Part 1. Development of the Department of Surgery at The Hospital for Sick Children

Maggie, the first child admitted to The Hospital for Sick Children on April 3, 1875 would be considered, by today's standards, a surgical patient. She was barely 3-years old and a few days earlier had stumbled over a bucket of boiling water. She had been scalded terribly. The best medical attention available at that time consisted in large measure of good food, large doses of religious instruction and much love. If Maggie presented today, she would be reviewed by a full-time pediatric plastic surgeon, dedicated to burn care.

The Hospital's first annual report (July 1, 1876) indicated that 111 children had been treated, of which 44 were in-patients. Twenty-one of those children were "surgical". Many of the children who were admitted in the subsequent 25 years, required treatment for the ravages of infectious disease, particularly tuberculosis. They could present with spinal deformity, or "hip or knee-joint disease". Operations were undertaken, but it remains unclear in those early days just who was the operating surgeon. Subsequently, the identity of surgery began to take shape with the appointment of Dr. Clarence L. Starr as a Junior Surgeon in 1898. Tuberculosis of the bone was his specialty and as his experience expanded he was to become one of the world's leading orthopedic surgeons and teachers.

In 1913 a new development took place in the medical management of the Hospital. This was the appointment of a Physician-in-Chief and a Surgeon-in-Chief. Dr. Clarence Starr was the first Surgeon-in-Chief, and he with his second in command Dr. W. E. Gallie, completely reorganized the surgical staff of the hospital. They chose promising young men for appointments to the staff and encouraged them to do new and daring things. They developed an esprit de corps and a strong sense of team effort that was to become, and remain, a dominant characteristic of the hospital. Starr remained in his new position until 1921 when Dr. Gallie succeeded him.

In the fall of 1918, Emily was admitted to hospital with previously diagnosed diabetes mellitus. What neither she nor her mother knew was that Dr. Frederick G. Banting was working on a solution to Emily's problem and that he would become closely associated with her. A graduate of the University of Toronto, Banting had completed his service in the medical corps overseas, when in 1919 he joined the Hospital as a surgical registrar. He came in contact with Drs. Starr and Gallie as well as Drs. Donald E. Robertson, Bruce Robertson and A.B. LeMesurier. Banting learned surgical techniques from them that were to serve
him well in his work with animals, while he and Dr. Charles Best were searching for a cure for diabetes. In the fall of 1921, on Banting’s 30th birthday, he and Best announced that they had discovered insulin. One of the first children to come to the newly established diabetic clinic at the hospital was Emily. Admitted in a precarious condition with acidosis, Emily was given insulin, and immediately regained consciousness and demanded food. She subsequently was followed in the clinic, with improved health and grew to a normal height.

By the late 1920s, Dr. Gallie who had followed Starr as Surgeon-in-Chief, completed that position in 1929 when he then succeeded Starr as Professor of Surgery at the University of Toronto. In turn, Dr. D. E. "Eddie" Robertson as Surgeon-in-Chief followed Gallie, a position that he held until 1944. Along with Professor Alan Brown of the Department of Pediatrics, Robertson led the fight to keep The Hospital for Sick Children as the best and most progressive on the continent. But, during his 15 years tenure and for a few years after, there were competing interests, such as the global recovery from the Great Depression. An adverse consequence of this at HSC affected the planning and development of the new hospital. In addition, many surgeons were absent from the hospital in order to provide consultative and surgical treatments for troops involved in the Second World War. Regrettably, Robertson died in February 1944 just a few days before a key meeting of the HSC trustees, when they agreed to organize a capital campaign for purposes of construction of the new hospital, on University Avenue.

Dr. A. B. LeMesurier succeeded Robertson as Surgeon-in-Chief. He was another one of the compleat HSC surgeons who had made a reputation as a surgeon of “great skill and delicacy” especially in cleft lip operations, as well as for his work in the treatment of spinal scoliosis. The move of patients from the old Hospital on College Street to 21/2 blocks south to the new building, took place in February 1951. Dr. Robert M. (Tim) Wansbrough performed the first emergency operation in the new hospital, on an infant with pyloric stenosis, at noon on the day of the move. He had taken over from LeMesurier in 1950 as Surgeon-in-Chief.

In the spring of 1946, Archie, a happy, healthy, blond-headed 10-year old was delivering the morning newspapers in his small town near Toronto. While taking a shortcut, he was attacked by a dog who left Archie with multiple injuries to his scalp and face. The surgeon who performed staged reconstructive procedures on Archie over the next few years, was Dr. A.W. Farmer who earlier, had left his post as Clinical Assistant in Surgery at the hospital to join the Air Force. When he returned to the hospital after the war, Farmer was certified as a surgeon in 3 disciplines - plastic, orthopaedic and general surgery. In 1956, Farmer succeeded Wansbrough and brought not only his surgical skills to the new appointment but also organizational experience that he had acquired as a Medical Director at the Christie Street
Veterans’ Hospital. Farmer applied the concept of military stratification to create divisions within the Department of Surgery. He selected the surgeons who were to lead those divisions - Dr. William Keith (neurosurgery), Dr. William K. Lindsay (plastic surgery), Dr. William T. Mustard (cardiovascular surgery), Dr. Robert B. Salter (orthopaedic surgery) and Dr. Stuart Thomson (general surgery). (The Division of Urology was formed later, following upon the arrival of Dr. Robert D. Jeffs).

The structure of 6 divisions within the Department of Surgery that Farmer created remains today. Such has fostered research and creative enterprise in the various surgical disciplines. Ground-breaking advances appeared for the operative correction of infants and children (known originally as the "blue babies") with congenital heart disease, and for congenital hip dislocation, and progressive spinal scoliosis, craniofacial disorders, and infants born with major brain and blood vessel malformations. The general surgeons operated upon their first set of conjoined twins in September 1966. The first kidney transplant at the hospital was carried out in January 1969. Many more have been accomplished successfully since, in addition to transplantation of other organs, such as liver, heart and lungs.

When Farmer completed his 10 years term in 1966, Dr Robert B. Salter who had established an international reputation as a pediatric orthopaedic surgeon and as a surgeon-scientist succeeded him. By this time, the pediatric identity was weaving its way through the various subspecialties of surgery. Formerly, a "pediatric surgeon" was a general surgeon who, as we have seen, was very experienced and comfortable operating upon various organ systems in the child's body. Now, the individual surgical disciplines were becoming subspecialized, and full-time surgeons with extra training in their respective pediatric surgical specialty were joining the staffs of children's hospitals.

In February 1979, seven-month-old Herbie from Brooklyn, New York, arrived in Toronto. He was born with a rare birth defect that made it difficult for him to breathe while being fed. This consequence of his tracheomalacia resulted in his referral to Dr. Robert M Filler, who had been recruited from Boston in 1976, to become the hospital's eighth Surgeon-in-Chief. A pediatric general surgeon, Filler also led surgical teams that operated on additional sets of conjoined twins. After reading about Herbie's successful treatment in local newspapers, a number of people generously donated money to cover his hospital costs. Subsequently, a major hospital Foundation supporter created the Herbie Fund that sponsors children, up to 14 years of age from around the world, to come to the hospital for corrective surgery.
Dr. John H Wedge, became Surroge-in-Chief in 1995. By that time he was also the Chair of the Department of Surgery at the University of Toronto, like his predecessors Drs C.L. Starr and W.E. Gallie. When the new millenium appeared, the character of surgery at the Hospital for Sick Children had changed considerably. Contemporary practice involves complex, multi-discipline tertiary and quaternary patient care. Our current surgeon-scientists will bring the discoveries from the "bench" to the child's "bedside" thus sustaining the surgical advances that have been associated with the Hospital for Sick Children, since its inception.

Robin P. Humphreys, MD

James M. Drake Appointed Neurosurgery Division Head

During this year of the Division of Neurosurgery's 70th anniversary, Dr. Jim Drake will become the fifth neurosurgeon in its history, to assume responsibilities as Division Chief.

Dr. Drake graduated from Princeton University with a B.S. in aerospace and mechanical engineering, before studying medicine at the Royal College of Surgeons in Ireland. After post-graduate neurosurgical training at the University of Toronto and then the University of Paris, Dr. Drake returned to Toronto in 1988 to open the Hydrocephalus Research Laboratory in the hospital's Research Institute. His main clinical interests include the treatment of hydrocephalus, the use of neuroendoscopy and, functional neurosurgery. He collaborates on patient management for disorders of the cervical spine, peripheral nerve and brachial plexus. He is a Professor, in the Department of Surgery, University of Toronto, and a Senior Associate Scientist in Brain and Behaviour Research, at the Research Institute. His work there focuses on the development of non-invasive techniques to diagnose and treat CSF shunt obstruction, as well as mathematical models to predict the response of the brain to hydrocephalus, and its treatment.

With his appointment, Jim will replace Dr. Robin Humphreys who is stepping down this spring, after a neurosurgical career of 32 years at HSC.

Residents and Fellows - January 1st

Dr William Whitehead has been particularly devoted to his various responsibilities that have been rather extraordinary during the past 6 months. Upon the completion of his year at HSC, Bill will take up a university position at a major children's hospital in the United States.
Dr Michael Carter's devotion is unfailing and infectious. His fellowship experience at HSC has expanded upon his earlier training in Southampton, England. He has proven to be a most compleat physician, and will take his skills back to England, this summer.

Dr Aurelia Peraud from the time of her first contact with HSC faculty has been an enthusiast for paediatric neurosurgery. Upon completion of her HSC clinical and research experience, Aurelia will return to Munich, Germany to write her thesis that is the final step toward an academic appointment.

Dr Hisashi Hatano completed his neurosurgical training at Nagoya University in Japan in 1999. Since October 2000, he has been aligned with the Division, first as an observer, and for the past 18 months as a clinical fellow. Later this winter, Dr Hatano will return to a faculty position in the Department of Neurosurgery, Nagoya University School of Medicine.

Dr Raafat Yahya credits one of his Lebanese teachers who instilled in him the disciplines of operative neurosurgery, for his love of our specialty. Dr Yahya is completing his North American fellowship experience, first in Cleveland and now at HSC where he is also working on a research project, Differential gene expression in ependymomas.

Dr Stephen McCluskey has joined the UofT neurosurgical program following upon earlier experience gained at the University of Ottawa. A graduate dentist from the University of Western Ontario, Steve practiced that profession before entering medical school at the University of Ottawa, from which he graduated in 1991.

Biomedical Communications and the Master's Student

For decades, neurosurgeons have stood in awe of the various accomplishments of Dr. Harvey Cushing. One of these was his penchant for sketching the relevant features of a surgical procedure, that he did upon its completion. Other neurosurgeons over time have copied Dr. Cushing's style. But none of us could approach the detail that is demonstrated in the anatomical atlases of J.C.B. Grant and E. Pernkopf. The application of art to medicine is a well-honed craft.

The first university academic program to offer a formal education in medical illustration was established in 1911 at the Johns Hopkins University by Max Brödel. Over a period of 30 years Brödel educated more than 160 students, one of whom was Maria Wishart (1893-1983) of Toronto. She founded the
Department of Medical Art Service in 1925 in the original Anatomy Building at the University of Toronto. Then Dean of the Faculty of Medicine, Alexander Primrose approved her appointment as Toronto's first professionally trained medical illustrator. For the next ten years she did all the surgical and anatomical illustration work in the service department.

In 1945, Wishart formed a three-year diploma course in medical illustration, at which time the name of the department was changed to Art as Applied to Medicine (AAM). The diploma course was in part an academic program and in part an apprenticeship. Students attended some classes with medical students but, for a good part of their time, they worked under Wishart’s supervision on illustrations of gross anatomy, pathology and surgery. The work of Max Brödel was used as a model, and the techniques were those he taught: carbon dust, pen and ink on scratchboard, and transparent watercolour. In addition to directing the academic program, Wishart continued to work as an illustrator, contributing many superb drawings to journal articles and books written by members of the Faculty of Medicine, including Drs. W.E. Gallie, A.B. Le Mesurier and K. G. MacKenzie (Canada's first neurosurgeon). She also made several hundred wax models of pathological conditions and surgical techniques. Wishart was active in organizing the members of her profession, beginning in 1945, when she became one of 54 charter members of the Association of Medical Illustrators.

Grahame Joy succeeded Wishart as chair of the department in 1962. Joy had been an Assistant Professor in the Department of Surgery at the University of Manitoba and was well known in Toronto for her outstanding illustrations in Grant's Atlas of Anatomy and his textbook, the Method of Anatomy. Largely as the result of Joy's efforts, and of the strong support of Dean John Hamilton the diploma program was elevated to undergraduate status. In February 1967, the Bachelor of Science program in Art as Applied to Medicine (B.Sc.AAM) became a reality.

In 1986, Linda Wilson-Pauwels was installed as acting Chair and Director of the department. Her 1993 doctoral dissertation, "The development of academic programs in medical illustration in North America from 1911 to 1991", clearly identified the role of art, as applied to medicine. By this time, the AAM program had become the Division of Biomedical Communications within the Department of Surgery. Dr. Wilson-Pauwels was appointed Chair of the BMC Division and Director of the newly named Bachelor of Science in Biomedical Communications (B.Sc.BMC) program. In 1993, a BMC graduate advisory committee was established to prepare a proposal for a Master of Science in Biomedical Communications for the School of Graduate Studies. The program became a reality, and by 1995 the M.Sc.BMC degree was being offered through the Institute of Medical Science.

In September 2000, Biomedical Communications expanded the M.Sc.BMC curriculum to include a combined program with Sheridan College in 3-D computer animation, which would allow BMC students
to develop advanced skills in 3-D animation techniques. Over the past year a student from the M.Sc.BMC program, Jennifer Polk, utilized these techniques to create a Web site called HeadStart that is intended to assist parents with the recognition of certain skull abnormalities, in infants. She worked with faculty, a parent advisor and Dr. Robin Humphreys. The purpose of this project was twofold. First, from a patient education standpoint, Jennifer consulted parents whose children have defined craniosynostosis, to determine the parents' information needs. These parents were contacted and asked to participate in two online surveys, the first one to determine just what are their needs. The second component evaluated the program upon its completion. Secondly, Jennifer explored ways from a technological and artistic standpoint to convey 3-D concepts in an interactive web format. She was able to develop a novel method of using 3-D modelling to create interactive vector animations for the web.

The concepts of infant cranial abnormalities present an opportunity for one to research methods of conveying 3-dimensional structures in a 2-dimensional format for the web. Parents must be able to visualize the infant's skull from varying perspectives in order for them to effectively recognize cranial anatomy and possible abnormalities in their child. It was found that users were able to interact with the artwork in a way that surpasses the interactive ability of traditional 3-D formats for the web.

The Introduction and Sagittal Synostosis sections of the web site have been developed as a prototype. In the future, there is room for the development of other sections such as for coronal, metopic and lambdoid synostosis, and positional plagiocephaly. Ultimately, physicians and nurses will be able to utilize this valuable educational tool to inform families about their infant's situation.

Linda Wilson-Pauwels
Jennifer Polk,
Robin Humphreys.

For more information on the BMC program:
http://www.bmc.med.utoronto.ca/bmc
To view the HeadStart website link to:
http://brodel.med.utoronto.ca/~jenniferpolk/headstart/

The International Society of Pediatric Neurosurgery Celebrates Its 30th Birthday

HSC neurosurgical staff has been involved with the creation and sustenance of the International Society of Pediatric Neurosurgery (ISPN), which was formed in 1972. The Society celebrated its 30th anniversary
at its annual meeting in Kyoto, Japan in October 2002. HSC's Dr. E. Bruce Hendrick, Canada's first full-time paediatric neurosurgeon, was on the founding committee of the ISPN. In 1996, Dr. Hendrick was elevated to Honorary Member status in a special celebration at the Society's Silver Anniversary meeting held in Verona, Italy.

Drs. Harold Hoffman and Robin Humphreys have served as president of the Society (in 1983 and 1993 respectively), and at the Kyoto meeting, Dr. Marion L. Walker, HSC Fellow 1973, was identified as president-elect of the ISPN.

Robin Humphreys and Steve Santoreneous presented a paper on *Pediatric intracranial aneurysms: A review of 56 cases*.

**Scientific Forums, The Lecture Circuit and Traveling Professorships**

The HSC staff surgeons, who each hold ranking in the university's Department of Surgery, are constantly in demand to participate in a variety of university and professional academic forums. Such require many hours of preparation time as well as for travel.

**HSC Neurosurgeons Participate in the Annual Meeting of the Congress of Neurological Surgeons.**

At the Annual Meeting of the Congress, held in September in Philadelphia, the "Jims" participated as faculty in various teaching forums. Jim Drake taught in a session, *Shunt Update: Risk factors for complications*. Jim Rutka was course director for a session on *Review of Neuro-Oncology* and he moderated other sessions on *Posterior Fossa and Brainstem Tumors: Approaches and Complication Avoidance*, and *Complications of Invasive Subdural Grid Monitoring in Children*.

**AANS/CNS Section on Pediatric Neurological Surgery.**

The 31st annual "Section Meeting" was held in Scottsdale, AZ, in early December. Jim Rutka and Robin Humphreys represented HSC. Jim was the assigned discussant for 2 papers, *Adenoviral BDNF induces neostriatal neuronal recruitment from endogenous progenitor cells in transgenic R6/2 Huntingtin mice* and, *Immuno-gene therapy for malignant pediatric brain tumors*.

Robin attended a meeting of program directors that examined North American fellowship education in pediatric neurosurgery in the future.
And Elsewhere.

Peter Dirks was an invited lecturer at the annual meeting of the Society for Neuro-Oncology, held in San Diego, CA. He spoke on *Cancer stem cells in brain tumours*. Peter also presented 2 posters on, *A novel assay of stem cells in pediatric brain tumours,* and *Brain tumour derived PDGFR-alpha is transforming and may suggest a role for PDGFR-alpha in the nucleus.*

Jim Drake Participated in the Congres des Sciences Neurologiques du Quebec, in Montreal, QC. He spoke on *Pediatric hydrocephalus - Managing the risk.*

Robin Humphreys was Visiting Professor at Brown University, in Providence RI. He delivered 2 lectures on, *Idiosyncrasies of pediatric brain tumours* and, *The differences between pediatric and adult spontaneous cerebral hemorrhage.*

Jim Rutka was Visiting Professor at Albany Medical College, Albany, NY. His lecture was titled "*Molecular biology in the new millennium*." Subsequently, he was an invited speaker at the International Society of Pediatric Oncology, in Porto, Portugal. Advances in *neurosurgery,* was the topic of his address. Jim was special guest lecturer at the Research Update in Neuroscience for Neurosurgeons (RUNN) Course, in Woods Hole, MA. He spoke on the *Molecular biology of human brain tumours.* He was the 2002 J.Garber Galbraith Lecturer at the University of Alabama in Birmingham, where he spoke on, *Pediatric epilepsy surgery: The Hospital for Sick Children experience,* and, *The Harold J. Hoffman Slide Collection: Images from 35 years of pediatric neurosurgical experience.* As a guest speaker at the 2nd Annual Brain Tumor Awareness Day at the Brain Tumor Foundation in New York, NY in November, he spoke on Recent advances in brain tumor research.

Jim Rutka also served as a guest examiner at the oral examinations of the American Board of Neurological Surgeons, held in Houston, TX in November.

At the annual meeting of the Society for Neuroscience in Orlando, FL, Sheila Singh and Peter Dirks presented their work on *A novel assay of stem cells in pediatric brain tumours.*

An Annual Nursing Academic Event Continues

November 18, 2002 marked the second Neuroscience Nursing Research Day at HSC. It was even more successful than the initial program arranged a year earlier. There were 9 invited speakers, most of them
nurses, who delivered talks on: The experience for nurses working with families, Moyamoya cerebrovascular disease, Speech and language deficits in children with post fossa tumors, Pain in spina bifida, Improved quality of life in children following epilepsy surgery, Nursing an international patient: The story of Julian and, Post fossa brain tumours. In addition, informative and colourful posters were on view in the Main Rotunda.

Honours and Awards

E. Bruce Hendrick Endowment Established.

David and Anne Ward established the Dr. E. Bruce Hendrick Endowment Fund in Neurosurgery, in December 2001. The purpose of the fund is to support research in the diagnosis and treatment of children with spina bifida and hydrocephalus, in the Division of Neurosurgery at the Hospital for Sick Children. David Ward is a past director of the Hospital for Sick Children Foundation. Mr. Ward and his wife, Anne, have established this fund to commemorate Dr. E. Bruce Hendrick’s lifetime achievements and extraordinary dedication to advancing paediatric care. In addition to his years of providing care for newborns with the spina bifida, Dr. Hendrick was a key participant in the creation and functioning of the Spina Bifida Clinic at the Bloorview-MacMillan Centre.

The CHIN UP Clinical Scholar in Paediatric Nerve Injury.

In 1997, Henry and Ann Louise Vehovec became aware of the work at The Hospital for Sick Children in paediatric nerve injuries, when a family member was treated and operated on at HSC. The Vehovecs also learned that 1 in 500 children experience nerve injuries of varying degrees. These injuries can greatly affect quality of life through loss of motor or sensory function.

Recognizing the significant role that Sick Kids plays in the research and treatment of injured nerves, the Vehovecs were the force behind the establishment of the CHIN UP (Children’s Injured Nerves UP) Clinical Scholar in Paediatric Nerve Injury at the hospital. The $1.5 million endowment, to be funded by the CHIN UP Foundation with additional support from The Hospital for Sick Children Foundation, will help promote research into the prevention, treatment and cure of children's nerve injuries. The gift also represents the first Clinical Scholar to be named at Sick Kids; the Clinical Scholar program was established through the HSC Foundation to encourage donor support of research at the hospital. Our sincere thanks go to Henry Vehovec, Chair of the CHIN UP Foundation, for investing in outstanding world class research.
Announcements

Mr. Anthony D. Hockley Invited as the 2003 EB Hendrick Visiting Professor

Mister (as surgeons in Britain are identified as), Anthony D. Hockley will be the 2003 E. Bruce Hendrick Visiting Professor. Mr. Hockley, HSC Fellow in 1975, is Neurosurgeon-in-Chief at the Diana, Princess of Wales Children's Hospital, in Birmingham, England. For the last 25 years, Mr. Hockley has been an influential force in pediatric neurosurgery in the United Kingdom. A popular lecturer at post-graduate courses, established by the European Society of Pediatric Neurosurgery, Mr. Hockley is also a past-president of the International Society of Pediatric Neurosurgery. He will deliver lectures to the faculty, fellows and residents associated with the University of Toronto.

Facts

In addition to pro forma educational commitments, the 4 neurosurgical faculty since 1996, have been invited as 30 visiting professors, delivered an additional 41 invited lectures, been responsible for the instruction of 32 UofT residents and 22 international fellows and have served on 13 professional committee and journal editorial boards.

Publications - Released January-December, 2002


A health care teaching and research centre dedicated exclusively to children; affiliated with the University of Toronto.
The Trauma Season

"I've seen children injured in almost every conceivable way. Nothing surprises me anymore". These words, by the late Dr Bruce Hendrick, Canada's first full-time paediatric neurosurgeon, were prophetic each summer, when the trauma season began. This "season" generally correlates with the improving weather and the end of the school year. In 1964, Dr Hendrick published the facts on 4,465 children who had suffered from head injury. He spoke to professional groups and parents' organizations on the consequences of head trauma and the measures that could be taken to protect our children. He was even known to lecture automobile drivers at intersections, about the perils of allowing their children to leap about unrestrained in a "playpen on four wheels". His efforts preceded by years, the establishment of organized governmental and institutional trauma systems.

Each year, the Hospital for Sick Children (HSC) admits approximately 1000 children (under 16 years of age), who have been injured. As many as 140 of these patients are hurt seriously. The injuries sustained by children occur as the result of a variety of mechanisms. True to Dr. Hendrick's preaching, collision with a motor vehicle is the prime cause that inflicts major bodily injury (40%). Fortunately, with the advent of child restraint legislation in the early 1990's, motor vehicle related hospitalizations fell by 20% across Canada. This decline is attributed to several factors, including improved vehicle design and engineering, public awareness campaigns, and legislation. The increasing use of child restraint systems has reduced the risk of death or serious injury in children by more than 40%.

It turns out that road traffic mishaps are not the leading cause in children of injury-related hospitalizations, regardless of severity. Falls are, from whatever height. The media regularly profiles the escapades of a toddler, who sometimes is labeled as a "miracle baby" having sustained only minor injuries after escaping from a fifth floor apartment balcony. Children under 5 years of age are the most vulnerable to the consequences of falls. Infants hurt themselves by tumbling from furniture, down stairs or when they are accidentally dropped from a parent's arms. As the infant's head is disparate in size and control, it often takes the brunt of the impact. Children having left the infancy stage, fall from unrestrained high level windows or balconies, playground equipment or while climbing trees. The causes are numerous. "Nothing surprises us."
In 2001, 236 children came to HSC as a "Code 50". This code is announced over the hospital's public address system when an injured child is deemed in advance to require evaluation by all members of the trauma team, once the patient arrives in the Emergency Room (ER). Such initiates the infant's or child's "journey" through the trauma program that began at HSC, two decades ago. The vision belonged to general surgeon Dr. David Wesson, who along with Dr. Peter Armstrong, an orthopaedic surgeon, were key members of the original Trauma Care Committee. This committee was established in 1982 in response to a request from the Metro Toronto District Health Council, who sought a proposal for government to establish additional regional trauma centres. In 1987, then provincial Minister of Health, Eleanor Kaplan, announced significant expansion to the Trauma Care Network in Metropolitan Toronto. By 1989, HSC was recognized as the Pediatric Level 1 Trauma Centre for Central Eastern Ontario. Not only was there a quest to organize trauma care in the Central East Region, but also across the province. Eleven hospitals have been designated as "Lead Trauma Hospitals" (LTH). In addition to HSC, there are two other LTH's in Toronto, Sunnybrook & Womens' College Health Sciences Centre and St. Michael's Hospital, who treat trauma patients over the age of 16 years. HSC was the only pediatric LTH in Ontario until 2000, when the Children's Hospital of Eastern Ontario (Ottawa) gained this designation as well. Field triage guidelines are in place that ensure severely injured patients, children or adults, are taken directly to trauma centres, thereby bypassing local health care facilities.

As a Lead Trauma Hospital, there are responsibilities that include provision of coverage 24/7 by a Trauma Team Leader (TTL) and backup service by a number of primary and secondary response physicians. The team also has a medical director, data analyst, secretary, and a trauma patient care coordinator who takes primary responsibility for identifying trauma patients. The coordinator ensures that patients have access to the appropriate trauma services, within and beyond the hospital. Like other LTHs, HSC must provide data to a provincial registry. Since 1992, HSC has collected detailed information on each severely injured trauma patient, which data is collated by the Ontario Trauma Registry. This provides statistics for injury prevention programs, Ministry of Health funding and general planning for the trauma network in Ontario. (In addition to information required by the Ministry of Health, HSC maintains its own data registry on all patients admitted, regardless of injury severity.)

A number of subsequent developments solidified the identity of trauma programs generally, and that at HSC specifically. The Kiwanis Club of Humber Valley partnered with HSC to promote trauma care and injury prevention. In 1988, the first, annual Kiwanis HSC Trauma Lectureship was held. The plaque commemorating this endeavour remains on display on the trauma unit (5C). The following year, HSC designated trauma as one of eight priority programs. The Trauma Care Committee designed a five year plan (that included a nursing unit dedicated to trauma), formalized the structure and actions of the Code
50 (trauma) team, and the management principles for the trauma program. Simultaneously, planning was underway for construction of the hospital's new Atrium. A geographic 12 bed unit was designated for the intake of trauma patients. This unit would be staffed with nurses who possessed additional trauma experience and who would be able to care for multiply injured patients in a more efficient manner. Shortly after the Atrium opened in 1993, the trauma unit was amalgamated with the existing neurosurgical unit on 5C. This seemed an appropriate marriage of services, as many trauma patients have also suffered head injury.

The relationship between the trauma program and the patient begins the moment the child is identified as a "trauma patient". This can occur in two ways, each involving the TTL. First, patients who are referred to HSC from a community hospital with potential life threatening injuries are screened by the TTL following his/her telephone discussion with the referring physician. These patients are then transferred to HSC by land or air ambulance. Secondly, patients may be brought directly to HSC from the trauma scene. All patients meeting "Code 50" criteria will be assessed by the TTL in the Trauma Room. These criteria are based on the mechanism of injury, vital signs and anatomical factors. The typical patient who would meet these criteria is a child struck by a car travelling at more than 40 km/hr, and who has suspected head and leg injuries. When the locating operator announces the arrival of a "Code 50", all primary team members immediately leave what they are doing and attend in the ER. This team is led by the TTL. In attendance are residents from general surgery, anaesthesia, orthopedics, emergency/pediatrics, neurosurgery and radiology, as well as ER nurses, a respiratory technician, radiology technician, chaplain, trauma social worker, trauma patient care coordinator and a patient service aide. If you think our trauma room looks like ER, on a Thursday evening you would be right, sometimes!

Once the patient has been thoroughly assessed and the initial resuscitation is completed, a decision is made by the TTL as to where in the hospital, the child will receive the most appropriate medical care, based on the nature of their injuries. If such are severe enough, then admission to the Critical Care Unit, may be required. More life threatening injuries, such as hypovolemic shock or major brain trauma, might dictate that the child is taken first to the operating room, for urgent surgical intervention. Patients with less threatening injury severity scores are admitted to the Trauma/Neurosurgical Unit (5C). The TTL maintains contact with the child throughout their hospital stay, collaborating with the other members of the interdisciplinary trauma team. This team is made up of allied personnel from nursing, physio- and occupational therapy, speech and language pathology, dietetics, chaplaincy, discharge planning,
neuropsychology and childlife, in addition to the trauma social worker and trauma patient care coordinator. Information and medical condition updates are provided to team members at informal daily rounds and more formally at weekly interdisciplinary rounds. The goal of this team is to exchange ongoing information and plan for the child's short- and long-term needs.

When a child is injured, parents and other family members, including siblings, can be devastated. Frequently, parents need to take time away from work, sometimes unpaid, and in the longer term they may all face an uncertain future. Psychosocial support is offered to assist these families cope with the unplanned event that has harmed their child. The presence of a social worker and chaplain during a Code 50 may be the first opportunity to provide this assistance. In the past, parents of an injured child were required to wait in a "quiet room" in the ER. The social worker or chaplain remained with the family and were present when the physician met with parents to discuss their child's medical condition and the plan of care. But, members of the team re-examined parental involvement in the trauma room, after studying research conducted in two American hospitals on this practice.(4,5) These reports reviewed the emotional and psychological impact when families were present during invasive procedures in the emergency room. As a result, a process was developed at HSC to offer parents the opportunity to choose to be present with their child in the trauma room. HSC has become the first pediatric trauma centre in Canada to formally establish a parental presence program.

The nature of a child's injuries may require comprehensive physiotherapy and cognitive assessments, as well as an analysis for additional services at home, following the patient's hospital release. These assessments are provided to families on an informal basis. An important adjunct to these services is an educational component for the patient and family.(8) If the child needs continuing rehabilitation, there are strong links with community partners, such as the Bloorview-MacMillan Children's Centre, whose intake coordinator attends weekly interdisciplinary rounds at HSC, in order to ensure a smooth transition between facilities.

Many injuries are preventable, and therefore one of the mandates of the trauma program is to provide injury prevention education to children and their families, while the child is still in hospital. For example, many children are injured as a result of being struck by a car while riding a bicycle. Properly fitting bicycle helmets can reduce the risk of serious brain injury by up to 88%.(6) In 1992, nursing and medical staff from the HSC trauma and neurosurgery programs were instrumental in lobbying the Government of Ontario for legislation that would require the mandatory use of bicycle helmets for all children under 18 years of age. Research had demonstrated that legislation increases helmet use and reduces head injuries, while there is no decline in the number of people who ride bikes.(7) Legislation likely stimulates
cultural shifts too. It can be "cool" to ride a bicycle with a flashy and colourful, approved helmet. Additionally, staff from the trauma program were involved in creating the hospital-wide car seat promotion, the aim of which is to provide all children who are in-patients with the opportunity to travel home safely by being properly restrained in a vehicle. SafeKids Canada has a partnership with HSC. Hospital nurses have become involved in safety displays during SafeKids week each spring at HSC. They provide information on child car seats, bicycle helmet use and the prevention of falls from heights. Safety education is also delivered in the community through the HSC links with SafeKids Canada.

But, despite valiant efforts of public education programs aimed at child safety, children will continue to be injured. Unfortunately, each spring signals the beginning of another Trauma Season. The trauma program is firmly established and well prepared to meet the challenges that this season brings.

Dorothy McDowall, RN., BScN, CNN(C),
Trauma Patient Care Coordinator
Carole Harrison, MSW, RSW,
Trauma Social Worker
Robin P Humphreys, MD

Misshapen Heads - "Why Is The Back of My Baby's Head Flat? Is it Serious? Will it Affect my Baby's Brain?"

In Anthropology 101, a university course that is taught to many medical students, there is an examination of some cultural mores and the influence they may have on the diverse features of man. The use of back boards by a parent to transport an infant or, head wrapping used in some cultures to "design" an infant's skull shape are two examples that have been examined by medical specialists over time, with respect to any adverse consequences that may result to the child's growth and skeletal development. It would be interesting to read anthropological reports a few centuries from now, to learn what would be the contemporary interpretation of positional skull deformities, known currently, as "positional (or "occipital" or "deformational") plagiocephaly".

All of us have a "flat spot" high on the crown at the back of our heads. In fact, neurosurgeons on occasion will rely on the patient's flat spot as a surface landmark to design the skull exposure for some brain operations. But there has probably been no time prior to the present, when so much thought, analysis, language and counseling have been directed at the increasing recognition of an infant's asymmetric flattening of the head. If it's so common, it must be bad for you? And, must it be corrected?
Occipital plagiocephaly (OP) refers to flattening through the back of the skull, in the region of the occipital bones, and it usually occurs on one side only. It is not new. It has likely existed for centuries. But, beginning in 1992, there has been a significant increase in the diagnosis of OP. The incidence is reported to be as high as 48% in typical, healthy infants, less than a year of age. Shrewd observers have linked this feature to the 1992 report from the American Academy of Pediatrics (AAP) and others, that infants be placed on their backs for sleep. Prone (face down) and to a lesser extent side sleeping during early infancy, have been linked with sudden infant death syndrome (SIDS). Since the AAP "Back to Sleep" campaign was launched that year, prone sleeping has decreased markedly and national SIDS rates have decreased correspondingly by more than 40%. Despite the increase in OP, it is clear that the recommendation for a supine sleep position should be followed for the vast majority of infants.

Normally, the head at birth is an oval shape and is reasonably symmetric; that is, the right and left sides of the head are virtually identical in character. It is stressed that such are the features of the newborn infant, who then by age 2-3 months develops the changes in keeping with occipital plagiocephaly. In the latter circumstance, the infant's head when viewed from above, shows flattening on one side at the back of the skull. Most normal infants when positioned on their backs spend as much as 80% of their time with their head turned to the right. In 10% of occasions, it is positioned towards the left and the mid-position is adopted in sleep by the remaining 10%. It is thus no surprise that 80% of infants with OP according to recent evidence show right occipital flattening. That is, the side that the infant looks toward corresponds almost always to the side of posterior skull flattening. There are additional confirming features of OP such as forward positioning of the ear or, subtle prominence of the forehead or cheek on the same side as the OP.

A small percentage of infants who develop OP as a consequence of torticollis or tight neck muscles, should have assessment of the range of their neck movements. This is often completed in such infants by a physiotherapist and a program of neck stretching exercises prescribed. By the time the torticollis is corrected, the OP becomes abundantly obvious. The diagnosis of OP is made on the basis of examination of the infant, and skull xrays or CT scan are unnecessary. In fact, in this circumstance the interpretation of ordinary skull radiographs can be misleading.

The key treatment for OP is its prevention. Physicians responsible for well baby care should instruct parents to lay the baby down to sleep in the supine position, alternating positions (ie. left and right occiputs) where possible. This can sometimes be accomplished by placing a towel roll on one side beneath the back. It is also recommended that a certain amount of dedicated "tummy time" be used when the infant is placed in the prone position while awake and being observed. If a visual object on one side of their crib intrigues the infant, the object should be moved at intervals, to the opposite side of the crib. All of these strategies are also of value for the infant who has been diagnosed with OP.
What is to be done if an infant is labeled as having positional or occipital plagiocephaly? Fundamentally, OP in virtually every case is a cosmetic issue only. There exists no evidence that OP restricts brain growth nor that it causes brain damage, developmental delay nor cognitive impairment. Occipital plagiocephaly is certainly not responsible if the infant subsequently struggles with high school physics! OP frequently appears worse between the 5th and 9th months of life and then begins to correct itself between 9 and 13 months of age. This of course is the time when the infant is rolling over in sleep, and during the day is spending more time sitting up and showing good head control. The correcting process continues through to the third year, and although positional plagiocephaly may not resolve completely, any residual flattening is usually minor and, is covered with hair. Objective evidence in the form of prospective controlled studies is lacking with respect to the efficacy of external orthotic devices, such as molding helmets or bands, to correct OP. Moreover, although these devices are generally well tolerated, they are expensive and have the potential for complications including skin irritation and breakdown. Finally, it is clear that a neurosurgical operation is not a solution for an infant with positional plagiocephaly.

References available on request.
For more information on this subject consult -
www.neurosurgery.org/health/patient/answers.asp?DisorderID=49
Robin P. Humphreys, MD, FAAP,
Neurosurgeon-in-Chief.

Fellows and Residents - July 1st

Dr. William Whitehead obtained his MD from the medical school at the University of Texas - Houston, and took his postgraduate training at Georgetown University in Washington, and then the University of Utah in Salt Lake. While there, he was influenced by Dr Jack Walker Neurosurgeon-in-Chief at the Primary Children's Medical Center (and HSC fellow 1973). As part of his neurosurgery training program, Dr Whitehead had 12 months of experience in pediatric neurosurgery, that has become his career interest. He has collaborated on 3 publications with Dr John Kestle (HSC fellow 1992).

Dr. Michael Carter graduated from the Southampton University Medical School, in England. Like Ms Lynn Myles (HSC fellow 1998), Dr Carter has taken his neurosurgical training at the Wessex Neurological Centre in Southampton. He holds his FRCS(Eng) and FRCS(Neurosurg), and for a year was a Lecturer in anatomy at the University of Manchester. Dr Carter's research interests include mechanisms of memory
recovery after brain injury, and the genetic abnormalities in CNS tumors. In 1999 he won the Presidents' Prize from The Royal Society of Medicine.

**Dr. Hisashi Hatano** will continue his HSC neurosurgical studies. It was originally intended that he would complete these in October, but Dr Hatano and his Chairman at Nagoya University School of Medicine, have asked that he remain until mid-2003.

**Dr. Aurelia Peraud** graduated in 1993 from the Medizinischen Hochschule Hanover, FRG. Earlier that year she was a biomedical exchange student at Tufts University in Boston, MA. In 1994, she began her formal neurosurgical training in Munich, FRG, and passed her national specialty examinations in July, 2001. Aurelia has broad research experience and most recently has been studying the prognostic impact of molecular genetic alterations in low grade astrocytomas.

**Dr. Ash Singhal** is an honours MD graduate of the University of Alberta. He won the gold medal as the top student in neurosciences, and was also a past recipient of research funding from the Alberta Heritage Foundation. Ash entered the UofT postgraduate neurosurgical program in 1997 and in 2000 was allied with the Institute of Medical Science at the university where later this year, he will defend his MSc thesis on Modifiable clinical factors predict outcome after aneurysmal subarachnoid hemorrhage.

**Dr. Raafat Yahya** is a 1994 graduate of the American University of Beirut-Medical Center where he began his neurosurgical residency 2 years later. Upon completion of his chief residency experience, Dr. Yahya began an 18 months fellowship at the Cleveland Clinic Foundation in Cleveland, OH., where in the last several months he concentrated on oncology and stereotaxy. Raafat is a Member of the Lebanese Order of Physicians.

**Dr. Dominique Renier Charms as the 2002 EB Hendrick Visiting Professor**

In May, Dr Dominique Renier, neurosurgeon at the Hôpital de Necker Enfants-Malades, and the University of Paris, visited HSC as this year’s E. Bruce Hendrick Visiting Professor. Professor Renier, Director of Craniofacial Surgery at the hospital, has become the world’s most authoritative voice with respect to the neurosurgical issues of craniofacial surgery. He has been studying all of the related matters for the last 25 years. With classic Gallic charm, Professor Renier in his major address spoke on Prognosis for mental function in craniosynostosis. He then participated in a UofT mini-symposium on craniofacial surgery, where his address was Craniosynostosis: Surgical techniques according to age and late results. Other symposium speakers were Dr Christopher R. Forrest, HSC's Director of the Craniofacial Program, who delivered a paper on Application of new technologies in craniofacial surgery. Robin Humphreys’ lecture was titled The neurosurgical lessons after 30 years of craniofacial surgery.
Scientific Forums, The Lecture Circuit and Traveling Professorships

The HSC staff surgeons, who each hold ranking in the university's Department of Surgery, are constantly in demand to participate in a variety of university and professional academic forums. Such require many hours of preparation time as well as for travel. During the last 7 months, the 4 HSC neurosurgeons have also been preoccupied with the 3 hours weekly seminar course structured as part of the academic curriculum for all of the neurosurgical residents at the University of Toronto. Peter Dirks designed the pediatric neurosurgical block that began last December, and was completed with the end of term examination in June. The neurosurgeons also extend their gratitude to some of the other invited HSC lecturers, Drs Derek Armstrong, Brenda Banwell, Susan Blaser, Eric Bouffet, David Chitayat, Gabrielle de Veber, Chris Forrest, Dirk Huyer, Venita Jay, Normand Lapierre, Phillip Porter, and Karel terBrugge.

ASPN Silver Anniversary

Robin Humphreys represented HSC at the annual meeting of the American Society of Pediatric Neurosurgeons (ASPN), held in the West Indies in January. He moderated a session on the treatment of craniopharyngioma. The ASPN was formed in 1978 and Drs Humphreys and David McLone, Neurosurgeon-in-Chief at the Children's Memorial Hospital in Chicago, were the only two of the original founding members to be in attendance to celebrate the Society's 25th anniversary. Also present were 9 former HSC fellows who on the last evening of the meeting, celebrated their past association with HSC's Division of Neurosurgery. Dr W. Jerry Oakes of Birmingham, AL (HSC clinical fellow 1975) is the newly elected President of the ASPN.

Canadian Pediatric Neurosurgery Study Group

Jim Drake organized a meeting of Canadian surgeons who practice in the country's children's hospitals. Fifteen pediatric neurosurgeons met in February, in snowy conditions in Bromont, QC. The intent of this major initiative, the first of its kind in Canada, was to examine controversial issues that exist in our care for children with neurosurgical disorders, and to assign study groups who will research their topics and report back in a year's time. The ultimate goal is to establish treatment guidelines for the future.

Jim challenged the group on his topic of Percutaneous shunt unblocking and Peter Dirks collaborated with Dr Robert Griebel (HSC fellow 1985) who discussed practical and ethical issues that would pertain to the establishment of a National tumor data bank. Robin Humphreys spoke on Resource issues in Canadian pediatric neurosurgery. The group will meet again in February 2003, in Banff, AB.

Annual Meeting of the American Association of Neurological Surgeons (AANS)
At the 71st annual meeting of the AANS, held in Chicago, IL, Clinical Fellow, Pat McDonald delivered a paper on, Does decompressive hemorrhage following shunting of neonatal hydrocephalus correlate with valve opening pressure? Jim Rutka spoke on Malignant brain tumors: State-of-the-art treatment at a Breakfast Seminar.

**The Society of Neurological Surgeons (SNS) Meets in Toronto**

For only the fourth time in its 82 years, the American-based SNS, also regarded as the "Senior Society", met in Canada in May. Jim and Mari Rutka were the energetic Toronto hosts. Characteristically, faculty in the host city profile its accomplishments during the first morning of the meeting. A number of University of Toronto speakers took to the podium, including Dr David Naylor, Dean of the Faculty of Medicine, Dr John Wedge, Chair of Surgery at the university, and the well known public speaker, Dr Robert Buckman, medical oncologist at Sunnybrook and Women’s College Health Sciences Centre. Jim Rutka provided a comprehensive review of The Division of Neurosurgery at the University of Toronto, and Robin Humphreys spoke on The history of paediatric neurosurgery at the Hospital for Sick Children.

**And Elsewhere**

**Peter Dirks** was a guest of the Japanese Society for Pediatric Neurosurgery and their annual meeting held in Asahikawa, Japan. His invited lecture was on. Is a neural stem cell transformed into a brain tumor?

**Jim Drake** was invited to participate in the annual meeting of the Korean Neurosurgical Society held in Seoul, in the spring. He delivered papers on, Prospective studies in pediatric CSF shunt failure - guides to risk reduction, and, Endoscopic third ventriculostomy - assessing efficacy. In May he participated in the Hydrocephalus Association: National Conference on Hydrocephalus for Families and Professionals, in Chicago, IL. His assigned talks were on The diagnosis and treatment of hydrocephalus in infants and children, and Shunt malfunctions, Complex hydrocephalus, including Dandy Walker malformation and multioculated hydrocephalus. Jim was also invited to speak at the annual meeting of the European Society of Pediatric Neurosurgeons in Kiruna, Sweden. He lectured on CSF shunts in the new millennium: trials and tribulations, and Treatment of hydrocephalus and choroid plexus tumors using a choroid specific immunotoxin - an in vitro study.

**Robin Humphreys** was an invited Visiting Professor to the Children's Hospital of Alabama, at the University of Alabama. He met with various members of the faculty and delivered lectures on The significance of cutaneous signatures of occult spinal dysraphism and, Lessons learned from 30 years of
craniofacial surgery. The following week, he visited Raleigh/Durham NC to speak about The delivery of health care in Canada, to senior members of the American Society of Pediatric Neurosurgeons.

Jim Rutka had a busy winter and spring visiting other university centres. He was the Visiting Professor and Peter Moyes Lecturer at the B.C. Neuroscience Day, where he lectured on The molecular biological basis of neurosurgical disease. At the University of British Columbia, he presented papers on Present and future management of the child with craniopharyngioma, The management of the child with lesional and non-lesional epilepsy, and Medulloblastoma: from a difficult past to a promising future. At the University of Wisconsin, he repeated his medulloblastoma talk and also spoke on Classification and current management of brainstem tumors in children. Similar lectures were delivered when he served as a Visiting Professor at the University of Pittsburgh. He was the Kasdon Lecturer at the annual Richard Lende Winter Neurosurgery Conference, in Snowbird, Utah. He talked on lesional and non-lesional epilepsy and also showed the Harold Hoffman slide collection: Images from 35 years of pediatric neurosurgical experience. Finally, he was invited to address Recent advances in molecular biology of meningiomas at the 4th International Congress on Meningiomas combined with the annual meeting of the Turkish Neurosurgical Society, held in Istanbul, Turkey.

Nursing Accomplishments

Patti Rowe

It is a significant honour to receive one of the HSC Nursing Scholarship Awards, that are distributed annually. Congratulations to Patti Rowe (OPD) who won an award in the Graduate/Post-Graduate/Doctoral section from the Alma Rae Fellowes Endowment Fund. Patti also participated in b.r.a.i.n.child's Fifth Annual Paediatric Brain Tumor Conference where she and Michelle Hart (Clinical Leader 5C) guided a workshop, Session for teenage and young adult survivors.

Canadian Association of Neurological and Neurosurgical Nurses

HSC was represented at the 33rd Annual Meeting, held in June, in Vancouver. Arbelle Manicat-Emo, Kristine Asuncion, Paula Beauchamp, Marie Josee Beaulieu, Shelly Biggs, Linda Domaoal and Melanie Ofilan presented a paper on Nursing the international patient: The story of Juliean. Herta Wai-Ham Yu, Abby Varughese, Seetha Padmanabhan and Maria Lambert-Pasculli made a poster presentation on Endoscopic third ventriculostomy as a treatment for hydrocephalus.
Honours and Awards

Robin Humphreys - Wall of Fame Inductee at Runnymede Collegiate Institute

On the occasion of the 75th anniversary celebrations of the founding of Runnymede Collegiate Institute in Toronto, Robin Humphreys was chosen as one of 45 inaugural inductees into the school's Wall of Fame. Other inductees with a University of Toronto connection include, Dr Claude Bissell and Professor James Ham, former Presidents of the University of Toronto, and Margaret Boake Hancock, the first female Warden of UofT's Hart House.

Abaya Kulkarni (Resident October 2001 - March 2002) was recipient of the annual K.G. McKenzie Clinical Research Prize awarded by the Canadian Neurosurgical Society

Charles Matouk (Resident January - June 2002) has received a Research Fellowship Award from the Neurosurgery Research and Education Foundation of the American Association of Neurological Surgeons for his project entitled Endothelial phenotype in inherited neurovascular disease: Transgenic approaches. Charles will be working in the laboratory of Dr. Phil Marsden at the University of Toronto, with Chris Wallace as co-supervisor.

James Rutka Identified as a "Nation Builder"

Leading up to Canada Day, the Globe and Mail identified 50 people "whose efforts have contributed materially, intellectually or simply in terms of national pride, to Canada's sense of coming into its own". Jim Rutka was profiled in the "Science" section as a neurosurgeon, clinician and scientist who "returned to Canada after working in San Francisco and Japan." His science was quoted as, "Some E. coli strains produce a toxin known as verotoxin ... which makes a two-pronged attack on the tumor: it destroys tumor cells and shuts down the tumor's blood supply".

Jim also received a 3 year grant from the National Cancer Institute of Canada for his research project titled The role of human suppressor of fused in medulloblastoma.

Sheila Singh received a Research Fellowship Award from the American Brain Tumor Association for her project entitled A novel assay of stem cell populations in paediatric brain tumours. Sheila will continue to work in the laboratory of Peter Dirks at the Arthur and Sonia Labatt Brain Tumor Research Centre, while completing her fellowship and PhD.
Michael Taylor (James Rutka supervisor) was identified as a 2001 Research Fellow by the Neurosurgery Research and Education Foundation of the American Association of Neurological Surgeons, for his work on the Role of gli transcription factors in the pathogenesis of medulloblastoma. Michael also won the top honours in the UofT Department of Surgery's Gallie Bateman Resident Research Prize, for the project Germline mutations of human suppressor of fused predispose to desmoplastic medulloblastoma through activation of sonic hedgehog and Wnt signalling. In June, Michael was the recipient of the K.G. McKenzie Basic Science Research Prize awarded by the Canadian Neurosurgical Society.

Synaptic Connections

Professor John Wedge Steps Down at UofT

In the next several weeks, Dr John H. Wedge, will complete his 10 years term as the R.S. McLaughlin Chair of the Department of Surgery at the University of Toronto. Since 1995, Dr Wedge has also been HSC's Surgeon-in-Chief. In each of these capacities, he has been a strong advocate for the neurosurgical program at the university and HSC. At a celebratory dinner held in June, the Dean of the Faculty of Medicine offered these remarks with respect to the Wedge era. "A few weeks ago, two external reviewers came to appraise the Department of Surgery. These distinguished surgical leaders, one from Harvard and the other from McGill, later wrote to say that our Department was unequivocally number 1 in Canada and among the top ten in the world. I promptly wrote to John Wedge, repeating this high praise, and seeking to direct some of it his way. The one-sentence response came back within a few minutes. According to John, the success of the Department simply reflected the talent and commitment of the faculty and staff and the legacy of those leaders who had gone before him.

"It was about the only time I have read an email from John and been 100% certain that the author was dead wrong. John Wedge has worked something akin to magic in a phenomenally challenging decade. He has forged a high degree of consensus within the Department, maintained the respect of surgical chiefs and hospital administrators citywide, championed the interests of clinician-teachers while protecting the time of educators and researchers, raised academic standards, introduced innovative programs, served as Chief of Surgery in a major teaching hospital, continued to operate on children with complex orthopedic problems and somehow, retained a golf handicap in single digits!

"Not just the Department of Surgery, but the entire Faculty of Medicine has been enriched by John's myriad contributions. His incisive comments, wisdom, and wry humour will all be missed greatly by those of us who have had the privilege to work with him as University administrators. And for many
years to come, I believe John Wedge will remain a role model in academic surgery who implausibly combined extraordinary effectiveness, an understated personal style, and relentless selfless leadership.

David Naylor
Professor of Surgery and Dean, Faculty of Medicine
Vice Provost, Relations with Health Care Institutions
University of Toronto

Pathology Department welcomes Dr. Hawkins

Dr. Cynthia Hawkins has joined the Division of Pathology, Department of Paediatric Laboratory Medicine as a neuropathologist. Dr. Hawkins graduated from the University of Western Ontario with a PhD in 1996 and an MD in 1997. She spent a year in Switzerland in the laboratory of Professor A. Guzzi at the University of Zurich as a postdoctoral fellow where her work focused on the function of the prion-related protein Doppel. Experience with cell culture work has shown that Doppel may be involved in neuronal development and Dr. Hawkins' aim was to develop a method for isolating and culturing cerebellar precursor cells to further study this effect. The results of this research were presented at the CANP in 2001. Dr. Hawkins will focus her research interests on brain tumours - particularly medulloblastoma.

Facts

Since 1954, the neurosurgical faculty at the Hospital for Sick Children has been responsible for the education of 200 resident surgeons and 86 neurosurgical clinical fellows.

A health care teaching and research centre dedicated exclusively to children; affiliated with the University of Toronto.
1. Diagnostic Imaging in the New Millenium.

"Do you want to see the scan first or, the patient?" This question, a prelude to the consultation on a new patient, echoes repeatedly through hospital corridors everywhere. We have become infatuated with (and admittedly reliant upon) the information provided by contemporary imaging (or radiological) studies. In our reflective moments we wonder if the machines have become smarter than the humans are?

It wasn't always like this. In the "BC era" (Before CAT scanning), a respected former university chairman of pediatrics would utter, "Don't do something! Stand there and observe the child". Indeed that was about all one could do. Consider the options for the small patient with symptoms of 9 months duration that suggested the possibility of a brain tumour. If the clinical information was most consistent with this diagnosis, the child would be subject to a primitive xray procedure that consisted of injecting air into the brain ventricles (air pneumoencephalography). After a while, the air would percolate through the ventricles and maybe cap the front edge of a tumour residing partly or completely, within the fourth ventricle and cerebellum. An operation would be planned for which the surgeon often felt at a disadvantage. What were the actual dimensions of the tumour and into what critical structures had it insinuated itself? How naïve we were.

The injected air-type examinations that were foggy, incomplete and inferential, and were described by some as "barbaric", came to their end by the mid-1970s. Godfrey Hounsfield had developed computerized axial tomographic (CAT) scanning, in England. Building on the work of others, Hounsfield in 1972 developed the EMI machine that created cross-sectional images through the brain, from top to bottom. It provided axial slices of brain tissue that revealed the outline of the 4 cerebral ventricles and a degree of distinction between the brain's grey and white matter structures. Initially, the scans required 5 minutes/individual slice. The images, although miraculous, had such a lengthy acquisition time that they often required a general anesthetic for the child to lie still. Over the next few years, scan time was
reduced to 2 seconds/slice, so that a scan of the entire head could be completed within as little as 5 minutes. Scan quality also greatly improved thereby providing much additional detail. Neuroradiological diagnosis was revolutionized.

And, neurosurgeons were liberated. Pathological processes could be confirmed, as could the detail of their anatomical relationships to adjacent brain structures. After the injection of an intravenous contrast agent, the vascular and associated pathological co-habitors of the lesion were defined. At last the surgeon possessed an imaging tool that could provide one with an intelligent list of diagnostic possibilities and, in the event an operation would be required, the roadmap for surgical approaches. By the late 1970's, pediatric neurosurgeons recognized that the earlier intake of children with brain tumours was a product of the proliferation of computerized tomography (CT) equipment and the access that children had to it in a more timely fashion. Now, several CT generations later, this technology has not lost any of its glamour. Every day CT imaging provides rapid and reliable information about disease states that involve the nervous system, chest, abdomen, and some soft tissue and bony structures. Within pediatric neurosurgery CT imaging is a reliable screening tool for infants and children who have suffered head injury. For example, those with a minor insult who have a normal clinical evaluation and CT scan can be confidently discharged home. If a child has experienced a more consequential injury that may require a specific operation or initiation of another type of treatment protocol for their head trauma, the early and rapidly obtained CT scan will navigate the course. Three-dimensional reconstructed views of the facial skeleton and skull provide valuable information for the surgeons associated with the craniofacial team. Similarly, children who have sustained a neck injury and whose plain cervical spine radiography is confusing (frequently the circumstance in children vis-à-vis adults), can be very effectively sorted out by means of detailed CT analysis of this portion of their spinal column. And currently, there is groundswell support for 3-dimensional CT angiography that may supercede traditional arteriography and MRI (MR angiography) to become the key instrument for the diagnosis of intracranial arterial aneurysms and related vascular spasm.

But in early 2001, an alarm was sounded in the popular media which picked up on 3 scientific reports, with respect to a potential hazard of CT examinations being performed in children. This pertains to the exposure of children to radiation during a CT scan, and the recent increases in CT imaging in children. (For example, at a large American children's hospital, there was a 92% increase between 1996 and 1999 in abdominal and pelvic CT examinations performed on children less than 15 years of age.) The authors of one scientific paper argue with respect to CT scans that the risk-benefit balance is still strongly tilted toward benefit. However, they do state that "Because the frequency of pediatric examinations is rapidly increasing, estimates that quantitative lifetime radiation risks for children undergoing CT are not
negligible, may stimulate more active reduction of CT exposure settings in children." The latter is the issue as techniques for radiologists to limit radiation exposure include adjusting the settings for the CT scan, based on the weight or size of the child and the type of examination contemplated. Many centres that perform CT examinations of both adults and children were in the practice of using the same radiation dose for all patients. Clearly, the settings for adults are not appropriate for children.

The Society for Pediatric Radiology underscores this principle and argues that "CT scans are recommended when children are sick and injured" and that "CT scans are highly effective tools in determining the proper course of action". At HSC, the radiologists have been cognizant for years about the need for reduced doses in our patients. And, the surgeons are always contemplative and cautious when ordering a CT study, especially in children with chronic disease that may require repeat CT imaging of multiple body structures. Would alternative methods of diagnosis that do not use radiation (e.g., ultrasound or MRI) suffice? We of course, look forward to the ever-increasing speed of newer MRI sequences to make replacement of routine CT imaging with MR feasible, just as happened when the maturation of CT imaging allowed the phasing out of pneumoencephalography. In the future many routine examinations will be performed only with MRI. Until that time, however, CT remains an important tool in the evaluation of the critically ill or injured infant and child. Additionally, CT remains either the only, or the far superior technique, to obtain information required to treat the child with abnormalities of the skull, facial bones, and spinal column.

CT has improved our diagnostic skills and patient outcomes. It couldn't get any better. But, not too many years after its development, neurosurgeons and neuroradiologists were astonished to learn about and then view, the pictures of the brain and spinal cord obtained by means of a non-radiation emitting technology. Magnetic resonance imaging (MRI), the fundamental physics of which were studied in 1933, made its first appearance for clinical application in 1978. MRI is based on the principle that when certain atomic nuclei, the most abundant of which in living tissues is hydrogen, are placed in a magnetic field, they act as small magnets. Hydrogen (or proton) is present in relatively high concentrations in all body tissues, mainly in the form of water, but also in fat and protein. As the hydrogen nucleus spins about its axis it creates a magnetic moment. Like CT, MRI produces cross-sectional images that depict the properties of the tissue under examination. The tissues are differentiated when radio-frequency energy is applied to the magnetic field. Different tissue types react differently, thus creating tissue differentiations. For example, water appears dark during the first phase (T1) of the examination. Thus the outline of the 4 cerebral ventricles on the MRI scan would appear as black. During this same phase,
the grey matter of the brain appears grey and the white matter, white (depending upon its stage of myelin differentiation). The printed MRI pictures resemble the black and white photographs of the brain that are found in the traditional atlases of anatomy, with which all medical students are familiar. The many additional manipulations of the MRI sequences have provided by now greater confidence than ever before, with respect to the precise diagnosis of the disease condition in the nervous system. This is especially true for lesions in the spinal cord, where MRI reliability surpasses that of CT and myelography.

As indicated previously, the acquisition time for a complete MRI examination far exceeds presently that necessary for a CT scan. The MR imaging of a child's brain can take upwards of an hour and given this time commitment and the requirement for a stationary patient, as well as the scanner's background noise, it is frequently necessary to perform the examination of an infant or child under sedation or anesthesia. HSC has 2 MRI scanners that each function for 2 shifts each day. One can readily calculate how many children can be investigated with this technology every 24 hours, and also acknowledge the even greater number of requests that arrive each day from across Ontario for access to pediatric MRI, at HSC. With respect to the nervous system, our MRIs are used to detail tumours of the brain and spinal cord, stroke conditions in children, complex developmental malformations of the brain and injuries to the spinal cord. Even metabolic abnormalities of brain tissue can be evaluated.

The CT and MRI assessments of the brain and spinal cord are but 2 of the galaxy of imaging tools available for our patients. They are usually our first choice for the reasons given. Now, these technologies and some of the others have been incorporated into the treatment process.

2. The Image Guided Therapy Suite

Neurosurgery of the future may be very different than what we see today. The new Hospital for Sick Children Centre for Image-Guided Therapy (IGT), which offers a combined approach to diagnosis and treatment using minimally invasive procedures and state-of-the-art interventional radiology equipment, opened in mid-May, this year. Instead of traditional, invasive surgery, surgeons, radiologists, physicians and anaesthetists work together using needles, catheters, wires and probes inserted through small incisions, in combination with imaging equipment and tiny cameras, to examine and treat patients. Four suites equipped with CT scanners, ultrasound, fluoroscopy, (and in due course MRI) along with endoscopy, lasers and operating microscopy, make it possible for a patient to undergo multiple or combined procedures in one day, under one general anaesthetic, all in one location. For example, a child has a fluid collection around the brain that could be drained through a needle or endoscope that is
introduced with ultrasound and/or CT guidance. After the fluid is released, a final CT scan will ensure that the problem has been eradicated, thereby obviating a more open form of surgery. This new modality will simplify patient care and reduce the diagnostic and surgical trauma to our young patients.

"The equipment was made to our specifications and in particular for a paediatric population," states Dr. Peter Chait, an HSC interventional radiologist. It was also designed to meet the needs of the children and their families from colourful jester motifs that adorn the walls in waiting rooms and corridors to the ability to offer both diagnostic procedures and treatments under one roof. The CT scanner is the first of its type in North America and one of only three in the world. It was designed in Japan and expanded to meet HSC's requirements. Weighing more than 1.3 metric tons, the scanner travels on floor rails that are precisely balanced to move over the examining table to take images. The bearings are smooth making it possible for the scanner to be pushed by hand in the event of a power failure. The C-Arm, which weighs 1.4 metric tons, moves on ceiling rails over the examining table. It uses short pulses of X-rays to reduce the radiation dosage. And, it is water cooled to reduce noise. The CT scanner, examining table and C-Arm communicate with each other via fibre optic links to assure their movements do not interfere with each other. It is now possible for multiple disciplines to work together at the same table, to effect a correction of a child's condition in any one of a variety of the body's organ systems. During the past few months, the neurosurgical team has worked with IGT staff to insert or cleanse catheters used in hydrocephalus treatment, and also for the exploration and biopsy of unusual brain tumours as well as for localization of vascular malformations in the brain.

Research in the new Centre will include the development and refinement of innovative procedures, evaluation of the technology and of different types of images, as well as comparison of patient outcomes that examine such factors as quality of life, long-term results and cost-benefit analysis.

"We strongly believe that our international reputation for excellence is dependent on three things: having the best people in the world work here; providing those people with the best tools and equipment so that they can do their jobs; and building both a physical and cultural environment that allow people to do their best work." said Michael Strofolino, HSC president and CEO, at the time of the opening. "This new Centre for Image-Guided Therapy is an example of bringing these three elements together so that we can continue to develop new and better treatments for the children we serve."

Robin P Humphreys,
Susan E Blaser,
Maria Lamberti-Pasculli and,
This Week - May 17, 2001.
Residents and Fellows - January 1st

**Dr. Patrick McDonald** in a recent conversation contemplated one of life's mysteries that pertain to the inverse relationship between sleep and professional performance. Certainly Pat's energetic activities have shown him to be dedicated, omnipresent and thorough with his patient care and academic activities. He is being sought by a number of Canadian universities to practice pediatric neurosurgery at their children's hospitals.

**Dr. Stephen Santoreneos** has demonstrated an infectious enthusiasm for neurosurgery, particularly pediatric neurosurgery. We are delighted that he has followed in the exemplary footsteps of many of his Australian predecessors, and that he will remain with us until July. After that, Stephen will return to Australia, likely in the region of Sydney.

**Dr. Abhaya Kulkarni** will continue with us until the end of March. He will prepare for his Canadian Royal College of Surgeons examinations in June and then complete his doctoral (PhD) program at McMaster University. Later this year he will head off to Europe for further studies.

**Dr. Hisashi Hatano** is a 1992 MD graduate from Nagoya University in Japan. He completed his neurosurgical training at that university in 1999 and in October 2000 he was accepted as a clinical and research observer on our Division. In October 2001, the University of Toronto appointed Hishashi as a clinical fellow. We are impressed with all his activities to date and upon completion of his Canadian experience, Hisashi will return to a faculty position in the Department of Neurosurgery, Nagoya University School of Medicine.

**Dr. Charles Matouk**, a Montreal scholar, obtained an honours B,Sc degree from McGill University before he entered medical school at the University of Calgary from which he graduated in 1999. During that time he received several research awards, one from the Leukemia Research Fund of Canada and another from the Brain tumour Research Group. Last year, Charles received the Sopman Humanitarian Award for excellence in the provision of health care, and a few weeks ago he placed first in the UofT WJ Horsey prize for his paper titled, *Clinical and radiographic features of intracranial dural arteriovenous fistulae: An under-recognized cause of progressive cognitive deficits*.

**Dr. Mandeep Tamber** graduated with distinction from the Faculty of Medicine at the University of Alberta in 1999. During his summers at medical school he received medical research summer studentships from the Alberta Heritage Foundation, for his work in the university's Department of Cell
Biology and Anatomy. Earlier this year, he collaborated on a project with Pat McDonald that was the basis for a presentation to the American Association of Neurological Surgeons when the group met in Toronto, in April (see: The Neurotransmitter, Summer 2001). Currently, Mandeep is a resident representative to the university's Division of Neurosurgery residency program committee.

Dr. Daniel McNeely is visiting the Division as part of an elective period associated with the training program in neurosurgery at Dalhousie University in Halifax. Daniel worked at the Children's Hospital of Eastern Ontario while he was a medical student at the University of Ottawa, from which he graduated in 1997. His past organizational and computer skills are currently manifest in his role as the Dalhousie neurosurgery webpage manager.

Dr. Edward Bruce Hendrick

Dr. E. Bruce Hendrick, Canada's first full-time pediatric neurosurgeon, died after a brief illness on August 17th, 2001. He was 77.

It may have occurred to more than one surgeon while operating on a Galenic venous malformation that it was "like sitting beneath Niagara Falls in a basket of quivering serpents." At least that is how E. Bruce Hendrick once described his experience with the lesion. There are few surgeons who have been able to articulate their surgical vistas or instructive bon mots in quite the colorful but memorable terms as this founder of Canadian pediatric neurosurgery.

Bruce Hendrick, even today, is a rare Torontonian who was actually born in the city in which he practiced and lived. Apart from a brief absence during his residency, his unflagging Canadian loyalties had been sustained through his high school and University of Toronto education, the postgraduate surgical program at that university, and a brief military career. He travelled to Boston in 1952 to begin a two years neurosurgery fellowship at the Children's Medical Center and Peter Bent Brigham Hospital, where he studied under Franc Ingraham and Donald Matson. About this decision, he confessed that "I knew very little about Ingraham and Matson and nothing about pediatrics". Even in those years, Bruce brought originality to the daily conduct of pediatric neurosurgery, as typified by a question to one of Dr. Matson's patients with a spinal cord tumour and paresthesia who was asked if, "your legs feel like ginger ale looks?" The Hendrick aphorisms will remain with students and residents longer than the logical sequences of thought which the rest of us teach.

Having completed his Boston experience Bruce Hendrick returned to Toronto in 1954 to begin neurosurgical practice at The Hospital for Sick Children. Although he also held responsibilities at the Toronto Western Hospital, it was clear that his joy came from caring for children's neurosurgical disorders, as he swept about Sick Kids entrancing students young and old with the mysteries of pediatric
neurosurgery. Forever the generous Good Samaritan, Bruce opened his wallet and his home to a variety of old friends and new visitors to the city and his favorite hospital. Newly arrived residents who had not yet found accommodations, would be housed temporarily at Leggett Avenue. And, if later on one of them or their family suffered from a winter illness, they would likely find Bruce at their doorstep ready to reactivate his family practice skills. In 1964 he became Neurosurgeon-in-Chief at the Hospital in 1964. During the next twenty-two years he attracted many young men and women from all parts of the globe for training in pediatric neurosurgery. Several neurosurgical units have been established in North America and overseas as a direct result of his stimulation of these young surgeons. He cared very much about his resident surgeons so it should come as no surprise that a young Japanese resident would name his Canadian-conceived son, "Bruce".

Over the years, the relationship between Bruce and his resident staff had been quite special, if not predictable. Eschewing complete reliance upon gadgetry for clinical decisions, he exhorted residents to adhere to fundamental Oslerian principles of history gathering and physical examination or as he said in a 1993 editorial - "Whatever mother says!" He advised residents to be prepared to defend their own conclusions. While still assimilating such ward teachings from their respected mentor, many a resident would miss the change of mood and find himself suddenly caught in the crossfire of a water pistol fight between Bruce and his patients. It was a serious business on Friday afternoons, when nurses, parents and child life therapists joined the patients to develop strategies for these sessions. The children wore green garbage bags; "Uncle Bruce" took the soakings in his OR scrub suit. Syringe barrels did duty for patients who didn't have their own water pistols and all of them tried to outdo Bruce's escalating level of armaments. Bruce had been part of the nascence and maturation of the specialty of pediatric neurosurgery. He was on the founding committees of the International Society for Pediatric Neurosurgery and the American Society of Pediatric Neurosurgeons. He was a past President of the Canadian Neurosurgical Society and also he was a board member of the American Association of Neurological Surgeons (AANS), which organization in 1998 honoured him as the first recipient of the Franc D. Ingraham Lifetime Achievement Award. An avid skier, he received a lifetime membership in the Canadian Ski Patrol and in recognition of his voluntary activities for that organization and others, he received the Queen's Jubilee Medal from Her Majesty, Queen Elizabeth II, in 1977. Many of these activities and the awards, as well as his collection of military armaments are found at home in his den to which all visitors naturally gravitate - truly a man's room, personal, historical, comfortable and, messy! Throughout his career, Bruce enjoyed the great support of Gloria and their children - Sheelagh and Michael, and more recently their grandchildren.

In 1988, Bruce delivered a tribute to his Boston mentor, Franc Ingraham. He commented that "as his resident you felt his concern and friendship for you and your family. His generosity and quiet help during times of illness or personal problems was unobtrusive but given with a graciousness that was a source of great comfort. This caring was evident in his concern for his patients and their families." Such should be
said about Bruce as well, for his greatest and lasting devotion has been that to his small patients. He has brought joy to the children for whom he has cared, and their gratitude in turn has showered him with crayon drawings, stuffed toys, small soldiers and large cigars. A not unfamiliar hospital sight late at night was that of Bruce sitting in his office with arms folded across numerous open books on his desktop, while providing fatherly counsel to young parents who seek hope and reassurance for their child's illness. From time to time he had to disappoint, and in expressing his frustration he has been heard to say, "If I had distilled essence of moonbeams to give, I would".

Sometimes when Bruce sipped a single malt whiskey, he would reflect on the quality of life that he defined as, "It's not how long you go, but how long you go well". Bruce Hendrick went so very well through life. The children and staff at the Hospital will continue to miss him.

**Scientific Forums, The Lecture Circuit and Traveling Professorships**

The HSC staff surgeons, who each hold ranking in the university's Department of Surgery, are constantly in demand to participate in a variety of university and professional academic forums. Such require many hours of preparation time as well as for travel.

**DJ2 Neurosurgeons Participate in the Annual Meeting of the Congress of Neurological Surgeons.**

On the scientific program, Jim Drake participated in a session on Reinventing Neurosurgery: Operative Nuances. *Shunt surgery: managing the difficult and impossible shunt. He also presented a paper on The endoscopic shunt insertion trial: Preliminary results.*

Michael Taylor and Todd Mainprize (supervisor Jim Rutka) presented their paper on *cDNA microarray analysis of pediatric medulloblastomas. Michael also presented, Persistent seizure disorder secondary to residual/recurrent dysembryoplastic neuroepithelial tumours (DNET).*

In the seminars forum dedicated to head injury and the shaken baby syndrome, Peter Dirks discussed the *Diagnosis and neurosurgical management of complex pediatric head injury and Shaken baby syndrome.*

In another seminar, Jim Rutka spoke on *Posterior fossa and brainstem tumours in children: Approaches and complication avoidance.*

**AANS/CNS Section on Pediatric Neurological Surgery.**

The 30th annual "Section Meeting" was held in New York, NY, in early December, Robin Humphreys and Peter Dirks represented HSC. Michael Taylor (supervisor Jim Rutka) delivered a paper on *Germline*
mutations of human suppressor of fused predispose to medulloblastoma and Gorlin's Syndrome through failure to suppress sonic hedgehog and Wnt signaling. Abhaya Kulkarni (supervisor Jim Drake) spoke on Development of a health status outcome measure for children with hydrocephalus. Robin also attended meetings there in his capacity as Vice-Chairman of the American Board of Pediatric Neurosurgery.

**And Elsewhere.**

In September, Jim Drake was an invited guest of the Japanese Pediatric Neurosurgical Society. He lectured on, *Pediatric shunt treatment - Risk Management* and also, *Endoscopic third ventriculosity: Assessing efficacy*. Later in the autumn, he was in George Hinton Lecturer at the University of Western Ontario Paediatric Neuroscience Refresher Day. His topic was Advances in the treatment of spina bifida and hydrocephalus.

Robin Humphreys had engagements in the United States during the autumn. As the annual George E. Perret Lecturer at the University of Iowa, he spoke on *Contemporary issues with spinal dysraphism, and, Lessons learned from 30 years of craniofacial surgery*. Shortly thereafter he went to Stanford University where he spoke on *Controversial issues in the management of pediatric brain tumours*. At Cornell University and the New York Presbyterian Hospital, he instructed on techniques for surgical specialty examinations.

While in California, Robin attended the annual meeting of the American Academy of Pediatrics (AAP) where as a member of the Executive Committee he participated in continuing negotiations for the Provisional Section on Neurological Surgery within the AAP.

Jim Rutka was a Visiting Professor at Seoul National University, Seoul, Korea. His papers there included, *Recent advances and future direction of brain tumour research; Surgery of brainstem tumours in children; Genetic basis of neurosurgical disease; New models for studying the pathobiology of human brain tumours; Developmental signaling pathways in human medulloblastoma*. At the St. Mary Hospital in Taegu, Korea, he spoke on, *Prospects for the future of neuro-oncology in the new millennium*.

Also during the autumn, Jim was invited to the University of Connecticut where he delivered the Voynek Lecture, *Classification and management of brainstem tumours in children*. Subsequently, at the American Academy of Neurological Surgeons meeting, he spoke on, Germline and somatic mutations of suppressor of fused predispose to medulloblastoma through failure to suppress sonic hedgehog and WNT signaling.
An Annual Nursing Academic Event Is Born!

November 2, 2001 marked the first Neuroscience Nursing Research Day at HSC. With the support of the neurosurgery program and warm welcoming remarks from Dr. Robin Humphreys, this day was comprised of several presentations dealing with contemporary neuroscience issues. The intent of the day was to showcase the work of our neuroscience nurses and to increase accessibility for all staff to learn from presentations that were given at the Canadian Neuroscience Nurses' National Conference, held in Halifax, Nova Scotia, earlier this year.

The topics included Shunt revision pathways, Quality of life with intractable epilepsy, Herniation syndromes, Impact of caring for children and families with neurosurgical illness on staff nurses, Posterior occipital reversible encephalopathy, Locked-in syndrome, and Fluid-balance monitoring in post-transphenoidal pituitary tumour surgery patients. The post-event comments were extremely positive and interest has grown since the session was held. All indications point to this becoming an annual event that will take advantage of multi-discipline speakers.

_Arbelle Manicat-Emo MS, CNS/NP, Shawna Rooke B.Sc. RN CCN, Margaret Skulj B.Sc. RN Herta Yu MN, CNS/NP_

Honours and Awards

_Michael Taylor_ (Jim Rutka, supervisor) has been granted a 2001 PSI Resident Research Award for his paper titled, "Mutations of suppressor of fused predispose to medulloblastoma through alterations in sonic hedgehog and WNT signalling". He also has received a second place prize from the American Academy of Neurological Surgeons, for his research on medulloblastoma.

_Jim Rutka_ received a 3 year renewal of his CIHR grant entitled "Cytoskeletal-matrix interactions in human astrocytomas". He was also named Chair of the Neuro-oncology Committee of the World Federation of Neurological Surgeons. In the Spring he was identified as the 2001 winner of the Lister Prize from the university's Department of Surgery. At the annual ceremony in October, he presented his paper, "Human brain tumours: The last frontier in cancer biology."

_Arbelle Manicat-Emo Receives UofT 2001 Arbor Award_

Arbelle Manicat-Emo, clinical nurse specialist, Neurosurgery, is the recipient of a 2001 Arbor Award for outstanding volunteer service to the University of Toronto. The Arbor Award was established to recognize the outstanding personal service of alumni volunteers. In recent years, the award was
expanded to recognize and thank friends of the university who have made generous commitments of
time, energy, and expertise by serving on task forces, boards, and committees. Arbelle was nominated
by University of Toronto faculty and staff.

Identifying the need to keep graduates informed of activities and developments in nursing, she founded
the nursing alumni newsletter *Vital Connections* and was its co-editor from 1991 to 1996. As the alumni
representative, she also made an important contribution to the planning of the annual Research Day for
nursing. Arbelle is a member of the faculty's Alumni Association, a permanent member of the Class of
1991 executive and a mentor for students preparing for a career in nursing.

**HSC Wins Three Year Accreditation Approval**

At regular intervals, the Canadian Council on Health Services Accreditation (CCHSA) examines the quality
of care in all Canadian hospitals. Characteristically 3 reviewers, usually a physician, nurse and a senior
hospital executive, visit the hospital under assessment and spend several days examining the
performance of the hospital and its staff with respect to national standards. In early October, HSC was
subject to analysis after which it received the full, three-year accreditation. The 89-page report
concluded, "Overall, this organization can be commended for its continued development as a premier
hospital within Canada. Without a doubt, it lives up to its reputation as an outstanding performer in the
Canadian health-care system." One surveyor said he always dreamed of caring for children in the
foremost institution in the world, where the highest quality practices and finest research was
complemented by family centered care and, "I think I just visited that place".

For the first time in many years, the neurosurgical unit was the site of a half day's presentation and visit
by the CCHSA surveyors. Neurosurgery clinical leader Margaret Skulj, B.Sc. RN, served as the
accreditation team leader, working at the direction of Polly Stevens, Marie Pinard and Janice Campbell.
The preparations for this accreditation visit began in the autumn of 2000. Margaret demonstrated
energy, enthusiasm, extraordinary patience and supreme organization when she brought together a
broad multi-discipline group of professionals who completed the requisite documentation and response
strategies pertinent to the neurosurgical, trauma, plastic surgery, urology and ophthalmology programs.
She added some innovative touches, one of them being the inclusion of a parent (of a neurosurgical
patient) as part of the team. In a message to nursing staff, Chief Nursing Officer, Janet Rush said, "The
(survey) team was impressed with the organization and preparedness of the hospital, the teamwork
evidenced (and) the positive attitude of the staff." They must have had Margaret in mind for she was
responsible for our showing. She certainly deserves our thanks and respect.
Synaptic Connections

Thanks and a Tribute to Michael Strofolino

Early last year, Michael Strofolino, President and CEO of the Hospital for Sick Children announced his intention to retire at the end of his current contract. This will take effect in the next few months. We can understand the difficulty "Mike" had with his decision because his self-confessed "passion for Sick Kids" is almost palpable. Board of Trustees Chairman, Alexander Aird said "that there was overwhelming support for Mike Strofolino to continue his role, beyond July 2002, for at least one or two years". But the Board respected Mike's decision and stated that new leadership "will build on the solid foundation of excellence created under Mike's direction."

It is unique that surgeons will line up with unqualified support for their hospital's CEO. That such happened at HSC was apparent during Mike's tenure. Mike has been especially loyal to the staff on the Division of Neurosurgery. He recognized the importance and quality of our achievements and offered recruitment and retention strategies. He was a motivating factor in the creation of the Hoffman/Shopper's Chair in Paediatric Neurosurgery (see: The Neurotransmitter - Summer 2000). His enthusiasm for all aspects of HSC reminds one of the football locker room at game time, when Coach Mike convinced his surgeons that we were the best and we would win. Mike Strofolino is one unique guy.

Announcements

Dr. Dominique Renier Invited as the 2002 EB Hendrick Visiting Professor

Dr. Dominique Renier, neurosurgeon at the Hôpital Necker-Enfants Malades, and the University of Paris has been invited to be the 2002 E. Bruce Hendrick Visiting Professor. For several years, Dr Renier has been the world's most authoritative voice with respect to the neurosurgical issues of craniofacial surgery. He has recently reported on 2,220 children with craniosynostosis referred to his unit between 1976 and 1999. During his visit, Dr Renier will participate in a mini-symposium on craniofacial surgery at HSC.

Facts

The Sayings of Dr. Bruce Hendrick -

1. On the importance of taking a history - "Whatever mother says!"
2. On accepting advice from those who do not take responsibility - "Beware the reckless courage of the non-combatant".
3. On participation in committee work - "A committee is like a tax. You never get rid of it."
4. On milestone birthdays - "Any man who says he can do at 40 what he did at 20, didn't do much at 20!"
5. On pushing the envelope - "if you gild the lilly, the petals fall off!".

**Publications - Released January-December, 2001**


Humphreys RP: Editor, Surgery Newsletter (Vol 17) and *Surgical Alumni Newsletter* (Vol 16). University of Toronto Department of Surgery.


A health care teaching and research centre dedicated exclusively to children; affiliated with the University of Toronto.
Editorial Comment

The Globalization of Professional On-call/Away Times and Competence - Shift Work and Corporate Rules?

During the last six months there occurred a number of seemingly unrelated events that in the future could have a significant impact on the delivery of surgical care in Canada, to say nothing of one’s relationship with his or her surgeon. In no particular order these included the announcement from the province of Ontario that test sites will be established to guarantee that communities have round-the-clock access to a wide range of health services. In January, the Professional Association of Interns and Residents of Ontario (PAIRO) stipulated that their membership is not allowed to take more than 1:4 first call "in house" (physician spends 24 hours on duty in the hospital). Simultaneously, the National Health Service (NHS) in the United Kingdom stated that their house officers and registrars must adhere to a 1:5 first call rotor. Further, medical and union negotiators are advising the NHS to limit all medical practitioners in the UK to just less than 50 hours of work per week. As a followup, a distinguished British academic surgeon spoke to these matters in Australia in May. Meanwhile, consultant neurosurgeons at the premier children's hospital in France were instructed that they are disallowed from any form of patient contact after a night of first call. Also in January, the Royal College of Physicians and Surgeons of Canada for the first time expected its certified members to complete documentation of their year 2000 continuous professional development activities. In April, the American Association of Neurological Surgeons (AANS), the world's largest professional neurosurgical organization held its 69th annual meeting in Toronto. Coincidentally during that same week, the review teams from the Royal College were also in Toronto evaluating all of the postgraduate training programs that are associated with the Faculty of Medicine at the University of Toronto. And finally, just as this issue of The Neurotransmitter was about ready, a Globe and Mail front page reported on pilot fatigue in an article that was titled "Asleep in the cockpit." Is there any commonality to all this? For the time being at least these events are somewhat disconnected, but given the discussions that are taking place in multiple forums and in multiple countries, the nature of a consultant surgeon's practice is likely to change in the future.

It's called work hours and away time, with the resulting impact on human resources and performance. The Ontario government's pilot project, known as Family Health Networks, would guarantee that patients have 24-hour access to medical services in their own community. This would provide care by those physicians, nurse practitioners and others who are most knowledgeable of their own patient base. While offering convenience for patients, the arrangement amongst other things is also intended to dilute patient input to the over-crowded provincial Emergency Rooms. But round-the-clock service
implies shift work for all the providers who as a corollary will require time off. For some this formula would seem contrary to the extraordinary hours of work each week that is a characteristic of the practice of medicine. Such is usually advertised by physicians as, "Always available for the needs of my patients." But, the principle of a physician's work hours and due time off has recently come under increased scrutiny by many organizations globally. Should physicians put limits on their work week and if so, how?

First of all, Canadians are not as overworked as they might think. Roper Reports Worldwide states that the average Canadian workweek for full time employees is 42.2 hours, just below the U.S. average of 42.4 hours and 29th on the global scale, placing Canada marginally ahead of the U.K., Italy and France. (Korea is first with 55.1 hours.) But all types of professionals, many of whom would not consider themselves as "full time employees," knowingly stretch the limit. In so doing, is the professional performing with optimum ability or, putting themselves and others at risk? This brings up the Globe and Mail article. Historically, the airline industry serves as the benchmark for its continuing examination of work hours with respect to flight crews. The U.S. National Aeronautics and Space Administration (NASA) has studied pilot fatigue. It determined that travelling during the day, especially crossing time zones with layovers, affects one's circadian rhythm (which is based in some way on the daily alternations of darkness and light) by not allowing adequate time for the body to attain adequate sleep. Some researchers refer to the "window of circadian low" as being the time between the hours of 0200h and 0600h when performance declines and interestingly, when certain man-made disasters have occurred (eg. the 1979 accident at Three Mile Island Nuclear Station in Pennsylvania). Cumulative sleep loss, continuous hours of wakefulness, and circadian time of day are the factors that lead to pilot fatigue. Hence, the world's airlines and their pilots' unions are in constant dialogue about the maximum number of hours known as "flight time" (which is distinct from "duty time") that are allowable each month. The Globe and Mail article reports that the time the pilot spends actually flying the plane must not exceed 300 hours over 90 consecutive days. By that arithmetic measure, should surgeons be restricted in their cognitive and operative tasks with patients to 25 or even 30 hours each week? Do we approach the extreme situation as exists in some Scandinavian countries where surgeons can work only so many days each month? Proposed changes to a physician's duty hours are essentially directed at their cognitive and decision-making performance and additionally for surgeons, their manual operative skills. Presumably these principles lie behind the recent actions taken by PAIRO in Ontario and with the surgeons at Hôpital Necker Enfants-Malades in Paris.

Professor Sir David Carter, former surgeon to the Queen and presently Vice-Principal of Edinburgh University, spoke on surgery at the crossroads in an invited oration given to The Royal Australasian College of Surgeons in May. While assessing the general state of the National Health Service in Great Britain, he commented specifically on the provision of surgical care. With respect to the altered on-call system that now affects the registrars in the U.K., Sir David expressed concern about the future quality and duration of postgraduate training programs in surgery. He demonstrated that 10 years ago when the on-call rotor for general surgical trainees was more intense than presently, a registrar having
completed his/her training program would have accumulated in excess of 25,000 hours of operating room experience. He predicts that given the new 1:5 first call system, a registrar who fulfills the existing program requirements (which are measured in chronological rotations) would have nearly 50 per cent fewer hours of operating room activity. Should surgical trainees be subject to the same regulations that apply to those securing a pilot's license who before becoming eligible, must log a stipulated number of flying hours? Or, how many hours of practice are necessary to produce a concert pianist, ballerina or professional athlete?

Certainly Professor Carter is aware of the impact of the training and practice of surgery on human resources in the U.K. If it is deemed that the training programs, for surgeons at least, will have to be lengthened in order to meet minimum practical operating room experience, then there will result a paucity of newly graduated surgeons to fill available consultant positions. While it might appear that this would be only a transient deficit it could be argued that there may be more opportunities in the U.K. for consultants than qualified personnel to fill the positions, for several years. For, in addition to Sir David's observations it is noted that some British surgeons especially those engaged in high stress activity, have been taking advantage of an established NHS early retirement package by leaving practice at age 60 years. Further, if surgical consultants are limited in the number of hours of work allowed each year, then continuing patient demand will necessitate more surgeons. And that could result in the dilution of a surgeon's case experience, which brings us to the maintenance of competence and surgical skills.

If physicians are restricted to "x" hours each week for patient contact such as time on call, or time spent in the operating room, in clinic or making rounds (ie the pilot's "flight time"), then does there exist for the physician an equivalent to the pilot's "duty time?" The latter refers to the additional pre- and post-flight work that a crew spends gathering meteorological data, equipment checks and so forth. The surgeon's equivalent would entail the preparation of medical records and reports, review of patients' laboratory and imaging data, the arrangements for a patient's hospital admission and surgery, etc. There are also additional expectations for the academic surgeon such as research and teaching time, to guarantee the maintenance of standards, the process of continuous professional development (CPD) has been set forth by the Royal College of Physicians and Surgeons of Canada. The College regularly evaluates the Canadian university postgraduate training programs as to their structure, content, work loads, educational curricula, and hospital resources etc, as happened at the University of Toronto in April. Having monitored the training programs, the college then assesses individual trainees for the quality of their training and the level of their experience. Ultimately the postgraduate physician or
surgeon is subject to a rigorous process of examinations, the success with which determines whether that individual will be recognized as a "specialist" in their chosen field. The most recent development is the evaluation of one's continuing study habits or CPD. In order to maintain one's specialty certification and membership, the college expects its members to acquire a requisite number of credits over a five-year term, through accredited group and other learning activities, educational development, teaching and research, structured learning projects and accredited self-assessment programs. All members of the Royal College are subject to this review that in the end will confirm for patients that their certified physician is "keeping up to date." The HSC neurosurgeons will not have any difficulty achieving their individual quotas because of their personal commitments to education and research. For example, each holds ranking in the university's Department of Surgery, all are constantly in demand to participate in a variety of university and professional academic forums, such as the AANS meeting held in Toronto in the spring (see: Scientific Forums, The Lecture Circuit and Travelling Professorships). Such activities involve many hours of preparation time as well as that necessary for travel. Just as corporate executives must travel and do business, so also do academic surgeons. Participation in continuing medical education is not vacation time but rather necessary and obligated time away for the patient's ultimate benefit.

So, the surgeon's hours are filling up. Now that summer is here is there any time left for families, friends, leisure travel and personal interests? Former Royal Bank Chairman and CEO John Cleghorn has been quoted on the importance of an individual's allowable annual vacation time, of which he personally took maximum advantage. It seems fair to compare most surgeons to the senior corporate executive, given the number of hours surgeons work each week as well as on weekends. One also wonders whether a holiday formula for surgeons should build in "bonus days" that are proportionate to the number of days a surgeon spends on call during the year. For example, does one group of surgeons who each year work a 1:4 call schedule deserve more time away than other physician clusters with a less demanding on-call rotor? All of that provokes consideration of how much more important is a surgeon's mental health compared to that of a law partner, airline captain, executive vice-president, or banker?

The learned professions, of which medicine is one, subscribe to the principles of self-determination and self-regulation. Given the altruism of quality of patient care, this whirlwind of activity during the last six months presents some interesting challenges for the future with respect to professional self-governance, available human resources and the economics associated with those, and specific to surgeons, their maintenance of competence.

Robin P. Humphreys

Paediatric Pain Management for the Neurosurgical Patient
Pain and pain management are topics that come up often for discussion with families and patients about to undergo a neurosurgical procedure. Pain is an important issue to address for two reasons. It is often the first experience for children and their families with the health care environment and therefore, the way pain is managed is precedent setting for future interactions with all health care providers. Secondly, the consequences of unmanaged pain have physiological, psychosocial and economic implications. Unmanaged pain causes increased anxiety, fear, sleeplessness, fatigue and depression. Unmanaged pain initiates a stress response that can impede healing and place unwarranted demands on various body systems. Pain generally affects the patient's overall functioning and mobility, that in turn can extend hospitalization and be responsible for secondary ailments.

The physiology responsible for the pain experience in the surgical patient is caused by mechanical trauma (the surgery and tissue dissection), and the subsequent chemical trauma (swelling and irritation following surgery). In neurosurgical operations there are receptors present in the skin and all the way through to the dura (the outermost protective layer of the brain and spinal cord). These receptors, called nociceptors, are very sensitive to painful stimuli and when they become stimulated send messages to the spinal cord. Depending on the type of the pain stimuli the message is either transmitted via A fibres or C fibres. So called fast pain is transmitted by A fibres (for sharp pain) while C fibres (slow pain) transmit dull aching pain. From the spinal cord there are various pathways that carry the pain message to the brain. The sensation of pain is generated in the thalamus; the sensory cortex localizes the pain to a part of the body and the brain's limbic system relates one's previous experiences to the pain. There is also a hypersensitivity reaction that occurs once there has been an insult to an area. The nociceptors having been activated previously develop a decreased threshold for painful stimulation. What this means is that things that generally would not cause an individual pain can be painful once this pain experience is initiated, as for example by combing hair or removing bandages.

Although the pain process appears to be well defined, it has only been within the last 20 years that the issue of paediatric pain has been recognized. Prior to this time it was assumed that the child lacked the physiological maturity and ability to experience pain. A review of the medical and nursing literature over the last 20 years reveals that the subject was addressed as, "Do children experience pain?" This attitude highlights the incongruities in paediatric pain management. At last, the recent literature has examined the unique aspects of paediatric pain management.
Originally, it was thought that children did not experience pain similar to their adult counterparts. This was highlighted in many studies that examined adult and paediatric patients undergoing identical surgical procedures and comparing the postoperative pain management strategies of the two patient groups. These studies concluded that children were ordered less medication and narcotics (both in dosages and duration) than their adult counterparts. A 1983 study is perhaps the most noteworthy as it highlights the key issues in respect to paediatric pain management. This study reviewed the post operative pain management of 170 paediatric patients subject to various operative procedures. The findings of the study were, (1) That there was lack of uniformity amongst surgeons for the treatment of pain with respect to the ordering of pain medications and, the dosing amounts and schedules. (2) That pain medications for children were ordered "as necessary" (prn). Therefore the administration of pain medications was left up to the subjective interpretation of the nursing staff at a time when pain assessment for children was not fully understood. (3) That when narcotics and non-narcotics were each ordered, non- narcotics were given more frequently than narcotics. The most striking result of this study was that 75 per cent of patients complained of pain in the post operative period but only 16 per cent received pain medications!

The conclusions of these studies illustrate what were the primary reasons for unmanaged pain in children - a lack of knowledge and, the difficulties encountered when assessing pain in children. The lack of knowledge primarily speaks to a lack of education regarding paediatric pain for all those within the medical profession. As a result, certain dogma surrounds the recognition of paediatric pain. The early medical literature lacks information regarding the safety and efficacy of analgesic medications in children. For example, there is an overwhelming concern regarding the risk of respiratory depression by narcotics as well as the fear of opioid addiction in children, both of which have been found to be no different than that in adults (when ordered appropriately). This overall lack of knowledge created a vicious cycle in which there was inadequate prescribing of medications that in turn allowed children's pain to go unmanaged.

The other issue prevalent in the literature concerns the difficulty when one assesses pain in children. The child is unique in the evaluation of their pain because of their limitations related to language, cognitive development, communication and the lack of prior experience with pain. These factors make it difficult for children to convey anything specific about the nature of their pain and also, their ability to interpret their experience. Younger children may not understand what is happening and misinterpret their pain. Many of our children have not had a painful experience like this before and thus are not able to put it into context. As adults we can say we are having pain and qualify it in some detail. Children at varying ages have difficulty verbalizing their pain and therefore present in different ways. Pain may also
be manifested in the patients' behaviour and activity. Children will often not report pain to the nursing or medical staff who must then possess a high degree of suspicion for pain and be prepared to offer a multifaceted approach to pain assessment. This is where pain scales can be used as effective tools. These allow for consistent tracking of a patient's pain experience. There exist many pain scales in the literature that are reliable for capturing the child's pain experience, thus directing appropriate intervention. Depending on the scale and the age of the child there is a differing emphasis put on behaviour, activity and the self-report of pain.

The early literature also failed to recognize the child's interdependence within their family unit and thus overlooked the importance of the parents in a child's pain experience. Parents know their children best and know how their child is responding to pain. Research has proven that parents can accurately report their child's pain, as children are able to express their pain experience to their parents in their own way. Research has also shown that the parents' perception and response to their child's pain will influence positively or negatively the child's perception and reaction to the pain. Increased parental anxiety is often involved with the child's behavioural distress. Thus, parents who are prepared for what will happen will provide more effective support to their child.

Thus far we have discussed the general literature of paediatric pain management. There is limited literature on pain management in the neurosurgical patient. Although many of the reasons for the lack of literature specific to this patient population are related to the aforementioned, there is something unique about the neurosurgical patient that cannot be overlooked. Neurosurgical practice has been based fundamentally on the clinical neurological examination that is important for detection of post-surgical complications. Patients need to be alert and awake to cooperate with the examination. As a result, analgesics that provide pain relief and sedation (eg. morphine) have not been used routinely in the neurosurgical patient as they may blur the neurological testing. However the pain management strategies for the neurosurgical patient, adult or child, are being questioned presently, with the hope of finding a balance between pain management and the value of continuing clinical evaluation.

At HSC the neurosurgeons and nursing staff are very aware of the issues that surround paediatric pain control. While it would be unrealistic to think we could make the neurosurgical procedure absolutely pain free, the neurosurgical team is dedicated to minimizing the pain in our post-surgical patients. Our strategies to accomplish this goal involve formalizing our past pain management techniques. This
involves setting up specific pain protocols using pain measurement scales, educating new residents on the uniqueness of paediatric pain, and similarly educating patients and families who are performing pain assessments. Lastly we must recognize that surgical procedures inflict pain and address this matter prior to the surgery. With these strategies and a strong team approach we will move forward to minimize the pain experience for our children.

*Tina Popov, MSc, CNS/NP*

**Residents and Fellows - July 1st**

**Dr. Patrick McDonald** the 2001-'02 Match fellow is a 1992 honors graduate from the medical school at the University of Toronto. He has completed the university's training program in neurosurgery as well as graduate studies in epilepsy research in the Bloorview Epilepsy Research Laboratory at the UoT Department of Physiology. In June, he obtained success with the Canadian Royal College examinations. Pat holds a number of additional honours including an MRC sponsored neuroscience fellowship under the jurisdiction of the Canadian Congress of Neurological Sciences. Pat was here during the first six months of 1996 for his resident rotation and will devote his professional career to paediatric neurosurgery.

**Dr. Carl Bruce** states that his professional objective is to "achieve a distinguished career as an academic neurological surgeon and neuroscience researcher." To those ends he has received scholarships and awards prior to and following his graduation from the University of West Indies where in 1993, he qualified with his MB BS. In 1998, he passed the examinations of the Royal College of Surgeons of Edinburgh, thereby obtaining his FRCSEd. In 2000 he passed Part I of the Doctor of Medicine (DM) degree (which in the English system differs from that in North America). Carl is sponsored by his home university for further clinical experience at the Hospital for Sick Children.

**Dr. Stephen Santoreneos**, having finished his primary schooling on the Island of Kalymnos, Greece, then travelled to Australia where upon completion of high school he entered medical school at Adelaide University, from which he graduated in 1990. His neurosurgical training took place in both Adelaide and Sydney, Australia, and he was admitted as a Fellow, Royal Australasian College of Surgeons, in January 2000. The Royal College has awarded him the W.G. Norman Fellowship to study ß-amyloid precursor protein as a marker of axonal injury in spinal cord trauma. Stephen continues the "Adelaide connection"
following in the footsteps of former HSC fellow Brian Brophy (1980) who was one of Stephen's instructors.

Dr. Abhaya Kulkarni is a face familiar to many at HSC. He worked with the Division staff as a summer student and like Pat McDonald, graduated with honors from the UofT medical school, in 1994. At present, Abhaya is completing his Doctor of Philosophy program in the Department of Clinical Epidemiology & Biostatistics at McMaster University. Abhaya also holds a number of past awards for his research including the Duncan L. Gordon Fellowship in Clinical Pediatric Research and the year 2000 Congress of Neurological Surgeons resident award. Abhaya will arrive for his six months rotation on October 1st.

Also attached to the Unit are Dr. Torben Hansen who is completing his 6 months experience before returning to Aalborg, Denmark later this summer, and Dr. Mohammed Bin-Mahfoodh from the UofT program and Dr. Hisashi Hatano from Japan.

Dr. D. Douglas Cochrane - The First Canadian to be the E. Bruce Hendrick Visiting Professor

The E. Bruce Hendrick Visiting Professorship was established in 1986 to honour Canada's first full-time paediatric neurosurgeon. Following studies at the University of Toronto and then the Children's Hospital in Boston, Bruce Hendrick returned to HSC in 1954 to begin his practice for children with surgical disorders of the nervous system. During his 36-year career at HSC, Bruce Hendrick showed unlimited dedication, skill, compassion and intuitiveness - all allied with an impromptu wit and playfulness.

In keeping with Bruce's devotion to Canada, Dr. Douglas Cochrane, the Surgeon-in-Chief at the Children's and Women's Hospital, Vancouver, B.C., is the first Canadian speaker invited to be the annual Visiting Professor. In addition to his successes as a surgeon-administrator and teacher at the University of British Columbia, Dr. Cochrane is held in high regard throughout North America for his thoughtful, intelligent analyses of contemporary issues in children's neurosurgery. In early June, he spoke to the UofT neurosurgical faculty, residents and fellows on, There but for the grace of ... Complex systems and risk reduction in neurosurgery and in a second lecture, Cord untethering: Expectations and results. During these presentations Dr. Cochrane sprinkled in various memorable quotations that he had learned from Dr. Hendrick. The university residents were also quite impressed by Dr. Cochrane's analytical experience that shone through during the two hours of "bear pit" instruction session with them.

Scientific Forums, The Lecture Circuit and Travelling Professorships

As noted in the editorial, the HSC staff neurosurgeons have many external obligations to attend the
meetings of professional organizations, at which a variety of academic presentations are given. The following list outlines the events during the first six months of this year.

The annual meeting of the American Society of Pediatric Neurosurgeons is usually held in January. At the 24th meeting this year, Jim Rutka presented a paper on indications and utility of tumour biopsy in the paediatric population, while Peter Dirks delivered a paper on aberrant localization and signaling from a PDGF receptor-alpha isolated from a glioblastoma.

As mentioned earlier, the American Association of Neurological Surgeons returned to Toronto, after an absence of 13 years. Jim Drake took part in a seminar on third ventriculostomy: indications, techniques and outcomes.

Robin Humphreys participated in a seminar on Advances in the management of paediatric brain tumours where he spoke on controversies in the management of paediatric brain tumours.

Jim Rutka participated in a seminar on third ventricle tumours.

Howard Ginsberg (Jim Drake, supervisor) delivered a platform paper on, cleaning ventricular catheters with ultrasonic cavitation. Walter Hader (Jim Rutka, supervisor) also presented surgical treatment of epilepsy in children with cortical dysplasia: A review of 42 cases. Poster presentations included one from Mubarak Al-Gahtany (Jim Rutka, supervisor) central nervous system sarcoma in the paediatric patient.

The HSC neurosurgeons also hold responsibilities for various administrative functions. In addition to acting as the Co-Chairman for Local Arrangements for this meeting, Jim Rutka was elected chairman of the AANS/CNS Section on Tumours. Robin Humphreys attended meetings with the American Board of Pediatric Neurosurgery in his capacity as Vice-Chairman.

The 36th meeting of the Canadian Congress of Neurological Sciences was held in Halifax, N.S., in June. HSC neurosurgery was extremely well represented. Platform presentations were delivered by: Walter Hader (Jim Rutka supervisor): Surgical treatment of epilepsy in children with cortical dysplasia: A review of 42 cases. Todd Mainprize (Jim Rutka supervisor): Expression of notch-1 protects U251 astrocytoma cells from apoptosis in response to serum depletion. Jim Rutka: Multiple subpial transections in the surgical management of paediatric epilepsy. Michael Taylor (Jim Rutka supervisor): Truncating mutations of human suppressor of fused (hSu[fu]) in paediatric medulloblastomas: Implications for sonic hedgehog and Wnt signaling.

A total of nine poster presentations were delivered - Peter Dirks: Surgical treatment of moyamoya disease by direct EC-IC bypass. Abhaya Kulkarni (Jim Drake supervisor): Repeat cerebrospinal fluid shunt infection in children. Todd Mainprize (Peter Dirks and Jim Rutka supervisors): Focal malignant midbrain
tumours in young children: Report of two cases; Novel truncating germline mutations in VHL tumour suppressor gene presenting as type II Von Hippel Lindau syndrome.


There were various other lectures and invited professorships in which the neurosurgical staff participated. At the UofT Department of Paediatrics, Paediatric Update 2001, Peter Dirks gave a contemporary paper on, Concussion and sports: Should my child play hockey?

Jim Drake's year began with his participation in the 8th Annual Neurosciences Banff Conference, where he spoke on paediatric hydrocephalus - risk management. He subsequently visited Greece where he took part in the 3rd International Hydrocephalus Workshop, sponsored by the Hellenic Neurosurgical Society. His papers were, patient selection and avoidance of complications in 3rd ventriculostomy, and Prospective clinical trials in CSF shunt treatment - Firm foundation for future investigation. He was also invited to Detroit, Mich., for the retirement symposium for Dr. Alexa Canady, America's first black, woman neurosurgeon. In keeping with Dr. Canady's long-standing interests, Jim spoke of the reality of shunting in hydrocephalus.

Robin Humphreys was a Visiting Professor at the University of Miami, Departments of Surgery and Paedics where he spoke on contemporary issues with spinal dysraphism, skin signatures of spina bifida and, Idiosyncrasies of pediatric arteriovenous malformations. A month later he was an invited teacher at the postgraduate course in Pediatric Neurosurgery in The Netherlands, sponsored by the European Society of Pediatric Neurosurgery. In addition to several interactive sessions, he lectured on neonatal and childhood and brain abscess and diastematomyelia, sinuses and fosette. An invitation followed from the Royal Australasian College of Surgeons and the Neurosurgical Society of Australasia to attend their joint meeting in Canberra, Australia, in May. Robin spoke on Controversy in the management of paediatric brain tumors, lessons learned from 30 years of craniofacial surgery and, management of paediatric cerebral AVMs in this millennium. He also acted as a Visiting Professor and Consultant at the Royal Brisbane Hospital and the Royal Melbourne Children's Hospital.

In January, Jim Rutka was an invited lecturer to a conference at the New York Memorial Sloan-Kettering Cancer Center where he spoke on neuroscience - neuro-oncology. Later in the month at a similar conference in Houston, Tex., devoted to "The Decade Ahead" he lectured on molecular determinants of glioma invasiveness. In the spring he spoke on the role of multiple subpial transections in epilepsy surgery.
in children, at the University of Virginia, and then at the Society of Neurological Surgeons' meeting in
Cleveland, Ohio, he talked on the molecular basis of neurosurgical disease. Each May, the UofT
Department of Surgery sponsors Gallie Day at which UofT surgical staff and residents are asked to
present their best material from the year. Jim delivered a paper on new models for studying the
pathology of human brain tumours.

Honours and Awards

**Dr. James M. Drake** has been appointed a full professor in the Department of Surgery at the University
of Toronto. An HSC surgeon and faculty member at the UofT since 1988, Dr. Drake's promotion comes
after several months of rigorous analysis of his academic, research and educational accomplishments, by
the university. These must match the achievements of others that aspire to this rank not only within the
Faculty of Medicine but throughout all university faculties.

The annual Alan R. Hudson Faculty Teaching Award was given to **Jim Drake** in recognition of his
continuing teaching efforts and in particular his innovative educational OSCE and endoscopic instruction
programs for the UofT neurosurgical residents.

**Howard Ginsberg** in a 4-year alliance with Jim Drake, supervisor, successfully defended his PhD thesis on
Recanalization of obstructed cerebrospinal fluid ventricular catheters with ultrasonic cavitation.

**Michael Taylor**, a frequent prize winner, received first place in the annual TP Morley residents' research
competition which is held in conjunction with the W.S. Keith Visiting Professorship each February. (Dr.
Keith was a neurosurgeon at both HSC and the Toronto Western Hospital. Professor Morley was the
UofT Chairman of Neurosurgery from 1963 to 1979.)

Synaptic Connections

**A Distinguished Honour for Mr. David Bloom**

David Bloom's support of the neurosurgical division extends back for more than 20 years. In 1997, it
culminated with his sponsorship of the Harold J. Hoffman/Shoppers Drug Mart Chair in Paediatric
Neurosurgery. A 1967 graduate from the Faculty of Pharmacy at the University of Toronto, Mr. Bloom
has become the Inaugural Inductee in the Canadian Retail Hall of Fame. This very special honour is a
tribute to David's career with Shoppers Drug Mart where he began as a pharmacist associate in 1968. He
has just retired as Chairman and CEO of that organization. Mr. Bloom is the recipient of numerous other honors and awards, from the Ontario Pharmacists' Association, Canadian Public Relations Society, Canadian Council of Christian and Jews, McGill University and the Hebrew University of Jerusalem. It was well put at the celebratory luncheon sponsored by the Retail Council of Canada where the title of the program booklet stated, "The Best is Yet to Come." The medical, nursing and all the health care staff on the Division of Neurosurgery send their congratulations and best wishes to David Bloom.

New Staff Join the Neurosurgical Program
Kimberly Knowlton-Munn joined our multi-disciplinary team in May 2001 as social worker for the neurosurgery program. She has an extensive background working with children and families in various crisis situations. After graduating from the University of Windsor, Kim continued her studies in Michigan at Wayne State University, for her Master of Social Work degree in 1994. Interestingly, 'Knowlton' is a familiar west Toronto medical name. Kim's 0.5FTE position within our program will greatly help to address and support the emotional needs and challenges facing many of the patients and families on 5C.

Herta Yu is covering the CNS/NP position for the neurosurgery program while Tina Popov is on maternity leave. Herta joined our team in April 2001 and will be with us for six months. She is a graduate of Ryerson Polytechnic University, where she received a certificate specializing in neuroscience. She recently completed the Master of Nursing Science Program at the University of Toronto. For many years, Herta's unique and diverse background in neuroscience has served patients on the neurosurgical unit at the Toronto Western Hospital where, amongst other things, she established their neurosurgical step-down facility.

Facts

During the last 30 years, 261 fellows and residents have received their postgraduate neurosurgical education while working on the HSC Division of Neurosurgery. They have returned to work across Canada and the United States, as well as Argentina, Australia, Brazil, England, Germany, Iran, Ireland, Israel, Italy, Japan, Korea, Panama, Saudi Arabia, South Africa and Taiwan.

A health care teaching and research centre dedicated exclusively to children; affiliated with the University of Toronto.
Clinic!

One afternoon during the summer holidays I was in a hardware store watching the clerk mix a formula for some household paint. This was on a day when otherwise I would have been in clinic. As that thought surfaced, things developed around me that provoked comparisons with typical clinic activity. First there was a telephone call to the clerk from a customer seeking a follow-up on an order for paint. Then another member of staff asked my clerk where he had placed some articles for her? As he started away to complete my coloring job he was accosted by another clerk who wanted more information on a lawnmower reserved for her customer. When the clerk finished with me the commotion continued with my next door neighbour who was also seeking information about his paint order. Maybe this store needs more clerks? Not necessarily. Think of the parallels to a day in clinic. Telephone calls arrive in clinic from callers, usually physicians within the Hospital as well as from many sites across Canada and the United States. Or HSC nurses, therapists or physicians come to clinic to speak to staff there about patient cases of varying degrees of complexity. And just when everything appears to be under control, the staff surgeon who is in clinic has to leave for the operating room to provide advice or assist on an unplanned procedure. And so forth.

Each week there are 157 outpatient clinics held within The Hospital for Sick Children. Most begin at 0800h daily and some may last to 1800h. More than 2,500 patients are seen on any given weekday. The Division of Neurosurgery has 5 outpatient clinics each week, each of which last most of the day. The clinic is supervised by one of the staff neurosurgeons (usually the child's responsible surgeon), who is assisted by various fellows, residents and nurse practitioners. The clinic also serves as a setting for academic instruction to medical students and visiting surgeons. We have much to be proud of in our neurosurgical clinics, especially the staff who are of tremendous assistance to families, children and the surgeons. Diane Vitaliano is the first voice one hears at the time when a clinic appointment is booked. Possessing radar-like qualities, Diane can scope out names, dates and physician addresses even without checking her stored PC files. Patti Rowe is the surgeons' "boss" as she is a solid link to the details of the child's inpatient care and their presence in clinic. She knows a child's diagnosis, family situations, and recent laboratory information and often she has made a correct analysis for a child's unplanned reappearance in clinic. Susan Awrey and Maria Pereira who are well known to children who have been inpatients supervise the Same Day Admit program. They are responsible for all the processing and its
attendant paper work for a child who is to be admitted electively for surgery. During this particular phase they serve as the link between the family and the surgeon. Some children will require certain investigative studies either as part of their continuing care or prior to their admission to hospital. That organizational and booking responsibility falls upon Pamela Beausoleil who works quietly and effectively behind the scenes meshing together the child's needs with the family's availability and the realities of the institution.

**Triage of Referrals - Is a Consultation Really Required?**

Their primary physician must refer all children who require an outpatient neurosurgical consultation. That process involves a note faxed to the clinic that contains the child's demographics, a brief narrative of his/her clinical circumstance that the consultation is to address and, the results of relevant imaging or laboratory tests. Upon arrival, these faxes are reviewed by one of the four staff surgeons, primarily to determine the urgency of the matter and thus the most appropriate clinic date for the child. Sometimes a child's presumed neurosurgical problem would be handled better in an allied clinic, eg neurology, neuro-developmental, orthopaedic surgery, or psychology, and to which the child will be referred on. As well, the neurosurgeons have arranged certain disease specific clinics at HSC in which they participate, such as the combined spine clinic, a peripheral nerve clinic and a rhizotomy clinic (with HSC orthopaedic surgeons and Bloorview-MacMillan staff respectively).

While everyone has a right to seek a professional medical consultation or a "second opinion", sometimes the question is whether in the end it is really necessary? There was a time when the craft of neurosurgery was highly dependent on the relevant medical history, a detailed neurological examination and the experience and gestalt of the practitioner. While these features are still essential to medical practice, the reality is that many professionals and patients believe that the machines are smarter than the humans. Hence the first question often asked by patients is, “What did the (xrays, ultrasound, CT, MRI, arteriogram) show?” As a result a number of consultation requests appear to be justified by a subtle finding on an imaging study. Typical examples include a skull radiograph that suggests early fusion of a skull suture or, an ultrasound examination of the spine that is reported to be "in keeping" with an occult form of spina bifida. In the first instance the prematurely "fused" suture often does not exist, and in the second example there may be the suggestion on ultrasound examination that spina bifida is present when evidence-based literature does not support the reliability of this imaging technique to demonstrate such an abnormality. In both circumstances a physician's examination of the patient may also confirm that the radiological "abnormality" does not match the patient's clinical features. Hence, as
part of the clinic triage process, a staff neurosurgeon will review the imaging and/or its report and if necessary speak with the referring physician. If it is the neurosurgeon's opinion that the child does not need to be examined and that the issue can be resolved via the primary care physician then such is advised. The child and family are thus relieved of a trip to Toronto.

On many occasions a consultation request is advertised as "Urgent" or "ASAP". The clinical reasoning behind these labels is usually provided, but sometimes it is not. Rather than guess at what may be the circumstances, Patti will contact the referring doctor and/or the family to obtain more detail. If in her opinion there is not an "urgent" need, Patti then checks the facts with the identified neurosurgeon. If he is in agreement the family is notified accordingly and an elective date is given. Alternatively, in any circumstance when a legitimate need exists that child is reviewed within the next few days. Such happens almost every week and these appointments are but one factor contributing to crowded clinic lists and patient scheduling.

Why Do I Have to Wait So Long in Clinic?

This question is likely heard more often than any other in the outpatient settings of most clinics in most hospitals in North America. The answer frequently comes down to human factors that to a large extent are uncontrollable. For example, unforeseen commuting or travel difficulties (eg bad weather) may delay a family's on-time arrival. Perhaps this explains that regularly each week some families who hold early morning appointments in our clinics are late for them? A related issue for many is the request that routine appointments be scheduled to coincide with school breaks, holidays or summer vacations. The latter is especially a request from families in Northern Ontario or other remote areas when for example, the summer months are more conducive for travel. And, it can be frustrating for staff and others waiting for an appointment when families (referred to as "no shows") have not called to cancel their child's appointment.

Some children justifiably have to be inserted at the last minute into an established clinic list because of their urgent need. This is most often encountered when a child previously known to us has become ill and is returning unexpectedly. To meet the needs of the child and family and also to facilitate their rapid processing and admission, this child may bypass the Emergency Room in favour of the clinic, if it is in progress when they arrive. Or, by virtue of its status as a tertiary care centre HSC has a substantial number of children who are being treated by multiple specialists in multiple clinics. In the end, every effort is made to coordinate a child's various appointments on a schedule most convenient for the family.
If none of these is the explanation for appointment delays, then there may be "in flight" processing delays caused by incomplete chart or laboratory information. With respect to the latter, the presence in clinic of the PACS viewing system that displays current radiological imaging is especially useful if some of the child's prior studies are not immediately available. As a result of their present review, some children may require additional laboratory studies during the clinic visit. Upon their completion, the child returns to clinic for a decision about the next course of action. And all this will delay their passage through the building.

There are two explanations if one wonders why it is that their surgeon is often seen on, or called to the telephone while in clinic. First he or she may have to receive telephone calls as noted earlier or, on behalf of the clinic patient, make calls to other physicians or services within the hospital to dispense or seek additional information on that patient. As well the telephone serves as a dictating instrument. Upon completion of the child's appointment, the physician dictates a report that is processed centrally and mailed to the child's outside doctor. To delay this vital patient dictation until the end of the clinic would be detrimental to the best interests of the child. Immediate dictation guarantees that the physician's thoughts are focused, the context of the discussion with the parents is fresh and the details of the next course of action firmly set out. Another processing matter concerns the time that may be consumed by paper work brought along by families. This consists of various forms - travel grants, insurance, return to school slips, or parental absentee permissions for employer - most of which must be completed by a physician on site.

Many families are overwhelmed by the prospect of their child having a neurological disease that requires surgical care. This explains the disappearance of one's neurosurgeon into an examining room from which he may not emerge for an interminable amount of time. The surgeon has become involved in a long question and answer session, the substance of which frequently requires repeating.

In the end, whatever is the explanation for the logjam in clinic, one can appreciate that sooner or later the domino factor kicks in and lasts until the clinic is over. Humans dealing with humans and life's major events.

Exit Planning

Many children require continuing assessments of their condition through the childhood and adolescent years. The HSC neurosurgeon will determine at the time of his patient's eighteenth birthday, if that individual's care requires transfer across to a neurosurgeon who works in an adult hospital. Sometimes the original disease process has come to an end and such will not be necessary. Otherwise, one will identify a neurosurgeon and facility that best matches the patient's medical requirements. The
neurosurgical services in the province of Ontario are located in Windsor, London, Mississauga, Toronto (at the Toronto Western Hospital, St Michael’s Hospital and Sunnybrook and Women’s College Health Sciences Centre), Thunder Bay, Sudbury, Kingston and Ottawa.

With this in mind, families are advised to begin organizing their thoughts at about the time of their teenager's sixteenth birthday. After they have turned eighteen, where will they be living and going to school or working? What other medical supports and clinics, at HSC or elsewhere in Toronto, have been required in the past and, will there be a continuing need for them in the future too? What special needs does the family unit have?

The final visit for the "graduating" patient usually takes place on the last clinic date prior to their eighteenth birthday. The teenage patient should also be prepared for that occasion and bring along his/her own questions. These commonly concern the usual long-term outcome of their medical condition and its impact on their schooling or employment. They also ask about the likelihood that they will require additional surgery in the future, as well as personal issues such as the liability to their offspring for a similar condition and in the case of the young woman, her ability to bear and deliver children. Finally, when families learn the identity of the neurosurgeon to whom they are being referred, they are advised to request that a copy of the transfer letter to that surgeon also be mailed to them. Such a letter will reinforce the name and address of the new neurosurgeon and also contain a precis of the clinical details relevant to their child. Such could be of importance if their son or daughter experiences difficulty prior to the date of new neurosurgeon’s appointment, or at any time when the patient is away and traveling.

Robin P Humphreys

Gene Therapy Strategies for Brain Tumors

Cancer, the uncontrolled proliferation of cells, is secondary to a series of accumulated, acquired mutations or alterations in genes that affect the regulation of cell growth, differentiation, death, and genetic stability. Over the past 30 years, research has been able to define many of the genes responsible for turning a normal cell into a malignant one that divides and grows unchecked. Currently, the treatment of cancers (including brain tumors) consists of surgery, radiation therapy and/or chemotherapy. However, with the advancing knowledge of the molecular anatomy of the cancer cell, the possibility of altering cellular processes through gene therapy is becoming a reality. The two major considerations in gene therapy are (1) what gene to transfer to the cancer cells and (2) how to get the gene into the cancer cells.

In general, there are four major strategies developed to accomplish cancer gene therapy. These
Approaches include (1) mutation compensation, (2) molecular chemotherapy, (3) genetic manipulation of the immune system and, (4) viral-mediated cell lysis (bursting of a cell). In the first instance, if a tumor cell has a specific known mutation contributing to its growth, then the replacement of a non-mutated gene into the cancer cell may compensate for the lost function and stop the cancer from growing. For example in glioblastoma multiforme (GBM) a malignant brain tumor, mutations in growth regulating genes such as $p53$ and $p16$ have been shown to contribute to the cancerous process. Replacement of these genes into cancer cells in the laboratory has been demonstrated to slow down or stop the growth of tumors thus suggesting potential therapeutic targets. In the molecular chemotherapy approach, a toxic gene is introduced into the cell making it more susceptible to chemotherapeutic agents. This strategy has been the most popular one to date and has been used in several gene therapy studies of brain tumors. A viral enzyme is introduced into a cell that is able to convert a non-toxic drug into a toxic metabolite, thereby destroying the cell from within. This enzyme is only important in actively dividing cells such as tumor cells, thus allowing for a degree of protection from the treatment for normal cells. As the development of clinically evident tumors implies the failure of the immune system to recognize and eliminate the tumor cells, there is a hypothetical role for modulation of the immune system. The introduction of genes that either increase the immune response or increase the immune recognition of the tumor cells are potential pathways. Finally, certain types of viruses are able to specifically target abnormally growing tumor cells and replicate to a high degree in only these types of cells. When the virus grows to a substantial number, the cell bursts and dies, releasing more viruses to infect and destroy more tumor cells, and so on. Normal cells seem to be protected from this viral replication because of the presence of various growth regulating mechanisms.

Although there are many specific genes that can be used to fulfill the above strategies, the efficient transfer of the genetic material to the tumor is the limiting step. A variety of different vehicles have been developed. These are divided into two types of delivery mechanisms - viral and non-viral. Viruses are small self-replicating particles that consist of a nucleic acid (ie. DNA) core surrounded by a coat of protein and/or lipid material. These viruses have evolved to become highly efficient in transferring nucleic acid (genes) into host cells. Hence they are being used in gene therapy. Although there are a multitude of different viruses with their inherent individual strengths and weaknesses that are currently being used in research laboratories and clinical trials, they all perform the same basic task of introducing a gene of interest into a cell. But an unique problem that may set limiting factors for the treatment of brain tumors stems from the existence of a blood-brain barrier (BBB) which inhibits the passage of larger molecules and particles into brain tissue. A number of strategies have been developed to circumvent this anatomic blockade. These include (1) surgically injecting the virus (or cells carrying the virus) directly into the tumor surgically; (2) injecting the virus into the cerebrospinal fluid spaces; (3) chemically disrupting the BBB temporarily, after which the virus is introduced by an intravenous injection thereby
allowing their entry into the brain via the blood stream. Currently, the most common approach taken is direct viral inoculation into the tumor at the time of the tumor resection. Once the virus is injected into the brain, it will introduce the nucleic acid into the host cell, which will in turn incorporate the gene into its genome. This will leave the host cell with a functional gene, which will perform one of the gene therapy strategies discussed earlier.

Several non-viral gene delivery methods have been developed in order to prevent the theoretical toxicity of the virus. As DNA is a negatively charged molecule that is repelled from the negatively charged lipid cell membrane, packaging it into positively charged lipid bags (liposomes) overcomes some of the problems. Unfortunately, there is relatively poor delivery of genetic material into cells by this method and it is rarely applied to the clinical setting.

There have been several clinical trials that have examined the safety of viral gene therapy in the treatment of brain tumors. These studies have demonstrated that viral gene therapy is safe and feasible and without adverse side effects. Patients treated with gene therapy have not shown infective viral particles in their blood stream nor in various other organs. This verifies that the viral vehicle does not act as a true infection, but remains targeted to the region of the tumor. Although the patient trials to date have shown only a marginal benefit with gene therapy, continued advances in the manner that genes are delivered to cancer cells will assuredly improve survival and quality of life of those afflicted with brain tumors.

Many patients, neurosurgeons and scientists dream of the day when brain cancer is no longer treated with surgery, radiation and chemotherapy but is cured with a single injection.

*Todd G. Mainprize*

**Residents and Fellows - January 1st**

**Dr Walter Hader** is completing the second half of his fellowship year. His impressive skills in pediatric neurosurgery are being sought by a number of American and Canadian children’s centres. Current indications are that he will accept a full-time academic appointment at a children's hospital in Western Canada.

**Dr Patrick Lo** our current Australian ambassador, is completing his year’s fellowship and will depart during January for Sydney, Australia where he will begin practice at the Royal Alexandra Hospital for Children. He is aiming toward a full-time position in pediatric neurosurgery, and will as well have an academic appointment at Sydney University.
Dr Hussam Kutub will remain in his clinical fellowship position through 2001, continuing to add to his extensive Canadian neurosurgical experience. A knowledgeable, caring physician, Dr Kutub’s name is added to those from Saudi Arabia who have preceded him and left their own signatures at HSC.

Dr Torben Hansen is a 1990 medical graduate of Odense University in Denmark. He began his neurosurgical training at that university in 1993 and completed his experience as senior registrar at the Aalborg University Hospital, where his mentor Dr Jens Haase, a long-time supporter and frequent visitor to HSC, has promoted Dr Hansen's visit to Toronto. This year Dr Hansen received his Danish authorization in neurosurgery.

Dr Wai-Shing Winston Ho is a 1992 graduate of the University of Hong Kong where he also took most of his postgraduate training. Most recently his neurosurgical experience has been completed at the Pamela Youde Nethersole Eastern Hospital, Hong Kong. Earlier this year he completed commissioned training in paediatric neurosurgery. Dr Ho is a Fellow, Royal College Surgeons (Edin) and also of the Hong Kong College of Surgeons.

Dr Eric Massicotte transferred to the UofT neurosurgical program in 1999 having previously studied at the University of Ottawa (BSc and MD degrees) and the University of Manitoba (MSc Surgery). His publications denote an experimental interest in hydrocephalus and the histopathological changes noted following its treatment. His work was supported by the American-based Frank E Nulsen Hydrocephalus Research Fund. During his first year in the Toronto program, Dr Massicotte impressed his peers and faculty by winning the Alan R Hudson resident teaching award.

Dr Jay Riva-Cambrin joined the division team in October 2000 as part of his UofT rotation. He will remain for a further 3 months, before taking an elective experience at the University of Zimbabwe. A native of Edmonton, Dr Riva-Cambrin graduated from the University of Alberta in 1998 having secured 6 scholarships, first class standing and placement on the Dean’s Honour List.

Dr Julian Spears, born in London, England, graduated from Dalhousie University where faculty noted his interest in surgery, in part promoted by a Medical Research Council Burroughs Wellcome Studentship. His research and publications centre on neural transplantation for Parkinson's disease and GABAergic grafts in animal models of epilepsy. A certified commercial pilot, Dr Spears' love of the east coast is expressed as guitarist in the professional Rock Island Blues Band.

**Scientific Forums, The Lecture Circuit and Traveling Professorships**

The HSC staff surgeons, who each hold ranking in the university's Department of Surgery, are constantly in demand to participate in a variety of university and professional academic forums.
Several members of the division traveled to San Antonio, TX for the annual meeting of the Congress of Neurological Surgeons. Peter Dirks participated in luncheon seminars on Pediatric spine surgery and Diagnosis and management of child abuse. Likewise, Jim Drake delivered talks in seminars, Current management of medically refractory spasticity: From rhizotomy to Baclofen pump and, Managing shunt complications. Jim Rutka was a speaker in a seminar on Third ventricular tumors: Open, stereotactic, and endoscopic approaches.. He also moderated sessions on Molecular genetics of gliomas for diagnosis and investigation and, Advances in neuroimaging for management of brain tumors.

Two UofT residents won major awards for their presentations. Michael Taylor (supervisor: Jim Rutka) won the Preuss Award for his paper on A novel genetic syndrome of posterior fossa tumors of infancy secondary to germline mutation of hSNF5. At another session he delivered a second paper on Molecular cloning, genomic structure, mapping and mutational analysis of human suppressor of fused (hSu(fu)), a candidate tumor suppressor gene for medulloblastoma/ PNET on chromosome 10q24.3. Ab Kulkarni (supervisor: Jim Drake) won this year's CNS Resident Award for his paper on Cerebrospinal fluid shunt infection: A prospective study of risk factors. Immediate past Fellow, Jeffrey Blount presented HSC experience with Multiple subpial transection in the surgical management of pediatric epilepsy (supervisor: Jim Rutka). The Rutka team also had 3 posters on display, Central nervous system sarcoma in the pediatric patient, Effect of PSC 833 on the growth of human astrocytoma cells in vitro, and Magnetic resonance imaging of mouse brain tumor models.

AANS/CNS Section on Pediatric Neurological Surgery. At the 29th annual "Section Meeting" held in San Diego, CA, HSC was again well represented. Tina Popov, the division's first Clinical Nurse Specialist/Nurse Practitioner was an invited speaker for the Nursing Seminar section. Her topic was Pain management in the pediatric posterior fossa craniotomy patient. In the physicians' Section, Patrick Lo presented Avulsion transverse ligament injuries in children: Successful treatment with non-operative management (supervisors: Peter Dirks and James Drake). Walter Hader delivered a paper on Death following delayed failure of third ventriculostomy: A report of 3 cases (supervisor: James Drake). And, Jeffrey Blount (Fellow 1999-2000) presented Pediatric craniopharyngioma: Long term followup following aggressive surgical resection (supervisor: James Rutka).

Jim Rutka was Visiting Professor at the Department of Neurosurgery, University of California at Los Angeles where he spoke on Cell cycle dysregulation in human astrocytomas, and Present and future management of craniopharyngioma.
Peter Dirks was an invited visiting professor at the St Louis Children's Hospital and Washington University. He spoke on *Regulation of proliferation and differentiation of gliomas: Views from two different approaches*. He subsequently addressed the Toronto Critical Care Medicine Symposium on, *The role of decompressive craniotomy in the treatment of refractory intracranial hypertension in severe pediatric head injury*.

At other American professional organizational meetings during the autumn, Robin Humphreys holds a position on the Executive Committee of the Provisional Section on Neurological Surgery, during negotiations within the American Academy of Pediatrics. In another matter he completed his term as Vice-Chairman, American Board of Pediatric Neurosurgery.

**Honours and Awards**

In addition to those noted above, Michael Taylor (supervisor: James Rutka) received the Chisholm Memorial Fellowship and the Elizabeth Arbuthnot Dyson Fellowship from the UofT Faculty of Medicine for his work in the Clinician Investigator Program.

**Synaptic Connections**

*Neuro-oncology Is Identified.*

HSC has captured Dr Eric Bouffet from the European Union, to become Director of our Pediatric Neuro-oncology Program. A 1980 graduate of the University of Lyon, France Dr Bouffet took further training in the Lyon Municipal Hospitals. He subsequently obtained qualifications in pediatrics, anesthesia and intensive care, and in 1994 oncology. He has served as a consultant oncologist in France and most recently in England, where first he was a consultant senior lecturer in pediatric oncology at the University of Bristol and subsequently, a pediatric oncologist at the Royal Marsden Hospital in London. Dr Bouffet has an extensive bibliography that examines treatment modalities and outcomes for a variety of childhood neurological tumors. His goal for HSC is to provide "integrated care for all children with brain tumor - medical management, rehabilitation, social and psychological support with specific emphasis on learning and speech difficulties". Dr Bouffet will join Dr Sylvain Baruchel and share the increasing load of our brain tumor patients.

*b.r.a.i.n.child Moves from Success to Success*

Brainchild is a group of parents, family and friends who have shared the common experience of caring for a child with a brain tumor. The objectives of this organization are to assist patients, their families and friends through education and shared experiences, to inform the community about the importance of early detection and the special need of children with brain tumors and, to seek and provide funding for research into the causes, treatment and cure of brain tumors.
Brainchild's sixth annual Summerfest was held on a perfect Saturday in August and surpassed all of its predecessors with the fundraising. Deserved tributes were paid to the diligent Mr Gordon West, founding president of the organization and also to Mr Gary Kisiloski for his extraordinary organizing efforts each year on behalf of Summerfest. In his recognition, the b.r.a.i.n.child - Kisiloski Endowment Fund has been established.

Announcements

Dr D. Douglas Cochrane Invited as the 2001 EB Hendrick Visiting Professor

Dr Douglas Cochrane, the Surgeon-in-Chief at the Children's and Women's Hospital, Vancouver B.C. is the first Canadian speaker invited to be the annual E. Bruce Hendrick Visiting Professor. In addition to his successes as a surgeon-administrator and teacher at the University of Calgary and now the University of British Columbia, Dr Cochrane is held in high regard throughout North America for his thoughtful, intelligent analyses of contemporary issues in children's neurosurgery. He will visit in May.

The American Association of Neurological Surgeons (AANS) Returns to Toronto.

The "double ANS" will hold its annual meeting in Toronto from April 22nd through 26th. The American-based professional organization was last here in 1988. Several thousand persons - surgeons, nurses, other health care providers and exhibitors - will take over much of the city's hotel space and the Metro Convention Centre. Typically each day begins at 0700h and runs through the next 12 - 14 hours with seminars, platform, poster and specialty section scientific presentations, and numerous committee meetings. All UofT neurosurgeons will act as hosts and be involved with the scientific, administrative and social programs.

Facts

In 1999, 4,011 patients were reviewed in the neurosurgical clinics. This is a 10% increase since 1996.

Publications - Released January-December, 2000


Humphreys RP: Editor, University of Toronto Department of Surgery, *Surgery Newsletter* (Vol 16) and *Surgical Alumni Newsletter* (Vol 15).


A health care teaching and research centre dedicated exclusively to children; affiliated with the University of Toronto.
Editorial Comment

The Operating Room

If you believe the writers of medical television series surgeons wait by the 'phone for the call, "to ER stat!" Even before the first commercial break appears the patient has been assessed by the full surgical team and is whisked off "to the OR". It is astonishing that proportionately so many patients who present in a weekly 60 minute television drama require an urgent operative solution for their deteriorating medical condition. Do these teams have nothing else to do? In reality the surgeon's life while perhaps less frenetic, is more complex. Certainly the operating rooms and their staff at The Hospital for Sick Children are prepared for these most urgent of cases, known here as life-threatening "Priority I - within 60 minutes". On average at HSC such occurs five times each week. Does that mean that the surgeons, anaesthetists, nurses and technicians just sit around consuming coffee the rest of the time?

Running an operating room is not dissimilar to managing an airline. Each serves the public, each is labour intensive, each utilizes high tech equipment, each is associated with more than average stress and, each is subject to the vagaries of unplanned events. It can be very difficult for managers to predict urgent intake of patients or travellers, equipment failures, breakdown in the before or after "in-flight" processes (eg closed airports or critical care beds), staff illness, weather changes, etc. But each of these human endeavours has its own set of operational rules that govern the planned and, most of the unforeseen circumstances.

There are 18 operating rooms at HSC that are assigned to the nine programs (of which neurosurgery is one) in the hospital's Surgical Services. (HSC is one of a very few North American children's hospitals that has so many tertiary and quaternary surgical programs). These rooms and the patients who enter them are allocated geographically for day care use (patient in and home on the day of procedure) or same day admit and, in-patient procedures. For a long time airlines have relied upon computerized systems for processing their passengers' ticketing, entry and throughput thereby defining the deployment of personnel and equipment to meet the needs of their customers. During the past eight years, the activity in the HSC operating rooms has been tracked by SurgiServer its computer program. The initial case booking is registered in the system as to date, time, surgeon, room and procedure. For a long time airlines have relied upon computerized systems for processing their passengers' ticketing, entry and throughput thereby defining the deployment of personnel and equipment to meet the needs of their customers. During the past eight years, the activity in the HSC operating rooms has been tracked by SurgiServer its computer program. The initial case booking is registered in the system as to date, time, surgeon, room and procedure. On the basis of accumulated historical data SurgiServer will react to a surgeon's list specifically with respect to the case type, its requirements and the timing for the planned procedure. For instance, if doubt arises about the
appropriateness of the operative time listed in a booking, SurgiServer will analyze the last 5-10 comparable cases and if necessary adjust the time accordingly. Incidentally, as surgeons are frequently asked how long a case will take families should distinguish between "case time" vs "surgeon’s time". If the answer for example is "two hours" that may indeed represent the entire time from the moment the child enters the operating room to their exit for the recovery area two hours later. More often, the surgeon's response is the time which he/she will require to complete their work, to the front and back ends of which is added 30-60 minutes of anaesthetic and nursing time. At the conclusion of the case the anaesthetist and surgeon will complete their own records on the child simultaneous with which SurgiServer will have documented within it multiple entries logged during the procedure by the nursing staff. This record can be recalled subsequently if it is necessary to confirm the nature of laboratory specimens taken, equipment used, and so forth.

After we have received our boarding pass at the airport check-in counter we are directed to the departure gate. At HSC the "departure" takes place at the pre-anaesthetic room where families will meet OR nursing personnel and the anaesthetist assigned to their child's case. As these staff will remain with the child during the entire operative "flight" this preliminary meeting allows them to confirm medical and nursing information on the child and answer any last minute questions which parents might have. Once the child has left this departure area and entered the neurosurgical operating room multiple activities will take place simultaneously. One nurse joins the anaesthetist to induce anaesthesia and place the various monitoring and intravenous lines. At the same time two other nurses one of whom is "scrubbed", are checking and aligning the sterile instruments which will be used. Radiological and electrophysiological technicians if required for various monitoring procedures during the surgery will be setting up their equipment recalling from them the patient's stored baseline information. And, the surgeon and his associates will conduct a final review of the child's relevant clinical notes and imaging pictures. (This is not dissimilar to the check by the captain and crew which takes place on a plane's flight deck prior to its overseas departure.) Back at HSC after decisions have been made about the patient's position on the operating table the wound area is prepared, draped and the surgery begins.

At regular intervals the airlines advertise their new technology, whether it is in the form of computerized navigational instrumentation, ticketless travel, electronic baggage handling and so on. Surgical technological advances, perhaps having taken a little while longer to make their appearances, are now part of virtually every neurosurgical procedure. Intraoperative ultrasonography can be used to localize shunt catheters vis-a-vis the spinal fluid cavities which they are supposed to drain. Tumors and vascular malformations especially those which are small can be localized with a stereotactic wand with read-outs provided on stored CT or MR images thus guiding the surgeon to and around the target tissue. Many of the delicate dissections which are performed in the brain or spinal cord are assisted by the use
of the operating microscope which is guided into position over the patient and permits the surgeon to
manipulate tissues by means of miniaturized dissecting instruments. The next generation of the
operating microscope has the stereotactic guidance systems built into it so that the surgeon enjoys real-
time analysis of the targeted tissue. For several years we have relied upon an ultrasonic tissue aspirator
which gently teases away and aspirates diseased tissue such as brain or spinal cord tumors collecting it
for pathological testing, while respecting the surrounding normal nervous system. And of course there
are lasers whose use in neurosurgery is not quite as vast as was originally predicted. Each technology
comes with its own idiosyncrasies and complex user instructions, but each provides definitive care and
safe passage for the child's "flight" through the operating room.

No one will forget January 1999 when the Toronto region was hit by a massive snowstorm. Airlines were
crippled as they attempted to clear snow-clogged runways and gates and manage the domino effect of
re-routed aircraft and altered flight schedules across the country and abroad. At HSC, clinics and some
planned operative procedures were cancelled as staff struggled to get to work. (The morning after the
storm the on call HSC neurosurgeon walked three miles through the snow to reach the hospital to
perform an emergency operation). While none of us can control the weather those of us in both the
airline industry and health care are called upon to manage extreme circumstances. The best-designed
staffing deployments accommodate for time off associated with statutory holidays. But such a situation
can be complicated by unplanned absences relating to illness, such as the influenza which struck airline
and hospital personnel particularly severely during that same winter. Regrettably this also sometimes
translates into cancelled flights or in our case, booked operative procedures.

Now it is summer and the "summer schedule" phrase pops up. It refers to the operating room
scheduling for patients during the 10 weeks period that extends from late June to the Labour Day
weekend. In order to accommodate the needs of its staff one operating theatre is closed for 10 weeks
during the summer months. With advance planning all members of staff are able to commit to their
summer activities. Surgeons likewise can discuss their coverage and away times and equally important
schedule their elective cases. The net effect of all this is a seamless use of the operating theatres
throughout the summer without days when many staff and rooms may lie idle.

Now for some of those who are justifiably enjoying time off, it's out to the airport!

Robin P Humphreys

The Harold J Hoffman/Shoppers Drug Mart Chair in Paediatric Neurosurgery

The establishment of the Shoppers Drug Mart Chair in Pediatric Neurosurgery has roots within the
Division of Neurosurgery that extend back to 1968. Although "evidence based medicine" was not the buzz phrase at that time, it was exactly that phenomenon which Dr Harold Hoffman had in mind when he established our clinical data bank. For starters, he was eager to track the relevant information on our management of children with hydrocephalus. He obtained funding to support a research fellow who by means of chart and operative records completed a collection of data sheets, which information was subsequently transferred to key-punch cards.

As knowledge expanded and, considering the leadership position of the neurosurgical division, there was the need to analyze some of our other case material, such as children with spina bifida and brain tumors. In order to provide continuity to this project, a part-time data manager was hired with the direction to create computer programs in which our data was stored. In view of their professional relationship, Dr Hoffman approached Mr David Bloom CEO of Shoppers Drug Mart, in the late seventies and designed a plan for financial support for this project that was nearing its tenth birthday. Mr Bloom's participation continued until 1997, when he announced the creation of a Chair in Paediatric Neurosurgery.

During the last few months, each of the HSC neurosurgeons has been busy preparing scientific lectures and writing book chapters for medical texts. Our thoughts expressed in many of these activities reflect the analysis of clinical material stored in the data bank that Dr Hoffman had in mind 30 years ago. In terms of his original dream with respect to hydrocephalus, we have reached the point where this division has shown its international primacy in the analysis of hydrocephalus shunting techniques, the associated infection risks and alternative therapies, to name but a few. This work will continue. It is so appropriate that Shoppers Drug Mart has created this Chair in honour of Dr Harold J Hoffman.

In January, the University Provost announced that Dr Robin Humphreys will be the inaugural recipient of the Chair, the celebration of which was held on June 9.

Evidence-based Medicine: What Is It and Why Do We Need It?

Over the past 10-20 years, evidence-based medicine (EBM) has evolved from a simple neologism to an entirely different way of thinking about clinical medicine and decision-making. The quest for "evidence" is the hallmark of EBM. But what is this "evidence" we are supposed to seek and how is it any different from what doctors have been doing for decades?

Evidence-based medicine is the application of systematic, unbiased, reproducible observations toward clinical decision-making. It is epitomized by the randomized controlled trial (RCT). The key word in this
Bias is the systematic deviation of the results of a study from the "truth". The more bias, the further away the results are from the truth. For example, a study may conclude that Drug A is of greater benefit to patients than Surgery B (that is, Drug A is more efficacious than Surgery B). The conclusion, however, may be far from the truth if the study is heavily biased. How can a study be biased? Well, bias enters a study at several levels, but three important forms of bias are:

A. Biased patient selection (selection bias): An investigator may knowingly, or subconsciously, only choose to give Drug A to the more healthy patients (who would do better anyway), thereby providing a false sense that Drug A is more efficacious.

B. Biased outcome assessment (observer bias): An investigator may inherently feel that Drug A is superior and, therefore, may discount the poor results of Drug A and exaggerate the good results. Conversely, he/she may downplay the good results of Surgery B and exaggerate its poor results.

C. Biased recall of past experience (recall bias): There may be tendency to only selectively remember certain past experiences on the part of the patient or the doctor. For example, a doctor may only remember the patients who did well with Drug A or those who did poorly with Surgery B. This will lead to an inaccurate account of past events.

The goal of EBM is to reduce these, and other forms of bias.

To find out how EBM tries to reduce bias, let's first examine how medical decisions were made prior to EBM, using a hypothetical situation. Let's say a doctor is faced with a clinical dilemma and must decide, for a given patient, which of two interventions, say Drug A versus Surgery B, should be given. The doctor must consider patient-related variables (known prognostic factors, social issues, compliance, etc.) and the efficacy of Drug A versus Surgery B. Prior to EBM, the doctor would have assessed the efficacy of these interventions based primarily on: (1) His/her own personal experiences ("I recall that my last 10 patients did very well with Drug A"). (2) The teachings of his/her professors ("I remember Dr. Hendrick telling me that Surgery B works very well in this situation"). (3) Case series from the literature ("I think Dr. Hoffman reported great success using Drug A in a series of 55 patients in one of our journals").

All of these are considered in a rather informal, subjective manner by the physician and a conclusion is reached about the relative efficacy of the two interventions. However, from the perspective of EBM, all these sources of information are potentially subject to substantial bias. In fact, they are all subject to each of the three forms of bias we listed before. Therefore, the conclusions that are made based on this
type of information are biased and may not be an accurate reflection of the truth.

If these traditional sources of information are biased, how do we get good, unbiased information, i.e., evidence? From the perspective of EBM, the best source of information is the RCT. If we were to design a RCT to test the efficacy of Drug A versus Surgery B, then every patient enrolled in the study would have an equal (random) chance of receiving either Drug A or Surgery B. The decision is entirely up to chance and not the investigator. This helps eliminate selection bias. The outcomes of the patients would ideally be assessed by observers who were blinded (i.e., they would not know if the patient they were assessing had received Drug A or Surgery B). This would help eliminate observer bias. Moreover, since all the data in a RCT is collected prospectively (i.e., the information is collected as it occurs), recall bias is also eliminated. These and other factors combine to help reduce the amount of bias in a RCT to a minimum. Therefore, the conclusions that can be drawn from the results of a RCT are more likely to be a more accurate representation of the "truth". (Caveat: Readers must keep in mind that not all RCT's are so well designed and the degree to which any single RCT is able to limit bias is highly variable. Not all RCT's are created equal!).

The preceding may have left the impression that EBM is the panacea for all medical decision making. Unfortunately, we have found that this is most certainly not the case! For example, what do we do if two well-designed RCT's produce conflicting results? Which better represents the "truth"? Also, what do we do if a certain disease is too rare or its outcome takes too long to develop, so that a proper RCT is not even feasible? Evidence-based medicine does not provide clear answers to these questions. So, in these types of situations, we do the only thing we can: we try to seek out the best available evidence (i.e., the least biased information) and draw the most reasonable conclusions. This means that we must not always be fixated on RCT's. We must learn to incorporate other forms of evidence, recognizing, however, their potential for bias and, therefore, inaccuracy. In a sense, this is one of the main achievements of EBM: it has forced us to face and accept uncertainty and our relative lack of knowledge. We perhaps do not know as much as we once thought we did. But recognition of that fact is an advance in itself, since that is what will encourage further high-quality clinical research in an attempt to provide accurate answers to difficult medical problems.

Abhaya V Kulkarni, MD

Residents and Fellows - July 1st

Dr Walter Hader
A native of Saskatchewan and graduate of its university's medical school, Walter Hader will begin his
year as Clinical Fellow. A former teaching assistant in neuroanatomy and histology at the University of Saskatchewan, Walter completed the postgraduate training program in neurosurgery at the University of British Columbia. He has presented and authored numerous scientific papers, the most recent of which analyzes the surveillance techniques for external ventricular drains. And, in the past Walter was the Canadian junior men's speedskating champion.

Dr Patrick Lo
The consumate team player, Patrick will continue as a fellow until January, 2001. What we have come to expect as the Australian skill, knowledge and charm, to say nothing of Patrick's conversant ability in Mandarin, will continue.

Dr Sheila Singh
Sheila is a 1997 graduate of McMaster University Medical School. A past recipient of a Canada Scholarship and a McGill University Entrance Scholarship, she received her BSc with honours from McGill. In 1996 she choose elective rotations in pediatric neurosurgery at the Children's Hospital, Boston and also at HSC. She was accepted into the UofT neurosurgical program the following year.

Dr Hussam Kutub
A 1988 graduate of the King Abdulaziz University College of Medicine in Jeddah, Saudi Arabia, Hussam Kutub has worked in Canada for the past 7 years. His neurosurgical training began in Saudi Arabia, then continued at the University of Alberta Hospitals and since 1996, he has been a resident neurosurgeon at the University of Western Ontario.

Dr Tae Sung Park - Year 2000 Annual E Bruce Hendrick Visiting Professor
A 1981-'82 Clinical Fellow on the Division, Tae Sung ("TS") Park returned this spring as the Y2000 Bruce Hendrick Visiting Professor. In a sense he was returning home for although his neurosurgical training took place sequentially at Yonsei University College of Medicine in Seoul, Korea, then the University of Virginia Hospital, Ohio State University and Massachusetts General Hospital, TS considers his year at HSC as the "best of all". Upon completion of his Toronto experience, he spent a year at the Children's Hospital of Los Angeles, then returned to a faculty position at the University of Virginia. In 1989 he was lured to the St Louis Children's Hospital and Washington University where he is Professor of Neurosurgery, Pediatrics and, Anatomy and Neurobiology. In the past 15 years he has garnered more than eight million dollars in NIH research funding and in 1999 received the NIH Neuroscience Investigator Award. Dr Park delivered two addresses during his brief trip to HSC - Selective amygdalo-
Hippocampectomy for mesial temporal lobe epilepsy in children, and Selective dorsal rhizotomy for spastic cerebral palsy in children and adults. TS dazzled his Toronto audience many of whom were good friends and collaborators with him during his year here almost two decades ago.

HSC Celebrates Its 125th Birthday

On April 3rd, 2000 patients at The Hospital for Sick Children and their families joined together with staff and a special guest, the Honourable Hilary M. Weston, Lieutenant Governor of Ontario, to celebrate the hospital's 125th birthday. The Hospital opened its doors on March 1, 1875. But it was on April 3, 1875 that it received its first patient, Maggie - a young girl who came to the newly opened facility seeking help for a severely scalded arm. Toronto native Elizabeth McMaster had a vision and the determination to open the first hospital in Canada dedicated to treating sick children. She and a committee of 22 women launched the first capital campaign to raise money to open the new hospital, an 11-room, two-storey house on Avenue Road. At this year's celebration, Alexander R. Aird, Chairman of the Board commented on the future, "A future filled with possibilities of new discoveries, interventions and treatments, and new ways of communicating these to improve children's health not just at Sick Kids but around the world."

Scientific Forums, The Lecture Circuit and Travelling Professorships

Annual Meeting of the American Association of Neurological Surgeons - San Francisco, CA In April, several members of the division traveled to San Francisco for the annual meeting of the AANS. Robin Humphreys participated in a seminar on Advances in the management of pediatric brain tumors while Jim Rutka took part in other seminars on, Novel treatments for malignant brain tumors, and Management of brainstem tumors. He was also involved in an all day Practical Clinic on Update on tumors for the general neurosurgeon. Peter Dirks presented his paper on Ligand independent activation and aberrant localization of a mutant platelet-derived growth factor receptor-alpha isolated from glioblastoma, at the Tumor Section meeting. Drs Segun Tuli and Julian Spears (Dr James Drake, supervisor, with Ms M Lamberti-Pasculli co-author) presented a paper on Predictors of mortality in pediatric shunted hydrocephalus while Dr Abhaya Kulkarni (Dr James Drake, supervisor, with Drs PB Dirks and DC Armstrong co-authors) delivered his paper on Ventricular size and flow void following endoscopic third ventriculostomy.

Peter Dirks has been traveling to the west coast, first to a mini-conference on the Treatment for Severe Traumatic Brain Injury. His paper was The role of decompressive craniotomy in severe head injury in children. He repeated his AANS/CNS presentation at the Canadian Neuro-oncology meeting in Vancouver in late May.
Jim Drake visits abroad. First to Vicoforte De Mondovi, Italy where he was an invited lecturer at the First International Meeting of Ventricular & Cisternal Pathology. Current Opinions, Controversial Approaches & New Trends. His papers were, *Hydrocephalus, shunts: The state of the art, and Arachnoid cysts, Suprasellar cysts - History of treatment and new concepts in neuroendoscopic era*. Then, a few weeks later off to Sydney, Australia for the Hydrocephalus - Beyond 2000 Conference. Amongst other things he took part in a debate on *Multi-centre trials*.

**Fact or faction?** In May, he was an invited guest to CRIANCA 2000 International Congress of Pediatric Specialties in Curitiba, Brazil, where he spoke on *Selective posterior rhizotomy, Spasticity - The neurosurgeon's view and, The tethered spinal cord*. He then attended the Math 2000 Conference at McMaster University sponsored by the Canadian Mathematical Society, where he spoke on *Requirement for new mathematical models of the brain for hydrocephalus treatment*.

Robin Humphreys was an invited speaker to Buenos Aires, Argentina for the V Jornadas Anuales de Controversias en Patologia Vascular Cerebral. As the only pediatric neurosurgeon on the faculty he delivered 3 lectures on *Hematomas cerebrales: Una revision clinica y quirurgica, Aneurismas cerebrales en pediatria, and Malformaciones arteiovenosas en la infancia: Revision clinica y quirurgica*, in addition to participating in a number of Round Table discussions.

A few weeks later it was off to the Fifth European Postgraduate Course in Pediatric Neurosurgery in Brasov Romania for another lecture on *AVM in childhood*, and participation in multiple interactive teaching sessions.

Jim Rutka treasures the far east. As an invited speaker of the Korean Neurosurgical Society in April, he spoke on *Aggressive surgical resection of brainstem tumors in children, and Epilepsy surgery in children*. A few weeks later, he returned to Japan for the 2nd International Symposium on Brain Tumor Pathology where he delivered papers on *Cell cycle control and human astrocytomas and, Developmental signalling pathways and medulloblastoma*. On this same trip he was a Visiting Professor at the University of Kagoshima when he spoke on *Craniopharyngioma: Current and future management*.

**Honours and Awards**

Dr. Peter Dirks has received a 3 year operating grant from the National Cancer Institute of Canada for his project on the role of CNS stem cells in the pathogenesis of human brain tumours.

Dr. Howard Ginsberg has been awarded fellowship support from Johnson & Johnson, in the Surgeon
Scientist Program in the Department of Surgery, the University of Toronto, for 1999.

Dr. Abhaya Kulkarni has received funding for 1 year from the Physicians Services Incorporated (PSI) for his research study "Development of a disease-specific health status outcome measure for children with hydrocephalus". Having received third year funding as a Duncan L Gordon Fellow at HSC, he also won the HSC 2000 Annual Surgical Services Clinical Science Research Competition.

Dr. Jane McGlade, Scientist, The Arthur and Sonia Labatt Brain Tumour Research Centre, has received a 5 year operating grant from the National Cancer Institute of Canada for her project on the characterization of numb protein interactions in mammalian cells.

Dr. Jim Rutka received a 1 year extension award from the National Cancer Institute for his grant on targeting the p53/pRb pathway in human astrocytomas (with Dr. Paul Hamel, co-applicant).

**Facts**

In the last 5 years, HSC neurosurgeons have performed 3,473 surgical operations which lasted 9,501 hours.

A health care teaching and research centre dedicated exclusively to children; affiliated with the University of Toronto.
Editorial Comment

Tina Popov – Neurosurgery’s First Nurse Practitioner

A dream which began in the minds of the "3Hs" (Hendrick, Hoffman and Humphreys) in the late seventies came to fruition this past August when Tina Popov was appointed the first Clinical Nurse Specialist/Nurse Practitioner on the Division of Neurosurgery. At the outset, such a strategy was never intended as an empire expansion. Rather there was an innovative opportunity to share values and governance with nursing and to promote within their professional practice, autonomy and accountability. The goal in the end is teamwork.

The superficial reasons for Tina’s appointment began with events that occurred in the university hospitals during the summer of 1998. In retrospect, the issues that prevailed then in fact had been a focal point of the Boudreau Commission of 1973. The Commission recognized the important role of the nurse practitioner to meet the health care needs of Canadians. The flash-point in the early seventies was the lack of medical residents and hence the lack of access to health care for the people in Canada’s northern communities. It was not until 1983 when McMaster University developed the Acute Care Nurse Practitioner (ACNP) program. This initiative too was propagated by the shortage of residents, then in both the neonatal and cardio-thoracic specialties. In July 1998, residents associated with the University of Toronto’s postgraduate program in neurosurgery expressed grievances about the conflicts in their service and education responsibilities. In a word they couldn’t be all things to all people. A graphic example (one of many) provided by one senior resident was that in the course of a particular day he answered 74 telephone calls. How could he also be expected to be in attendance simultaneously in the Emergency Room, Critical Care Unit, on the ward and in the operating theatre? The residents needed help.

The Barrer-Stoddart report of 1991 reinforced the need for alternative caregivers in the tertiary hospital setting. The report acknowledged the reduction in the number of university residency training positions and encouraged the development of training programs for alternative health care personnel. The passage of the Ontario Health Care Reform Act in 1992 continued to foster interest in the role of the Nurse Practitioner. The Ontario government, facing the economic constraints to maintain a universal health care package was examining other ways to manage it. One aspect of the proposed health care systems model would emphasize continuity of care from the tertiary to the primary setting. The recognition of this gap in the present health care delivery provided opportunity for another ACNP
program. The Max Bell Foundation funded a fast track program for acute care nurse practitioners which provided for Masters prepared nurses the opportunity to be trained for the acute care setting in order to meet the changing needs of the population. On February 18, 1998 the Ontario Ministry of Health passed the Expanded Nursing Services for Patients Act which legitimized the role of the Primary Nurse Practitioner (PNP). This role allowed the PNP to practice in the community autonomously - to provide a diagnosis and order diagnostic tests and to prescribe medications - no longer under medical directives. While the ACNP’s role is far from being wholly recognized, it is intended to address the needs in the tertiary care hospitals. The College of Nurses of Ontario is currently working on standards of practice for the ACNP’s. Those nurse practitioners presently working within the tertiary setting are subject to medical directives implemented by their institution and endorsed by its Medical Advisory Committee. They are held accountable within their scope of nursing practice as recognized under the Regulated Health Professions Act.

Tina Popov has been part of the HSC fabric since 1994. A BScN graduate of the University of Toronto in 1993, she began her work experience in the Neonatal Intensive Care Level III Nursery at Driscoll Children’s Hospital in Corpus Christi, TX. Tina returned to Toronto and our Neonatal Intensive Care Unit in April 1994; 18 months later she was allied with the Neonatal Transport Team. Having completed some initial studies at OISE, Tina entered the Pediatric Nurse Practitioner’s Program and received her Master’s degree in Nursing from the University of Toronto, in April 1999. She is certified in cardio-pulmonary resuscitation and neonatal pulmonary resuscitation. Along the way she has worked on HSC’s Medical and Poison Information Line, and has held teaching responsibilities in the Neonatal ICU.

Historically the Nurse Practitioner role was initiated in response to a decrease in the numbers of medical residents. The role mirrored the supply and demand of medical practice. It then progressed to a means of fulfilling the requirements of current health care reform. Presently the Acute Care Nurse Practitioner is seen as an alternative health care professional, one who is necessary to fill a gap in a system which is experiencing economic constraints and thus requires increased efficiency with decreased resources. In just a few months, Tina has already blended in well with the activities of our neurosurgical fellows and residents, much to their delight as she provides increasing continuity of care and assists with moment-to-moment patient needs. She will be a neurosurgical beacon in advancing exemplary nursing practice which, centred on the patient and their family, is creative and outcome oriented.

Robin P Humphreys
Residents and Fellows - January 1st

Dr Jeff Blount

Dr Blount will continue with his excellent fellowship work until June 30th. He was sought after by two very fine American children’s hospitals and in July he will join the faculty at the University of Alabama and the Children’s Hospital of Alabama where Dr W Jerry Oakes (HSC Fellow, 1975) is the Neurosurgeon-in-Chief.

Dr Teresa Withers

Having safely delivered her Canadian-born daughter, Dr "TK" will remain at HSC for 6 months while she assists in the clinics and completes some writing assignments.

Dr Dwight Webster

Dr Webster will continue to help keep the ship on an even keel as he completes the second 6 months of his year’s assignment. He will leave us temporarily for a brief rotation at the Toronto Western Hospital and then having completed his HSC experience he will return to his native Jamaica to practice general neurosurgery with an emphasis on pediatrics at the Kingston Regional Hospitals.

Dr Patrick Lo

The wonderful Australian connection will continue when Dr Lo arrives for a year’s experience in February. A 1991 medical graduate of the University of Sydney, he has been training in neurosurgery since 1994 during which time his teachers have included past HSCFellows Drs Ian Johnston (1972) and Michael Besser (1979). His research interests have included the rate of CSF accumulation in syringomyelia. Dr Lo was certified as a neurosurgical specialist by the Royal Australasian College of Surgeons in May, 1999.

Dr Lily Angelov

Dr Angelov is a MD graduate from UofT and has been associated with the university's neurosurgical program since 1993. She is completing her MSc work in the Institute of Medical Science for which activity she has received research fellowships from the National Cancer Institute of Canada and the American Association of Neurological Surgeons. She has also won several local and national academic prizes.
Dr Nabil Al Shaffi

An international medical graduate who is training in the UofT program (see: The Neurotransmitter, Winter 1999), Dr Al Shaffi will remain with us until July, 2000.

Dr David Sandberg

Dr Sandberg, a Phi Beta Kappa from Harvard College, graduated from the Johns Hopkins University School of Medicine. Following upon the recommendation of Dr Mark Souweidane, (HSC Fellow 1994), he will come to HSC for a 2 months rotation beginning in April, as part of his residency position at the New York Hospital and Cornell University. His visit is sponsored by the AANS/CNS Pediatric Section Travelling Fellowship.

The Hospital for Sick Children’s Epilepsy Monitoring Unit

The Epilepsy Monitoring Unit also called "EMU" (and not be confused with a large flightless Australian bird) was established at The Hospital for Sick Children in 1986. It began as a two bed-unit and has since grown to four private room units. The additional two units also have the ability to do satellite monitoring throughout the hospital.

The EMU was initially established to monitor patients with intractable seizure disorders who were candidates for epilepsy surgery. The unit monitored approximately 20 patients in the first year and currently monitors over 200 patients a year. Our current Nicolet-BMSI 5000 EMU unit has the ability to record time locked, continuous 128 channels of EEG data. This unit shares a split-screen video with automatic seizure and spike detection programs, for patients ranging in age from 1 day to 18 years. Our patient referrals come from within Canada and abroad.

The EMU has several diagnostic functions: (1) To classify and identify seizures; (2) To document non-epileptic events; (3) To identify the onset of focal seizures in patients who may be candidates for corrective surgery; (4) To monitor and treat patients with uncontrolled status epilepticus. The primary function of the EMU is to identify the clinical seizure onset with the localization of the epileptogenic focus on the EEG during a convulsion. This is accomplished by both visual analysis of the clinical seizure and computer aided automatic spike and seizure detection software. The information gathered from
this EEG data is then correlated with the patient’s clinical neurological history, neuropsychology testing
and relevant data from various neuroimaging studies including brain perfusion scans (SPECT), and
functional neuroimaging studies (MRI and PET) to determine if the patient is a suitable candidate for
epilepsy surgery.

The EMU and the epilepsy management program at The Hospital for Sick Children has undergone a
dramatic transformation over the past three years. This is due to the introduction of custom designed
subdural grids, strips and depth electrode recording techniques. This has lead to the formation of our
satellite unit (in the Critical Care Unit) where patients with implanted sub-dural grids are monitored. The
majority of children we monitor have intractable extra-temporal lobe epilepsy without lesion. They are
monitored until they have a minimum of 3-4 seizures or, for a maximum of 10 days. During the
monitoring procedure the functional cortex is mapped out in detail to aid the neurologist and
neurosurgeon during epilepsy surgery. This advanced intracranial invasive video EEG monitoring
procedure has provided a further surgical modality for patients with intractable epilepsy. This satellite
unit has also assisted in the treatment of patients with uncontrolled status epilepticus.

The EMU at The Hospital for Sick Children has come a long way since its inception. It has proved to be an
important diagnostic vehicle to study and monitor patients with various types of seizure control and
surgical outcomes. The future for our EMU is to embrace the new technology that will be available in the
next century. The advent of digital video recorders, the network and faster computers will make our
EMU more efficient, technically superior and ultimately provide better identification of a child’s seizure
onset. Who knows, we may even monitor patients in their own home through a "protected" network?

Rohit Sharma, R.E.T., Senior Neurodiagnostic Technologist and,
Dr. Hiroshi Otsubo, Director of Neurophysiology Lab.

Scientific Forums, The Lecture Circuit and Traveling Professorships

The HSC staff neurosurgeons, who each hold ranking in the university’s Department of Surgery, are
constantly in demand to participate in a variety of university and professional academic forums. Such
require many hours of preparation time as well as for travel. The past 6 months are typical.

HSC Neurosurgery Active at Congress of Neurological Surgeons - Boston, MA.
Several members of the division traveled to Boston early in November where they presented at the 49th
Annual Meeting of the Congress of Neurological Surgeons. In a session dedicated as a Pediatric Update
for the General Neurosurgeon, Jim Drake lectured on Shunt technology: How to choose a valve, and Jim
Rutka spoke on Pediatric brain tumors: From the laboratory bench to the operating room. In separate
seminar presentations, Jim Drake moderated a session on Managing shunt complications – Lecture series, and Robin Humphreys spoke on Craniofacial surgery: What have we learned? And Jim Rutka lectured on Publishing scientific articles in Neurosurgery. He also moderated a session on Treatment of craniopharyngiomas, and was a collaborator on papers by Mojgan Hodaie (Utility of image-guided frameless stereotactic sectioning of the corpus callosum in children with intractable epilepsy). Jim Rutka’s group also had 3 separate posters on view. Jim Drake was a co-author on a paper, Observer reliability of the frontal and occipital horn ratio measurement of ventricular size delivered in an open forum by Abhaya Kulkarni. Sagun Tuli also collaborated on a project Risk factors for repeat cerebrospinal shunt failures in pediatric hydrocephalus.

This once-in-a-lifetime event held in early December and organized by members of the European Society for Pediatric Neurosurgery addressed present and future issues within our discipline. Jim Drake lectured on CSF hydrodynamic disorders – Shunts and Jim Rutka delivered a paper on Perspectives in pediatric neurosurgery.

Robin Humphreys represented HSC at the 27th Annual Congress of the International Society for Pediatric Neurosurgery, in Salt Lake City, UT where he moderated the opening session. Ten days later he travelled to Washington, DC as an invited guest of the American Academy of Pediatrics where he delivered a seminar on Big heads, small heads: Operate or tolerate? In early December he again moderated a session at the annual meeting of the Section on Pediatric Neurological Surgery, American Association of Neurological Surgeons, in Atlanta, GA.

Honours and Awards

Dr Howard Ginsberg (Research Fellow, Supervisor JM Drake) was successful in obtaining an MRC Doctoral Research Award for his work on overcoming shunt obstruction using ultrasound energy.

Dr Abhaya Kulkarni (Research Fellow, Supervisor JM Drake) successfully defended his Master’s thesis in Clinical Epidemiology at McMaster University. He is now officially in the university’s PhD program.

Dr Todd Mainprize in his first year as a Research Fellow, Labatt Brain Tumor Research Centre, (Supervisor JT Rutka) has received a National Cancer Institute of Canada research fellowship.

Dr Michael Taylor (Research Fellow, Labatt Brain Tumor Research Centre, Supervisor JT Rutka) has
received a Clinician-Scientist Training Program Award from the Research Training Centre at HSC for the period Jan 01, 2000 to Dec 31, 2003.

**Synaptic Connections**

*1999 Faculty Appointments in the Division of Neurology*

Dr Brenda Banwell joined the Division in July 1999, upon completion of a 2 year fellowship in neuromuscular diseases at the Mayo Clinic. She won a number of prizes while attending the University of Western Ontario and subsequently completed her training in the neurology program at UofT (where she captured more awards). While at HSC for her pediatric neurology experience Dr Banwell received the Hospital’s Humanitarian Award. Part of her research activity will consist of the examination of the incidence of critical illness-related neuromuscular disorders. She has also set up HSC’s multi-disciplinary multiple sclerosis clinic.

Dr Gabrielle deVeber has been a consultant to the Division since 1994. She cemented her relationship with HSC in July 1998 when she left McMaster University to become aligned with the Clinician-Scientist Track in the Research Institute. Her clinical epidemiology and biostatistical skills have garnered substantial amounts of research funding, (at present she holds a Stroke Investigator Award from the Heart and Stroke Foundation of Ontario). Dr deVeber has been the engine in the Canadian Pediatric Ischemic Stroke Registry whose databases are the largest in the world for pediatric stroke.

**Thanks.**

To b.r.a.i.n.child for their continuing support of the Division’s research activities as a result of the outstanding summer fair, and for the reception and special presentations held in November.

To Ms Debbie Cauley for her work on the Dance and Silent Auction last spring which raised $9,000 for special neurosurgical operative instrumentation.

And to so many others who maintain their anonymity while directing donations to the Division and the Hospital for clinical, nursing and research purposes. On behalf of the children, we thank you all.

**Announcements**

Dr Greg Cairncross of the London Regional Cancer Centre will deliver the Second Annual Arthur and Sonia Labatt Academic Lectureship on January 20, 2000.

Dr Tae-Sung Park, Neurosurgeon-in-Chief at the St Louis Children’s Hospital and Professor, Washington
University, in St Louis, MO has accepted the invitation to be the Y2000 E Bruce Hendrick Visiting Professor. The Professorship which was inaugurated in 1986 honours E Bruce Hendrick Canada’s first full-time pediatric neurosurgeon. Dr Park who was the HSC fellow in 1981-'82, will visit in June.

Facts

There are 1,311 nurses working at The Hospital for Sick Children. Fifty-three are attached to the Division of Neurosurgery.

Publications - Released January-December, 1999


A health care teaching and research centre dedicated exclusively to children; affiliated with the University of Toronto.
Dan Chair Moves to HSC. James Rutka Appointed University Neurosurgical Division Head

The University of Toronto appointment of Chairman, Division of Neurosurgery changes every 10 years. Professor Charles H Tator of the Toronto Western Hospital has just completed his term. Previously, Dr Alan R Hudson presently the CEO of the University Health Network held the position. During this spring a national search was conducted to identify the next university chairman. The identified individual is responsible for coalescing the clinical and academic activities of the university hospitals and their respective neurosurgical staff as well as acting as the spokesperson for "Toronto neurosurgery" in the national and international professional communities.

Early in June the university’s Department of Surgery Chairman, John H Wedge announced that James T Rutka would become the head of the university’s Division of Neurosurgery, effective July 1, 1999. He thus accepts from Professor Tator the Dan Family Chair in Neurosurgery at the university. This is a signal honour for HSC as it has been exceptional that HSC surgeons have received a university division chairman’s appointment. In the past there have only been 3 other surgeons so identified, Drs William K Lindsay (Plastic Surgery), Robert B Salter (Orthopaedic Surgery) and William G Williams (Cardiovascular Surgery).

Jim was born in Toronto where he received his elementary and secondary education. A 1975 Ontario Scholar he entered and graduated from the Faculty of Medicine at Queen’s University in 1981, winning the Dean Fowler Prize for the highest standing in the final year. In 1978 he quarterbacked the Queen’s Golden Gaels football team which won the national College Bowl championship. Jim made his first contact with HSC when he chose a 4 weeks student elective on the neurosurgical unit. Surely that was the catalyst for his energetic contributions that began after his appointment to the HSC staff in July 1990. By that time he had completed his neurosurgical training and also, as a candidate in the university’s surgeon scientist program he had received his PhD from the University of California at San Francisco. Upon passing his Royal College examinations in 1989, Jim and his family traveled to Japan for six months where he studied and lectured in several centres. Simultaneous with his clinical appointment, Jim received recognition in the Hospital’s Research Institute. His studies there on the molecular activity of human brain tumors have resulted in multiple, significant supporting grants from the Medical Research Council of Canada (MRC), the National Cancer Institute of Canada (NCIC) and the Samuel Lunenfeld Charitable Foundation amongst others. The MRC has recognized Jim’s contributions by recently conferring on him the title of "Career Scientist". Likely the crowning achievement for his laboratory has been the opening in January of the Labatt Brain Tumor Research Centre (see below).
Characteristically Jim publicly acknowledges the support he has received from others around him. Particularly special in his life are his spouse Mari whom he married in 1979 and their 3 children Daniel, Hanna and Marissa. Professionally, Jim Rutka enjoys a unique collaboration with Jim Drake. These two surgeons seem to have been destined to work with each other as each studied at Queen’s University, both families each have three children - 2 girls and 1 boy, both surgeons are active in sports and each one has eclectic tastes in music. In 1990, "the Jims" formed an alliance that is both unique and much envied by others in the North American neurosurgical community. Their academic union provides that every month each surgeon in turn will be guaranteed protected time to devote to his investigative activities. As a result during the past nine years, "the Jims" have enhanced each others’ careers as they have contributed greatly to their hospital and the university. Their accomplishments are much admired and as yet unparalleled by other neurosurgical teams on this continent and beyond. Peter Dirks (see: The Neurotransmitter, Winter 1999) who was the first student to complete and defend his PhD thesis based on work in Jim Rutka’s laboratory will play a key role in Jim’s activities after July. Peter’s intellect, energy and clinical skills already very much in evidence, will be fundamental to the continuing accomplishments of the Brain Tumor Research Centre.

Upon accepting his new appointment, Jim stated that his vision is "to raise the bar and to establish the University of Toronto’s Division of Neurosurgery as the finest on the continent." He will have the university neurosurgical community solidly behind him.

Robin P Humphreys

Residents and Fellows - July 1st

Jeffrey Blount

A National Honor Society recipient in high school, Jeff Blount graduated Phi Beta Kappa from Washington and Lee University. He studied medicine at the University of Rochester from which he graduated as an Alpha Omega Alpha student in 1989. He took his internship and neurosurgical residency at the University of Minnesota completing the latter in 1996. To date he has completed 20 platform and poster scientific presentations and has 7 published papers. Since 1996, Jeff has been a US Naval Medical Officer in Okinawa and San Diego.

Teresa K Withers

"TK" will continue as a fellow at HSC until January, 2000. Bringing her clinical and operative experience from Australia she has contributed substantially to patient care here, winning the admiration and respect of all those who have worked with her. Upon completion of her year in Toronto TK will return to
practice pediatric neurosurgery in Australia.

**Mahmoud Rashidi**

An accomplished student of physics in high school, Mahmoud graduated in 1991 from the Kerman University of Medical Sciences in Iran, being recognized as the top student in the doctorate program. Thus he received a full scholarship from the country’s Ministry of Health and Medical Education. Attached to the neurosurgical program at UofT since January 1996, he has just completed the obligatory experience in neuropathology.

**Taufik Valiante**

Also an Ontario Scholar, Taufik was accepted into the combined MD/PhD program at the University of Toronto in 1988 graduating in 1997. He entered the UofT neurosurgical training program that same year. During his undergraduate career he held a Medical Research Council of Canada Studentship. He shares authorship on 16 scientific papers to date and he has considerable interest in computer software design.

**Dwight Webster**

Dwight is spending 2 years at the University of Toronto on a scholarship from the Government of Jamaica. A 1989 graduate of the University of West Indies he obtained in FRCS in the UK in 1995. He then returned to the University Hospital of the West Indies for his neurosurgical experience, and is spending his time in Toronto acquiring additional knowledge in adult (at St Michael’s Hospital) and pediatric neurosurgery, before returning home.

**Grand Opening of the Arthur and Sonia Labatt Brain Tumor Research Centre -**

"... we should be rejoicing every day in what you give to this country"

The Main Auditorium was packed with staff and guests, as well as media for the grand opening of The Arthur and Sonia Labatt Brain Tumour Research Centre on January 22nd (see *The Neurotransmitter*, Winter 1998). His Excellency, the Right Honourable Roméo LeBlanc, Governor General of Canada, officially opened the centre, Canada's first for basic science brain tumour research. Here are excerpts from the Governor General's speech:

"This is a day I hope we all mark in our calendars and remember. The right people and the right institutions have come together to create The Arthur and Sonia Labatt Brain Tumour Research Centre.
Time will show the benefits for Canadian patients, both adults and children. And I’m certain these research discoveries will be important all over the world.

We can believe in those future benefits for several reasons. First, because of your record. Time after time, The Hospital for Sick Children, The Toronto Hospital, and the University of Toronto have made new discoveries and pioneered new treatments. The ordinary person knows of your more famous achievements, such as Pablum and insulin and bypass grafts of the brain. And from time to time we hear of other accomplishments. So we say, "that's fine," and then we have the bad habit of forgetting. But, before this visit, I read over a long list of your achievements, all collected in one place. That shining record reminded me that instead of taking you, these institutions and these people, for granted, we should be rejoicing every day in what you give to this country...

We should also be grateful for what you demonstrate at all levels, from senior staff to volunteers to the people who keep the cafeteria and the elevators running and the boilers going.

Yet, no matter how great your institutions’ record or your devotion, you still need resources. And that is the final reason why we can celebrate today, thanks to the generosity of Arthur and Sonia Labatt. Arthur and Sonia Labatt have not only given one of the greatest gifts in the history of your institutions, but have directed that funding exactly where it is needed. Brain tumour research has received too little attention. Your work at this Centre will draw hope out of heartbreak. I know that everybody involved will put this great gift to good use.

Thank you to the Labatt family. Thank you to all those who were instrumental in bringing together this great initiative. And, from my experience of visiting a great deal of Canada, we should be so proud that we have such a generous country."

On the day prior to the visit by the Governor General the First Annual Arthur and Sonia Labatt Brain Tumor Research Centre Academic Lecture was given by Dr Robert L Martuza, professor and Chair of the Department of Neurosurgery, Georgetown University. He lectured on The development of replication-competent herpes vectors for the treatment of brain tumors and other cancers.

"A McLaughlin in Paris"

After a brisk 20 minute walk from my apartment on the left bank past eglise St. Germain, the oldest church in Paris and the burial place of Rene Descartes, past the Café de Flore an old haunt of Sartre, Hemingway and Picasso, and past chic designer shops such as Rykiel and Prada, my day would start at 0830h (yes) in the Service de Neurochirurgie at Hopital Necker Enfant-Malades. The morning would begin with a meeting attended by all the staff in which every patient would be discussed and a plan
would be made for their management. On Mondays this would consist of a ward round, "la visite", which proved to be a grand tour of the service by all. At 0930h, after a quick café and pain au chocolate, we would descend "au bloc" to the operating room for a day of surgery. Each day there were two operating rooms in use, one large OR "salle cinq" where a major case would be managed such as a difficult brain tumor, and a second OR "salle six" where a craniofacial case, shunt, or posterior fossa tumor would be operated upon. The operating rooms would typically last until 1700h, after which we’d emerge to review the days’ events and the cases for the next day. On Fridays there were neuro-oncology rounds and an academic presentation on an area in pediatric neuroscience or neurosurgery by a faculty member. Typically at 1900h, I’d be on my way back to my apartment for an evening of study for my impending Royal College examinations. But the pressures of studying were often relieved by an evening walk along the Seine past the Louvre and Notre Dame.

It was a great privilege to be awarded a fellowship for pediatric neurosurgery training from the McLaughlin Foundation for study abroad at Necker Hospital, in the Rene Descartes University in Paris. Located in the 15th arrondissement near the Eiffel tower, Necker is a series of pavilions separated by roads, courtyards, and lawns surrounded by a perimeter wall. The place is steeped in history, being named after a hero in the French Revolution and consisting of pavilions identifying the famous French physicians who worked there. The stethoscope was devised by Laennac at Necker. Although the whole complex consists of departments serving adult and pediatric medicine, the neurosurgical unit is the only such pediatric unit in Paris, serving a population of 10 million. The unit consists of 8-10 ICU beds and 40-50 ward patients, and two operating rooms.

The McLaughlin fellowship provides trainees with an opportunity for further specialized training in their chosen medical or surgical discipline at an institution of their choice. My choice of study at Necker was exceptional because of the size and volume of the unit and the expertise of its staff. The faculty at Necker possess special expertise in the management of hydrocephalus, particularly by means of third ventriculostomy. They are also skilled in the management of brain tumors with robotic image-guided surgery, and they have exceptional experience in the treatment of craniofacial disorders, spinal dysraphism, and prenatal diagnosis. This fellowship was an opportunity for me to have a broad exposure to the diverse clinical areas that make up pediatric neurosurgery. It also gave me a perspective of a very different "European" view of medicine, at every level from organization of the ward and ICU, to academic structure within the division of neurosurgery, to distinct clinical decision making and different surgical technique. From an operative technical perspective, I learned a variety of subtle points of surgical technique that broadened my armamentarium in tackling difficult neurosurgical cases. There
were differences in patient positioning, surgical incisions, methods of bony opening, and the use of tools to operate in and around the brain and spinal cord.

Perhaps more important than technical points, I learned through my attendance at neurosurgical clinics and divisional meetings a great deal about making surgical decisions and managing patients. The high volume of patients and the superb follow up the surgeons had with their patients allowed me to see many different clinical problems and to analyze their outcomes. I think that this aspect of my experience helped me most in my first year in practice.

It was also interesting to witness the relationship between French doctors and their patients. The French hold great respect for their physicians and in turn the French physicians manage the children and their families in a manner of great caring and respect and with a special charm and sweetness for the children. In return, many of the children would say farewell to their male or female doctors with a "petit bisou", a greeting completely appropriate in the French society and reflective of an honest and close doctor-patient relationship. But, all was not entirely perfect in Paris so that I am grateful to return to Canada and The Hospital for Sick Children. I realized what a very special institution at every level we have at HSC and what a privilege it is for me to work here.

To live in Paris for a short period of time was indeed very interesting, an opportunity for me to get to know the nooks and crannies of this richly historical, cultural, and beautiful city, and to experience a little of how Parisians truly live. My experiences at Necker in 1998 have helped me a great deal in beginning my career and will be forever imprinted on my mind as a special opportunity and time in my life.

Peter B Dirks

1999 EB Hendrick Visiting Professor - Harold L Rekate

Dr "Hal" Rekate of the Barrow Neurological Institute in Phoenix, AZ and Clinical Professor of Neurosurgery at the University of Arizona School of Medicine was the invited 1999 E Bruce Hendrick Visiting Professor of Neurosurgery. Dr Rekate spent two days in Toronto, a trip squeezed in between others to Italy and Denmark. An enthusiast at all times, he delivered a lecture on Assessment and management of traumatic spinal column injuries in children to a combined rounds of orthopaedic and neurosurgeons. Later in the day he spoke at the weekly Seizure Conference on Lesional epilepsy in children: Management based on published evidence. Dr Rekate proved once again that he is an inquisitive and thoughtful teacher who serves as an excellent role model for pediatric neurosurgery.
The division gratefully acknowledges the assistance of Johnson & Johnson Medical Products, Codman Division in helping to fund this Professorship.

**The Three Legged Stool and TES**

It used to be that academic surgeons had a triple layer of responsibilities metaphorically represented by a three-legged stool. Each leg assumes equal importance and each also serves as a measure of academic productivity. Clinical care is paramount for every surgeon and when not assessing or treating patients the academic surgeon is conducting basic or clinical research which results are shared with other surgeons in various scientific forums. Teaching represents the third leg which for some surgeons consumes enormous time and energy.

Just as teachers stand before the students whom they will examine and grade so also are the teachers accountable to the students. Every two years the postgraduate residents in the University of Toronto’s neurosurgical teaching program rate the 24 members of the university’s faculty who are located at the four university teaching hospitals. A number of indices are analyzed - didactic presentations, clinic, bedside and operating room instruction, role modeling, doctor-patient relationships, etc - in order to provide a global score of teaching effectiveness (TES) for each faculty member. The 1996-'98 scores were released earlier this year. The top three teachers in the university were HSC’s Robin Humphreys, Jim Rutka and Jim Drake. (Peter Dirks was not ranked in this session as his faculty appointment was too recent). This is the second time in sequence when one of the HSC neurosurgeons has been ranked as the top neurosurgical teacher in the university.

**Scientific Forums, The Lecture Circuit and Traveling Professorships**

22nd Annual Meeting of The American Society of Pediatric Neurosurgeons (ASPN)

At the annual winter meeting of the ASPN Jim Drake delivered his paper, Third ventriculostomy vs CSF shunt as a first procedure in pediatric hydrocephalus. The ASPN has membership exclusive to those who have achieved academic excellence in the field and whose majority practice is limited to the care of children. Robin Humphreys also attended, completing his term as a past president member of the Nominating Committee.

67th Annual AANS Meeting in New Orleans

Robin Humphreys and Jim Rutka were invited participants in the annual meeting of the American Association of Neurological Surgeons. Robin Humphreys chaired a seminar on Pediatric brain tumors and
Jim Rutka participated in a similar seminar on *Low grade gliomas: Current treatments and controversies*. He was also an appointed discussant for the paper *A novel herpes simplex virus mutant is safe and human-glioma specific*. In addition each surgeon had several related organizational and administrative meetings.

**Jim Drake Off to Japan and Taiwan**

First to Kochi, Japan where Jim Drake participated in the Fifth Symposium on the Treatment of Hydrocephalus delivering a paper on *Treatment of pediatric hydrocephalus with shunts - issues for the next millenium*. Later he traveled to Taipei, Taiwan for the Pediatric Neurosurgical Section of the annual Chinese Medical Association meeting. He delivered 3 addresses, *Computer assisted neurosurgery*, *Update on the management of hydrocephalus in children* and, *Selection of shunt device and its relative complications*.

Sandwiched in between these trips, he acted as Visiting Professor at Wayne State University, Detroit, MI. Dr Drake delivered the ES Gurdjian Lecture, *Clinical trials in CSF shunt complications - Paths to improved outcome*. He also spoke on *Pediatric neuroendoscopy*. He was also an invited lecturer on *Shunt failure in pediatric patients* at the annual lectureships of the University of Virginia in Charlottesville, VA.

Peter Dirks was invited to the International Symposium on Spina Bifida held in Verona, Italy. He delivered a paper on *Symptomatic Chiari II malformation: A 10 year experience at The Hospital for Sick Children*. A few days after his return to Toronto he participated in the 25th Annual Gallie day sponsored by the University of Toronto. His address on *Brain tumours: Views from two different microscopes* recounted his bench laboratory work on tumor cell multiplication and then the use of operating microscopic techniques available to ablate brain tumors in children.

Robin Humphreys was invited to Denmark for the Fifth Postgraduate Course in Pediatric Neurosurgery, sponsored by the European Society for Pediatric Neurosurgery. He lectured on *Posterior fossa cysts, Solve-a-Case* and instructed at a question and answer seminar.

Jim Rutka visited Stanford University where as invited professor he delivered a paper on *Current concepts in pediatric epilepsy surgery*.

**Honours and Awards**

During his first year back in Toronto, Peter Dirks received both a Faculty of Medicine Dean’s Fund New Staff Grant and a Connaught Staff Matching award in recognition of his brain tumor research projects.
Facts

For almost 50 years neurosurgeons at HSC have provided 24 hours coverage year-round by an on-call, full-time pediatric neurosurgeon. The designated individual in addition to everything else in his professional career, must be available at any time day or night to manage urgent or unplanned neurosurgical cases. In 1999 each HSC neurosurgeon will average 91 days on call.

A health care teaching and research centre dedicated exclusively to children; affiliated with the University of Toronto.
Editorial Comment

Who Are All Those Doctors?

While fleeing an efficient pursuit team after their latest train robbery, Butch Cassidy looking over his shoulder asks the Sundance Kid, in the movie of the same name, "Who are those guys, anyway? They're very good!" The same questions may come up when each issue of The Neurotransmitter lists the Fellows and Residents who are in their pediatric neurosurgery rotations at HSC. We can be assured first that none of these men or women have robbed banks or trains and also, that their credentials have been examined very carefully by multiple teams representing the HSC Medical Appointments Office, the University of Toronto, the College of Physicians and Surgeons of Ontario, the provincial Ministry of Health and when necessary, Canadian Immigration.

Just after the conclusion of the Second World War, the University of Toronto established a postgraduate training program in surgery under the directorship of Dr William E Gallie then the university’s chair of surgery (and a previous surgeon-in-chief at HSC). By the early fifties a structured neurosurgical program was set in place by Drs KG McKenzie (see below, McKenzie 75th Anniversary) and E Harry Botterell. Their initial trainees had completed the "Gallie Course" and then required additional experience in clinical neurosurgery, neurology, neuropathology and other related disciplines, at the Toronto General Hospital, and The Hospital for Sick Children. As the UofT neurosurgical program matured over the next four decades it has become recognized as one of the top three in North America by virtue of its vast clinical resources, academic productivity and research achievements.

There are two entry streams to our university’s neurosurgical discipline, each representing the ends of the spectrum. At the front end medical students, soon to graduate as physicians who have made neurosurgery their career decision, will apply to a Canadian university for full training, a process requiring a minimum of six years (and frequently more) of postgraduate experience. Each January about 20 outstanding Canadian students are short-listed for the UofT neurosurgical interview weekend. Three will be selected and will enter the program the following July 1st. Thereafter, they will rotate through the four affiliated university hospitals. HSC provides the obligatory six months rotation in pediatric neurosurgery, a relative rarity for many training programs in North America which lack a free standing children’s hospital and two or more full-time pediatric neurosurgeons. At the conclusion of his/her training, the postgraduate student having fulfilled the requirements of the Royal College of Physicians and Surgeons of Canada will then take their qualifying examinations. If successful, the physician is recognized as a consultant neurosurgeon.
The era of "subspecialization" within neurosurgery accounts for an entry channel of fully qualified surgeons who upon completion of their formal training, wish to pursue a "fellowship" for additional training in pediatric neurosurgery, in our case. During the course of their residency experience, such individuals decided to limit their own practice to the subspeciality of pediatrics. These surgeons may originate from within our own university program (eg Dr Nalin Gupta, last year’s fellow), or from a program external to UofT (eg the present fellow Dr Mark Iantosca who completed his training at the University of Connecticut). About a dozen applications are received each year for the one position as Clinical Fellow at HSC, which assignment is eventually determined by a North American pediatric neurosurgical match program.

In either of the above circumstances, the assessment process for students whose medical education is foreign to Canada consists of detailed scrutiny by the University of Toronto which recognised its responsibility for international education several years ago. Within the Faculty of Medicine, many of the activities of the Department of Postgraduate Medical Education are directed at the identification, processing and instruction for the international medical graduate (IMG). The countries of origin for the IMGs presently placed within the faculty are in order, the United States, United Kingdom, Saudi Arabia, Japan, Australia, Israel, Ireland, Libya, Kuwait and Switzerland. The Department of Surgery has the highest number of IMGs of any department within the university, and HSC the largest number of any of the university hospitals.

There are three fundamental expectations of the IMG. First, they must show evidence of graduation from a recognised medical school. Second, the applicant must be sponsored by a governmental agency, hospital or university (or occasionally corporate entity), which institution must be prepared to identify and verify the support funding for the applicant. Finally, the individual must be prepared to take the English language tests (TOEFL: test of English as a foreign language and TSE: test of spoken English). In addition to these requisites the IMG will be required to present their CV (if not already submitted), as well as a copy of their medical school graduation diploma and proof of his/her passage of the Medical Council of Canada Evaluating Examination (MCCEE). A requirement of Canadian Immigration is a personal physical examination by a physician recognised by the local Canadian Consulate. In addition one must present proof of a normal chest radiograph as within the health care professions the applicant must not be deemed to be a threat to the patients for whom they are caring, nor should they place their own personal health at risk. If that parcel is complete then the subsequent processing through the university and the Ministry of Health can be carried out expeditiously in a few weeks, and finally, the respective Canadian Consulate identified.
Complex paperwork and huge frustrations may be encountered by many in an effort to bring the international student to the University of Toronto. But for those of us who have participated in their education the rewards are life-long - for us and we trust, our IMG students.

Robin P Humphreys

Residents and Fellows - January 1st

Dr Mark Iantosca will continue as fellow until June 30, and complete some scientific writing assignments. Although he is being sought by other American centres, Dr Iantosca will return to the University of Connecticut to assume responsibility for all pediatric neurosurgery in the region served by the university.

Dr Teresa Withers a medical graduate of the University of Queensland will join the staff in early February when she and her husband arrive at HSC to share fellowship duties (he in Genetics). Australasian neurosurgical training is frequently split between 2 major centres and Dr Withers began her training at the Royal Brisbane Hospital and has recently completed it at the Prince of Wales Hospital in Sydney, Australia. She has recently passed her Royal Australasian College examinations in the speciality of neurosurgery.

Dr Moji Hodaie, a resident attached to the University of Toronto program is another graduate of Queen’s University (see: Facts, below). Armed with a MSc from the UofT Department of Molecular and Medical Genetics, Dr Hodaie entered Queen’s medical school from which she graduated in 1996 with the Edgar Forrester Scholarship for the highest overall standing. She also won prizes for proficiency in medicine, surgery, obstetrics and anaesthesia. To date, Dr Hodaie has 7 scientific publications to her credit.

Dr Babak Jahromi also represents the University of Toronto program. Prior to entering the UofT medical school from which he graduated with honours, Dr Jahromi completed 2 years study in biophysics. He has a sustained interest in computer skills including assembly of electronic circuitry, board layout and design. Dr Jahromi has 12 papers in print and earlier this autumn he won the university’s WJ Horsey Neurosurgical Resident prize for clinical research.

The Intraoperative Viewing Wand - The Surgeon’s Roadmap

During the past three decades there have been many advancements with respect to the operative removal of brain tumors and other similar lesions. CT scanning, magnetic resonance imaging (MRI),
operative microscopes and the Cavitron ultrasonic aspirator (CUSA) have each assisted neurosurgeons in
their quest to remove as much tumor as possible with minimal insult to the brain tissues and, the
patient. In September, 1991 another tool - the viewing wand - was made available to the HSC
neurosurgeons.

The viewing wand is a specialized computer system which helps surgeons locate brain tumors at the
time of operation. Conceived by designers at ISG Technologies in Mississauga, the viewing wand was
initially made available to three hospitals, of which HSC was the first pediatric site chosen in the world.
The preparation, performance and maintenance of the viewing wand is accomplished by three medical
radiation technologists who also specialize in CT scanning and are ultimately responsible for assistance
to the company as a beta test site for software and equipment.

The wand is comprised of an electronic pointing device and a computer loaded with specialized 3D
software. Two types of pointing devices are currently available. The first is a passive robotic arm which is
attached to the operating table and to which different pointers or probes can be affixed. The more
recent and second pointer is light-guided and it uses multiple infra-red light emitting diodes that are
picked up by a special camera. The information obtained is then transmitted to the 3D computer. Prior
to their operation, the child is prepared with a particular type of CT or MRI scan at a date close to the
time of the scheduled surgery. As the scan images are so important to the use of the system it
sometimes becomes necessary to repeat the study specifically for wand data collection. Once acquired
the images are sent and stored to a 3D post-processing station which allows for 3D skin surface and
other objects to be produced for measurements in the operating room. The child’s scans and 3D
reconstructions having been loaded into the viewing wand’s computer are taken with this system to the
operating room on the day of surgery.

Once the patient is asleep and prepared for surgery the technologist attaches the pointer to the frame
(in which the patient’s head rests), ensures the system’s accuracy and then correlates the pointer’s
position in reference to the patient’s head and superficial landmarks (eg the outline of the orbit, the ear,
base of the nose etc). Once the setup is completed the surgeon is able to point to the patient’s head to
determine the most favourable route to the tumor or other lesion. This information can be demostrated
by two-dimensional reconstructions of the original CT or MRI images or by a virtual pointer seen on the
three-dimensional reconstructions. This information is critical to the surgeon who prior to beginning the
procedure can plan accurately the incision site, skull opening and path to the tumor. During the
operation the wand can also assist the surgeon by confirming with the sterilized probes the present
location of the operative exploration vis-a-vis the target and other important anatomy.

Because of its ability to help the surgeon find the best path to the tumour the viewing wand has been of
great benefit to the practice of neurosurgery. It means that a smaller incision and skull opening can be
performed. While time is consumed for the initial setup, the payback is the time saved for the surgeon
to confirm the location and accomplishments of the work underway. The greatest benefit of the wand is
that it allows surgeons to remove more tumor tissue from the most delicate areas of the brain, than
ever before. To date more than 300 children have been treated with the assistance of the viewing wand.
Its role has grown from the initial explorations as a research device to an active tool for the
neurosurgeon’s armamentarium.

Stephanie Holowka, MRT(R)

**UofT Honors Dr KG McKenzie with a 75th Anniversary Celebration**

The first fully trained neurosurgeon to begin practice in Canada was Dr Kenneth G McKenzie who, after
completing basic surgical training and receiving additional experience with Dr Harvey Cushing in Boston,
returned to the Toronto General Hospital in 1923. He very quickly became a neurosurgical icon
recognized for his clinical acumen, surgical skills and thoughtful analysis of his work. He trained many
neurosurgeons who were subsequently dispersed across Canada; one of them was Professor Charles
Drake, father of Dr Jim Drake.

The University of Toronto and its participating hospitals celebrated Dr McKenzie’s life during a special
three days event in October. More than 150 neurosurgeons and neuroscientists who were
representative of all of the areas of expertise for which the university division has become world
renowned, arrived from around the globe to share their knowledge with surgeons from across Canada,
the United States, Europe, Taiwan, Japan, Israel, and Argentina. The 1998 E Bruce Hendrick Visiting
Professorship was folded into this event.

Professor Concezio Di Rocco from Rome, the 1998 Hendrick Lecturer addressed the HSC neurologists
and neurosurgeons on *Hemimegalencephaly*, and then afterwards during the McKenzie program
delivered a major address on *The history of hydrocephalus*. Dr John Kestle a former fellow who is now
practising in Salt Lake City, UT also delivered a lecture on *Lessons learned in a multi-centre pediatric
neurosurgical trial*. Also during the pediatric session which focused on hydrocephalus, Jim Drake spoke
on *Minimally invasive intraventricular strategies* and Robin Humphreys, who was the meeting’s scientific
program chairman, delivered a paper on *Our contemporary treatments - what have we learned?* During
the neuro-oncology session, Jim Rutka presented his paper, *Recent developments in gene transfer
techniques: Applications to experimental neuro-oncology.*

**Scientific Forums, The Lecture Circuit and Traveling Professorships**

The HSC staff surgeons, who each hold ranking in the university’s Department of Surgery, are constantly
in demand to participate in a variety of university and professional academic forums. Such require many hours of preparation time as well as for travel. The past 6 months are typical.

**HSC Neurosurgery Active at Congress of Neurological Surgeons - Seattle, WA**

Several members of the division travelled to Seattle to participate in the 48th annual meeting of the Congress of Neurological Surgeons. Ab Kulkarni (Research/JM Drake) presented a paper on *MRI findings of anaplastic astrocytoma of the spinal cord in children*, while Sagun Tuli (Research/JM Drake) spoke on *Change in ventricular size and effect of ventricular catheter placement on shunted hydrocephalus*. Jim Drake addressed a luncheon seminar on *Intracranial endoscopy - Longterm results of third ventriculostomy*. At another luncheon seminar Jim Rutka spoke on *Craniopharyngioma*.

**Spina Bifida and Hydrocephalus Association of Ontario (SBHAO) Celebrates 25 Years**

Twenty-five years ago this autumn, the SBHAO received its provincial charter and since then there has been no looking back. Initially, the organization acted as a parent support group and also provided educational assistance for professionals and families who care for children with spina bifida. The mandate of the Ontario Association has expanded dramatically over the years as it became the model upon which other provincial associations were formed. A three day celebratory event was held in Toronto during August. A variety of invited professional speakers addressed the attendees. Jim Drake spoke on *Endoscopic surgery* and Robin Humphreys addressed the group on *Neurosurgical update*.

Jim Drake was invited to Santiago Chile where he participated in the 28th Latin American Congress of Neurosurgery. He delivered 3 lectures, *Complications of complex craniofacial surgery*, *Intraventricular tumors in children* and *Mechanical complications of CSF shunts*.

Robin Humphreys was a special invited guest of the European Society for Pediatric Neurosurgery which held its XVI Congress in Marseilles, France in October. He presided over a day's session on cerebrovascular disease in children and delivered an address on *Pediatric AVM - Issues in the 90s*.

Jim Rutka took part in the Candlelighters Third International Conference in Montreal, PQ where he talked on *Recent advances in the management of the child with a brain tumor*. Shortly thereafter he visited Paris, France and the L’hopital Enfants Malades, Necker where he presented a paper on *Role of multiple subpial transections in refractory epilepsy in children*. Then off to the Alberta Heritage Medical Research Invited Professor at the University of Calgary for two presentations, *Cell cycle control in human astrocytomas* and, *Medulloblastoma a recent appraisal*. In September at a satellite program of the Pediatric Oncology Group of Ontario held in Toronto, Jim spoke on *Surgical considerations in medulloblastoma*. 
Honours and Awards

Bruce Hendrick Receives Lifetime Achievement Award

The first Franc D Ingraham Lifetime Achievement Award honours Emeritus Professor, E Bruce Hendrick, as Canada’s first full time pediatric neurosurgeon. The award, sponsored by the American Association of Neurological Surgeons, was created in 1997 and Dr Hendrick the first awardee, received it in December at the annual Pediatric Section meeting in Indianapolis, IN. Dr Hendrick was nominated by several of his previous residents and fellows who amongst other things remarked on his unique teaching style characterized by inspired bon mots which are not soon to be forgotten. Dr Hendrick was provided with a certificate and a cheque for $1,000 to be directed in his honour to the EB Hendrick Visiting Professorship Fund at HSC.

At the same meeting, Jim Drake and Jim Rutka participated in breakfast seminars which addressed Subtle forms of CSF shunt dysfunction and Pediatric neuro-oncology update, respectively.

Difficult to Come By MRC Grants Awarded to Rutka and Dirks

In an era of highly competitive research awards, especially from the prestigious Medical Research Council (MRC) of Canada, the team of Jim Rutka, Laurence Becker (Neurpath) and Peter Dirks has received a 3-year grant from MRC for their project Intermediate filament-induced alterations in astrocytoma morphology.

Synaptic Connections

Dr Maureen Dennis, Research Institute neuropsychologist is leading an HSC team consisting of Marcia Barnes and Ross Hetherington (Psychology), Susan Blaser (Neuroradiology), Raymond Buncic (Ophthalmologist-in-Chief), James Drake, Daune MacGregor (Neurology) and Stephen Scherer (Genetics) in a five year multimillion dollar study “to uncover the secrets of spina bifida”. The HSC group will cooperate with an investigative team at the University of Texas-Houston Health Science Center who will share the NIH award, and evaluate 583 children with spina bifida. The fundamental aim is to understand how spina bifida changes brain development and the brain adapts to these changes.

Announcements

Dr Harold L Rekate Invited as 1999 EB Hendrick Visiting Professor

Dr "Hal" Rekate of the Barrow Neurological Institute in Phoenix, AZ has been invited as the 1999 Hendrick Visiting Professor. Dr Rekate is a graduate of the Medical College of Virginia, and then took his
neurosurgical training at the Case Western Reserve University, in Cleveland, OH where he practiced for a few years before being invited to join the faculty of the renowned Barrow Institute. An inquisitive, entertaining and sometimes controversial teacher, Dr Rekate is frequently asked to participate in instructional courses around the world. In 1999, the lectureship event will revert to its usual time, in May.

Facts

Each of the staff neurosurgeons shares a bond with Queen’s University. Jim Rutka and Peter Dirks graduated from its medical school. Jim Drake and Robin Humphreys took a portion of their postgraduate training there in general surgery and neuropathology, respectively.

Publications - Released January-December, 1998


A health care teaching and research centre dedicated exclusively to children; affiliated with the University of Toronto.
Our Roots and A Welcome to Peter B Dirks

Toronto has an outstanding neurosurgical reputation around the world. Just a few years after Kenneth G McKenzie gave birth to Canadian neurosurgery at the Toronto General Hospital, (see: University of Toronto to Celebrate 75 Years of Neurosurgery) William S Keith was appointed in 1933 to The Hospital for Sick Children (HSC). He became the first neurosurgeon in the Hospital's 58 year history, and the first in Canada to have a designated neurosurgical responsibility for children. Although his appointment was only part-time, he nevertheless began paediatric neurosurgery which was to flourish as the next six decades passed.

William Keith initially came to the hospital as an undergraduate intern in 1927 and returned as a full intern a year later, when he made an impression upon Dr William Gallie the Surgeon-in-Chief. Gallie encouraged Keith to pursue further education in the neurological sciences. Fellowship money was arranged for Keith to study first at the University of Chicago and then in 1931 to travel to the National Hospital, Queen's Square in London for a neurology clerkship. He subsequently became Chief Resident in Surgery at HSC and upon joining staff in 1933 he was expected to be equally facile in general and orthopedic surgery as well as neurosurgery.

Dr Keith maintained a steadfast relationship with HSC until 1964, when he restricted his activities to adult practice at the Toronto Western Hospital. When he finally closed his neurosurgical practice, Dr Keith as a septuagenarian returned to an old love, general family medicine which he worked at between obligatory fishing trips in the remote areas of Ontario and British Columbia. Bill Keith died in December, 1987.

The post-graduate training programme in neurological surgery at the University of Toronto was set just after the second war, and by the early fifties it had come under the aegis of the Gallie Course in the Faculty of Medicine. In 1952, E Bruce Hendrick having completed his Gallie training in general surgery was informed that he was being "given the opportunity of a lifetime" by being sent to the Children's Hospital in Boston to study paediatric neurosurgery under Franc Ingraham and Donald Matson. About
this decision, Hendrick confessed that "I knew very little about Ingraham or Matson and nothing about paediatrics". However, he had observed that despite Bill Keith's presence only a limited amount of children's neurosurgery was being performed at HSC. Most children with brain and spinal cord tumours were transferred to the adult hospitals for surgery and returned to paediatrics for convalescence. Head injured children were admitted to the HSC general surgeons who also operated on infants with myelomeningocele. Hendrick concluded that paediatric neurosurgery was a minor part of the Toronto neurosurgical scene as it also seemed to be in most major medical centres in North America.

All of that was to change when Bruce Hendrick returned to Toronto in 1954 to pursue what he described as his "eccentric interests at the Children's". With his youthful vigor and military brush cut, he swept about the Hospital entrancing students young and old with the mysteries of children's neurosurgery. He was established as Canada's first full time paediatric neurosurgeon in 1956, when Dr AW Farmer then Surgeon-in-Chief, formed speciality divisions within the HSC Department of Surgery. This resulted in a coalescence of patient care and guidelines were established as to just which cases were to be admitted to the division. as governed by the principal of delivery of expert care for the child's nervous system. The neurosurgical patient census would extend upwards from the assigned 30 beds with the children scattered about the Hospital. Residents, at first from the university general surgical programme and then from neurosurgery were assigned to the division. By the late fifties it was structured that a resident's penultimate year of neurosurgical training would be spent at HSC.

In July, 1964, Bruce Hendrick (now the Division Chief) after several years of unflagging and almost solo call, realized some order in his life. Harold J Hoffman fresh from a year's travel abroad on a McLaughlin scholarship had accepted an earlier invitation to join Hendrick on the HSC staff. Hoffman had spent time with Professor Murray Falconer in the United Kingdom for an experience which no doubt stimulated his subsequent interest in the surgery of paediatric epilepsy. Now, two surgeons could share the onerous duties and call schedule of an increasingly busy unit. By no small coincidence the Gerrard wing of the Hospital opened at the same time and the division was granted a designated 32 bed patient care area on ward 5G - the first specialized geographic surgical unit in the Hospital. Three floors directly below, lay the largest neurosurgical operating theatre in Toronto. The neurosurgeons performed their own ventriculograms and myelograms which might tie up one staff member each morning. Clinics were held two mornings a week and the division also had assigned operating room time each weekday. Most importantly, this two man practice eased one's sense of isolation as each could trade experience and joys and, seek the other's counsel.

The division was becoming a touchstone for children’s neurosurgery and visitors arrived from around the world. As the years passed there was time to reflect on the developmental and traumatic problems
of the child's nervous system and, to convey that experience in scientific writings and presentations as paediatric neurosurgery had become a firmly established subspeciality. That it should become more specialized might not even have been considered. But, Hendrick and Hoffman began to develop areas of individual and particular interest which were to be crystallized through the eighties.

It has been claimed facetiously that the need for a third neurosurgeon whose name began with "H", lay behind the appointment of Robin P Humphreys to the division in December, 1970. Perhaps forecasting requirements of the nineties, Hendrick wanted Humphreys to take a year's fellowship beyond the six months he had just completed at HSC, and travel first to Boston to work with Donald Matson and then on to Mr Kenneth Till at The Hospital for Sick Children, Great Ormond Street in London, England. The plans went awry at the last minute when it was learned that Hendrick's Boston mentor had tragically succumbed to a neurological illness and, Mr Till was organizing his retirement. Frustrated by this turn of events, Hendrick announced to his new associate, "You might as well learn on the job!" By that time each surgeon was expected to develop his niche, Hendrick and his Hospital and extramural administrative responsibilities, Hoffman the laboratory projects on brain edema and the tabulation of unit clinical experience and Humphreys to assist with the development of craniofacial surgery and to establish a structured teaching programme. From that point on these three neurosurgeons became known internationally as "the 3Hs in Toronto" although at home they discovered that they were not prophets in their own land. The ladies of the Women’s Auxiliary dubbed them, "He, Ho and Hum"!

When Harold Hoffman was named Division Chief in 1986, he faced two immediate issues. The first was staff recruitment as there had been no appointment since that of Robin Humphreys in 1970. Secondly, Hoffman had to deal with the one obvious deficiency within the division, namely that of active laboratory investigation. During 1986, James M Drake a graduate aeronautical engineer and physician, completed his post-graduate neurosurgical training at the University of Toronto. He declared his interest in paediatric neurosurgery and having then obtained his MSc degree, Drake spent 6 months working at Necker Hospital Enfants des Malades in Paris. He returned to HSC in July, 1988 and opened the first neurosurgical research laboratory in the division's history, at the Elizabeth McMaster building. Drake brought legitimate scientific inquiry to numerous research questions which concerned the developmental disorders of the child's nervous system, especially those which pertain to the circulation of spinal fluid through shunting devices. Since his appointment he has collaborated on this topic with investigators in Europe and North America and he has won professional awards for his research. He also brought his inquiring mind to the performance and outcome analysis of selective dorsal rhizotomy for children with leg spasticity. And he has has established himself as an authority in minimally invasive operative technology (e.g. third ventriculostomy) for which he has become the UofT expert.

Following upon the retirement of Bruce Hendrick, the infusion of young, enthusiastic talent continued
with the arrival of James T Rutka in 1990. He was in the vanguard of the surgeon-scientist programme established by the Department of Surgery at the university. As such, he interrupted his clinical training for three years and obtained his PhD from the Brain Tumor Research Institute at the University of California, San Francisco. After he finished his clinical neurosurgical training, Rutka spent six months in Japan during which time he forged links there with various academic centres. That set the stage for a continuing shuttle of young Japanese surgeons who seek additional experience and knowledge in the division’s clinical and research arenas. The management of children’s brain tumors accounts for at least 15% of our activity and to that end the Brain Tumor Research Laboratory which Rutka established shortly after his return to Toronto has been proliferative with its investigative work and productivity. The laboratory efforts have resulted in a number of distinguished funding grants and Rutka has recently been named as Director of the Labatt Chair in Brain Tumor Research (see: The Neurotransmitter, Winter 1998). In their relatively brief time on staff the “two Jims” have brought prestigious academic credentials to the division. Each runs his own very successful laboratory to which he is committed two weeks monthly. Thus, by the end of 1991 the time had arrived to change the established "3Hs" monicker to "H2 Jim2".

Upon being appointed Division Chief in 1996, Robin Humphreys’ most immediate task was that of succession planning. For the previous three years Peter B Dirks, who was born in Montreal, educated in Kingston and was now involved with post-graduate neurosurgical training in Toronto, had stepped aside from his clinical responsibilities to study in Jim Rutka’s laboratory. It has never taken Peter Dirks long to fit comfortably into the traces of whatever he pursues - clinical medicine, scientific bench research or recreational athletics (as an undergraduate he won the Queen’s University Sutton prize “for combined academic and athletic achievement”). Not unexpectedly his laboratory research star ascended as he studied the regulation of the cell cycle and cell phenotype in malignant astrocytomas, for which he was ultimately awarded his PhD in November, 1997. Along the way he has gathered in outstanding fellowship awards from the Medical Research Council of Canada, the National Cancer Institute of Canada and most recently a McLaughlin Travelling Fellowship which has supported his studies for the last six months at the Necker Hospital in Paris. Add to that a half dozen other university prizes and 20 scientific papers and Peter is launched. HSC is doubly fortunate in attracting not only Peter but also his physician spouse, Tara Williams who has joined our Department of Diagnostic Imaging.

Peter Dirks becomes the seventh neurosurgeon appointed to The Hospital for Sick Children full time staff. "To be the best we can be" is a core value of the Hospital’s mission statement. As the years have passed, the achievements of the neurosurgeons at The Hospital for Sick Children have been recognized within the institution and university, as well as across Canada and, abroad. The division’s international stature continues to grow so that as we enter the next millenium the accomplishments of William Keith and the "3Hs" to "be the best we can be" will be enhanced further by Jim Drake, Jim Rutka and Peter Dirks.
Residents and Fellows - July 1st

Mark Iantosca returns to HSC as the Clinical Fellow, after a three months rotation here in 1995. He graduated with his MD from Tufts University School of Medicine in Boston (where HSC alumnus Dr William Shucart, 1970, is presently the neurosurgical program chair), and also winning the DL Kasdon Prize for "outstanding achievement in the neurosciences". Dr Iantosca has completed his neurosurgical training at the University of Connecticut School of Medicine where he presently holds faculty ranking as an instructor. He has just completed a year of scientific research and upon finishing his HSC fellowship intends to practice full-time pediatric neurosurgery.

Lynn Myles follows along the UK traditions established previously by Mr Anthony Hockley (1975), Mr Jonathon Punt (1983) and Mr Paul Chumas (1993) who also spent time at HSC as clinical fellows. Ms Myles attended Edinburgh University where she graduated MB ChB in 1986. Five years later that university awarded her the MD, a special post-graduate distinction for her work on peripheral nerve repairs. In 1994 she moved to the Wessex Neurological Centre, Southampton General Hospital where she is presently stationed. She received her FRCS (Surgical Neurology) in 1997 and intends to pursue pediatric neurosurgery as one of her major practice endeavours.

Mubarak Al-Gahtany is a 1993 graduate with MB BS from King Saud University College of Medicine in Saudi Arabia. He was a senior house officer in neurosurgery with the Riyadh Armed Forces Hospital before entering the UofT neurosurgical program in July, 1996.

Ayman Al-Shayji a native of Kuwait graduated MB, BCh in 1992 from the Royal College of Surgeons Ireland, during which education he studied pediatrics at Our Lady's Hospital for Sick Children in Dublin. He began his surgical registrar training in Kuwait and has been associated with the UofT neurosurgical program since July, 1995.

Kamal Thapar graduated from medical school in 1985 and since then has continued to go from strength to strength. As part of his UofT post-graduate neurosurgical training he spent several years in the laboratory where he established an international reputation for his pathophysiology research of pituitary tumors. He has won just about every internal university prize for surgical resident achievement and earlier this year was identified by the American Association of Neurological Surgeons as the 1998 winner of the prestigious Van Wagenen Fellowship.

Spina Bifida and Folic Acid

In the Grimm brothers fable Rampion, a woman has an overwhelming craving to eat rampions (brussels sprouts) around the time she becomes pregnant; subsequently she gives birth to "the most beautiful child under the sun." One hundred and seventy years later, life imitates art.

The folic acid story has been around for years. But, it was not until the early eighties when controlled scientific studies from the United Kingdom (where historically spina bifida had been far more prevalent
than in North America) demonstrated that folic acid, a vitamin abundantly found in green, leafy vegetables (especially brussels sprouts) helps prevent neural tube defects (NTD) such as spina bifida. Additional evidence of this effect was marshalled from subsequent American studies and in 1993 a Canadian Consensus was developed at a conference organized by the HSC Motherisk Program. At least partially as a result of that, the Canadian Task Force on the Periodic Health Examination published in 1994 its opinion on the prevention of neural tube defects by means of folic acid supplementation. Earlier this year, both Health Canada and the U.S. Food and Drug Administration required that enriched cereal grain products (flour, pasta, rice and corn meal) be fortified with folic acid, which is a water-soluble vitamin in the B-complex. But this fortification process will only increase the daily intake of folic acid in women of reproductive age by about 0.1mg/day.

Although there has been a declining world-wide incidence of such defects since the late 1940’s it is not concluded that folic acid supplementation deserves the credit for such, at least not until very recently. There is substantial laboratory evidence that aminopterin, a chemical which interferes with folic acid metabolism can act as a teratogen and is capable of producing NTDs. There has been detailed study of the dietary habits of mothers at risk for offspring with NTDs and over the last few years the role of folic acid has become clear. Importantly, the amount of folic acid recognized as sufficient to reduce the risk of NTD is 0.4mg/day \textit{in addition to} a diet containing foods known to be rich in the substance. This recommended dose is about four times greater than the amount recommended in the above legislation. Folic acid is widely available as a non-prescription item (many of the prenatal vitamins contain 1.0mg of folic acid), and when taken in the recommended doses it is not known to have adverse effects on women or their fetus. Women who have delivered a previous baby with a NTD, diabetics and women taking anti-convulsive medications should take 5mg of folic acid daily. Women who have first-degree relatives (ie brothers, sisters, parents or cousins) who have conditions caused by NTDs should be taking this higher amount too. It must also be stressed that the best guarantee for protection occurs when folic acid is taken \textit{before conception}. That is, folic acid therapy should be initiated 6 weeks before conception and continue on for at least 2 months thereafter. That could be a tall order if one acknowledges that at least 50% of pregnancies are unplanned.

\textbf{Scientific Forums, The Lecture Circuit and Travelling Professorships}

\textit{21st Annual Meeting of The American Society of Pediatric Neurosurgeons (ASPN)}

At the annual winter meeting of the ASPN Robin Humphreys and Jim Rutka represented HSC and
delivered their papers, *Retinal hemorrhages, Terson’s syndrome and non-accidental injury* and, *Expanded role of glial filaments in cells and tumors of glial origin*, respectively. Also attending this year’s annual meeting as invited guests were past fellows Joong-Uhn Choi, Seoul, Korea (1985), John Duncan, Providence, RI (1993) and Mark Souweidane, New York, NY (1995). The ASPN, of which Bruce Hendrick, Harold Hoffman and Robin Humphreys are founding members was formed in 1978, is dedicated to the advancement and development of pediatric neurosurgery. It has membership exclusive to those who have achieved academic excellence in the field and whose majority practice is limited to the care of children.

Jim Drake participated in the annual University of Toronto Department of Pediatrics Update Course where he was asked to speak on *New developments in the treatment of hydrocephalus*. Shortly thereafter he attended the Allegheny Medical Centre, in Pittsburgh as an invited Visiting Professor where he lectured on *CSF shunt valve design: Where have we been? Where are we headed?* and, *Current status of research in pediatric hydrocephalus*. In June, he travelled to Leeds, England where at the invitation of past fellow Paul Chumas he spoke on *Low grade gliomas in children* and, *Image guided surgery*.

Robin Humphreys was an invited lecturer at the Postgraduate Course of the European Society for Pediatric Neurosurgery held in May in Verona, Italy. He spoke on *Supratentorial intraventricular tumors* and directed the seminar, *Neurosurgical Quiz*.

Earlier in the month he spoke on *Infants with congenital neurological conditions and neurosurgical procedures* and, *Pediatric acquired brain injury* at a conference titled "It’s different for kids: The clinical application of neuroanatomy in paediatrics" which was organized by HSC’s Department of Rehabilitation Services.

Jim Rutka attended the annual meeting of the American Association of Neurological Surgeons meeting in Philadelphia, PA where he spoke on *Surgery of low grade gliomas* and also on *Brainstem tumors*. He also served as scientific chairman for the Third Biennial Brain Tumor Satellite Symposium which immediately followed. Upon returning to Canada he attended the Canadian Neuro-oncology Meeting to speak on *Cell cycle control in astrocytomas*. Later in May he was invited to Antayla, Turkey where he addressed the Turkish Neurosurgical Society on *Epilepsy surgery in children*, *Surgery for brainstem tumors* and *Frameless stereotaxy for brain tumors in children*. He was also in Leeds, England for the Chumas’ meeting and he spoke on *Medulloblastomas*.

*Brainchild Holds First Annual Pediatric Brain Tumor Conference*
With the theme of "Families moving forward, the challenge of childhood brain tumors" Brainchild inaugurated an annual conference on May 2nd at UofT’s Hart House. Robin Humphreys opened the conference by speaking on, An historical perspective of pediatric brain tumors and subsequently, Jim Rutka addressed the group on Tumor types: Suprasellar and medulloblastoma tumors. Dr Brenda Spiegler brought the neuro-psychologist’s view to School re-entry and Late effects (of treatment) and Dr Christine Littlefield led a panel discussion on Bereavement and grief.

University of Toronto to Celebrate 75 Years of Neurosurgery

Kenneth G McKenzie studied in Boston with Dr Harvey Cushing in 1922 and ‘23 and upon returning to Toronto was appointed to the staff of the University of Toronto and the Toronto General Hospital (TGH) an achievement subsequently described as "his courage to commit himself to the field of neurosurgery when he did, and to preserve and develop the first neurosurgical service in Canada." By all accounts he was a brilliant technical surgeon whose gifts were applied to some children with neurosurgical disorders upon whom McKenzie operated at the TGH before the arrival of William Keith at The Hospital for Sick Children. To celebrate McKenzie’s contributions and the subsequent accomplishments of the Division of Neurosurgery at UofT, the university and its allied teaching hospitals are sponsoring a 3 day meeting in Toronto, October 29-31, 1998. Twenty-two international figures renowned for their clinical neurosurgical skills and neuroscience research have been invited to speak at the meeting. The E Bruce Hendrick Visiting Professorship, an annual event usually held each May will be infolded into this special occasion. Professor Concezio Di Rocco of Rome, Italy is the invited Hendrick Professor and he will visit and lecture at HSC before the main meeting begins.

Honours and Awards

Imran Fayaz Receives a 1998 HSC Foundation Award

The Hospital for Sick Children Foundation created the Humanitarian Awards program in 1990 and since then more than 50 people have been acknowledged for their exceptional standards of care. This year, Dr Imran Fayaz (Resident, July - December, 1997) was nominated by staff in the Critical Care Unit and received the award a few weeks ago. The supporting letters documented Imran’s outstanding devotion to patient care and his relationships with patients and families.

Sagun Tuli Wins HSC Department of Surgery Award

The top prize in the 1998 Annual Surgical Services Clinical Research Competition was awarded to Dr Segun Tuli (Research; Supervisor James Drake) for her paper Change in ventricular size and effect of ventricular catheter placement on shunted hydrocephalus.
Synaptic Names in the Circuits

Carter Snead Assumes Wider University Responsibilities

Professor O Carter Snead, Chief, Division of Neurology has been appointed Head of the University of Toronto Epilepsy Program. His goal is to coordinate and create a teaching and research resource focused upon epilepsy throughout the Faculty of Medicine.

Nikki Brooks Organizes The Clinical Application of Neuroanatomy in Paediatrics

In May, an unique course in rehabilitation medicine was organized by occupational therapist Nikki Brooks and her colleagues with the assistance of Professor Anne Agur of UofT’s Department of Anatomy. The intent of the course was to emphasize the neuroanatomy and its disturbances in a variety of developmental and acquired disorders of the child’s nervous system. The course was designed for physio- and occupational therapists who work with children.

Dr Elizabeth Donner Graces Neurosurgery

Dr Elizabeth Donner was the latest in a series of residents from the neurology program who spent an elective month on neurosurgery during the winter. Her presence was most appreciated not just because she provided able pediatric medicine and neurology wisdom but also because her appearance coincided with unplanned absences of the neurosurgical housestaff due to illness. We’re sure that Dr Donner took away knowledge and experience of the workings of the "other side of the family".

Facts

Dr Harold Hoffman officially retired from HSC on June 30th, 1998 after an accomplished career which began in 1964. During that time he provided neurosurgical care for 15,741 patients.

A health care teaching and research centre dedicated exclusively to children; affiliated with the University of Toronto.
Editorial Comment

What's Behind Scientific Reporting?

On a fairly regular basis the print media publishes health and science news which extracts reports from any number of recognized scientific journals (eg New England Journal of Medicine, Nature, Canadian Medical Association Journal, etc). Using tantalizing headlines (eg TIME magazine’s "The Good News" and "The Bad News") some publications grab your attention on matters which may concern your own personal health. Regardless of the presentation style the news report consists of research or clinical findings, which have been distilled from a scientific journal, for the benefit of the lay reader who may be placing considerable faith not only in the original scientific report but also in the skills of the science reporter for the newspaper or magazine in which the material is printed secondarily. It is estimated that in excess of 5,000 papers are published each day in all branches of science. So, what lies behind the original legitimate scientific paper, especially those which are concerned with health matters?

The first scientific journal the Journal de Scavans was published in Paris more than three hundred years ago. Currently, scientific publishing has so matured that each journal has its set of standards which usually follow those of the International Committee of Medical Journal Editors. When a manuscript is submitted to a scientific journal for consideration it is anticipated that the hypothesis upon which the paper is constructed is relevant and of interest (and thus that the literature will be enhanced by its inclusion), that the methods of study are clearly set out as are the results, that the discussion is compact and germane, and that the conclusions are correct. All of this is dedicated to the journalistic principles of high quality research, and accurate and honest reporting regardless of the results (eg for trials). A journal’s peer review process, the integral component of scientific publishing, will assure that the reader is supplied with clear, concise, important, interesting and worthwhile information to help them provide care to their patients.

Quite remarkable for the time, peer review was a requisite of the Journal de Scavans. For most journals however peer review has been a phenomenon only since the late forties. Today it is calculated that in the western world about 75% of scientific journals are using peer evaluation for assessment of original articles. Manuscripts are becoming increasingly sophisticated and complex. To ensure a paper’s worthiness a journal’s editorial board will request an examination of the submission by at least three objective referees (frequently more) who are selected by virtue of their individual knowledge and experience, academic ranking, and university or research institute stature. (In addition to their
substantial contributions to the scientific literature - see Publications 1997 - the HSC neurosurgeons act as editorial board members and reviewers for Canadian Journal of Neurological Sciences, Child's Nervous System, Journal of Neurosurgery, Journal of Neuro-Oncology, Neurosurgery, and Pediatric Neurosurgery). Each reviewer dissects the material and offers an opinion which must also be based in fact. As much as is possible the review procedures must take into account the potential biases which might exist between the reviewer and the writer - eg the age and experience of the authors, inter-disciplinary hubris, nationality, or a known conflict of research interest between the two. Since the late eighties, the analysis of the scientific review and editing process has become so intense that some have termed it "journalology". The challenges of peer review make some wonder if all the effort is worth it? Some argue that despite quality reviews many articles published even in the leading medical journals are poor.

If the casual reader of the popular print media feels apprehensive about all this then they should be reassured by one senior and respected editor who has observed that in the end "publication and peer review have come to occupy pivotal positions not only for the personal careers of scientists but also for the progress of science and public policy".

**Labatts Set New Record in Sick Kids’ Donor History**

With the stroke of a pen from Arthur and Sonia Labatt, HSC became $5-million richer on September 22 during the community launch of the Help Make Sick Kids Better campaign.

The gift from the president of Trimark Financial Corporation and his wife is the largest contribution from a family in the Hospital's 123-year history. The funds will be used to establish The Brain Tumor Research Centre, a project that will bring together scientists and clinicians studying brain tumours from Sick Kids, the University of Toronto, and The Toronto Hospital, in a single laboratory at Sick Kids.

"Toronto has a critical mass of expertise in the study of the detection, treatment, and cure of brain tumours. We felt this was an area of research where we could make a difference," said Arthur Labatt. "We are fortunate enough to be able to make this gift, and we want to ensure the Hospital's excellence is maintained and enhanced. We hope we can also help by providing leverage for further investment in brain tumour research and the neurosciences."

Sick Kids' international reputation as a centre of excellence, in terms of the caliber of physicians and scientists and the quality of care given, figured prominently in the Labatt's decision to give to the Hospital.

"The outstanding contribution of Arthur and Sonia Labatt of $5-million for The Brain Tumor Research Centre is an investment that will affect children and adults alike," said Mike Strofolino, HSC president.
and CEO. "This generous donation ensures that Sick Kids continues to be one of the best research centres in the world." The Brain Tumor Research Centre will foster excellence in brain tumour research. Amalgamating scientists and clinicians in one laboratory under one roof will create a stimulating research environment and allow them to share resources, such as equipment and space.

**Residents and Fellows - January 1st**

**Nalin Gupta**, who recently won the university’s 1997 Alan R Hudson Resident Teaching Award for instruction of students, nurses and residents will remain as Clinical Fellow until July 1. In June he will write the neurosurgical examinations of the Royal College of Physicians and Surgeons (Canada) and thereafter begin the practice of pediatric neurosurgery for which he is being recruited actively by a number of centres in Canada and the USA.

**Awni Musharbash** we are pleased will also remain with us as a fellow until June and then plans to obtain additional experience in adult neurosurgery at one of the other university hospitals.

**Elaine Kiriakopoulos** obtained her MD from McMaster University in 1995 the same year of her entry into the UofT neurosurgery program. Amongst her many awards to date she has held two Medical Research Council of Canada Scholarships and has recently been a fellow in functional MRI in Boston, MA. To date she has 11 publications (two with HSC staff support) and has made 25 individual presentations, the most recent being to the Joint Section of Pediatric Neurosurgery, in New Orleans.

**Michael Taylor**, a cum laude honours MD graduate from the University of Western Ontario captured a number of awards there reaching the Dean’s Honour List on three separate occasions. He entered the UofT neurosurgery program in 1994 and to date has 10 papers published or in progress. Michael intends to become involved with neurosurgical oncology and research into human gliomas and to that end will enter Jim Rutka’s laboratory July 1st, for an extended period of research time.

**Scientific Forums, The Lecture Circuit and Traveling Professorships**

The HSC staff surgeons, who each hold ranking in the university’s Department of Surgery, are constantly in demand to participate in a variety of university and professional academic forums. Such require many hours of preparation time as well as subsequently for travel. The past 6 months are typical.

At the 11th International Congress of Neurological Surgery held in Amsterdam in July, Jim Drake lectured on *Current management of hydrocephalus and CSF complications*. Jim Rutka spoke on *Detection and*
management of raised intracranial pressure in children following craniofacial procedures, Repair of anterior fossa encephaloceles and, Medulloblastoma - Future therapies based on molecular biology. Harold Hoffman delivered talks on Brainstem and pineal region tumors.

At the 47th Annual Meeting of the Congress of Neurological Surgeons in New Orleans, in September, the "Jims" each acted as seminar moderators. Jim Drake kept order in Management of the difficult shunt while simultaneously Jim Rutka supervised a session on Management of posterior fossa tumors. Jim Drake also delivered a paper on the Implications of the randomized trial of CSF shunt design.

In Cleveland at the annual American Association of Neurological Surgeons’ Course on Neuroendoscopy, Jim Drake was an invited instructor and presented a paper on Practical problems and pitfalls. Several days later, he travelled to the II Congress of Pediatric Neurosurgery in Brasilia, Brazil where he delivered invited papers on Management of complex spinal deformity, Selective dorsal rhizotomy, Pediatric neuroendoscopy and, Determining the best shunt design.

Jim Rutka spent a few weeks in the UK and Asia in September and October, with a side trip to Banff where he presented a paper on p16-induced regulation of astrocytoma tumorigenicity to the American Academy of Neurological Surgeons. In Oxford, England he attended the XIIth International Conference on Brain Tumor Research and Therapy and presented papers on Expression of p16 in U343 astrocytoma cells is associated with changes in the retinoblastoma and E2F family proteins, Expression of p57 inhibits the growth of astrocytoma cells and, Expression of the 67 kDa elastin binding protein in human astrocytomas: Implications for astrocytoma invasion. Maintaining the tumor focus Jim travelled to Beijing, People’s Republic of China for the National Meeting on Malignant Tumors in Children where he spoke on The molecular biology of childhood brain tumors. Several days later, he attended the 56th Annual Meeting of the Japanese Neurosurgical Society in Osaka, Japan where he delivered papers on, Role of multiple subpial transections in children with epileptogenic foci in brain, New diagnostics and treatments for patients with malignant brain tumors based on molecular biology findings, Are radiotherapy and chemotherapy necessary for patients with low grade gliomas? and, Combined utility of fMRI, cortical mapping and frameless stereotaxy in the resection of lesions in eloquent brain in children. While in Japan, Jim visited a number of other university centres where he presented Medulloblastoma: Current practices and future directions (Juntendo University, Tokyo, Shinshu University, Matsumoto, Aichi Medical University, Aichi and Nagoya University, Nagoya). At the Toyama Medical and Pharmaceutical University, Toyama, he spoke on The molecular biology of human malignant gliomas.

Robin Humphreys was an invited faculty member to the 2nd Scandinavian Postgraduate Course in Pediatric Neuroradiology held in Tylosand, Sweden in August. As the only surgeon-participant he delivered a major lecture on Hydrocephalus: Pathophysiology and treatment as well as seminars on Back
pain, Scoliosis, subcutaneous masses, and spinal dysraphism, Myelomeningocele - late occurring complications and, "Shunts".

Then on to Nagasaki, Japan as a guest of the 2nd Annual Meeting of the Japanese Society for Brain Tumor Surgery where his invited lecture was on Surgery of the midline pediatric gliomas. The III Curso de Neurochirugia in honour of Professor Raul Carrea (another founding member of the ISPN) was held in Buenos Aires, Argentina in November. Robin delivered lectures on Assessment of the infant and child with spontaneous cerebral hemorrhage, Cerebral cavernous angiomas - Current management strategies, Pediatric intracranial aneurysms - do they match adult disease? and, Pediatric cerebral AVMs - Issues in the nineties.

Making Waves in the OR

In recent years, developments such as magnetic resonance imaging (MRI) have greatly assisted neurosurgeons with the visualization of pathology for which surgical intervention is indicated. These images may be brought into the operating room to provide a guide regarding the location of a lesion and the layout of its surrounding anatomy. Other tools, such as intra-operative ultrasound or on-line CT sampling with a sterile imaging arm may also assist the surgeon by providing structural orientation within the brain or spinal cord throughout surgery.

However these techniques do not describe the functional integrity of the structures at risk from surgical intervention. It is for this purpose that neuroelectrophysiological monitoring was introduced into the operating room. Evoked or spontaneous electrical activity from the nervous system can be recorded and monitored to guide the surgeon in the operating room. Information provided by these techniques can either confirm the safety of a surgical manoeuvre, or indicate the need to alter it in order to avoid a postoperative neurological deficit.

The area of medicine which is defined by clinical neurophysiological techniques and their interpretation is called electroneurodiagnostics (END). This field is comprised of neurological physicians, academic neurophysiologists, specially trained technologists and, for the intra-operative specialities, anaesthesiologists.

At present, intraoperative electrical testing/monitoring is used for both brain and spinal operations. Electrocorticography techniques are used to map functional brain tissue around lesions which are to be resected. Electromyographic methods are used for peripheral nerve testing in brachial plexus surgery,
selective dorsal rhizotomies and most procedures for tumors and tethering lesions of the spinal cord and cauda equina.

In the future, new techniques will allow us to provide a more rapid, complete and accurate assessment of neurological function which exists throughout the surgical procedure. Also, as current standard anaesthetic regimens may affect the quality of electrophysiological signals recorded intraoperatively, END personnel are working with the support of our anaesthesiologists to determine the anaesthetic techniques which will best facilitate neurophysiological monitoring in paediatric surgery.

With the incorporation of a full neurophysiology monitoring program in the HSC operating room, the neurosurgeons are continuing to increase the repertoire of clues which will aid in the management of their patients. With the access to varied paediatric neurosurgical situations, clinical neurophysiology has the opportunity to increase its efficacy and expand its scope of utility. The symbiotic relationship between these two areas of neuroscience are providing professionals in this field with another perspective from which to better understand the human nervous system and to improve outcomes in the paediatric neurosurgical patient.

Maria Moncada

**Honours and Awards**

*HSC Neurosurgical Training Program and Surgeons Receive Academic Recognition*

The Accreditation Council for Pediatric Neurosurgery has renewed the five-year accreditation of the HSC neurosurgical fellowship training program. This is the only program in Canada which has received unqualified certification.

In the last 12 months, Jim Drake, Harold Hoffman, Robin Humphreys, and Jim Rutka have each received their certificate of competence from the American Board of Pediatric Neurosurgery. The Board, of which Robin Humphreys was recently elected Vice-Chairman, recognizes the identity of pediatric neurosurgery and the qualifications of those who practice the speciality.

*Hendrick Honoured at Silver Anniversary of The ISPN*

The 25th anniversary meeting of the International Society for Pediatric Neurosurgery (ISPN) was held in Verona, Italy in September. As one of the Society’s founders, Bruce Hendrick was elevated to Honorary Member status in a special celebration. Robin Humphreys represented the HSC neurosurgeons and attended a private tribute dinner for the Society’s past-presidents.
Peter Dirks Off On Travelling McLaughlin Scholarship

At the fall convocation at the University of Toronto, Peter Dirks was awarded his PhD for work completed in Jim Rutka’s laboratory. He has also received the prestigious RS McLaughlin Travelling Fellowship to support his 6 months of study at the Hopital Necker Enfant-Malades in Paris, beginning January 1st.

Announcements

The annual EB Hendrick Visiting Professorship held characteristically each May will be postponed to October, 1998. At that time it will be blended in with the special celebrations of the 75th anniversary of the founding of neurosurgery at the University of Toronto. Details of the 3 day program will be found in the next issue of The Neurotransmitter.

Facts

Characteristically there are 5 outpatient neurosurgical clinics held each week. In the last year 3,632 patients from the GTA, elsewhere in Ontario and Canada and beyond, were assessed.

Our Net Address: www.sickkids.on.ca. Search the section, "for health care professionals".

A health care teaching and research centre dedicated exclusively to children; affiliated with the University of Toronto.

Publications - Released January-December, 1997


Editorial Comment

Summer Prizes

Remember those academic awards that were given out about mid-June as the school year wound down? There weren't many but you did wonder just how good you had to be in public school to be recognized as a winner in order to walk up on the stage, shake the principal's hand and receive a trophy for the best spelling effort in your entire grade. And for the the winner of the 100 yard dash in the spring track meet there was the prize with Hermes mounted on a wooden pedestal. Whether you realized it or not, that was probably the beginning of meritorious competition in your life.

The award time in high school, often held in the autumn, was characterized by more sophisticated prizes which honoured individual accomplishments for studies in a foreign language or, social and historical events or, physics (did those guys who won really understand "momentum, levers and centrifugal forces")? Recognition was given to the talented few who had now completed high school and had embarked upon a post-secondary education. Later, in university it took a while to sort out the system and as often as not one might be recipient of a prize which he or she never knew existed. But their professors did and they entered their student's name in competition. Thereafter, students (and faculty) set out pro-actively to achieve a goal by placing their work or teaching against that of their peers. The successful accomplishment would become at the very least an enhancing feature of one’s curriculum vitae and for a few, be a distinguished mark in their academic career.

The Hospital for Sick Children is a fully affiliated partner with the University of Toronto (UofT). Our annual academic responsibilities extend through the instruction of undergraduate medical students and post-graduate surgical residents, fellows and, visiting surgeons. The attending staff surgeons, who each hold ranking in the university's Department of Surgery, are also responsible to a variety of university and professional academic forums (see Scientific Forums, The Lecture Circuit and Traveling Professors). In addition, the division's laboratories are immersed in basic research activity which if successful may bestow honours on the investigators and their supervisors. One's attainments in any of these arenas may garner prizes or awards from the university or a prestigious external body.

Numerically, the HSC and UofT neurosurgeons form a relatively small group within their respective Departments of Surgery. Small but mighty. During the last few years, the members of the neurosurgical
community have been placed in competition with surgeons and research investigators of their own and other disciplines and they have walked off with outstanding awards. Names familiar to HSC are, Jennifer Brown 1996 Bayer Prize in Neurocritical Care. Peter Dirks, 1996 Physician Scholar of Medical Research Council of Canada; he also received the 1997 TP Morley prize from the university for his research. In 1995 the latter was awarded to Nalin Gupta. Jim Drake was recipient of the Robert H Pudenz Award in Hydrocephalus Research from the Congress of Neurological Surgeons. Matthias Feldkamp won the American Association of Cancer Research-Bristol-Myers Squibb Oncology Young Investigator Award. Ab Guha has just been identified as the 1997 recipient of the Gold Medal in Surgery from the Royal College of Physicians and Surgeons, Canada, the second year in a row that a UofT neurosurgeon has won this honour (Michael Fehlings, 1996). Last summer, Bruce Hendrick was honoured by the International Society for Pediatric Neurosurgery for his "pioneering contributions to the development of pediatric neurosurgery in Canada". UofT awarded the Lister Prize in Surgery to Harold Hoffman for the international distinction which he has brought to the university through his academic activities. The same year, Robin Humphreys won the E Bruce Tovee award as the best postgraduate teacher in the university's department. Miriam Kim was the recipient of the 1996 Mary Tom Award of the Canadian Association of Neuropathologists. Zelma Kiss won the William H Sweet Young Investigator Award in Pain Medicine from the American Association of Neurological Surgeons, and more recently the same organization has identified her as winner of the William P Van Wagenen Travelling Fellowship. Jim Rutka is a past winner of the university's George Armstrong Peters prize. This award recognizes outstanding productivity during one's initial period as an independent investigator. In two consecutive years the neurosurgeons won the UofT Bernard Langer Surgeon-Scientist Award - Michael Tymianski in 1995 and Raj Midha in 1996.

Life moves on from that first tentative walk up to the platform in public school to wider and more prestigious recognition from one's peers and the established institutions. HSC and the university are justly proud of these and many other accomplishments by their neurosurgical faculty and students.

**Chair in Pediatric Neurosurgery to Honour Harold Hoffman**

One hundred and fifty friends and surgical colleagues gathered at the Four Seasons Hotel on June 6th to pay tribute to Harold Hoffman's substantial contributions to the field of pediatric neurosurgery during the past 33 years and, to honour the completion of his term as Neurosurgeon-in-Chief at HSC. In 1964 Harold fresh from a year's travel abroad on a McLaughlin scholarship, joined Bruce Hendrick on the HSC staff. There began a long and productive career culminating with his appointment as Neurosurgeon-in-Chief, in 1986 (see The Neurotransmitter, Summer, 1996). Roasts, toasts and tributes filled the evening, which ended with the announcement of The Shoppers Drug Mart Chair in Paediatric Neurosurgery,
established in honour of Harold Hoffman. The creation of this Chair continues the commitment of Shoppers Drug Mart to the Hospital and the Division of Neurosurgery.

Residents and Fellows - July 1st

Dr Nalin Gupta is the 1997 HSC Clinical Fellow. A 1987 MD graduate from UofT, he completed his PhD last year in the Department of Biochemistry and Biophysics at the University of California, San Francisco. In so doing, he received a junior scientist travel award from the International Congress of Radiation Research. Nalin has 23 papers, abstracts and book chapters in print. In 1986 he spent an elective student period on our unit, and a few years later returned as a resident. After Nalin completes his fellowship year, he plans to enter practice in pediatric neurosurgery.

Dr Imran Fayaz is also a MD graduate of UofT and he has completed research activity with Professor Charles Tator. In his return to clinical neurosurgery, he will remain with us until December 31st.

Dr Awni Musharbash is a 1985 graduate of the University of Craiova - Romania and he subsequently received his Master Degree in Neurosurgery from Jordan University in 1994. Currently, he is a teaching assistant in neurosurgery at Jordan University Hospital in Amman working with Dr Nasri Khoury, a 1984 HSC resident. Awni has arrived in Canada with his wife and 2 daughters and will remain until July, 1997.

Dr Phillip Porter graduated as the Gold Medallist from UofT in 1991 and during his internship the following year won the Charles E Snelling Paediatric Education Award for the highest achievement in paediatrics. In his career to date, he has captured 15 other awards and scholarships, the most recent being the KG McKenzie Prize in Clinical Neuroscience Research which he won for his studies on cerebral cavernous malformations.

Dr Essam Al-Shail will split neurosurgical outpatient and educational duties with his major commitment as Dr John Phillips' Craniofacial Fellow.

Neurosurgery Shunt Research

So many trials - the CSF Infection Study, the Shunt Design Trial and, the Endoscopic Shunt Surgery Trial. What are their differences and why do we spend so much time and effort on these projects? Historically half of all shunts fail by 2 years usually through obstruction or infection. The consequences are hospitalization, anaesthesia and surgery and the child loses precious time away from school and home. Parents become stressed when dealing with a treatment over which they have no control. Most are very aware of the symptoms of shunt failure, but even the child who simply had the flu may have to be
admitted to hospital and exposed to more testing to rule out the possibility of a shunt malfunction or infection. These trials are designed to scientifically determine the causes of shunt failure, so that treatment can be improved.

**Cerebrospinal Fluid Shunt Infection Study**
Shunt infection is probably the most distressing cause of shunt failure. Shunt infection results in at least two additional shunt operations, puts the patient at increased risk of intellectual impairment, the development of loculated CSF compartments and has a significant mortality rate. The objective of this study is to determine what are the risk factors for shunt infection? With Dr. Jim Drake as the principal investigator, two research/observer nurses monitor shunt patients from the preoperative phase, through the entire shunt surgery and then postoperatively by acquiring detailed follow up information. All infections are thoroughly investigated. At the end of the trial, patient characteristics and operative events will be related to the infection rate.

**Shunt Design Trial**
This trial has examined whether the type of valve in the shunt system affects its performance. There are three different valve designs in common use today - (1) a standard valve which opens and closes in response to a change in pressure (2) a flow limiting valve restricts the amount of spinal fluid flow through the shunt in order to prevent over-drainage (3) an antisiphon valve which limits over-drainage or siphoning of CSF when the patient stands up. These three valves are currently used at HSC. Up to this point we do not know if one valve had any particular advantage over the others in terms of limiting the number of shunt failures. The only way to decide if one valve is better than the others is to select each by chance and determine if problems are any more frequent with one type, when compared with the others. This randomized controlled trial involved a number of international pediatric neurosurgical centers including Toronto, with Dr. Jim Drake and Dr. John Kestle as principal investigators. The final data is presently being examined.

**Endoscopic Shunt Surgery Trial**
The purpose of this study is to find out whether the use of a viewing endoscope to assist with placement of the shunt catheter into the brain will reduce shunt failure from proximal catheter obstruction. Often, the brain catheter is inserted by the surgeon relying on surface landmarks. Once positioned, the exact location of the catheter tip is unknown, although flow of CSF through the catheter usually confirms that it is in the ventricle. The use of a scope allows accurate placement of the catheter tip. The 1 mm scope fits inside the shunt in place of the usual wire guide. It pokes out the end of the shunt once the shunt is in the brain fluid cavity, allowing the surgeon to look within the ventricle and check its position. The
scopes (which can be used 5 times) cost $600, are more awkward to use, and the scope procedure takes slightly longer, so there is no point in using them unless they help. The trial is being spear-headed by Dr. John Kestle, with many of the same centres participating as with the shunt design trial.

The Division of Neurosurgery also has an extensive shunt database with more than 14,000 shunt procedures entered since the early 70's. All the trials and database represent an ongoing effort to improve the quality of life of our many shunt dependent patients.

Maria Lamberti-Pasculli

1997 EB Hendrick Visiting Professor - Derek A Bruce

The EB Hendrick Visiting Professorship was established in honour of Bruce Hendrick, Canada's first full-time paediatric neurosurgeon. The initial support for the lectureship came from the generous donations of more than 100 of Bruce's past residents. More recently, Johnson & Johnson, Codman Division and, the donation received from the Forest Hill Barber Shop Golf Tournament last summer have supported the lectureship which ensures that this annual spring visitation will remain one of the highlights of the university's neurosurgical academic calendar.

Dr Derek A Bruce Neurosurgeon-in-Chief at The Center for Pediatric Neurosurgery and Associate Professor, University of Texas Southwestern Medical Center in Dallas, TX was this year's Visiting Lecturer. Born and educated in Edinburgh, Scotland, Dr Bruce took further clinical and research training at the University of Pennsylvania where he joined the faculty and the attending staff of the Children's Hospital of Philadelphia. Very quickly he established his reputation as a skilled east coast paediatric neurosurgeon and his presentations at various scientific forums were always thoughtful if not provocative. His interests have been wide ranging but the insult to the child's brain caused by trauma or hypoxic injury has been a continuum. He has 107 papers which address this topic. Now residing in Dallas, TX, Dr Bruce has changed his focus slightly to that of the complexities of craniofacial dysostoses and skull base surgery. Thus his Toronto lectures addressed these topics - Base of skull tumors in children: Diagnosis, treatment and outcome, and Current controversies in the management of head injuries.

The "Summer Schedule"

The "summer schedule" phrase pops up each year during the last week of June. It refers to changed operating room scheduling for patients during the 10 weeks period which extends from then through
July and August to the Labour Day weekend. While the scheme was originally devised for use in the operating rooms, there are benefits felt everywhere else, particularly on the wards and ultimately on patient days.

In times past, the use of the operating rooms during the summer was at the whim of the surgeons, many of whom chose to take off the month of August for holidays. That didn't always mesh well with others such as anaesthetists, nurses and support staff, whose holidays had to be scheduled well in advance in an equitable fashion in order to meet everyone's demands. Much has changed since then as families' work patterns and holiday choices have become more diverse. One of the variables at present is that not everyone wishes to take a summer vacation or at least, one which extends for 4 weeks.

In the mid-1980s, the operating room declared that in order to accommodate the needs of all of its staff, at least one theatre would be closed for 10 weeks during the summer months. With advance planning which begins in mid-winter, all members of staff were then able to commit to their summer activities. Surgeons likewise could discuss their coverage and away times and equally important schedule their elective cases. The net effect of all this is a seamless use of the operating theatres throughout the summer without days when many staff and rooms are idle because so many surgeons are absent. Inevitably the wards feel the effect of this diminished activity and they too must be able to effectively program the holiday needs of their staff. If there exists the perception that the "summer schedule" equates to "gone fishin'" then the phrase applies only to those staff who are justifiably enjoying their time off. For the rest of us, we can only dream ...

**Scientific Forums, The Lecture Circuit and Travelling Professorships**

**19th Annual Meeting of The American Society of Pediatric Neurosurgeons (ASPN)**

At the annual winter meeting of the ASPN Jim Drake represented HSC and delivered his paper, Feasibility of measuring shunt flow with doppler ultrasound. During the business session, Jim Rutka was elected to Society membership. The ASPN, of which Bruce Hendrick, Harold Hoffman and Robin Humphreys are founding members was formed in 1978, and is dedicated to the advancement and development of pediatric neurosurgery. It has membership exclusive to those who have achieved academic excellence in the field and whose majority practice is limited to the care of children.

**1997 Annual Meeting of The American Association of Neurological Surgeons (AANS)**

HSC surgeons participated in the annual meeting of the AANS held in Denver, CO, in April. Jim Drake spoke in a seminar on Decision making in pediatric endoscopy, and then joined past fellow John Kestle in a special presentation on the Pediatric Hydrocephalus Treatment Evaluation Group: Randomized trial of
CSF shunt design. Harold Hoffman moderated a seminar on Pediatric brain tumors and was the appointed discussant for the paper Brainstem tumors in children: Classification and management. Jim Rutka participated in a seminar on Low grade glioma: Current treatment and controversies.

And ...

Jim Drake met with colleagues in the French Society of Neurosurgery where he spoke on Shunts: Current status, future directions. Later in Assisi, Italy he participated in a forum on Complex Hydrocephalus and Hydrocephalus Complications where he repeated his paper on the Randomized trial of CSF shunt design as well as the Influence of technology on CSF shunt design.

Harold Hoffman spoke at the Craniosynostosis and Skull Molding Symposium in Phoenix, AZ, and later in the spring addressed the Japanese Pediatric Surgical Society on neonatal tumors. He was invited as a Visiting Professor to the University of Pittsburgh where he spoke on pineal and brainstem tumors.

Jim Rutka leaped from Denver to San Diego where at the American Association for Cancer Research he presented papers on Expression of 67 kD elastin binding protein in human gliomas: Implications for glioma invasiveness and, Dissociation of cell cycle arrest from differentiation in U343 malignant astrocytoma cells. He also visited Korea where at the 10th anniversary symposium of the Korean Society for Pediatric Neurosurgery he presented papers on an update in basic neuro-oncologic research, frameless stereotactic surgery in pediatric neurosurgery and also brainstem tumors.

Utilities of frameless stereotaxy in resection of skull base and basal cerebral lesions in children was the title of the paper given by Essam Alshail and James Rutka at the 8th meeting of the North American Skull Base Society in Little Rock AK.

Honours and Awards

MacKenzie Travelling Fellowship Awarded to James Rutka

Dr Walter MacKenzie was a dynamic leader in the development of academic surgery in western Canada during the fifties. In his honour, the Royal College of Physicians and Surgeons of Canada established the Johnson & Johnson Travelling Fellowship, which this year was awarded to James Rutka. The award provides funding for Jim to spend time at the Montreal Neurological Institute.

Another Prize for Peter Dirks

While completing his PhD thesis and meeting the needs of the clinical service, Peter Dirks prepared a paper on Retinoic acid and cyclin dependent kinase inhibitors synergistically induce differentiation of
U343 astrocytomas. He delivered his research work to the annual meeting of the UofT Keith Professorship in Neurosurgery. Dr William S Keith was the first neurosurgeon appointed to HSC and the Toronto Western Hospital and this lectureship was established in his honour 22 years ago. This year's visiting professor was Professor Alim Benabid of Grenoble, France, and he was highly impressed with the research papers which were presented by various members of the postgraduate residency program. Peter won the Thomas P Morley Prize for the best paper. Subsequently he was chosen to deliver the paper to the university's Department of Surgery, 1997 Gallie Bateman Resident Research Presentations.

**Saudi Arabian Cultural Mission in Canada**

Essam Al-Shail who has supervised our educational program this year received the merit award from the Cultural Mission in Ottawa.

**Contributions to the Neurosurgery Fund**

**Brainchild Continues Apace**

Brainchild (The Neurotransmitter, Winter 1996) awarded a grant of $25,000 to James Rutka's laboratory for continuing studies in the biology of pediatric brain tumors.

**Efforts of Public School Students Will Assist All Children**

Students and staff at Courcelette Public School, Scarborough, raised $3,106 which was donated to James Drake's hydrocephalus research fund. He pointed out in his acceptance letter that such an effort "supports the highest quality research which will help children not only in Toronto but around the world".

**Synaptic Names in the Circuits**

**Lisa Pendergast - From One Ventricle to Another**

Staff at HSC are experiencing constant change and the Neurosurgery Program has not been exempt. The most recent development on 5C has been the change in Nursing leadership.

During the past nine years Lisa Pendergast has been dedicated to the care of neurosurgical patients and their families. She has developed as a professional evolving from a staff nurse to Nurse Manager and many of us feel privileged to have had the opportunity to work with her.
Lisa was instrumental in creating a positive and supportive work environment, quite an accomplishment during the times of constant "restructuring". She consistently displayed optimism and encouraged those around her to do the same. As our colleague and manager, Lisa's open door philosophy supported an interactive relationship with her staff. Not only were we encouraged, but we felt comfortable approaching Lisa with issues or concerns, knowing she would be able to give appropriate help or direction. Her commitment to her own professional growth and development, including her specialization certification for Neuroscience Nursing and past Councillor of the Canadian Association for Neuroscience Nurses--Toronto Chapter, has provided a strong leadership and role model for other staff nurses. Some of us look to Lisa as our mentor. She could implement unpopular decisions and was respected for her fairness and honesty. Lisa has the unique ability to balance the roles of manager and colleague.

We wish Lisa continued success as she takes on the challenges of her new role as the Child Health Services Manager of Cardiology. We welcome our new Child Health Services Manager, Josie Barbita and together with Josie we look forward to meeting new challenges in caring for neurosurgical patients and their families.

The 5C Nurses

Mikael Mosskin Completing Exchange Professorship in Neuroradiology

Dr Mikael Mosskin of the Karolinska Institute in Sweden was awarded a scholarship in paediatric neuroradiology in 1995, as a joint venture between his university and UofT. Promoted in large part by the late Dr Derek Harwood-Nash, Dr Mosskin's initial plan for a visit to HSC of 6-8 months duration has extended to 2 years. He has received support from the Bloorview Epilepsy Research Foundation and has become involved with research into hypoxic-ischemic stroke. As he wraps up his Canadian experience, he acknowledges the "huge amount of phenomenal rare and interesting cases and the great knowledge of individual doctors".

Announcements

We've Changed Our Net Address.

Not long after we provided readers with our net address in the last issue, it changed. Information about the HSC Division of Neurosurgery can now be reached at www.sickkids.on.ca Search the section, "for health care professionals".
Facts

During 1996, 1,019 operations were performed by the HSC neurosurgeons. These include 469 CSF shunt procedures, 10 third ventriculostomies and 107 tumor procedures. By far the most common central nervous system tumor encountered was the benign astrocytoma (35). There were also 31 children operated upon for craniofacial correction.

The Hospital for Sick Children is a health care teaching and research centre dedicated exclusively to children; affiliated with the University of Toronto.
Our Personal Charity

While riding on the subway recently, I counted 8 advertising panels in our car which alerted the reader to various health matters. Each display was sponsored by its respective special interest group and each promoted the awareness of its particular medical condition and the ultimate impact of that disorder on the health and productivity of our nation. The associated message of course was an appeal for charitable contributions which would further the organization's educational and research activities. The advertisements highlighted the need to explore the mysteries of disease and to always have hope that eventually bench research will bring the disorders to a halt.

In my travels abroad I never cease to be amazed at how populations, Americans in particular, line up behind a cause - hospitals and universities, churches, neighborhoods, political parties, etc - by putting substantial moneys into foundations, trusts and direct gifts to the institutions which they hold dear. For example, while serving as a visiting lecturer at Harvard and Duke universities and their affiliated hospitals, I have been astonished to learn of the depth of their respective endowments, which reportedly are hovering around one billion dollars, each. All of this came home to me again late last summer when Christopher Reeve traveled to Toronto to help launch the spark of life campaign, about a week after he was profiled in a cover story in Time magazine. Mr. Reeve, actor, activist and patient since his tragic equestrian accident in May, 1995 captivated his audience as he spoke eloquently of his personal experiences and his visions for the future, which he anticipated would ignite the flames of research inquiry. He admitted that during the early phases of his rehabilitation his "greatest fear was that funding won't happen to take us to where we should go. What if no one cares?" The spark of life campaign is a joint venture of the University of Toronto, The Toronto Hospital and The Hospital for Sick Children. Our yield will be The Brain Tumor Research Centre. This centre will combine the investigative efforts of The Hospital for Sick Children and The Toronto Hospital in a single laboratory under a single roof (at HSC).

Those of us associated with HSC are in the enviable position of working in one of the world's leading pediatric academic health sciences centres. Our record with innovative approaches to children's health care is unsurpassed. We are now embarking on a long term plan to continue this legacy so that we can effect a profound and lasting impact upon children's health care.
Research which is undertaken at the Hospital is supported, in part, through funds from the HSC Foundation’s Capital Fund. It is vitally important that we continue to invest in this fund to ensure a stable financial base for the future. It is for this reason that the Hospital has initiated the Help Make Sick Kids Better campaign. The funds which are raised will enhance clinical and basic research which in turn, will help to improve patient care. Endowed funds for the establishment of Chairs and a Research Training Centre will sustain the scholarly activity at the Hospital. Neurosurgery will be twice blessed by this campaign.

In addition to the research centre noted above, a Chair in Neurosurgery which seeks a $2 million endowment will be created to fund academic and other research endeavors in our specialty in order to maintain our world prominence into the next millennium. The holder of an academic chair is provided with discretionary moneys for educational and research purposes, such as the support of research staff, bridge funding for research projects and, the presentation of that activity at international educational forums and meetings. It also supports exchange visits of personnel with other universities and hospitals from which results the transfer of information - fundamental to the expansion of knowledge. Each issue of The Neurotransmitter outlines our academic presentations at various meetings as well as our publications list, for the prior 6 months period. A component of all of this activity has been supported previously by personal funds, but in these times of diminishing resources it is not surprising that Mr Reeve observed that the "scientists are way ahead of the dollars".

Robin P Humphreys

Dr. Derek Harwood-Nash - Loss of a Valued Synaptic Name

Hospital staff were stunned by the sudden death of Dr. Derek Harwood-Nash last October 18th, from a stroke. A senior radiologist and past Chief, Department of Diagnostic Imaging, "DHN" had graduated from the University of Cape Town, trained in radiology at the University of Toronto and after a fellowship joined the HSC staff and dedicated himself to the emerging specialty of pediatric neuroradiology. After morning sessions performing ventriculograms, myelograms and arteriography, DHN would hold court in his tiny office cluttered with viewing boxes and bags of films, in what is now the take-out window in the film library. Compared with modern neuro-imaging techniques he had to make sense out of inferential data - obscure air shadows, suspended droplets of contrast - and offer what was always a learned opinion on the structural disorder in the child’s nervous system. Eventually, he was the HSC point man for the acquisition of the CT and MRI technology which is now so familiar to everyone. He was responsible for the training of more than 70 fellows, now dispersed around the world,
in pediatric neuroradiology. As testimony to his distinguished career in neuroradiology, Derek was recently awarded the gold medal from The Society of Pediatric Radiology as well as the prestigious D.Sc. (Medicine) degree from his alma mater university. In the past few years he worked industriously to promote the union of numerous professional radiological societies around the globe to which end the World Federation of Neuroradiological Societies was formed. He was justly serving as the society's inaugural president at the time of his death.

Many staff will remember Derek not only for the content of his academic presentations (in which one always learned something even if one had heard it before), but also for the resonant voice with which he delivered his talks. His was not dissimilar to that of the actor James Earl Jones, which accounts for the Lion King tie which DHN proudly wore throughout 1996. Mr. Jones had done the voice-over as the Lion King in the film production and Derek's grand-daughter Maddie gave him the tie as she thought the Lion King could only be her grandfather.

Residents and Fellows - January 1st, 1997

Dr. John Myseros will continue his fellowship through to June 30, before returning to the United States to enter the practice of pediatric neurosurgery. Dr. Ahmed Al Khani will also remain until March 31st, when Dr. Teck Soo, who left December 31st, returns for a final 3 months experience. Teck will be writing his Royal College of Surgeons (Canada) examinations in late June. Dr. Essam Al-Shail will be working in Jim Drake's laboratory and also directing the medical student neurosurgical educational program at HSC. This will intensify in April so that "Sam" and his students will be familiar faces on 5C.

Dr. Franck-Emmanuel Roux is a graduate of the University of Medicine - Toulouse, France where, in 1991, he was awarded the top surgical prize. Since then he has obtained his Master of Science degree in anatomy and continues to study neurosurgery in preparation for a diploma in surgical science. He has already declared his interest in pediatric neurosurgery, a decision supported by his sponsoring professors. Upon completion of his rotation at HSC, he will return to Toulouse to put his Toronto experience to work. In addition to his native language, Dr. Roux is also fluent in Spanish and English.

Dr. Sagun Tuli, a graduate of UofT, entered the neurosurgical training program in 1993. As a medical student she won a number of prizes and scholarships including the Dean's Honor Award. Recently, she has worked on scientific publications and posters with the staff at The Toronto Hospital. Sagun will remain until June 30.

Our Alumni Distinguish Themselves

The division provides postgraduate surgical education of two types. For many neurosurgical residents,
most from the UofT program but others from around the world, the HSC rotation is their first which they spend on a pediatric neurosurgical unit. These individuals often have considerable "adult" contact but they require a pediatric rotation in an institution which is capable of providing a broad range of experience and knowledge, for educational credentialing purposes. Some of these residents have subsequently chosen a career in pediatric neurosurgery as a result of their HSC rotation.

The clinical fellow is a fully trained neurosurgeon who wishes to obtain additional knowledge in children's neurosurgery so that he or she may limit their practice to our specialty. The media room in our office has photographs of these surgeons many of whose careers have since flourished. William A Shucart (1970) was one of the first fellows who began the trend in Toronto and who has since become Professor and Chairman of the Department of Neurosurgery, Tufts University, Boston, MA. Others who followed and who have distinguished themselves are, Marion (Jack) L Walker (1972), Professor and Chairman, Division of Neurosurgery, Primary Children's Hospital, Salt Lake, UT and the University of Utah, Anthony D Hockley (1975), Chairman, Department of Neurosurgery University of Birmingham and Chief, Children's Hospital, Birmingham, UK, W Jerry Oakes (1975) Chief, Division of Neurosurgery, The Children's Hospital of Alabama, Birmingham AL, Warwick J Peacock (1978), Chief, Division of Neurosurgery, University of California at Los Angeles, Los Angeles, CA, Bruce B Storrs (1980), Chief, Pediatric Neurosurgery, Children's Hospital of New Mexico, Albuquerque, NM, Tae Sung Park, (1981), Chief, Department of Neurosurgery, St Louis Children's Hospital, St. Louis, MO, D Douglas Cochrane (1982), Chief, Section of Surgery, B.C. Children's Hospital and the University of British Columbia, Vancouver, BC, Jonathon Punt (1982) Chief, Department of Pediatric Neurosurgery, University Hospital Queen's Medical Centre, Nottingham, UK, and, Robert W Griebel (1985), Chief Pediatric Neurosurgery, Royal University Hospital and University of Saskatchewan, Saskatoon SK.

The HSC neurosurgeons congratulate these prominent surgeons and extend our wishes for continuing success in their careers.

**Brainchild's Summerfest Another Success**

On a fine Saturday in August at the Markham Fairgrounds, Brainchild held its annual summerfest as an opportunity for families not only to enjoy the weather but also more importantly to come together for the celebration of their successes. An astonishing array of activities scheduled over several hours kept everyone running from tent to table to stage to miniature golf and, the silent auction. The entire day was an organizational masterpiece to which the local community offered time, energy and assistance. By its end, over $34,000 was raised to further research and education in the management of children's brain and spinal cord tumors.

Brainchild was initiated in 1993 and serves to assist children with brain tumors, and their families and
friends through education and shared experiences. In addition, the organization informs the community about the importance of early detection of this childhood problem and the special needs of children so affected. In its brief history, the organization has successfully obtained funding for brain tumor research. As an example, Brainchild supported the purchase of a new microcentrifuge for the Brain Tumor Research Laboratory which technology has exceeded all expectations in processing various experiments underway there. Funding has also been made available for continuing education as outlined in the Brainchild newsletter by Susan Awrey who attended the 7th Symposium on Pediatric Neuro-oncology in Washington, DC several months ago. For further information about Brainchild, call (416) 813-7974.

Other Memories of Summer

In a fiercely contested match, the Neurosurgery Operating Room Team soundly defeated a team from Plastic Surgery, 3 games to 1, to capture the second annual Operating Room Summer Volleyball Challenge title. This is the second year that Neurosurgery has claimed victory in the challenge. Dr Ron Zuker, chief of the Division of Plastic Surgery, humbled by the defeat, commented that his squad played its best, but lacked one key ingredient for success against the neurosurgeons - "talent!"

Professor Emeritus E Bruce Hendrick Honoured at the 24th Annual Meeting of The International Society for Pediatric Neurosurgery (ISPN)

For the second time in its 24 year history, the ISPN held its annual meeting in Canada (the first occasion being in Toronto in 1975). This year, Ottawa hosted the meeting during the week of July 8th, where Dr. Enrique Ventureyra, Chief of Neurosurgery at the Children's Hospital of Eastern Ontario served as the Annual Meeting Chairman. As part of the international celebration Dr Bruce Hendrick was the honoured guest of the meeting in his recognition as Canada's first pediatric neurosurgeon as well as a founding member and the first treasurer of the Society. After a tribute delivered by Robin Humphreys, Bruce received a plaque and framed certificate from Society President Professor Sanat Bhagwati and from Dr Norman Hill, President of the Canadian Neurosurgical Society. The inscription on the plaque recognized Dr Hendrick's "pioneering contribution to the development of pediatric neurosurgery in Canada".

During the scientific sessions, Jim Rutka spoke on Combined utility of functional MRI, frameless stereotaxy and cortical mapping in the resection of brain tumors in eloquent locations in children. Richard Perrin, a medical student from Queen's University who previously had taken an elective rotation at HSC presented the material which he had studied while on the Unit, Posterior fossa subdural hematoma in newborns: diagnosis and management principles. Robin Humphreys also delivered his paper, The paediatric neurosurgeon managing managed care.

At the Society's business meeting, a former HSC fellow Anthony Hockley (1975) of Birmingham, UK
followed in the footsteps of his mentors Hoffman and Humphreys and was named President-Elect.

Scientific Forums, The Lecture Circuit and Travelling Professorships

University City-Wide Rounds Return to HSC

For the second time in 8 months the UofT city-wide neurosurgical rounds were held at HSC. Each university hospital hosts these rounds on a rotating, annual timetable. The HSC position has typically been January each year, but the university neurosurgeons returned for the second time in 1996, on September 13th to hear Harold Hoffman relate his 1995 experience with the separation of the cephalopagus twins. In addition, Jim Rutka and Richard Perrin repeated their ISPN talk for the Toronto neurosurgeons.

Congress of Neurological Surgeons Invites HSC Neurosurgeons to Montreal

All 4 HSC neurosurgeons shuttled back and forth to Montreal for speaking engagements at the 1996 annual meeting of the American-based Congress of Neurological Surgeons, held in October. In his organizational role, Jim Rutka was co-chairman of the daily luncheon seminars and he chaired one of the sessions on Posterior fossa and brainstem tumors in children. He also took part in Gene therapy: Results of recent trials and future directions and in another session spoke on ependymomas during the Treatment of posterior fossa tumors. Harold Hoffman held the stage with How I do it-Craniopharyngioma, as well as on brainstem gliomas during Treatment of posterior fossa tumors. Jim Drake participated in a Video seminar: Advances in cranial neuroendoscopy as well as a seminar on How to minimize CSF shunt complications. Robin Humphreys was moderator of Consultants Corner - Challenging cases in pediatric neurosurgery.

Section on Pediatric Neurosurgery, The American Association of Neurological Surgeons

Each December, about 250 surgeons with a declared interest in pediatric neurosurgery gather together somewhere in North America to discuss scientific issues related to our discipline. Twice in the past the meeting has been held in Toronto, but with the expansion of membership and the fixed December date there is now a tendency to eschew northern American cities and Canada, in favor of more temperate southern locales. This year's meeting took place in Charleston, SC where John Myseros and James Rutka presented their paper, Intracranial pressure monitoring after severe head injury in children - the Richmond bolt versus the Camino catheter. The research team of Yuzuru Tashiro and James Drake had 2 papers on the program, Changes in cholinergic and noradrenergic neurons before and after shunting in the rat kaolin-induced hydrocephalus and, Decrease in number of cholinergic and GABAergic neurons in
the neostriatum of kaolin-induced hydrocephalic rat. Robin Humphreys lead a seminar, Communication in pediatric neurosurgery.

And Other Invitations

Harold Hoffman attended the International Symposium on Moyamoya Disease in Fukuoka, Japan where he presented the HSC treatment results for this disorder. He subsequently spoke on brainstem tumors while visiting Juntendo University, Tokyo, as a Visiting Professor. Several weeks later he travelled to Honduras to present 4 lectures as an invited speaker for the XXVII Congresso Latinamerico de Neurocirugio. From there to Lucknow, India and the Congress of Indian Pediatric Neurosurgical Society where Harold spoke on hydrocephalus and brainstem tumors.

Invited as a Visiting Professor of Neurosurgery first to The Henry Ford Hospital and Medical Centre, Detroit, MI and then subsequently to the State University of New York, Buffalo NY, Robin Humphreys lectured to faculty and residents on Spinal dysraphism - issues in the 90s.

Announcements

1997 EB Hendrick Visiting Professor

Dr Derek A Bruce, Neurosurgeon-in-Chief at The Center for Pediatric Neurosurgery in Dallas, TX will be this year’s Visiting Lecturer. Born and raised in Scotland, Dr Bruce took further clinical and research training at the University of Pennsylvania and having declared his interest in pediatric neurosurgery joined his mentor (and a good friend to HSC) Professor Luis Schut at The Children's Hospital of Philadelphia. After an accomplished career there, he moved to Dallas where he joined HSC alumnus, Dr Ian Munro, craniofacial surgeon. Dr Bruce will lecture on May 13 and 14.

We're On The Net!!

The history of our Division of Neurosurgery, profiles of the faculty, the university's Annual Report and a description of the HSC fellowship program can be found on the Website:

brodel.med.utoronto.ca/NEURO/NEUROgeneralintro.html

Honours and Awards

Peter Dirks Top Physician Scholar in MRC Competition

Dr Peter Dirks, resident in the UofT neurosurgical program who is at present completing his doctorate
work in the laboratory of Jim Rutka, received a signal honour during 1996 Medical Research Council competitions. At a time when research funding continues to dwindle even for the prestigious MRC, Peter’s application competed with 110 others and he was ranked as number one of the 17 successful fellowship applicants. This is a very special accomplishment for a young surgeon-scientist and Peter's award brings prestige to HSC and the university's Department of Surgery.

Foundation Award to Jim Drake's and John Kestle's Team

The HSC Foundation has awarded $120,000 to a team of Canadian surgical and engineering investigators with which Jim Drake is associated. The study which will examine a randomized trial of endoscopic shunt placement, is headed by Dr John Kestle of Vancouver and a former HSC fellow (1992).

Jim Rutka Receives the HSC Foundation Family Advisory Committee Award

The Hospital for Sick Children Foundation created the Humanitarian Awards program in 1990 and since then 50 people have been acknowledged for their exceptional standards of care. This year, Dr Jim Rutka received the award which recognizes and honours staff members who provide care to HSC patients and demonstrate outstanding commitment to the philosophy of family-centred care. The fact that nominations come strictly from families is no doubt a mark of respect which they have for Jim and his creation of Brainchild.

Drs Tashiro and Drake Win Inaugural Scholarship

The first Frank E Nulsen Hydrocephalus Research Fellowship was awarded to Drs Yuzuru Tashiro and James Drake for their project, Neuronal histochemical changes before and after shunting in experimental hydrocephalus. The fellowship, sponsored by the American-based Hydrocephalus Research Foundation is named in honour of Dr Nulsen because of his pioneering work in the area of hydrocephalus research. Formerly, Dr Nulsen was Chairman of Neurosurgery at Case Western Reserve University in Cleveland.

Contributions to the Neurosurgery Fund

The Foster Hewitt Foundation

The Foster Hewitt Foundation generously contributed $10,000 to the Neurosurgical Fund via the HSC Foundation, after Mr Hewitt's great grandchild received treatment on the Unit. Foster Hewitt is a Canadian icon in sports broadcasting who became famous for his exclamatory "He shoots ... he scores!" as he described Maple Leaf hockey games from his radio booth tucked up in the rafters of Maple Leaf Gardens. He was certainly witness to the activities of Conn Smythe and the Gardens' management who
each Easter would recognize and promote the Ontario Society for Crippled Children. With its gift, the Hewitt Foundation is keeping the torch lit for children with comparable neurosurgical disabilities.

**Forest Hill Barbers**

Nick, Nicola, Mario and Anthony, the barbers at the Forest Hill Barber Shop which is recognized by Toronto Life as one of the best in the city, identified the Neurosurgery Fund as recipient for $4,000 which was raised in their first, and very successful golf tournament. Planning for the June event which was held at the Chestnut Hill Golf & Country Club began 8 months earlier and this "barbershop quartet" was assisted in their efforts by many of their golfing and charity-minded patrons. On a spectacular day last June, the 18 hole tournament ended with a family style barbeque and the awarding of outstanding prizes which had been donated by their generous customers and the merchants of Forest Hill Village. Nick and his associates also gave trophies to some of their most faithful customers, one of whom accepted the "longest drive" cup - not for his golf prowess but rather for his continued patronage of the barber shop since 1931!

**Synaptic Names in the Circuits**

**Division of Neurology Opens New Quarters**

The HSC Division of Neurology has a history dating back to 1912 according to the historical tribute photos of past division chiefs on the wall of the division's new headquarters on 6 Gerrard, of the Annex. In November, Division Head Carter Snead presided over the opening of the division's new offices, laboratories and neurophysiology centre. A feature of the day was numerous poster presentations which highlighted the division's present research accomplishments. Many clinical groups which previously were dispersed around the HSC campus are now on one site, under the watchful eyes of the past "chiefs". One of them in attendance was William A Hawke, chief of the service from 1952 to 1965.

**Publications - July - December, 1996**


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Editorial Comment

Harold J. Hoffman, MD

My first sighting of Harold Hoffman was just outside the cafeteria of the Toronto General Hospital in the spring of 1962, while he was lighting his pipe. He was then in the midst of his chief residency rotation in neurosurgery at TGH, an arduous 18 months stint under the supervision of the demanding Professor E Harry Botterell. It was but a glimpse and although I recognized Harold and subsequently was to appreciate the pipe tobacco which he used, he wouldn't have been able to distinguish me from all the other medical students who prowled the TGH corridors. It was over a year before I saw Harold again, by which time he had completed his residency and the Royal College examinations and was preparing for his McLaughlin Scholarship which would take him to the United Kingdom and Europe.

In the early winter of 1965, I had my next contact with Harold during my own residency at HSC. Just a few months earlier he had joined Bruce Hendrick on staff. He quickly demonstrated his questioning enthusiasm for the investigation and treatment of a child's nervous system disorder, as he left no stone unturned in his quest for clinical solutions. He put in very long days often joining the residents side-by-side in their ward and emergency room duties. He initiated a laboratory project to study the value of dexamethasone treatment for focal brain edema. And when he wasn't in the lab, or the theatre, or radiology, or his Monday morning clinics, he would be off to Sunnybrook Hospital for his once-weekly commitment there.

In the years which followed, he extended our academic and professional links through associations with a number of peers around the globe. He was a founding member of both the American Society of Pediatric Neurosurgeons and, the International Society for Pediatric Neurosurgery, professional organizations in each of which he was to become president. His demand as a lecturer and visiting professor consumed a considerable amount of his time taking him to the United States, Europe, South America, Asia and Australia. The people, hospitality and sushi of Japan enticed him most of all. Wherever, he was always counted upon to bring a new thought or nuance to an old problem and so he showed great responsibility in the preparation of his platform presentations. He is one of those individuals who has had speaking engagements on the same day in 2 European countries! But all that travel probably didn't prepare him for a ride in a private jet many years ago, when he was accompanying a friend back to Canada from the Mediterranean. The plane ran out of fuel over Iceland ... just 6 hours before he was due to start his usual Tuesday OR list! The problem was solved, the jet landed and his first case list proceeded without incident. It was not long after that he gave up pipe smoking!
Through the years, Harold Hoffman has captured a number of honours in recognition of his intense dedication to pediatric neurosurgery. Most recently he received the Lister Prize in Surgery, awarded by the University of Toronto to a faculty surgeon who has brought international distinction to the profession and the university by his/her academic activities. This past April, he served as the 1996 Matson Award Lecturer at the annual meeting of the American Association of Neurological Surgeons (AANS), in Minneapilis. He has further trips planned back to Japan, where he has also received professional honours.

Harold has given the neurosurgical patients on wards 10A, 5G, 4A, and now 5C enormous time, energy and dedication. As his involved travel schedule is to continue and, for a number of other right reasons, he is relinquishing his turn on the neurosurgical on-call list. From 1964-'70 he and Bruce Hendrick shared call each week about. One came off call, tidied up from that week and then went back on call 7 days later. The ideal schedule was reached in 1990 when the call list became "one in four". Harold deserves a break, but he will of course remain available for his own patients. His knowledge and experience will remain in the HSC ether.

Robin P Humphreys

1996 EB Hendrick Visiting Professor - Christian Sainte-Rose

Shortly after Harold Hoffman had been appointed chief of neurosurgery at The Hospital for Sick Children in 1986, he established the Hendrick Visiting Professorship in honour of Bruce Hendrick, Canada's first full-time paediatric neurosurgeon. Bruce had trained in the Gallie program and then acquired additional experience in paediatric neurosurgery at the Children's Hospital in Boston. He returned to Toronto and HSC in 1954, and shortly thereafter was appointed chief of neurosurgery when AW Farmer then Surgeon-in-Chief, established speciality divisions within the Department of Surgery. The initial support for the lectureship came from the generous donations of more than 100 of Bruce's past residents who gathered in Toronto in 1988 for a neurosurgical reunion dinner. More recently, Galen-Gryphon Medical Limited, Pudenz-Schulte Medical Corporation and the Corvette Fund of New York have provided generous support which ensures that this annual spring visitation will remain one of the highlights of the university's neurosurgical academic calendar.

The 1996 EB Hendrick Visiting Professor was a surgeon well-known to HSC staff. Christian Ste Rose of the Necker Hopital des Enfants Malades in Paris first came to Toronto in 1986 to spend several months on a sabbatical. During that time he completed an enormous review from the HSC data base of children.
treated for hydrocephalus which information he subsequently married with that from the Necker Hospital. The resulting scientific report was of great interest because of its conclusions to say nothing of the sheer volume of material upon which it was constructed. In early 1988, Jim Drake visited Paris and the Necker Hospital for 6 months on a visiting fellowship and the academic and collegial bonds between the two surgeons were cemented. Their continuing collaboration has resulted in the publication of *The Shunt Book*.

During his Toronto visit, Professor Ste Rose spoke on *Improving the management of hydrocephalus* and, the exciting technological advances of *Image guided neurosurgery and localization systems*, in addition to informal teaching sessions with the university neurosurgical residents.

**Residents and Fellows - July 1st**

A new academic year and new faces.

**Dr John Socrates Myseros** is the 1996-'97 HSC Neurosurgical Fellow. John was born in Washington, DC, graduated from The Johns Hopkins University School of Medicine and has completed his residency in neurosurgery at The Medical College of Virginia Hospitals, in Richmond, VA. An honour student throughout university and medical school, he has continued to cop various postgraduate awards and already has 11 scientific papers in print. He is enthusiastic about immersing himself in patient care at HSC and looks forward to the challenges which are presented. His intent is to practise pediatric neurosurgery upon his return to the United States. John is married and in the past 6 months has had his inauguration as a parent. He has already nailed down his favourite Greek restaurants on the Danforth!

**Dr Essam Al-Shail** will remain with us for another year while he completes a research project in Jim Drake’s laboratory, and runs a clinic and student teaching program.

**Dr Ahmed Alkhani** graduated from King Saud University in 1992 and entered the UofT neurosurgical program 2 years later. His paediatric interneship served as the stimulus for his first scientific publication. Ahmed is married and a father of a 2 year old son. He is looking forward to his HSC experience when he arrives in October.

**Dr Jennifer Brown** has just completed her MSc degree studying the metabolic responses in brain following acute injury. A native of western Canada, Jennifer graduated with her MD from McGill
University, then completed her core surgery at Queen's University and since 1992, has been a member of the UofT neurosurgical program. Jennifer will spend 6 months on the unit and after she completes her entire program in 1997, she intends to take fellowship training in neurocritical care.

**Dr Howard Ginsberg** is returning for a 3 months rotation (Jul - Sep). Howard graduated from Engineering Science in 1989 and then from the Faculty of Medicine, UofT in 1993. After his debut here at this time last year, Howard has spent 6 months in adult neurosurgery at the Sunnybrook Health Sciences Center.

**Dr Teck Soo** was born in Malaysia and graduated with Honours Medicine and Surgery from Trinity College School, Dublin. He acquired 4 years of experience in general and pediatric surgery, orthopaedics and cardiothoracic surgery at the University of Hong Kong before arriving in the UofT neurosurgical program in 1992. He will spend 6 months at HSC and upon completion of training intends to return to Malaysia to practice general and pediatric neurosurgery. Teck is a Fellow of the Royal College of Surgeons, Edinburgh.

**Our Academic Responsibilities**

The Hospital for Sick Children is a fully affiliated partner with the University of Toronto (UofT). Our annual academic responsibilities extend to the instruction of undergraduate medical, nursing and therapy students, and post-graduate surgical residents, fellows and visiting surgeons. The attending staff surgeons, who each hold ranking in the university's Department of Surgery, are also responsible to a variety of university and professional academic forums (see Scientific Forums, The Lecture Circuit and Travelling Professors). The latter usually account for the surgeons' frequent absences which are sometimes misinterpreted as a "vacation". There are tremendous expectations placed upon the HSC surgical staff to report on their research and cumulative experiences which in the eyes of many are second to none in the world!

Most are familiar with the weekly academic calendar for the medical staff:

- Combined Neurology-Neurosurgery Rounds (Tue)
- Neurosurgery Case Conference (Wed)
- Residents' Seminar (Thu)
- Tumor Board (Thu)
- UofT Neurosurgery Residents' Instructional Course (Fri)
During these times formal academic instruction and issues in clinical practice are presented. With the belief that it is "important to learn more every year than the year before"-Peter Ustinov 1977, the instruction of our staff is critically important for which we recognize the above sessions as protected time.

18th Annual Meeting of The American Society of Pediatric Neurosurgeons (ASPN)

The annual winter meeting of the ASPN was held on the "large island" of Hawaii from January 28th - February 3rd. Jim Rutka was an invited guest and his Monday lead-off paper was *Cell cycle gene dysregulation in pediatric brain tumors: A review*. At the same meeting, Robin Humphreys (whose paper, *Where to with pediatric AVMs? Choices in the nineties* represents the world's largest series) completed his term as the Society's past president and handed over the presidential symbol of office to Dr Jack Walker of Salt Lake City, UT (and a previous HSC fellow, 1972). During the business session, Jim Drake was elected to Society membership along with former HSC residents F Rick Boop, (1987, Little Rock, AK), and Kerry R Crone, (1985, Cincinnati, OH).

The Society, of which Bruce Hendrick, Harold Hoffman and Robin Humphreys are founding members was formed in 1978. It is dedicated to the advancement and development of pediatric neurosurgery and has membership exclusive to those who have achieved academic excellence in the field and whose majority practice is limited to the care of children. At present, there are 70 American, Canadian and international members.

Scientific Forums, The Lecture Circuit and Travelling Professorships

The staff surgeons' agenda has been full during the past 6 months. In addition to the Matson Lecture on *Separation of cephalopagus twins* at the AANS meeting in Minneapolis, MN, Harold Hoffman took part in a breakfast seminar on pediatric brain tumors.

Robin Humphreys was the Hackett Trust Lecturer for the Australasian College of Surgeons in Auckland, New Zealand. At the postgraduate course for Australasian registrars, he delivered lectures on spinal dysraphism, developmental brain cysts, vascular disease, trauma and the necessary preparations for fellowship examinations.

Jim Drake accompanied Surgeon-in-Chief John Wedge to Quito, Equador to participate in the VII Curso Internacional de Ortopedia y Traumatologia postgraduate course. He gave presentations on brachial
plexus surgery, spinal cord injury, tethered spinal cord, pathology of the foramen magnum, selective dorsal rhizotomy for spasticity and computer-assisted surgery. In June, Jim returned to his home town of London, ON for the annual meeting of the Canadian Congress of Neurological Sciences. His papers were, *Realistic simple mathematical model of brain biomechanics for computer simulation of hydrocephalus and other brain abnormalities, and, Results of posterior fossa decompression in childhood and adolescents with scoliosis, Chiari 1 malformations, and syringomyelia.*

Jim Rutka was invited as a Visiting Professor to the Children's Hospital of Philadelphia in April, and a month later to the Hop Ste-Justine, Montreal. He delivered a paper on *Focal adhesion kinase expression in human brain tumors* at the American Association for Cancer Research in Washington, DC. At the AANS meeting in Minneapolis he participated in a breakfast seminar on the current controversies in the treatment of low grade gliomas.

**Lisa Pendergast Speaks to University Surgeons**

Lisa Pendergast addressed the University of Toronto neurosurgeons when they held their rotating monthly rounds at HSC in January. It is unusual for a nurse to be asked to take an active part in this academic program which typically focuses on a patient's case presentation. Instead, Lisa and Robin Humphreys addressed some of the issues of managed care or program management. In a well crafted address, Lisa informed the surgeons about the structure and responsibilities of the neurosurgical program and spoke of the efficiencies (eg clinics, same day admissions, etc) which have been accomplished and how such translate into cost savings.

**Honours and Awards**

*SBHAO Names a Scholarship in Honour of Bruce Hendrick*

In 1990, the Spina Bifida and Hydrocephalus Association of Ontario established the Dr E Bruce Hendrick Scholarship as a tribute to his dedication and service to association members. The scholarship is open to students with spina bifida and/or hydrocephalus who are continuing on to post-secondary education. The 1994 winner, Spirit Synott, recounted for the *Toronto Sun* her studies in Florence, Italy as part of the off-campus program of the Ontario College of Art.

*Harold Hoffman Delivers the 1996 Matson Lecture.*

As noted previously, the Joint Pediatric Section of the American Association of Neurological Surgeons
AANS) and, the Congress of Neurological Surgeons sponsors an annual lectureship to honour both the speciality of pediatric neurosurgery as well as the lecturer.

Robin Humphreys Named in "Best Doctors' List"

American Health, a U.S. consumer health magazine has named Robin Humphreys as one of only two Canadian physicians in a list of the 1,000 best doctors in North America. The magazine based its report on the recommendations of 3,000 physicians at the most renowned medical institutions in the U.S.

Jim Drake’s Researchers Awarded HSC Prize

The HSC Department of Surgery at its annual research competition awarded third prize to Drs S Chakrabortty and Y Tashiro for their work under Jim Drake’s supervision. Their manuscript was Changes in tyrosine hydroxlyase immunoreactivity in experimental hydrocephalus.

Esam Al-Shail - President of The Saudi Arabian House in Toronto

Esam Al-Shail completed his year at HSC by presiding over the First Annual Meeting of the Saudi Arabian Postgraduate Medical Trainees in North America. The scientific meeting, co-sponsored by The Saudi Arabian House in Toronto and UofT, acquainted Saudi trainees with each other and each other’s specialization and was intended to strengthen the relationship and improve communication between trainees coming to UofT from the various health care institutions in Saudi Arabia. Sixteen Saudi physicians representing various surgical and medical disciplines convened June 22 for their meeting at the Medical Sciences Building.

Synaptic Names in the Circuits

Larry Becker Heads All Laboratory Services

Dr Laurence E Becker, senior neuropathologist and Chief, Department of Pathology has been named to lead the Department of Paediatric Laboratory Medicine. The creation of this new department represents the coalescence of the previous Departments of Microbiology, Clinical Biochemistry, and Pathology, as well as the Hematology/Blood Bank Lab. Larry is one the most experienced pediatric neuropathologists in North America, and has served as the Chairman, Division of Neuropathology at UofT.
More Honours for "DHN"

Dr Derek Harwood-Nash, senior radiologist continues his ever busy schedule. He is presently the inaugural president of the World Federation of Neuroradiological Societies, and also serves on the board of directors of the Radiological Society of North America. As testimony to his distinguished career in neuroradiology, Derek was recently awarded the gold medal from the Society of Pediatric Radiology.

Robert Haslam Completes Ten Years as Paediatrician-in-Chief

In his first life, Professor Robert Haslam was (and remains) a paediatric neurologist. During his 10 years as Chairman, Department of Paediatrics, UofT and Paediatrician-in-Chief at HSC Professor Haslam sustained not only his teaching schedule but was also a familiar figure in the neurology clinic on Friday mornings. Patients were referred to him from abroad for his wise opinion. During his tenure, he bolstered the research programs in his department, inaugurated a new funding arrangement for his staff and won several teaching awards from the students. He is now off to San Francisco on sabbatical and will return to HSC in a year to continue his career in neuro-oncology.

Carter Snead Arrives from Los Angeles as New Division Head - Neurology

Dr O Carter Snead arrived on site in January to lead the Division of Neurology and the Epilepsy Research Program. Formerly chief of the Division of Neurology at the Children's Hospital of Los Angeles and vice-chairman of the Department of Neurology at the University of Southern California, Carter is internationally recognized for his research studies in the mechanisms of epilepsy. He assumes HSC clinical responsibilities previously held by Drs J Stobo Prichard and William J Logan.

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