



The Office of Pediatric Surgical Evaluation and Innovation

Women's
BC Women's
Hospital &
Health Centre

British Columbia's
Children's Hospital
**Children's
Hospital**

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THE OFFICE OF PEDIATRIC SURGICAL EVALUATION AND INNOVATION

In 2003, the Pediatric Surgeons at BC Children's Hospital published their vision of Pediatric Surgical Services in British Columbia, "For Care, for Quality, for Life." Integral to the vision was the creation of the Office of Pediatric Surgical Evaluation and Innovation (OPSEI).

OPSEI is a key element of the new vision for pediatric surgery within the Province of British Columbia. With the ongoing advancement of surgical technology and the need to work within constrained resources, it is imperative that the Department of Pediatric Surgery at BCCH strives to provide the best surgical care to pediatric patients in the best setting for the best outcomes. To achieve this goal requires comprehensive evaluation of new technologies, work processes and care delivery coupled with the ability to be innovative and progressive.

OPSEI is a key element of the new vision for pediatric surgery within the Province of British Columbia.

OPSEI serves to provide unique scientific insight to help policy makers, managers, planners, clinicians, and researchers to shape the future of pediatric surgical care in BC. In collaboration with the University of British Columbia, the Provincial Health Services Authority, the Child and Family Research Institute, OPSEI's research will encompass the assessment of clinical care delivery, patterns of utilization and new technology and treatment modalities for pediatric surgery.

A Vision for OPSEI

OPSEI aims to establish and maintain a unique position for BC Children's Hospital as a leader nationally and internationally in the delivery of high quality pediatric surgical care. It is an investment in conducting clinical and translational research, which contributes to the effectiveness, quality, and efficiency of pediatric surgical care and outcomes in BC. As innovators, we plan to expand the frontiers in pediatric surgical knowledge



Sunny Bear & Members of the Pediatric Surgery Team

June 2-3, 2007: BC Children's Hospital Foundation raised \$14,688,536 for BC Children's Hospital during the 20th annual Miracle Weekend. Every cent raised during the Miracle Weekend goes to the Excellence in Child Health Fund, to purchase vital equipment and support clinical care, research and development, and staff and family education programs.

and understanding. As teachers, we will enthusiastically involve the educational community in our endeavors to inspire and engage surgical trainees. We will cultivate learning opportunities in order to create a rich, interdisciplinary academic environment in Pediatric Surgery within BC Children's Hospital. ■

Goals and Objectives

The goals and objectives of OPSEI are:

- To use operations research as a means of addressing critical utilization and access issues in surgical and perioperative care.
- To facilitate the implementation of new technologies.
- To assess the outcomes of new technologies on service delivery and patients.
- To address critical patient flow issues within surgical clinics.
- To advance and communicate pediatric surgical discoveries.
- To strive for excellence in pediatric surgical education for medical students, residents, fellows, and faculty.
- To facilitate clinical research, emphasizing randomized clinical trials that evaluate standard and innovative surgical therapies and surgical devices.
- To support the development of new analytical methods for evaluating surgical treatments.
- To advance innovation in surgery by creating a better understanding of practice.
- To conduct quality of care studies that focus on surgical error reduction.
- To investigate the health policy implications of research findings.
- To educate new investigators in surgical services research.

Our Team Values:

Partnership

Curiosity

Enthusiasm

Integrity

Service

Achievement



The Office of Pediatric Surgical Evaluation and Innovation (OPSEI) is a central element of the renewed vision *“For Care, For Quality, For Life”* of Pediatric

Surgical Services in British Columbia.

OPSEI was established three years ago with the generous support of Mrs. Sharon Toohey, President of B.C. Children’s Hospital; the Child Health Executive; The B.C. Children’s Hospital Foundation; Dr. Stuart MacLeod, Executive Director of The Child & Family Research Institute; and the Pediatric Surgeons and Anaesthetists of B.C. Children’s Hospital.

The core of OPSEI has grown to four team members – Mr. Damian Duffy, Managing Director; Mr. Navid Dena, Operational Research Analyst; Mrs. Bindy Sahota, Academic Administrative Assistant and Mrs. Debbie Bertanoli, Data Facilitation Officer. Dr. Kishore Mulpuri was recruited last year as the Scientific Director. On behalf of our pediatric surgeons, I would like to thank this dynamic team who has made an enormous difference in our work.

OPSEI provides unique clinical scientific insight in three key areas: Evaluative Research, Education and Development and Policy Creation. Under Evaluative Research, particular



Dr. Jacques G. LeBlanc: open heart surgery

MESSAGE FROM THE EXECUTIVE DIRECTOR

importance has been placed around the ongoing Development of the Pediatric Surgery Simulation Project, a unique tool in Canada, used in assessment of system areas, such as the Orthopaedic Clinic, the Emergency Room, the Operating Room Block Schedule but also to respond to surgical wait lists and helping to identify new strategies. Under Education and Development, OPSEI has supported competitive grant funding, student training, the OR,

the ICU, Global Health, and in clinical research. As you will read in the Education Section, several of our students have been honoured with a variety of prestigious awards.

OPSEI has evolved to become the academic arm and project office of Pediatric Surgery.

Under Policy Creation, OPSEI has supported the National Pediatric

Surgical Wait Time Project, led by Dr. Geoffrey Blair, Head of the Department of Pediatric Surgery and Mr. Navid Dena, Operations Research Analyst. With our Real-Time Priority Wait List Tool, and our work with web-based access, Mr. Dena has positioned B.C. Children’s Hospital as a leader in the National Wait List Project.

OPSEI is now presenting its second report, covering 2006-2008. Much has been achieved under the three key areas. Most importantly, OPSEI’s role has grown substantially in the Department of Pediatric Surgery, within the organization and nationally. OPSEI is now involved in Business Development and facilitation, for instance, to support programmatic development of surgical divisions in interdisciplinary projects involving surgery, anaesthesia and dentistry, and in national and international partnerships such as Uganda, Honduras and student opportunities in Global Health.

With its involvement in supporting several division and department members in their quest for Ethical Research, OPSEI has evolved to become the academic arm of Pediatric Surgery. It is an important new challenge that OPSEI will proudly undertake. It is with great anticipation that we look to the years ahead. ■

ROLES & RESPONSIBILITIES



OPSEI TEAM



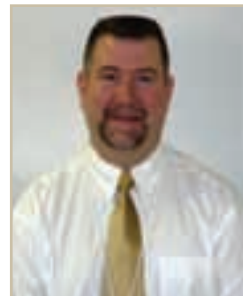
Dr. Geoffrey Blair, Chief of Pediatric Surgery,
B.C. Children's Hospital
Responsible for site specific: effective
delivery of clinical services; strategic and
policy advice; site medical administration;
quality monitoring and improvement;
support for teaching and research.



Dr. Jacques LeBlanc, Executive Medical Director
Responsible for the direction and priorities
of OPSEI which are determined in
collaboration with the Board.



Dr. Kishore Mulpuri, Scientific Director



Mr. Damian Duffy, Managing Director
Responsible for all OPSEI business
operations and overall project
management.



Mr. Navid Dena, Operations Research Analyst
Responsible for all initiatives relating to
access to care and surgical wait times.

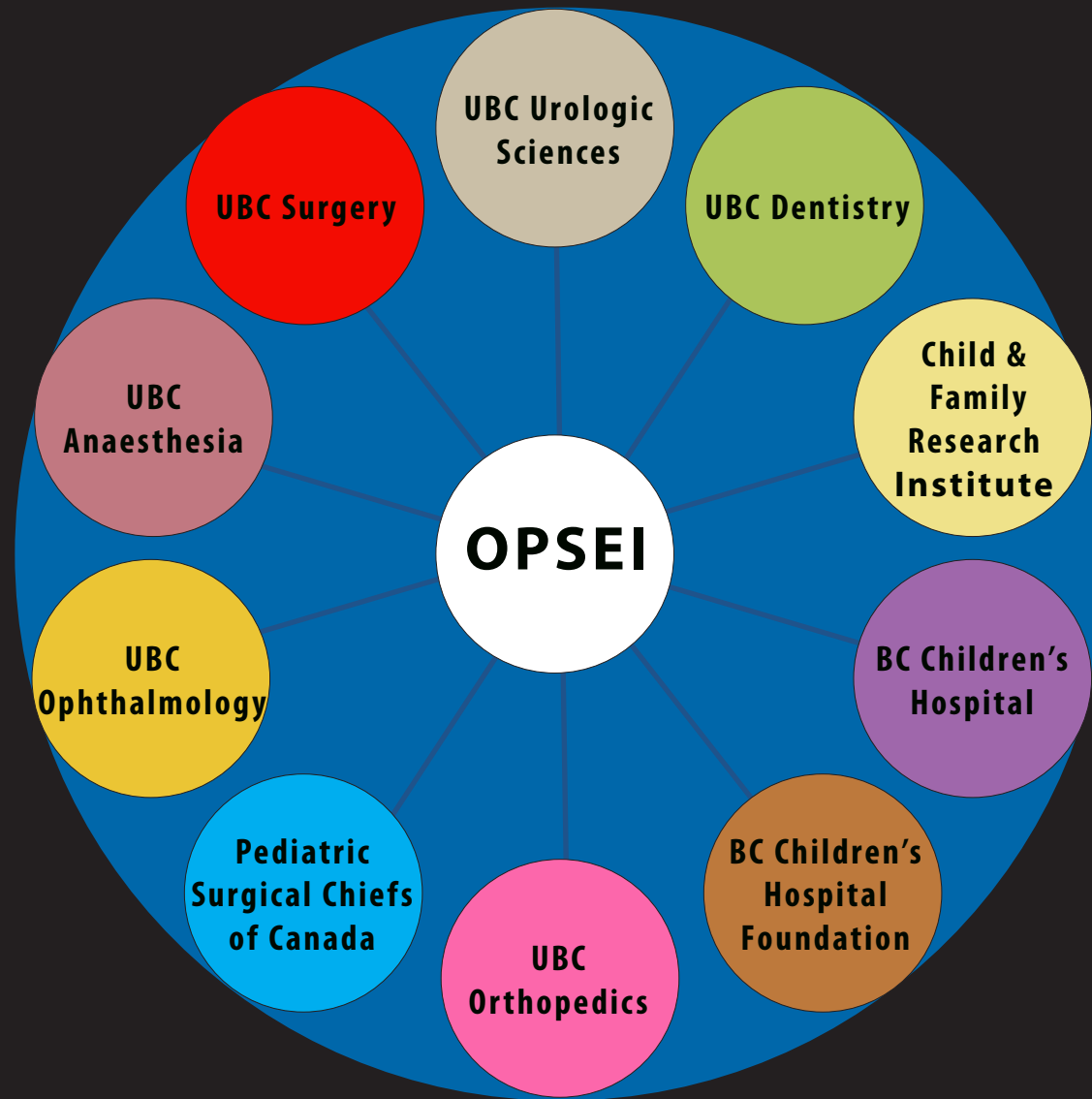


Mrs. Bindy Sahota, Academic Admin. Assistant
Responsible for all academic support to
the Pediatric Surgeons and coordinates
undergraduate and postgraduate training
programs.



Mrs. Debbie Bertanjoli, Data Facilitation Officer
Responsible for the departmental website,
academic databases and departmental
publications.

PARTNERS IN PEDIATRIC SURGICAL INNOVATION



1 OPSEI EVALUATIVE RESEARCH INITIATIVES



Mr. Damian Duffy, Dr. Geoffrey Blair, and Mr. Navid Dena from the Department of Pediatric welcome Ms. Jennifer Powers and Ms. Allison Millar from the BC Ministry of Health.

EVALUATIVE RESEARCH

Central to Evaluative Research is the use of operations research to understand and improve service delivery. Over the past three years, OPSEI has employed an Operations Research Analyst to support a number of key initiatives. Craig O'Neill and Navid Dena, Operations Research Analysts for OPSEI, have served as on-going decision support resources to the management and administration of the Operating Room (OR). In this important role they have provided expertise in the area of data collection, analysis, and modeling in relation to improved OR utilization. A number of decision support tools have been developed in OPSEI that allow for better assessment of the OR block allocations and patient flow in the OR suites. These tools incorporate operations research methodologies such as mathematical modeling, queuing theory, statistical analysis, and simulation modeling and are under continuous development and validation to reflect ongoing changes in the way operating rooms function.

The OR Patient Flow Simulation Model is an example of this important work. Until April of 2006 the majority of emergent surgeries were performed after-hours accumulating overtime costs or during regular hours causing cancellations and/or bumping other cases to the evening

late. The OR Patient Flow Simulation Model was used to assess the impact of running an Open Access (OA) room allocated for urgent cases. The model quantitatively demonstrated that running the OA room three times a week for highly urgent cases could attain significant benefits. This motivated

Surgical cancellations due to cases "bumped" by higher priority cases and overbooked surgical time were reduced by 55% and 88%, respectively.



Robot-assisted surgery in Pediatric Urology

hospital administration to pursue the opening of this room commencing in April, 2006 to minimize disturbance of elective cases and the shifting of more surgeries from night-time to day-time. After one year, overtime hours in the OR and Post Anesthetic Care Unit (PACU) were reduced by 17% and 38%, respectively.

Additional Operations Research projects completed or in progress since April, 2005 include: Emergency Department Patient Flow Project (Craig O'Neill), Orthopedics Clinic Redesign Patient Flow Project (Craig O'Neill), the Real Time Priority Wait List Pilot Application (Craig O'Neill), and the National Pediatric Surgical Wait Time Pilot Project (Navid Dena). ■

EMERGENCY DEPARTMENT PATIENT FLOW PROJECT

In the winter of 2005, an unprecedented increased in volume and acuity in the Pediatric Emergency Department (PED) at BCCH led to departmental overcrowding, increased patient waiting times and patients leaving without being seen. This led to demoralized and exhausted staff and, of course, dissatisfied patients and families. The need to address these issues, given a highly complex and dynamic environment, led to the use of innovative scientific methods in order to determine what aspects of PED activity could be modified to improve patient flow, reduce patient waiting times, and increase staff efficiency and morale. A Patient Flow Model was developed using discrete event simulation to test various simulated scenarios that were designed to alleviate the pressures realized due to patient volumes in the ER setting. Moreover, a Physician Scheduling Analysis Tool was developed to

assist in better scheduling of physicians. The validated models demonstrated that an additional hospital volunteer and a second triage nurse would decrease the pre-triage wait by over 50% and the proportion of patients who wait over an hour by 66%. It was also determined that adding an extra MD shift would reduce the acute care patient time to be seen by MD by 20% and LOS by 15%. The model allowed for the testing of additional scenarios that shed light on determinants that could improve efficiency of health care delivery with minimal costs. As a result of the project, a hospital volunteer and a second triage nurse (out of existing PED nursing staff pool) were assigned. An additional physician shift, a "swing shift", consistent with the simulation was also implemented. Immediate results were seen in the reduction of wait times and expedited patient throughput. ■

THE REAL TIME PRIORITY WAIT LIST TOOL PILOT PROJECT

Prior to 2005, there were no standardized means of assigning priorities to patients in the surgical waitlist. Moreover, there were no wait list management tools where priorities could be incorporated into day-to-day scheduling. A vision was developed to create a real-time priority wait list application. This application would assist in monitoring the wait times of patients and promote unbiased, efficient and strategic use of OR resources. Craig O'Neill developed a prototype waitlist management tool with a priority scheme incorporated as a function of waiting time and access targets.

Parallel to this, there was a national initiative to develop access targets that could be applied to pediatric surgery. In February 2006, Craig's tool was demonstrated at workshop proceedings for the National Pediatric Surgical

Wait Time (NPSWT) strategy, in Ottawa, to representatives from all sixteen pediatric academic health centres (PAHSCs) and Dr. Brian Postl, the Federal Advisor on Wait Times to Prime Minister. Tremendous interest was generated in relation to the initiative for waitlist management at BCCH. Following the workshop, Craig worked with a software company to develop a pilot application for his prototype tool, which by the end of 2006, was implemented and piloted in the Pediatric General Surgery and Urology Clinics. This pilot application aimed at helping Medical Office Assistants (MOAs) to better manage their surgical waitlist and schedule patients for the OR. It also identifies issues for creating a version that would support all of the services. Publication of this work is anticipated. ■

NATIONAL PEDIATRIC SURGICAL WAIT TIME PILOT PROJECT

In January 2007, Prime Minister Stephen Harper announced funding in support of a 15-month long NPSWT pilot project to measure the burden of surgical waiting times for Canada's children and youth. All sixteen PAHSCs across Canada collaborated with the primary focus on six key surgical areas: cardiac surgery, cancer surgery, neurosurgery, strabismus surgery, scoliosis surgery, and dental treatment requiring anesthesia. Navid Dena served as the Project Site Lead at BCCH and worked closely with other colleagues across the country to achieve the desired outcomes.

In the first phase of the project a survey was conducted to understand current clinical pathways at BCCH and across the country for providing recourse for patients with excessive wait times. This information was then used to develop standard clinical pathways to be applied in one targeted area in the fourth and last phase of the project. The goal of the second phase of the project was to retrospectively collect wait time information and assign access targets for each surgical case. This information would later assist in measuring the degree of improvements locally and nationally during the evaluation phase of the project. During the second phase, Navid streamlined the current booking processes and developed new dynamic computer-based OR booking forms with carefully designed fields to improve the quality and completeness of surgical wait time data. These forms were highly customized to each MOA and are in continuous improvement as the project progresses. Navid implemented nationally agreed access targets across all service areas as opposed to only the few that were proposed in the project.

For this all MOAs across all services needed to be trained and eased into using



Ms. Cathy Seguin, Dr. Geoffrey Blair, Dr. Jim Wright, Ms. Elaine Orrbine with Prime Minister Stephen Harper (*Photo courtesy of the PM's Office*)

the new booking system. The third phase of the project involved regular proactive data collection of surgical cases waiting or completed as well as their submission to the coordinating National Office of the project. For the first time, a picture of surgical wait times across the country was demonstrated including those patients who were outside their optimal window of care. The third phase is to be completed by the end of June 2008 while the fourth phase is to start in January 2008. Meanwhile, Navid has collaborated in drafting Stage 2 of the project, aiming at expanding the project to include more groups of children, community hospitals as well as leveraging the collected information to enhance current scheduling practices, optimize the allocation of OR resources, define nationally agreed definitions of resource utilization and efficiency to perform capacity analysis nationwide.

With regards to knowledge transfer, presentations have been delivered in a number of educational sessions such as the INFORMS Conference (Craig O'Neill), CORS Conference (Craig O'Neill), and Health Economics Forum at BCCH (Navid Dena). Dr. Blair has also presented his work at INFORMS and the COE Forum on Operations Research in Health care. Currently, Navid is collaborating in writing a paper, for publication, based on the work done in the orthopaedic redesign patient flow project. In addition to his full-time commitment to the NPSWT project and his role as decision support resource

This outstanding initiative established standards for pediatric surgical wait time, for the first time, based on nationally agreed definitions and priorities and the development of a conceptual framework for a pan-Canadian clinical pathway for children with wait time beyond acceptable targets.



Dr. Kishore Mulpuri, Pediatric Orthopedic Surgery

to management, Navid is also preparing to mentor two students conducting operations research projects from the Centre for Operations Excellence, Sauder School of Business, at the University of British Columbia. These projects are as a result of OPSEI's commitment to partner with the COE in order to promote innovative solutions in health care and to ultimately provide better care for the children of BC. ■

PLANNED OPERATIONS RESEARCH PROJECTS IN 2008

Redesign of Tertiary Care OR Suites and Formation of Ambulatory Surgical Units at BCCH

Current configuration of the OR suites at BCCH include the surgical day care unit, tertiary care OR, post anesthetic care unit, pediatric intensive care unit, pain clinic, and procedural sedation unit. All surgical cases regardless of their resource needs or complexity are allocated to the same tertiary OR suites.

Under consideration is the concept of having a separate ambulatory surgical unit "express surgery" to handle the relatively simple and less resource dependent surgeries. The hypothesis is that more patients could be accommodated with higher quality of care and improved patient flow in a more cost efficient manner. The project will investigate the criteria that should define an "express surgery," the extent of the overlap of the two units, the benefits

realized, and more. The findings from this project are anticipated to inform the new children's hospital design. Part of the research will involve forecasting advances in medicine and the state of epidemiology over the planned life of the new hospital.

Improving Patient Flow through Radiology at BCCH

The Department of Radiology handles all of the medical imaging requests at BCCH. It is a centralized department providing service to all other clinics and departments of the hospital. Currently the demand for radiology services is creating a backlog. A project will be carried out to investigate opportunities to improve patient flow through Radiology and serve scheduled and emergency patients in a timelier manner.

This work will inform the new hospital design and how future demand and advances in imaging technology can be incorporated to better serve the medical imaging needs of BC's children.

Ensuring Timely Access to High Quality Surgical Care for BC's Children and Youth

In March, 2008, OPSEI submitted a proposal to Canada Health Infoway Patient Access to Quality Care – Demonstration Projects program entitled, "Ensuring Timely Access to High Quality Surgical Care for BC's Children and Youth." OPSEI requested a funding of \$5.7 million dollars, over a two-year period, for a project to address the existing gap in wait time management systems in pediatric surgery. The project objective is to create a surgical scheduling, resource management and optimization system that allows surgeons, administrators, clinician groups, and organization leaders to better communicate, manage surgical resources, and prioritize waiting patients in a fair and equitable manner. The project aims to find solutions that integrate with existing electronic health systems and are scalable for use at other similar health centres. The demonstration project builds on current national pediatric wait time initiatives by operationalizing current access targets into day-to-day operating room scheduling and resource optimization. By doing this project, it is expected to have more children receive surgery in a timely manner, establish interfaces that coordinate pre-op, OR, and post-op resource requests, reduce the number of cancelled cases, improve resource utilization, minimize non-value added work, and provide transparency in the information that pertains to the use and access to the OR resources. ■

2 OPSEI EDUCATIONAL INITIATIVES

KNOWLEDGE NETWORK

In 2006 and 2007, the Department of Pediatric Surgery partnered with the Knowledge Network to produce and televise five vignettes designed to highlight innovative achievements in state-of-the-art care at BC Children's Hospital.

INNOVATIONS IN PEDIATRIC SURGERY TELEVISION VIGNETTE SERIES

The five Innovations in Pediatric Surgery Vignettes produced were:

1. Neonatal Cardiac Surgery – Dr. Jacques LeBlanc and Dr. Andrew Campbell

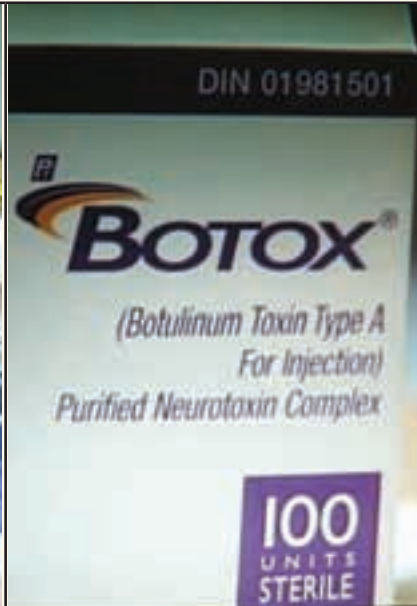
This vignette followed the Neonatal Cardiac team as they repair a congenital heart defect in a newborn child – one of the leading causes of death among infants. It is a story of hope, which delivers information regarding emerging science regarding the care of the tiniest newborn of just two kilograms to be placed safely on the heart-lung machine for open-heart surgery.



Dr. Jacques LeBlanc

2. The Clubfoot Program – Dr. Christine Alvarez

In BC, one in a thousand babies is born with clubfeet. For infants born with this condition it can mean a long and invasive series of casts, surgery and braces with complications. Now there is hope that many children can avoid these painful procedures with the use of Botulinum Toxin. This vignette highlights the outstanding work of the multidisciplinary team led by Dr. Christine Alvarez who has pioneered the use of Botox in the care of clubfeet. More than 100 children have undergone this unique procedure. Less than 2% of children treated with Botox, have required surgery, down by 80%.



Dr. Christine Alvarez

3. Laparoscopic Surgery – Dr. Kourosh Afshar

This vignette follows pediatric surgeons as they use the latest laparoscopic techniques to remove a diseased kidney from a seven-year-old child. With minimally invasive surgery, this procedure can be done with three or four 5 mm incisions, reducing pain, swelling, and post-operative care. As we see in this vignette, this procedure gets children back home and back to the basketball court where they belong – faster!



Dr. Kourosh Afshar

4. The Nuss Procedure – Dr. Erik Skarsgard

Pectus excavatum is the most common congenital chest-wall deformity, with an incidence of between 1 and 8 in 1000 births. The rib cage of individuals with pectus excavatum forms abnormally, resulting in a caved-in or sunken chest. The Nuss Procedure performed by Dr. Erik Skarsgard offers a minimally invasive-lower cost correction. This procedure is done in adolescents around the age of 12-14. Kids can benefit from the advantages of minimally-invasive surgery for the best outcomes.



Dr. Erik Skarsgard

5. The Epilepsy Program – Dr. Mary Connolly and Dr. Paul Steinbok

Epilepsy is the most common neurological disorder and accounts for 50% of referrals to the pediatric neurology clinic at BC Children's Hospital. This vignette highlights the multidisciplinary neurosciences team who work cohesively in the clinical, surgical, and postoperative setting to provide children and their families with outstanding care. Having been established in 1992, this vignette represents the significant advances and achievements in epilepsy care at BC Children's Hospital.



On behalf of the Department of Pediatric Surgery, we would like to honour the Knowledge Network and BC Children's Hospital Foundation for partnering with us on the Innovations in Pediatric Surgery Vignette Series. Most importantly, we would like to thank our pediatric patients and their families who shared their personal stories so that other families in BC can benefit from their experience, strength, and hope.

SWINGING OPEN THE OR DOORS TO EDUCATION OPPORTUNITIES

With \$86,000 in grant funding from the BC Academic Health Council “**SWINGING OPEN THE OR DOORS TO EDUCATIONAL OPPORTUNITY**”, provided exciting clinical research opportunities to a number of medical students, undergraduate students, and one high school student over the last year. These experiences produced strong research projects, which not only had a positive impact on patient care, but also cultivated new enthusiasm within our academic mandate in Pediatric Surgery. ■

NURSING STUDENT EDUCATION AND RECRUITMENT IN THE OR SETTING

With our BC Academic Health Council grant, we were able to recruit Ms. Sandra Harris, a Nurse and Clinician Educator whose role was to attract nursing students wishing to do clinical placements as part of their nursing training within the operating room and to expand and foster new innovative training opportunities for undergraduate students. This program has proven to be very successful, and we are pleased to report that we have had excellent responses from nursing students wishing to explore careers within the surgical setting. Ms. Harris has also developed a peri-operative prep course for interdisciplinary students seeking placements in the Operating Room environment or for nurses who would like to consider a change in clinical career and would like an orientation to this highly specialized environment.

Key outcomes included:

- Development of inter-professional competencies in the OR environment.
- Creation of an OR Prep course.
- Increased enthusiasm among nursing students to undertake OR placements at BC Children’s Hospital.
- Increased recruitment of nurses to the BCCH Operating Room.
- Increased interest in nursing students to pursue an extended practicum in the OR. ■



Ms. Sandra Harris and Ms. Barb Mcknight, Nursing Education

MEDICAL STUDENT PROJECTS

The Office of Pediatric Surgical Evaluation and Innovation has provided exciting clinical research opportunities to a number of medical students, undergraduate students, and one high school student over the last year. These experiences have produced strong research projects conducted, which not only have had a positive impact in patient care, but have also cultivated new enthusiasm within our academic mandate in Pediatric Surgery. OPSEI is pleased to report that five summer students presented their scholarly projects at the Western Society of Pediatric Research. They included:

STUDENT	SUPERVISOR	TITLE
Mr. Justin K. Lee and Mr. Chris Stevens	Dr. Geoffrey Blair	<i>The Role of Fine-Needle Aspiration Cytology in the Pre-operative Diagnosis of a Pediatric Thyroid Nodule</i>
Mr. Patrick Yang	Dr. Erik Skarsgard	<i>The Distribution and Expression of Transgene GFP in Fetal Cells following In Vivo Fetal Gene Therapy in Mice</i>
Mr. Ravi Ghag	Dr. Kishore Mulpuri	<i>Intra- and Inter-observer Agreement in the Radiographic Diagnosis of Femoral Head Osteonecrosis following Slipped Capital Femoral Epiphysis</i>
Ms. Courtney Collins	Dr. Geoffrey Blair & Mr. Damian Duffy	<i>A Roadmap to Global Health Education: A Student-Led Learning Initiative</i>
Mr. John Blair	Dr. Kishore Mulpuri	<i>The Use and Misuse of Child Restraint Seats in Manitoba</i>
Mr. Vince Lau	Dr. Christine Alvarez	<i>Early Effect of Botulinum Toxin Type A on Ankle Range of Motion in Children Diagnosed with Severe Idiopathic Toe Walking</i>
Ms. Lien Hoang	Dr. Erik Skarsgard	<i>Evaluation of Chitosan as a Gene Transfer Agent to Fetal Murine Organs and HEK293T Cells in Vitro, And Fetal Organs Following in Utero Gene Delivery</i>
Ms. Melanie Finkbeiner	Dr. Andrew Campbell	<i>Outcomes Associated with the Use of Recombinant Factor VII Following Pediatric Cardiac Surgery</i>
Mr. Chris Zappavigna, Mr. Bryn Runkle, and Mr. Jed Shimuzu	Dr. John Masterson	<i>The Design and Integration of Online Case-Based Interactive Multimedia Problem-Oriented Learning in Urology Using Standardized Software</i>

Through their hard work and conscientious scholarly activity, OPSEI is pleased to report that the students have been honoured with several awards from the Child and Family Research Institute, the UBC Faculty of Medicine and internationally at the Western Society of Pediatric Research:

STUDENT	AWARD
Ms. Courtney Collins, UBC Albert B. and Mary Steiner	Travel Award
Mr. Ravi Ghag, UBC Albert B. and Mary Steiner	Travel Award
Mr. Ravi Ghag, Claude K. Lardinois MD	Oral Presentation Award, Western Society of Pediatric Research
Ms. Melanie Finkbeiner	Third Prize, Child and Family Research Institute Summer Student Research Day
Mr. Patrick Yang, Second Prize	Child and Family Research Institute Summer Student Research Day Award
Mr. Patrick Yang	First Prize, 3rd Annual MUS Medical Student Research Forum
Mr. Patrick Yang UBC Albert B. and Mary Steiner	Award Travel Award
Mr. Patrick Yang	Best Basic Sciences Poster, Western Society of Pediatric Research
Mr. Vince Lau	UBC Faculty of Medicine, Student Travel Award
Mr. Christopher Zappavigna	UBC Faculty of Medicine, Student Travel Award
Mr. Bryn Runkle	UBC Faculty of Medicine, Student Travel Award
Ms. Lien Hoang, UBC Faculty of Medicine	Student Travel Award
Mr. Jed Shimizu, UBC Faculty of Medicine	Student Travel Award

QUOTES FROM MEDICAL STUDENTS

"In one of my research projects, I learned to perform surgery on pregnant mice, and then on the neonatal mice pups. It was challenging in terms of dexterity and hand-eye coordination, but I surely improved these skills in the course of my research. In another project, I learned to properly review patient charts and perform clinical research based on these records. Furthermore, I learned to create and present posters and PowerPoint presentations for clinical and basic science research. My most proud achievement would be winning second place for my research poster at the Child Family Research Institute Poster Day."

- Patrick Yang, UBC Medical Student

"I feel sure that whichever type of doctor I become, I would like to include clinical research in the job description. I enjoyed the process and I think there is research that needs to be done to further the education and knowledge of medical professionals. I have so many new skills that came from working as a summer student at Children's. I had no experience in research prior to this summer so I learned the entire research process. That ranged from applying for ethics review to writing the paper. Another important skill that I gained was public speaking. As part of the program, we were required to present our project to the other students, as well as prepare a poster that we were judged on. I believe the achievement I am most proud of was winning 3rd prize for the poster



Carmel 2007: Mr. Patrick Yang, Mr. Damian Duffy, Ms. Courtney Collins, Ms. Angie Perdios, Mr. Ravi Ghag, Mr. Justin Lee, Mr. John Blair, Dr. Erik Skarsgard, Dr. Geoffrey Blair

presentation, as that was the thing I was most scared of. Thank you so much, Dr. Campbell and Dr. LeBlanc."

- Melanie Finkbeiner, UBC Microbiology (Pre-Med)

"Working with Dr. Mulpuri and his research team was an incredible experience for me, especially since I received my first referenced publication as an undergraduate student."

- John Blair, McGill University Undergraduate Science Student

"My experience with the SCFE study in pediatric orthopedics has made me even more enthusiastic about being able to conduct clinical research while I practice medicine, especially orthopaedic surgery. I'm quite sure I will continue pursuing clinical research and I'm positive about my career choice. Absolutely fantastic - the resident Dr. Darin Davidson and supervisor Dr. Kishore Mulpuri as well as the research assistants Angie Perdios and Bronwyn Slobogean were very easy to approach and helpful in every way possible. Easy to get a hold of and a pleasure to work with."

- Ravi Ghag, UBC Medical Student



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SURGICAL TECHNIQUE EDUCATIONAL LEAVE FOR LEADING ADVANCEMENTS (STELLA)

Dr. Blair and Dr. LeBlanc have designed a continuing surgical education program for pediatric surgeons, pediatric anesthesiologists, and pediatric dentists at BCCH. It is designed to support the learning of new operative techniques.

The objectives of the STELLA program are:

- To afford surgeons, anesthesiologists, and dentists the opportunity to learn new techniques which contribute to excellence in child health.
- To assist surgeons, anesthesiologists, and dentists in bringing these new techniques back to BC Children's Hospital with a view to broadening the surgical procedures available at our hospital.
- To investigate those technical advances used elsewhere and to seek to improve upon them in an academic learning environment.



OPSEI ACADEMIC ROUNDS

Each month, OPSEI hosts academic rounds. These rounds are intended to highlight advances and innovations in pediatric surgical care and to cultivate a forum in which collaborative clinical research can be fostered.

OPSEI Academic Rounds have been running successfully for three years and attract a strong and regular following of medical students, residents, and faculty learners.

OPSEI Academic Rounds are held the first Tuesday of each month. Please join us for a cup of coffee and an excellent learning experience! ■

We are very pleased to report that the following pediatric surgeons and pediatric anesthesiologists were the 2007 Recipients of the STELLA Scholarship Program:

Recipient	Scholarship Program
<i>Dr Kishore Mulpuri</i> , Dept of Pediatric Orthopedic Surgery	Pediatric Pelvic Osteotomies
<i>Dr. Kourosh Afshar</i> , Div of Pediatric Urology	Robotic Surgical Skills Course
<i>Dr. Simon Whyte</i> , Dept of Pediatric Anesthesia	Advanced Pediatric Airway Management Program
<i>Dr. Ash Singhal</i> , Div of Pediatric Neurosurgery	Management of Lipomyelomeningocele and Split Malformations
<i>Dr. Andrew Campbell</i> , Div of Pediatric Cardiac Surgery; <i>Dr. Norbert Froese</i> , Dept of Pediatric Anesthesia	The Nikaido Procedure
<i>Dr. Paul Steinbok</i> , Div of Pediatric Neurosurgery	Endoscopic Craniosynostosis Surgery

“As OPSEI Academic Rounds have become an important part of continuous learning in Pediatric Surgery, we are pleased to announce that these rounds are now an Accredited Group Learning Activity as defined by the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada.”

- Geoff Blair



GLOBAL HEALTH EDUCATION CURRICULUM

OPSEI, through funding from the Vancouver Foundation and a matching grant of \$15,000 from the Department of Pediatric Surgery, has supported medical students committed to learning more about and getting involved in global health education.

The goals and objectives of the Global Health Education Curriculum are:

- To create an academic child health care community committed to and aware of global health concerns.
- To inspire student leadership in Pediatric Global Health Education initiatives through promoting dialogue, international linkages, and sustainable partnerships
- To foster generations of pediatric health care professionals' involvement in child and family Global Health through promoting early participation in clinical training
- To furnish health care professionals with the knowledge and skills necessary to make a meaningful contribution to international child and family health
- To make careers in International Health accessible through providing clinical learners and faculty with appropriate mentorship and collaboration
- To facilitate international educational opportunities, networking, sharing of information, and experiences related to Global Health Education.

This educational initiative has been tremendously well received by medical students and allied health trainees seeking to participate in Global Health projects. Ms. Courtney Collins was the medical student co-chair for this program and completed a summer project in OPSEI looking at the Global Health learning needs of students and faculty within the Faculty of Medicine at the University of British Columbia.

This project was accepted for oral presentation at the Western Society of Pediatric Research and will be presented as a poster presentation at the Bethune Round Table for International Surgery in May 2008. ■





GLOBAL HEALTH INITIATIVES

Uganda

OPSEI has also been very involved in other Global Health education initiatives including the medical education partnership with Makerere University in Kampala, Uganda. Mr. Damian Duffy co-facilitated a 4-day symposium looking at the development of accreditation of medical education in Uganda along with Dr. Robert Wollard and Dr. Bob Hilliard.

Concurrent with the medical education accreditation planning, pediatric surgeons from Kampala and Vancouver have been working on a project plan called “2008 Hernia Camp.” Hernia Camp is a Ugandan initiative led by Dr. Doreen Birabwa-Male. It ensures that economically challenged families with children in need of hernia repairs can access surgical care.

Building upon the success of Dr. Birabwa-Male’s inaugural Hernia Camp held in 2005, she has partnered with Dr. Geoffrey Blair and Dr. Eleanor Reimer from BC Children’s Hospital to grow and enhance this program. The 2008 Hernia Camp will be offered in April and as many pediatric patients as possible will receive hernia repair operations. The academic goal of this initiative will be to strengthen clinical education partnerships in surgery, anesthesia, and nursing and to cultivate clinical research opportunities for surgical and anesthesia trainees from Canada and Uganda.

Honduras

OPSEI has partnered with UBC medical students and a non-governmental organization called Programas para el Desarrollo de la Infancia y La Mujer (PRODIM). Within this program, medical students from UBC will participate in community-based projects in two Honduran villages in the summer of 2008 under the direction of PRODIM. The goals of this year’s student initiatives include conducting health needs assessment among families in the two selected villages, development and implementation of a health education curriculum on specific community health concerns identified by PRODIM, and to assist in the construction of one new village health clinic. We are very pleased that OPSEI has applied for and received nine International Learning Awards from CARE-UBC that will support this new initiative. ■

3 OPSEI POLICY CREATION

POLICY CREATION

The Pediatric Surgical Chiefs of Canada

In 2005, the Pediatric Surgical Chiefs of Canada held its inaugural meeting to discuss common issues effecting Pediatric Surgery across the country.

The Pediatric Surgical Chiefs of Canada represent 16 Canadian academic health institutions where pediatric surgical services are offered to children and their families. The PSCC's goal is to provide policy makers, hospital administrators, regional health authorities, universities, government and the public with the most accurate information about the state of pediatric surgical care and access to services in Canada. In this way, informed and responsible decisions can be made regarding the provision, allocation, and distribution of health care resources.

The goals of the PSCC are to:

- Advocate for improving the health of children and youth who are in need of surgical care
- Facilitate dialogue, promote synergies, and offer guidance on common issues affecting the practice of Pediatric Surgery in Canada
- Establish national benchmarks for Pediatric Surgical procedures
- Foster and promote scholarly partnerships across Canadian pediatric academic health centers

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to services in Canada. In this way, informed and responsible decisions can be made regarding the provision, allocation, and distribution of health care resources.

Current projects and initiatives of the PSCC include:

- The National Pediatric Surgical Wait Time Project (In progress)
- Application to Health Canada for Stage II of the National Pediatric Surgical Wait Time Project (Submitted)
- A Compensation Study of Canadian Pediatric Surgical Specialists (13 Canadian Pediatric Health Sciences Centres enrolled)
- Sponsorship of a Hospital Quality Measures Project, funded by CIHR and led by Dr. Astrid Guttman

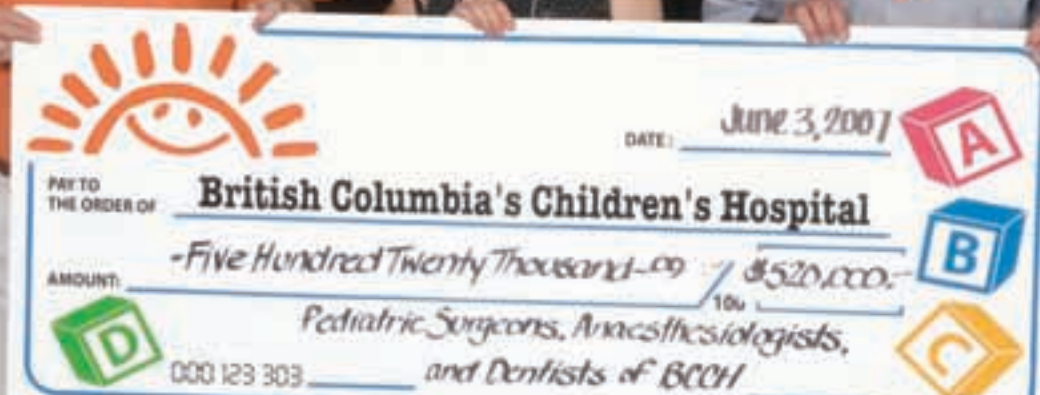
CHILDREN'S CIRCLE OF CARE AND THE HOSPITAL FAMILY MATCHING GIFT PROGRAM

Children's Circle of Care is an organization comprising 24 of North America's most prestigious pediatric hospitals whose mission is to advance the work of patient care, research and teaching by encouraging and recognizing major gift giving. Over the past three years, the Department of Pediatric Surgery, the Department of Pediatric Anesthesia and the Department of Pediatric Dentistry have worked collaboratively to promote philanthropy among our clinicians.

In addition, BC Children's Hospital Foundation has worked with all departments and offered the Hospital Family Matching Gift program in conjunction with Children's Circle of Care which allows annual donations of \$10,000 or more to be matched with a \$10,000 gift. We are pleased to report that through team effort the physicians in the Operating Room environment have increasingly supported Children's Circle of Care and benefited from the Hospital Family Matching Gift program in unprecedented numbers.along with Dr. Robert Wollard and Dr. Bob Hilliard. ■

Year	#Participating Surgeons/ Anesthetists/ Dentists	Total Donations Including Matching Gifts
2005	17	\$340,000
2006	20	\$392,000
2007	34	\$680,000

Mr. Damian Duffy,
Managing Director,
Dr. Eleanor Reimer,
Head of Anesthesia,
Dr. Doug Johnston,
Head of Pediatric
Dentistry



How do Children's Circle of Care and the Hospital Family Matching Gift program improve patient care, clinical research and medical education?

"A large component of the gifts this year has gone to augment instrumentation in the OR so that all our instruments can be reprocessed in SPD. Sterilization standards in the dental OR have been enhanced to meet current still provincial standards and the patients and their families can be assured that they are safe from cross contamination. It has cost over fifteen thousand dollars to increase the number of hand pieces alone to permit remote site sterilization. Many hand instruments were added to the inventory as well. The department was recently gifted a three dimensional facial camera. There were several accessories required to make it functional and funds from Children's Circle of Care donations and the matching gifts were used to complete the installation. The camera was put into operation last summer and a summer student was the first to use the camera. She completed an initial research project that should be presented this spring at Resident's Day. Photos taken will benefit children and adolescents with cleft lip and palate and craniofacial anomalies. The images can be shared globally and will assist the cleft lip and palate and craniofacial team, in particular plastic surgeons and orthodontists."

- Dr. Doug Johnston, Head, Department of Pediatric Dentistry

"Children's Circle of Care membership and the Hospital Family Matching Gift program have been extremely positive for the Department of Pediatric Anesthesia. For the first time ever, we have been able to set up a designated fund that will support endeavors specific to pediatric anesthesia. This fund has been initiated to support our 3 mandates: clinical excellence, education and research. Our own physicians have become very excited to be able to make significant donations to this fund knowing their dollars would be matched by the Foundation and they will be recognized as Children's Circle of Care donors."

Clinical excellence – We have used the designated fund to purchase new airway equipment specifically designed for small babies with abnormal anatomy. This specialized equipment will help us place breathing tubes for babies who require ventilation support, both in the operating room and in the intensive care units. We are also planning to purchase an ultrasound machine which will assist us in placing local anesthetics near nerves much more accurately. This is done for pain management post operatively.

Education – We have initiated an annual award to recognize the resident who

displayed the characteristics most becoming to pediatric anesthesiologist. This award is to stimulate residents to consider pediatric anesthesia as a career. We will also be using this fund to support physicians who want to take extra training. We are also supporting fellows and staff to go on overseas mission trips. These trips are to provide specialized surgical treatment to children in developing countries who do not have access to free health care. In addition to the surgical care, we provide equipment and teaching for the local health care team. This is to ensure sustainability after we leave. Research – We will be funding a research retreat to report and inspire more specialized pediatric research in Pediatric Anesthesia.”

- Dr. Eleanor Reimer, Head, Department of Pediatric Anesthesia

“Children’s Circle of Care level of giving and the Hospital Family Matching Gift program have been the key funding resource for our core clinical research program, which is designed to evaluate our surgical outcomes and to improve the care we can provide to kids. We are able to employ a research coordinator who facilitates all of our research studies. The number of clinical research projects and publications has grown tremendously. Our program has involved many residents and medical students which helps teach them research methodology techniques and the importance of evaluating surgical practice. Without the benefits of the Children’s Circle of Care and the matching gift program we would have a much smaller research footprint at BCCH.

We were also able to purchase some specialized diagnostic equipment, including a KT1000 which allows us to accurately measure knee injuries in children. The enthusiastic participation of our Pediatric Orthopedic Surgeons at the Children’s Circle of Care giving level has brought us together as a team and has built great cohesion and synergy within our clinical and academic work.”

- Dr. Christopher Reilly, Head, Department of Pediatric Orthopedic Surgery

The Hospital Family Matching Gift program and Children’s Circle of Care donors have had a tremendous impact on pediatric surgical innovation and discovery, outcomes measurement and most importantly on the day-to-day care of our province’s future – its children. Donor support at the Children’s Circle of Care level has enabled our operating rooms to purchase state-of-the-art minimal access instrumentation for our chest wall deformities program which provides complete deformity correction without visible incisions. Our systematic study of surgical outcomes in newborns across Canada with birth defects (CAPSNet) creates new knowledge that will enable the identification of best practices paradigms. We are extremely grateful to our visionary donors for their tremendous support of our clinical and research programs which are enabled through OPSEI.”

- Dr. Erik Skarsgard, Head, Division of Pediatric Surgery



Dr. Geoffrey Blair present a cheque at the Miracle Weekend

4

DIVISIONAL ACADEMIC HIGHLIGHTS



Division of Pediatric Plastic Surgery:
Dr. Nick Wilson-Jones, Fellow, Dr. Jennifer Prince, Resident,
Dr. Douglas Courtemanche, Dr. Cynthia Verchere

OPSEI acknowledges and values the academic work from our divisions and departments. We are pleased to highlight surgical faculty's refereed publications within this report.

CARDIOVASCULAR & THORACIC SURGERY

Refereed Publications

1. Choit RL, Tredwell SJ, Leblanc JG, Reilly CW, Mulpuri K. Abdominal aortic injuries associated with chance fractures in pediatric patients. *J Pediatr Surg*. 2006 Jun;41(6):1184-90.
2. Pollock Bar, Ziv SM, McCrindle BW, West LJ, Edgell D, Coles JG, VanArsdell GS, Bohn D, Perez R, Campbell A, Dipchand AI. Outcomes of Pediatric Patients Bridged to Heart Transplantation from Extracorporeal Membrane Oxygenation (ECMO) Support. *ASAIO J*; 2007 Jan-Feb;53(1): 97-102
3. Duncan WJ, Campbell AI, Human DG. Thrombosis of Left Ventricle Following a Norwood Procedure. *Cardiology in the Young*; 2007 Apr; 17(2):23
4. LeBlanc J, Heran M. Decision-making in unoperated adults with congenital heart disease: a difficult task. *Interact Cardiovasc Thorac Surg*. 2007 Dec;6(6):820-2
5. Hung T, Campbell A. Surgical Repair of Left Internal Jugular Phlebectasia. *Journal of Vascular Surgery*; December 2007 (accepted)
6. Mann GS, Robinson AJ, LeBlanc JG, Heran MK. Abdominal aortic pseudomass in a child: a diagnostic red herring. *J Ultrasound Med*. 2008 Feb;27(2):307-10.
7. Finkbeiner MR, LeBlanc JG, Hosking MCK, Lee RJ, Campbell AIM. Safe retrieval of embolized patent ductus arteriosus coil via left thoracotomy. *Annals of Thoracic Surgery*; February 2008 (accepted)
8. Lam MCW, Klassen AF, Montgomery CJ, LeBlanc JG, Skarsgard ED. Quality of Life Outcomes Following surgical Correction of Pectus Excavation: a comparison of the Ravitch and Nuss Procedure (in press)
9. Kalyanaraman M, DeCampi WM, Campbell A, Bhalala U, Harmon TG, Sandiford P, McMahon CK, Shore S, Yeh TS. Lactime as a predictor of mortality in children after cardiopulmonary bypass surgery. *Pediatric Critical Care Medicine*. January 2008 (submitted) ■

PEDIATRIC DENTISTRY

Refereed Publications

Johnston DH

1. Johnston DH. New Ectodermal Dysplasia Program at Children's Hospital. *BC Dental Association Connections*. July 2006.
2. Casas MJ, Kenny DJ, Judd PL, Johnston DH. Do we still need formocresol in pediatric dentistry? *J Can Dent Assoc*. 2006;71(10):749-51.

3. Johnston DH. A comparison of dental experience in Ontario and British Columbia. *BC Dental Association Connections*. March 2007.

Cheung WS

1. Tiberia MJ, Milnes AR, Feigal RJ, Morley KR, Richardson DS, Croft WG, Cheung WS. Risk factors for early childhood caries in Canadian preschool children seeking care. *Pediatr Dent*. 2007 May-Jun;29(3):201-8.

Harrison RL

1. Harrison RL, MacNab AJ, Duffy DJ, Benton DH. Brighter Smiles: Service learning, inter-professional collaboration and health promotion in a First Nations community. *Can J Public Health*. 2006 May-Jun;97(3):237-40.
2. Weinstein P, Harrison R, Benton T. Motivating parents to prevent caries in their young children: one-year findings. *J Am Dent Assoc*. 2006;137: 789-93.
3. Harrison RL, Amin MA. "Talking to parents beings with listening". *CONNECTIONS*. Newsletter of the British Columbia Dental Association, October 2006.
4. Amin MS, Harrison RL. A conceptual model of parental behavior change following a child's dental general anesthesia procedure. *Pediatr Dent*. 2007 Jul-Aug;29(4):278-86.
5. Harrison R, Benton T, Everson-Stewart S, Weinstein P. Effect of motivational interviewing on rates of early childhood caries: a randomized trial. *Pediatr Dent*. 2007 Jan-Feb;29(1):16-22. ■

PEDIATRIC GENERAL SURGERY

Refereed Publications

1. Mulpuri K, Reilly CW, Perdios A, Tredwell SJ, Blair GK. The spectrum of abdominal injuries associated with chance fractures in pediatric patients. *Eur J Pediatr Surg*. 2007 Oct;17(5):322-7.
2. Butterworth SA, Blair GK, LeBlanc JG, Skarsgard ED. An open and shut case for early VATS treatment of primary spontaneous pneumothorax in children. *Can J Surg*. 2007 Jun;50(3):171-4.
3. Mickelson JJ, MacNeily AE, Blair GK. The posterior urethra in anorectal malformations. *J Pediatr Surg*. 2007 Mar;42(3):585-7.
4. Jawaid W, Abdalwahab A, Blair G, Skarsgard E, Webber E. Outcomes of pyloroplasty and pyloric dilatation in children diagnosed with nonobstructive delayed gastric emptying. *J Pediatr Surg*. 2006 Dec;41(12):2059-61.
5. Murphy JJ, Swanson T, Ansermino M, Milner R. The Frequency of apneas in

- premature infants after inguinal hernia repair: Do they need overnight monitoring in the ICU? *J Pediatr Surg* (in press)
6. Dionne JM, Wu JK, Heran M, Murphy JJ, Jevon G, White CT. Malignant hypertension, polycythemia, and paragangliomas. *J Pediatr*. 2006 Apr;148(4):540-5.
 7. Butterworth SA, Murphy JJ. Necrotizing soft tissue infections—are they different in healthy vs immunocompromised children? *J Pediatr Surg*. 2006 May;41(5):935-9.
 8. Lam CW, Klassen AF, Montgomery CJ, LeBlanc JG, Skarsgard ED. Quality of Life Outcomes following surgical correction of pectus excavatum: A comparison of the Ravitch and Nuss procedures. *J Pediatr Surg* (in press)
 9. Baird R, MacNab YC, Skarsgard ED and the Canadian Pediatric Surgery Network. Outcome Predictors in Congenital Diaphragmatic Hernia. *J Pediatr Surg* (in press)
 10. Heran MKS, Baird R, Blair GK, Skarsgard ED. Topical Mitomycin-C for recalcitrant esophageal strictures: A novel endoscopic/fluoroscopic technique for safe endoluminal delivery. *J Pediatr Surg* (in press)
 11. Klassen AF, Stotland MA, Skarsgard ED, Pusic AL. Clinical research in pediatric plastic surgery and systematic review of quality-of-life questionnaires. *Clin Plast Surg*. 2008 Apr;35(2):251-67.
 12. Skarsgard ED, Claydon J, Bouchard S, Kim PC, Lee SK, Laberge JM, McMillan D, von Dadelszen P, Yanchar N; Canadian Pediatric Surgical Network. Canadian Pediatric Surgical Network: a population-based pediatric surgery network and database for analyzing surgical birth defects. The first 100 cases of gastroschisis. *J Pediatr Surg*. 2008 Jan;43(1):30-4.
 13. Hasosah M, Lemberg DA, Skarsgard E, Schreiber R. Congenital short bowel syndrome: a case report and review of the literature. *Can J Gastroenterol*. 2008 Jan;22(1):71-4.
 14. Amari E, Murray DM, Vandebek C, Montgomery CJ, Skarsgard E, Warnock F, Ansermino JM. Measuring the quality of pediatric day surgery care. *J Healthc Qual*. 2007 Nov-Dec;29(6):36-44, 49.
 15. Butterworth SA, Blair GK, LeBlanc JG, Skarsgard ED. An open and shut case for early VATS treatment of primary spontaneous pneumothorax in children. *Can J Surg*. 2007 Jun;50(3):171-4.
 16. Skarsgard ED. Networks in Canadian Paediatric Surgery Research: Time to Get Connected! *Paediatr Child Health* 11: 15-8, 2006.
Reebye SC, Blair GK, Rogers PC, Jamieson D, Skarsgard ED. An Audit of Cancer Diagnosis in a Canadian Children's Hospital: Quality, Timing and Efficiency. *Paediatr Child Health* 11: 143-47, 2006.
 17. Huang L, Reebye SC, Yeung AY, Jia WW, Skarsgard ED. Lentiviral-mediated fetal gene therapy for monogenic disorders: development of an in vitro rabbit model. *Fetal Diagn Ther*. 2006;21(3):241-5.
 18. Lam JC, Claydon J, Mitton CR, Skarsgard ED. A risk-adjusted study of outcome and resource utilization for congenital diaphragmatic hernia. *J Pediatr Surg*. 2006 May;41(5):883-7.
 19. Nahum E, Skippen PW, Gagnon RE, Macnab AJ, Skarsgard ED. Correlation of transcutaneous hepatic near-infrared spectroscopy readings with liver surface readings and perfusion parameters in a piglet endotoxemic shock model. *Liver Int*. 2006 Dec;26(10):1277-82.
 20. Nahum E, Skippen PW, Gagnon RE, Macnab AJ, Skarsgard ED. Correlation of near-infrared spectroscopy with perfusion parameters at the hepatic and systemic levels in an endotoxemic shock model. *Med Sci Monit*. 2006 Oct;12(10):BR313-7.
 21. Mills J, Konkin DE, Penner JG, Langer M, Webber EM. The quality of life in children following surgical repair for Hirschsprung's disease: From toddlerhood to young adulthood. *J Pediatr Surg* (in press)
 22. Boutros J, Sekhon MS, Webber EM, Sidhu RS. Vascular surgery training, exposure, and knowledge during general surgery residency: implications for the future. *Am J Surg*. 2007 May;193(5):561-6.
 23. Doyle JD, Webber EM, Sidhu RS. A universal global rating scale for the evaluation of technical skills in the operating room. *Am J Surg*. 2007 May;193(5):551-5.

Book Chapters

1. Blair GK, Konkin DE. Esophageal Atresia With or Without Tracheoesophageal Fistula. *Emedicine*, electronic journal. May 15, 2006
2. Skarsgard ED. Small Left Colon Syndrome. *Emedicine*, electronic journal. May 26, 2006 ■

PEDIATRIC NEUROSURGERY

Refereed Publications

1. Agrawal D, Cochrane DD. Traumatic retroclival epidural hematoma - a pediatric entity? *Childs Nerv Syst*. 2006 Jul;22(7):670-3.
2. Stimulated Fellow report, reviewed and redrafted manuscript, provided images approved final submission.
3. Ang BT, Steinbok P, Cochrane DD. Etiological differences between the isolated lateral ventricle and the isolated fourth ventricle. *Childs Nerv Syst*. 2006 Sep;22(9):1080-5. Comment in: *Childs Nerv Syst*. 2007 May;23(5):479.
4. Agrawal D, Steinbok P, Cochrane DD. Significance of beaten copper appearance on skull radiographs in children with isolated sagittal synostosis. *Childs Nerv Syst*. 2007 Dec;23(12):1467-70.
5. Steinbok P, Singhal A, Poskitt K, Cochrane DD. Early hypodensity on computed tomographic scan of the brain in an accidental pediatric head injury. *Neurosurgery*. 2007 Apr;60(4):689-94.
6. Kestle JR, Cochrane DD, Drake JM. Shunt insertion in the summer: is it safe? *J Neurosurg*. 2006 Sep;105(3 Suppl):165-8.

7. Agrawal D, Steinbok P, Cochrane DD. Pseudoclosure of anterior fontanelle by wormian bone in isolated sagittal craniosynostosis. *Pediatr Neurosurg.* 2006;42(3):135-7.
8. Steinbok P, Singhal A, Mills J, Cochrane DD, Price AV. Cerebrospinal fluid (CSF) leak and pseudomeningocele formation after posterior fossa tumor resection in children: a retrospective analysis. *Childs Nerv Syst.* 2007 Feb;23(2):171-4.
9. Agrawal D, Steinbok P, Cochrane DD. Reformation of the sagittal suture following surgery for isolated sagittal craniosynostosis. *J Neurosurg.* 2006 Aug;105(2 Suppl):115-7.
10. Kestle JR, Garton HJ, Whitehead WE, Drake JM, Kulkarni AV, Cochrane DD, Muszynski C, Walker ML. Management of shunt infections: a multicenter pilot study. *J Neurosurg.* 2006 Sep;105(3 Suppl):177-81.
11. Gan YC, Cochrane DD. Pre-syrinx state. Letter to the Editor *J Neurosurg.* 2006 Aug;105(2):156-7.
12. Agrawal D, Steinbok P, Cochrane DD. Long-term anthropometric outcomes following surgery for isolated sagittal craniosynostosis. *J Neurosurg.* 2006 Nov;105(5 Suppl):357-60.
13. Cochrane DD, King C, Beauchamp R, MacNeily A. Spasticity in Spina Bifida, In: *The Spina Bifida: Management And Outcome.* Ozek M, Cinalli G, Maixner WJ. Milan, Verlag Springer, 2007.
14. Gan PY, Singhal A. Complete upward migration of the peritoneal end of a ventriculoperitoneal shunt into the subgaleal space. *Pediatr Neurosurg.* 2006;42(6):404-5.
15. Agrawal D, Steinbok P, Cochrane DD. Diagnosis of isolated sagittal synostosis: are radiographic studies necessary? *Childs Nerv Syst.* 2006 Apr;22(4):375-8.
16. Agrawal D, Steinbok P, Cochrane DD. Pseudoclosure of anterior fontanelle by wormian bone in isolated sagittal craniosynostosis. *Pediatr Neurosurg.* 2006;42(3):135-7.
17. Steinbok P, Poskitt K, Henderson G. Spontaneous regression of cerebellar astrocytoma after subtotal resection. *Childs Nerv Syst.* 2006 Jun;22(6):572-6.
18. Steinbok P, Garton HJ, Gupta N. Occult tethered cord syndrome: a survey of practice patterns. *J Neurosurg.* 2006 May;104(5 Suppl):309-13. Comment in: *J Neurosurg.* 2007 May;106(5 Suppl):411-3.
19. Biyani N, Grisar-Soen G, Steinbok P, Sgouros S, Constantini S. Prophylactic antibiotics in pediatric shunt surgery. *Childs Nerv Syst.* 2006 Nov;22(11):1465-71.
20. Gan YC, Steinbok P. Migration of the peritoneal tip of a ventriculoperitoneal catheter causing shunt malfunction. Case illustration. *J Neurosurg.* 2006 Aug;105(2 Suppl):153.
21. Agrawal D, Steinbok P, Cochrane DD. Reformation of the sagittal suture following surgery for isolated sagittal craniosynostosis. *J Neurosurg.* 2006 Aug;105(2 Suppl):115-7.
22. Ang BT, Steinbok P, Cochrane DD. Etiological differences between the isolated lateral ventricle and the isolated fourth ventricle. *Childs Nerv Syst.* 2006 Sep;22(9):1080-5. Comment in: *Childs Nerv Syst.* 2007 May;23(5):479.
23. Mortenson PA, Steinbok P. Quantifying positional plagiocephaly: reliability and validity of anthropometric measurements. *J Craniofac Surg.* 2006 May;17(3):413-9.
24. Connolly MB, Henderson G, Steinbok P. Tuberous sclerosis complex: a review of the management of epilepsy with emphasis on surgical aspects. *Childs Nerv Syst.* 2006 Aug;22(8):896-908.
25. Steinbok P. Selection of treatment modalities in children with spastic cerebral palsy. *Neurosurg Focus.* 2006 Aug 15;21(2):e4.
26. Agrawal D, Steinbok P. Simple technique of head fixation for image-guided neurosurgery in infants. *Childs Nerv Syst.* 2006 Nov;22(11):1473-4. Comment in: *Childs Nerv Syst.* 2007 Jun;23(6):611; *Childs Nerv Syst.* 2007 Jun;23(6):615.
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28. Singhal A, Steinbok P. Operative management of growing skull fractures: a technical note. *Childs Nerv Syst.* 2007 Dec 21; [Epub ahead of print].
29. Kaczala GW, Poskitt KJ, Steinbok P, Henderson G, Eydoux P, Solimano AJ. Neonatal macrocephaly: cerebral primitive neuroectodermal tumor or neuroblastoma as an infrequent cause—a case report and review of the literature. *Am J Perinatol.* 2007 Oct;24(9):507-9.
30. Basheer SN, Connolly MB, Lautzenhiser A, Sherman EM, Henderson G, Steinbok P. Hemispheric surgery in children with refractory epilepsy: seizure outcome, complications, and adaptive function. *Epilepsia.* 2007 Jan;48(1):133-40.
31. Griffiths SY, Sherman EM, Slick DJ, Eyl K, Connolly MB, Steinbok P. Postsurgical health-related quality of life (HRQOL) in children following hemispherectomy for intractable epilepsy. *Epilepsia.* 2007 Mar;48(3):564-70.
32. MacNeily AL, Leonard MP, Metcalfe PD, Casale A, Guerra L, Steinbok P, Garton H. Development of an objective score to quantify the pediatric cystometrogram. *J Urol.* 2007 Oct;178(4 Pt 2):1752-6.
33. Steinbok P, Singhal A, Poskitt K, Cochrane DD. Early hypodensity on computed tomographic scan of the brain in an accidental pediatric head injury. *Neurosurgery.* 2007 Apr;60(4):689-94.
34. Hukin J, Steinbok P, Lafay-Cousin L, Henderson G, Strother D, Mercier C, Samson Y, Howes W, Bouffet E. Intracystic bleomycin therapy for craniopharyngioma in children: the Canadian experience. *Cancer.* 2007 May 15;109(10):2124-31.
35. Gan YC, Connolly MB, Steinbok P. Epilepsy associated with a cerebellar arachnoid cyst: seizure control following fenestration of the cyst. *Childs Nerv Syst.* 2008 Jan;24(1):125-34.
36. Gan P, Steinbok P. Aplasia cutis congenita of the scalp: is there a better treatment strategy? *Childs Nerv Syst.* 2006 Oct;22(10):1216-1217.
37. Steinbok P. "Conservative" surgical approach and early postoperative radiotherapy in a

- patient with a large cystic craniopharyngioma (Commentary). *Child Nerv Syst.* 2006; 22: 159.
38. Gul S, Steinbok P: Supratentorial primitive neuroectodermal tumors. In Ed.Tonn JC, Westphal M, Rutka JT, Grossman SA. *Neuro-oncology of CNS Tumors*. Springer, Berlin Heidelberg New York., 2006, pp 471-478.
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