoma, and vascular malformation based on the clinical findings and imaging modalities. However, after surgical resection, the histological findings reported the lesion to be a plexiform or diffuse

neurofibroma. Because plexiform or diffuse neurofibromas incorporate both elements of cutaneous and subcutaneous tissue, they are poorly defined lesions and can often mimick other benign soft-tissue tumor pathologies. Our study discusses the challenges associated with accurately diagnosing a scalp neurofibroma clinically in patients without any other evidence of neurofibromatosis.

The summer project taught me how to conduct a small, focused clinical review – meticulous data collecting and synthesizing the information collectively in a manner interesting to the reader. It also exposed me to research and methodology within three different disciplines: plastic surgery, neurosurgery, and interventional neuroradiology.

This experience, overall, has improved my research skills, which will be an asset during my studies and future career. Although still early in my medical training, I envision a career as a surgeon; however, the field of surgery that I want to specialize in remains a mystery to me. I am enticed by the OR environment where the concept of teamwork is

continuously tested in order to deliver the best care for the patient. In the near future, I would like to pursue a Master of Public Health degree in Policy and Management because of my interest in the health advocacy sector of medicine. I am currently working on a project that involves creating a comprehensive manual that will serve as an introduction to the Canadian Healthcare system and discuss some pressing issues in the health care arena. The objective of the manual will be to educate medical students on how the Canadian system evolved and how it is currently structured. Hopefully, this will fuel discussion amongst my peers and generate new ideas to continue innovation within our system.



“I envision a career as a surgeon; however, the field of surgery that I want to specialize in remains a mystery to me.”



# Children's Hospital Emergency & Main Entrance

- 60 MIN. PA
- PATIENT DR



## BC CHILDREN'S HOSPITAL WELCOMES THE APPOINTMENT OF DR. JENNIE MICKELSON

Dr. Jennie Mickelson was born and raised in Vancouver. She graduated with a BSc. in Psychology from the University of Victoria and an MD from the Faculty of Medicine at the University of British Columbia. After completing her Urology Residency at UBC in 2007, she completed a two-year fellowship in Pediatric Urology at Northwestern University in Chicago, Illinois. During her fellowship she enrolled in a Masters of Health Professions Education (MHPE) degree at the University of Illinois. The purpose of the MHPE is to provide effective and innovative leaders and scholars in health professions education for our department, our hospital, our pediatric patients and their families. We have been very fortunate to recruit Dr. Mickelson back to the Division of Pediatric Urology. Without the cooperation and generous support of TELUS Corporation, the UBC Department of Urologic Sciences Foundation and BC Children's Hospital this crucial appointment would not have been possible. Please join us in warmly welcoming Jennie to our hospital.

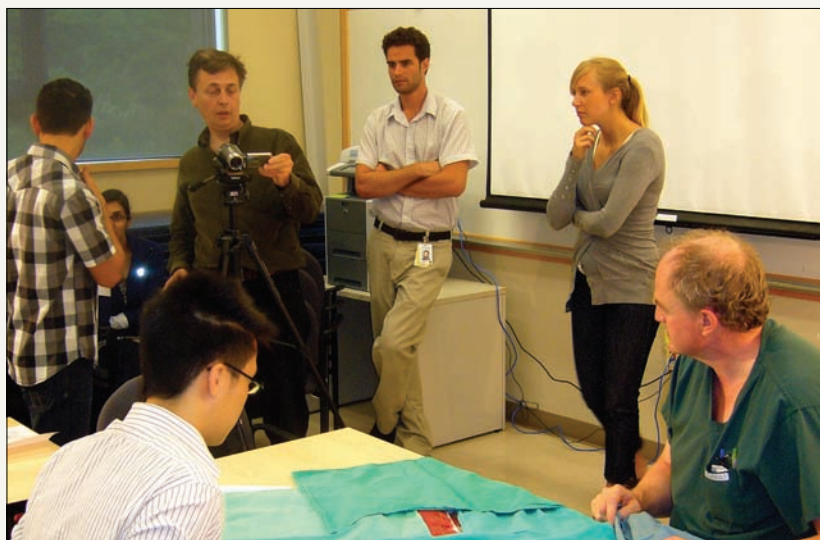


## THE OSCAR GOES TO...LIGHTS, CAMERA, SURGERY

**By: T Fraser, A Human, S Jones**

Over the past three years, the Office of Pediatric Surgical Education and Innovation (OPSEI) and the Department of Urologic Sciences has been funded from the UBC Teaching and Learning Enhancement Fund for the development of novel online resources aimed at preparing medical students for their clinical years. These educational tools were developed to help bridge the gap between the knowledge acquired in the first two years of traditional medical study and the expectations of the following clinical years. The resources are produced by medical students for medical students, with the guidance of residents and

faculty members. The result is the creation of over 50 online Problem Based Learning (PBL) cases, which illustrate a clinical approach to many genitourinary conditions. These cases provide medical students an opportunity to interactively work through a clinical scenario that they could be exposed to during their clerkship and clinical years. The success of the online PBL cases led to the creation of the “Lights, Camera, Surgery” project this past summer. This new dimension brought medical students and professionals together to produce surgical education videos aimed at giving students insight into common surgical procedures. This combination

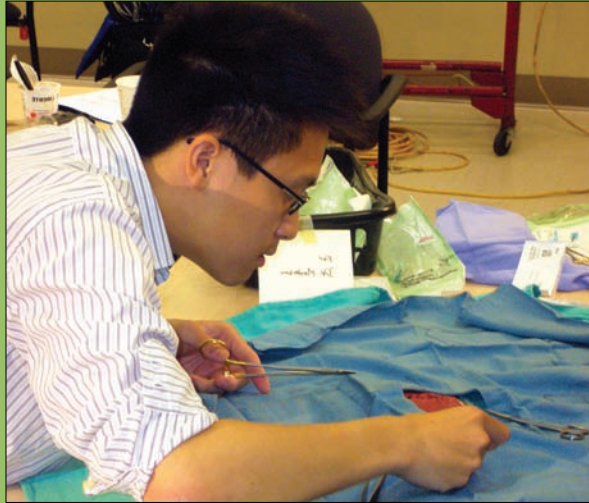


Students are learning how to film under the mentorship of a video coach.

has resulted in intellectually challenging and novel educational resources that are available to medical students across the country at the click of a button.

The online PBL cases are written by medical students and reviewed by urology residents and faculty members. The cases simulate real-life patient encounters, and are often modelled after actual patient data. Developed in a pedagogical manner, the cases provide a systematic review of clinical presentations, patient assessments, diagnosis, and treatment plans. They also include review questions related to pre-determined learning objectives, which





√  
 √

*"Lights, Camera, Surgery* is a new endeavour launched this year that has added another dimension to the project. This venture challenges students to research, film and produce short educational videos about common surgical procedures. "



encourage critical thinking and problem solving. Furthermore, comprehensive explanations and supplemental information ensure that students gain as much knowledge as possible from the cases. Once written, the cases are compiled in a highly structured template and published on the Diagnosis X server as a collaborative project between UBC, the Molson Medical Informatics Institute, and McGill University. Once published, medical students from all of UBC's distributed medical sites are able to access the cases through the Diagnosis X website. First year students are encouraged to use this resource during their Fluid, Electrolytes, Renal and Genitourinary (FERGU) block to help supplement the information that is presented in class. Thus far, most students have agreed that this resource is a valuable tool for helping enhance their understanding of the block.

"Lights, Camera, Surgery" is a new endeavour launched this year that has added another dimension to the project. This venture challenges students

to research, film and produce short educational videos about common surgical procedures. Students worked closely with physicians and other medical professionals to create over 15 videos that covered simple tasks such as Gowning and Gloving, NG tube insertion, and Urethral Catheterization to more complex procedures like Ureteroscopy, Percutaneous Nephrolithotomy and Inguinal Hernia Repair. The videos are five to ten minutes in length and are meant to highlight the important anatomy, techniques, and complications involved in the procedures.

Not only did medical students have an opportunity to see an array of medical procedures, they were also able to engage with medical professionals from many different specialties. The students found this process extremely rewarding and encourage continuation of this project. The videos will eventually be placed on Medicol with the intention of providing all UBC medical students access to viewing the videos for

educational purposes. In the future, our objective is to further integrate the Diagnosis X resources into the FERGU block. The project aims to continue improving and enhancing the diversity of the online cases for medical students at all levels. In addition, some of the videos created correspond with certain online PBL cases. Thus, we intend to amalgamate the two projects, further enhancing the interactive learning of UBC medical students. In the future we hope to obtain quantitative data showing DiagnosisX to be an efficacious resource.

The future looks bright as another summer project has proven successful. This success has translated into increased interest in expansion of the DiagnosisX concept beyond Urology into departments like Pediatrics, Family Practice and Psychiatry. Integrating and enhancing such resources can provide endless learning opportunities for medical professionals at all levels.



## ***IClicker: A TECHNOLOGY THAT HAS STUDENTS UTILIZING REMOTE CONTROL DEVICES TO SELECT A RESPONSE TO A MULTIPLE CHOICE QUESTION POSED BY THE LECTURER***

**By: Stephanie Wise and Meghan Gilley**

This past spring Dr. Masterson had a unique vision for the first year UBC Medical students, iclicker! Iclicker is a technology that has students utilizing remote control devices to select a response to a multiple choice question posed by the lecturer. The lecturer can then recall class responses and view a histogram displaying how the class answered the question and which answer was correct. Iclickers are currently being utilized in many settings from undergraduate classes to conferences. Dr. Masterson thought it was time the UBC Medical School benefited from this technology and that's when he called on us.

We are two students from the UBC Medical School class of 2012 and we spent the spring and summer assisting Dr. Masterson implement and study student opinion of iclicker. Iclicker was used in the Fluids, Electrolytes, Renal, Genital and Urinary block in all three of the distributed sites: Northern Medical Program, Island Medical Program and the Vancouver Fraser Medical Program. Every Friday morning students and lecturers used iclicker during one lecture for five weeks, and for three of those weeks we conducted a survey using the iclicker technology. The survey required students to rate their attitudes towards iclicker against several statements. As well, students were given the opportunity to comment on iclicker and its use through the UBC's Evaluation



Ms. Meghan Gilley and Ms. Stephanie Wise

Studies Unit. We compiled this data and with the help of Dr. Afshar worked through the quantitative data.

Overall, the results were promising. While students agree that technology difficulties, such as server crashes, need to be addressed, all three sites enjoyed the interactive learning style enabled by iclicker, and appreciate the opportunity to test their knowledge. Both of us enjoyed the opportunity to take part in this project from beginning to end. It required organization, team work and leadership - skills that we will be forever refining and are important in healthcare! The project reminded us of the importance of technology and

advancement in the pursuit to make processes such as teaching and learning more effective. Lastly, we valued working with and learning from project Faculty such as Dr. Masterson, Dr. Afshar and Mr. Duffy.

This fall, we are entering second year. This early on in our careers we both foresee a future direction in pediatrics however neither of us can narrow a specific field as of yet. We both appreciated the opportunity we had to become involved in Medical School Education.

We would like to thank OPSEI, BCCH, and UBC.

# UBC Surgical Residents Abroad

## ENCOURAGING RESIDENTS' GLOBAL HEALTH INTERESTS- -BRANCH FOR INTERNATIONAL SURGERY RESEARCH AWARDS

By: Mairi Murchison



Dr. Damon Ramsey and Dr. Paul Mick received Branch for International Surgery Research Scholarships

The 2009 awardees are:  
Vanessa Fawcett,  
Sonia Yeung,  
Paul Mick, and  
Damon Ramsey

More and more, UBC surgical residents are enquiring of program directors if their programs offer possibilities for international experience. This year, the Branch for International Surgery responded to this interest by launching a research award program. Four annual research awards of \$2500 each have been provided to support residents pursuing research on the burden of unmet surgical need in low resource regions.

The 2009 awardees –Vanessa Fawcett, Sonia Yeung, Paul Mick and Damon Ramsey will be using their awards to tackle some challenging surgical care research questions: How can the Cape Town Trauma Registry be modified so a simplified injury surveillance system can be maintained? What are the barriers to accessing essential surgery in Kampala, Uganda? What are the most suitable interventions to reduce post-transplant corneal graft infections in southern India?

Born in Kenya, Vanessa Fawcett's (Postgraduate Year 4, General Surgery) interest in global health was shaped by her African upbringing and working with HIV/AIDS outreach workers in Tanzania. In the course of exploring her interest in global surgical care, Dr. Fawcett met Dr. Morad Hameed who was in the initial stages of an injury prevention project in Cape Town and was looking for a surgery resident collaborator. By October 2008 Dr. Fawcett was part of a group that piloted an injury surveillance program, now known as the Cape Town Trauma Registry (CTTR), at Groote Schuur Hospital. The Branch's Research award will allow her to pursue Pilot 2, which will use the lessons learned from Pilot 1, and modify the CTTR to overcome some of the identified obstacles. In addition, Pilot 2 will set the stage for the introduction of this registry at other hospitals



The deadline for next year's awards is May 31, 2010 and applications are available on the Branch's website

***[www.internationalsurgery.ubc.ca](http://www.internationalsurgery.ubc.ca)***



in Cape Town and will contribute to injury surveillance in low-resource countries worldwide.

Two awardees, Paul Mick (Postgraduate Year 4, Otolaryngology Surgery) and Damon Ramsey (Postgraduate Year 1, General Surgery) share a common goal—to identify the key barriers to accessing surgical treatment in Uganda. This is building on the Uganda-UBC medical team efforts.

Working with Dr. Brian Westerberg, Dr. Mick will be using a semi-structured interview technique among patients at the Mulago Hospital to determine why so few patients with chronic middle ear disease are accessing effective treatment.

Dr. Ramsey will use his award to join Dr. Geoff Blair's paediatric general surgery mission to study the barriers to accessing paediatric surgery. He will travel to Paediatric Clinics away from the major centre in order to interview families as to the barriers.

A continent away in India, Sonia Yeung (Postgraduate Year 5, Department of Ophthalmology) whose interest in international surgical care and eye banking was stimulated by Dr. Paul Dubord, will be using her research award to study the clinical and microbiological profile of microbial keratitis in an eye care center in the developing world, particularly in the post-transplantation setting. Southern India hosts the largest documented number of nontuberculous mycobacterial keratitis known.

The deadline for next year's awards is May 31, 2010 and applications are available on the Branch's website *[www.internationalsurgery.ubc.ca](http://www.internationalsurgery.ubc.ca)*.



# CO-OP Work Term as a UBC Statistics Student with OPSEI

By: Anky Lai

“Working on these projects struck a chord with me as I live at home with my cousins and my younger brother, and I realize now how important it is to find ways to improve current and future hospital operations for all children and youth.”



I just completed my first co-op work term as a UBC Statistics student with OPSEI and it was certainly a very memorable and fulfilling experience. I decided to pursue a career in statistics, knowing that it is a well-established field. Unfortunately, I also knew it as a not-so-exciting one. However, the opportunity that I was given this summer was definitely not what I expected. It was fast-paced and demanding, but I never felt discouraged or stressed from the workload. Given that learning and boredom never worked well together for me, I found my own path for learning through a number of tasks and projects.

During my employment here, I had the chance to work on the Canadian Pediatric Surgical Wait Time Project assisting the Operations Research Analyst, Stoney Chen, and Systems Analyst, Amin Mardan. I was responsible for updating the OR Booking forms, making sure the OR waitlists were up-to-date, and doing data quality checks and data analysis to ensure improvements in efficient access to clinical care. The project has had a strong and positive impact and hopefully we will continue to implement changes when it comes to an end in March 2010.

In addition, I was fortunate enough to be included in the Economic Impact of Surgical Cancellations study and was able to provide assistance in the interviewing process and the gathering of data. The goal of this study is to capture the financial burden families have to face when their child's surgery is cancelled without any prior notice. Furthermore, it also gives families a chance to share their perspective to allow health care providers and decision makers aware of the effects due to cancellations.

On top of these projects, I was given the opportunity to do statistical analyses for physicians and medical students under the supervision of Dr. Ruth Milner, one of our on-site biostatisticians. I gained a lot of valuable experience and learned a great deal about the significance and important with the application of statistical analysis in clinical research.

Working on these projects struck a chord with me as I live at home with my cousins and my younger brother, and I realize now how important it is to find ways to improve current and future hospital operations for all children and youth. As a result, I have gradually become more and more interested in epidemiology and biostatistics; I have finally found a meaningful, rewarding, and selfless career knowing that the things I do are done only to benefit others. With this philosophy, I decided to continue on to graduate school next year to do a Masters in Public Health. The past four months have





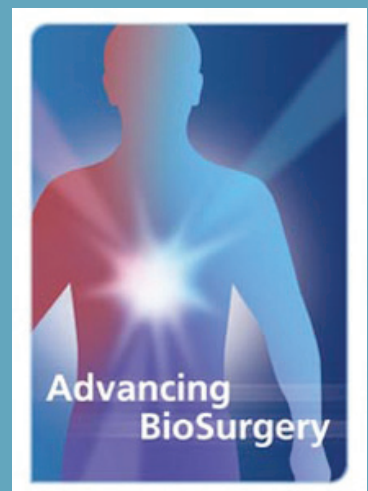
Mr. Stoney Chen and Ms. Anky Lai

unquestionably given me a glimpse of what the next chapter of my life will be like.

I would like to take this opportunity to thank everyone I worked with for all their time, patience, and support. Many thanks to Damian and Stoney for all the help and encouragement, but most importantly, for giving me the chance to help kids be kids again.

The Office of Pediatric Surgical Evaluation and Innovation would like to gratefully acknowledge an unrestricted education grant from Baxter which helps support the publication of the Slate newsletter.

**Baxter**





Room K0-110 4480 Oak Street  
Vancouver, BC V6H 3V4

**Next Issue - Spring 2010**

The Slate Newsletter is published bi-annually.  
Submissions from readers are both encouraged and welcomed at any time.

Editors:  
Damian Duffy  
Debbie Bertanjoli

Email:  
[dduffy@cw.bc.ca](mailto:dduffy@cw.bc.ca)

Current and back issues of all Newsletters can be found on the OPSEI Website:  
<http://www.ospei.bc.ca>