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ANNA

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# Australasian Journal of Neuroscience

*Australasian Journal of Neuroscience*, the journal of the Australasian Neuroscience Nurses Association, publishes original manuscripts pertinent to neuroscience nursing standards, education, practice, related paramedical fields and clinical neuroscience nursing research.




**ANNA**
***Australasian Journal of Neuroscience Nursing***

c/- PAMS, PO Box 193, Surrey Hills. Victoria. 3127.

Tel: (+61 3) 9895 4461

Fax: (+61 3) 9898 0249

www.anna.asn.au

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Vicki Evans (RNSH)
editor@anna.asn.au

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# In This Issue:

# Editorial

**Editor - Vicki Evans**

## Concussion - it's a TBI!

Much of recent media reports have concerned themselves with reporting the newly researched effects of concussion in footballers and trying to understand the cumulative effects of concussion - chronic traumatic encephalopathy (CTE) and dementia. Neuropathologist Dr Anne McKee, co-director of the Center for the Study of Traumatic Encephalopathy (CSTE), Boston University, has likened the brains of many footballers to those of professional boxers.

It is encouraging that this brain injury is gaining public awareness. There are a number of studies being done, concerning the after-effects of concussion. Evidence has now emerged showing that the cumulative effects of repeated concussions may increase the likelihood of cognitive impairment later in life eg: dementia puglistica. Once a person has had a concussion, he/she is as much as four times more likely to sustain a second one. Moreover, after several concussions, it takes less of a blow to cause the injury and requires more time to recover.

What is Australasia's stance on concussion – in schools and elite sports? The ARL have published guidelines just this year and the NRL are currently in talks to adopt those guidelines. The NRL has commissioned neurosurgeon Richard Parkinson to conduct a two-year study into the effects of concussion on its athletes. This review is in progress. It may well be time to change the game's rules governing concussions.

According to the NRL's injury surveillance report from the 2009 season, incidents of concussion have grown over the past three years. In 2007, average games missed per club through concussion were 0.8. In 2009, it was 2.0. Most head injuries were suffered by front-rowers. These are big hits, but at what cost? ITIM has published guidelines for GPs and Emergency Departments, but what of the Education Department, in particular secondary schools? Their guidelines could do with a review also….

*Cheers, Vicki*

# Guest Editorial

**Linda R. Littlejohns**

President-elect AANN

## Our Neuroscience Nursing Journey Together...

Every so often, we are afforded the opportunity to reflect on life and the roads we have traveled. Sometimes it happens during the balmy dog days of summer on a patio or beach and sometimes it happens while we are sitting in front of a fireplace watching the flickering, dancing flames in winter. One thing I do know is that it does not happen often enough in my life and an invitation to share some thoughts in *Australasian Journal of Neuroscience* gave me just the nudge that I needed.

How often do you get to think about your life as a neuroscience nurse, the journey you are taking and the friends you have made along the way?

Here are some of my reflections from across the Pacific …

Having an insatiable curiosity set me on the neuro path pretty early in my career; there were so many unanswered questions. AND in those early days we did not have the radiologic, monitoring or functional technology options to help us unravel the mysteries of brain injury and disease.

I wanted to know what was wrong, why there was a problem and I really wanted to figure out how to make things better for the patients and their families. What I didn't know was how many amazing nurses there were who felt just the way that I did. In those early days we assessed, conferred and made many decisions based on intuition and historical experiences in our individual hospitals and communities. Our practice today has moved towards an evidence based model and a lot more documentation, but at the root of all the progress and change I still find the neuro nurses who joined the profession because of curiosity, passion and a desire to make a difference … and our communities are global now.

A journey of 30 years takes us many places – some of them planned, but many experiences simply the result of passion and curiosity:

- Volunteering – whether by design or accident (the inadvertent nod of the head when we get excited) has allowed me to meet and join forces with incredibly gifted and kind neuro nurses around the globe as an educator in my profession or a member of AANN or WFNN. Some of my fondest memories include those of you on the Pacific Rim.
- Mentoring and being mentored has opened doors to inquiry and learning that I never imagined possible and we have laughed and cried as we learned together. Again your faces flash through my mind.
- Critical thinking skills in neuro nursing paired with advanced educational opportunities can channel and direct our skills to improve the outcomes for our patients and families. It worked in my practice and I have seen it working for many of you.
- Conferencing across the globe at our national/international meetings has joined us together. Colleagues turned into friends as we tapped into experiences that we brought to the table – scientific exchanges, cultural knowledge, humour and collective passion.

As I look forward to my role as President for AANN next year, I think of all the times I could have said no, or resisted change, or avoided a chance meeting. I love our profession and the humbling opportunities we get to make a difference. I know I can count on always finding an open door, a stimulating exchange, a funny story or a compassionate acknowledgement that our patients may not always recover but that we gave it our best shot, and I thank you all for your contributions. The passion and curiosity has kept my tank filled and knowing you are out there gives me a destination. I expect to keep bumping into you as we travel along the neuroscience nursing road.

If I don't get to visit you before, please know that I would love to see you at our Annual AANN conference in Seattle in April 28 through May 1, 2012 – it is shaping up to be a great meeting and is just a quick hop across the Pacific.

*Linda R. Littlejohns* MSN RN CNRN FAAN
Africa777@aol.com

**The Louie Blundell Prize**

This prize is in honour of our colleague Louie Blundell and will be awarded for the best neuroscience nursing paper by a student submitted to the Australasian Neuroscience Nurses Association (ANNA) for inclusion in the *Australasian Journal of Neuroscience* by the designated date each year. The monetary value of the prize is AUD$500.

Louie Blundell, was born in England, and although she wanted to be a nurse she had to wait until after World War II to start her training as a mature student in her late twenties. Later she and her family moved to Western Australia in 1959. She worked for a General Practice surgery in Perth until a move to the Eastern Goldfields in 1963. Subsequently, she worked at Southern Cross Hospital and then Meriden Hospital. During this time she undertook post basic education to maintain her currency of knowledge and practice, especially in coronary care.

Louie was also active in the community. She joined the Country Women's Association and over the years held branch, division and state executive positions until shortly before her death in 2007. She was especially involved in supporting the welfare of students at secondary school, serving on a high school hostel board for some time.

She felt strongly that education was important for women and was a strong supporter and advocate of the move of nursing education to the tertiary sector, of post graduate study in nursing and the development of nursing scholarship and research, strongly defending this view to others over the years.

For further details and criteria guidelines please visit the ANNA website at www.anna.asn.au

# Book Reviews

*By **Linda Nichols**, Lecturer, School of Nursing and Midwifery. University of Tasmania, and Dr **David Nichols**, Section Head - Organic Chemistry. Analytical Services, Tasmania.*

**Principles & Practice of Neuro-oncology A Multidisciplinary Approach.** Edited by Minesh Mehta, Demos Medical Publishing 2011.

Dr. Minesh Mehta is an internationally renowned lecturer/author and as editor-in-chief has published what can be regarded as the definitive textbook in neuro-oncology.

The editorial team has carefully compiled the individual chapters to ensure the integration of the individual contributions and that the topics flow logically and seamlessly throughout the text. The text draws upon the expertise of over 180 authors who bring a highly diverse spectrum of knowledge across the individual specialties detailed ranging from epidemiology, molecular biology, clinical presentation, imaging, histopathological harmonisation, neurosurgical techniques, combined modality treatments and the advent of new drugs and treatment options.

It moves beyond a nursing text to become a detailed reference source in clearly defined sections dealing with the various specialisations covering the fundamentals of the neuro-oncology field. The text contains a large mid-section of colour plates (48 pages) which focuses on significant details concerning modern imaging approaches and histological specimens. In addition, many colour figures detail the cellular metabolic pathways involved in the basic biochemistry of tumour cell growth & suppression.

However from one reference perspective, the division of the text into small chapters has led to some repetition of introductory comments and tends to fragment some information between specialties when researching a specific tumor topic rather than presenting a focused view. This role is left to challenge the reader in fully utilising the text as a study and practical resource.

In our opinion the text meets the editor's desire in that it reflects the breadth and depth of neuro-oncology, whilst remaining focused on improving patient outcomes. The multidisciplinary focus is a superb example of how the optimal management of neuro-oncology patients relies on the intersection of various specialties. The text will serve as an important learning and reference source.

*By **Rochelle Firth**, MN, Grad Dip, FFACNP Nurse Practitioner: Neurosurgery. NSW*

**WHO Classification of Tumours of the Central Nervous System** IARC WHO Classification of Tumours, No 1 Louis, D.N., Ohgaki, H., Wiestler, O.D., Cavenee, W.K. ISBN-13, 9789283224303 ISBN-10, 9283224302

This book is part of the series "WHO Classification of Tumours" providing a standardised guideline for histological and genetic classification of all human tumours. This volume focuses on classification of Tumours of the Central Nervous System (CNS) and is an invaluable resource for all Neurosurgery Departments.

The book was developed by 73 authors representing 19 countries. The guideline presented is now the internationally accepted standard of CNS tumour classification and grading. This book offers learning opportunities and point of reference to a range of practitioners, from novice to expert. The reader is able to first read the brief introduction to each tumour type to obtain an overview of the tumour characteristics. Reading then can continue to develop a more in depth understanding of each tumour type and future direction. The text not only allows for a thorough description of all tumours but provides a learning framework for the novice.

The format of the book is easily navigated and covers a brief description and grading of each tumour classification. A breakdown of incidence, sex and age distribution and locations of most common predilection is then presented. Clinical features of tumour types are discussed and include radiographic description and presenting signs and symptoms. The book includes a range of colour photographs, radiographic imaging, histopathology slides and graphs. This gives the reader an opportunity for visual learning when making correlations with the text. The histopathology and genetic descriptions included allow the reader to develop an understanding of the differences between the tumour grades and provides a direction for future learning. Gaining an appreciation of these differences allows the neuroscience nurse to further advocate for education, service planning and research for the neuro-oncology patient. Prognosis and predictive factors are also covered. This information should be used as an overview as it may not accurately reflect current trends.

Neuro-oncology is a rapidly growing field and this book is an excellent reference and resource.

# Audit and Prevalence Rates of Ventriculitis in Neurosurgical Patients with External Ventricular Drains.

*Alanah Bailey, Scott Lamont.*


## Abstract

External ventricular drains (EVD's) are considered an essential emergency treatment for hydrocephalus. Treatment with EVD's can be offset by complications such as cerebro-spinal fluid (CSF) infections (ventriculitis), with significant associated patient morbidity/mortality. This study aimed to identify prevalence rates of ventriculitis in neurosurgical patients with antibiotic coated EVD's, any potential confounding variables influencing this, and to identify future directions for management in this population. Medical records of all patients with an EVD within the audit period were retrospectively reviewed. The medical file audit sought to identify the following clinical variables; diagnosis, presence of infection, duration of EVD, number of EVD changes, CSF white cell count, serum white cell count, prescribed prophylactic antibiotics, febricity, sepsis and CSF leak. N=30 medical records of patients with EVD's were reviewed. A total of n=5 (17%) patients were found to have an infection. The audit highlighted areas of service delivery that should be subject to review and evaluation against professional guidelines and contemporary literature. Guideline development is underway to standardise care for these patients. This paper has shown that auditing of EVD practices may help quality improvement processes.


***Key Words:*** ventriculitis, cerebrospinal fluid infection, external ventricular drains, indwelling catheters, risk

## Introduction

External ventricular drains are considered an essential emergency treatment for hydrocephalus and are widely accepted as the most accurate and reliable treatment (Lo, Spelman, Bailey, Cooper, Rosenfeld, and Brecknell, 2007).

They allow clinicians to ascertain a value for the intracranial pressure (ICP) as well as draining cerebrospinal fluid, which reduces the ICP and treats the hydrocephalus. The benefits from treatment with an EVD can be offset by complications such as infections of the CSF (ventriculitis), which occurs with colonisation of the catheter surface by microorganisms (Zabramski, Whiting, Darouiche, Horner, Olson, Robertson, and Hamilton, 2003). Hader and Steinbok (2000), report that infection is the most common complication in relation to EVD's. There are varying definitions within the literature regarding what constitutes an infection of the CSF.

The criteria used by the American Centre for Disease Control is CSF that cultures an organism, or a sign or symptom of infection such as a fever, with no other recognised cause and a laboratory finding such as a high CSF white cell count (WCC) (Horan, Andrus, and Dudeck, 2008). Zabramski, et al., (2003) argue that the same organism needs to grow on two different types of media or the same type of medium twice. Lyke, Obasanjo, Williams, O'Brien, Chotani, and Peri, (2001) define an infection of the CSF simply as the presence of one growth of a recognised pathogen only.

Healthcare acquired infections are known to generate economic burdens as well as leading to increased length of stay, and increased patient morbidity and mortality (Graves, Weinhold, Tong, Birrell, Doidge, Ramritu, Halton, Lairson, and Whitby, 2007). Muttaiyah, Ritchie, John, Mee, and Roberts, (2010) report prevalence rates for ventriculitis as ranging between 3.4%-21.9%, whilst Lozier, Sciacca, Romagnoli, and Connolly, (2003) report an average of 10%. Lyke, et al., (2001) report that infection rates from EVDs are associated with patient mortality rates of around 58%, which makes this a substantial issue requiring attention within the neurosurgical speciality. The major risk factors reported by Lozier, et al., (2002) associated with contributing to ventriculitis are presence of a CSF

*Questions or comments about this article should be directed to Alanah Bailey, Neuro-Oncology Care Coordinator at* Alanah.Bailey@sesiahs.health.nsw.gov.au

leak, EVD duration, other systemic infections and type of injury. Arabi, Memish, Balkhy, Francis, Ferayan, Al Shimemeri, and Almuneef, (2005) added that changing EVDs during the treatment of hydrocephalus was also a risk factor for developing ventriculitis.

## Background

The types of EVD's which are available for this population have evolved. Antibiotic coated EVD's were introduced in 2004 to address the high prevalence of ventriculitis in this population. Muttaiyah, et al., (2010) found a reduction in positive CSF cultures and a trend towards lower rates of infection when using the antibiotic coated EVD's. Two randomised control trials (RCT's) compared the original EVD with the new antibiotic coated EVD's, with contrasting conclusions. An RCT by Zabramski, et al., (2003) revealed that EVD's impregnated with antibiotics significantly reduced infections, however a study by Kaufmann, Lye, Redekop, Brevner, Hamilton, Kozey, and Easton, (2004) revealed no difference in infection rate when comparing the two types of EVD's.

Unpublished data from the study site between June 2002 and May 2003 with a sample of n=23 patients with the older EVDs, demonstrated 56% experienced infection of the CSF during their acute in-hospital stay. This original study defined infection of the CSF as the presence of one or more positive CSF cultures. Using the same definition for infection, this study sought to identify prevalence rates for ventriculitis in neurosurgical patients with antibiotic coated EVD's.

## Method

The study site is a 550 bed generalist hospital in the metropolitan suburbs of Sydney, with a 30 bed Neuroscience ward which cares for patients with neurological and neurosurgical conditions. The current audit was conducted between November 2008 and October 2009. Medical records of all patients with an EVD within the audit period were retrospectively reviewed. The medical file audit sought to identify the following clinical variables; diagnosis, presence of infection, using one positive culture only duration EVD in situ, number of EVD changes, CSF white cell count, serum white cell count, prescribed prophylactic antibiotics, febricity of above 38 degrees, sepsis and CSF leak. Cross tabulation statistical analysis was used to identify potential associations between these variables. All patients were included unless they already had a confirmed or suspected CSF infection before EVD placement. This exclusion criterion is consistent with current literature in determining device related infections, which requires the patient to be hospitalised for at least 48 hours before the infection can be considered nosocomial (Celik, 2004). Duration of EVD was categorised into less than 5 days, 5-10 days and greater than 10 days (Lozier, et al., 2002; Moon, Kim, Lee, Lim, and Park, 2007). CSF white cell count was categorised as 0-5 (normal) and greater than 5 (high) (Green, Sanchez-Juan, Ladogana, Cuandrado-Corrales, Sanchez-Valle, Mitova, Stoeck, Sklaviadis, Kulczycki, Heine-mann, Hess, Slivarichova, Saiz, Calero, Mellina, Knight, Van Duijn, and Zerr, 2007).

Relevant data was entered into SPSS™ version 15.0 for analysis.

| **Characteristic** | | **N (%)** |
|---|---|---|
| Diagnosis: | haemorrhage<br>other | 26 (87)<br>4 (13) |
| Ventriculitis | | 5 (17) |
| Duration of EVD: | < 5 days<br>5-10 days<br>> 10 days | 11 (37)<br>10 (33)<br>9 (30) |
| Catheter changes: | 0<br>1<br>2 | 26 (87)<br>3 (10)<br>1 (3) |
| CSF wcc: | normal<br>high | 7 (23)<br>23 (77) |
| Serum wcc: | low<br>normal<br>high | 1 (3)<br>4 (13)<br>25 (84) |
| Prophylactic Antibiotics | | 19 (63) |
| Steroids | | 7 (23) |
| Febricity | | 18 (60) |
| Sepsis | | 11 (37) |
| CSF leak | | 3 (10) |

**Table 1:** *Clinical characteristics of audit sample of patients (n=30)*

## Results

A total of n=32 patients had an EVD during the study period. Two patients were excluded on the grounds of suspected CSF infection before EVD placement, leaving a study sample of n=30. All the medical records (n=30) were located and retrospectively reviewed. Table 1 reports clinical characteristics for the study sample.

The sample included n=16 (53%) males and n=14 (47%) females. The age range was 20-77

years for males (mean=50) and 29-82 years for females (mean=54). The primary reason for placement of an EVD was an intracranial haemorrhage (n=26, 87%), mainly subarachnoid. A total of n=5 (17%) patients were diagnosed with an infection, using the definition of one positive culture only.

The presence of sepsis from any site, a higher than normal CSF WCC and increasing duration with EVD in situ were significantly associated with being febrile (p=0.018, p=0.011 and p=0.017) using Fischer's Exact Test. Patients were significantly more likely to have a high CSF WCC and trended towards having sepsis the longer the duration of the EVD. (p=0.006 and p=0.079).

## Discussion

The majority of the sample (87%) had an EVD inserted for cerebral haemorrhage. The infection rate (17%) reported in this study is consistent with other studies, which range from 3.4%-21.9% (Muttaiyah, et al., 2010).This is consistent with intracranial pressure being highly prevalent within this population (Muttaiyah, Ritchie, Upton, and Roberts, 2008). This is a significant reduction in infection prevalence when considering that previously unpublished data from the study site yielded a 56% infection rate using the EVD's that were not coated in antibiotics. Whilst this reduction may have been influenced by the use of new antibiotic impregnated EVD's; there were likely to have been other factors which affected these specific local prevalence rates. The prevalence for ventriculitis in the unpublished data from 2003 was substantially higher than reports in the literature at that time. It was beyond the scope of this study to identify potential causes for this at that time. However, anecdotal evidence suggests that hand hygiene practices were identified as an area for improvement, which resulted in local education initiatives.

The duration of the EVD in relation to drainage days is associated with ventriculitis prevalence in the literature. In a literature review of 17 studies by Lozier, et al., (2002), 10 studies reported that the duration of the EVD was associated with infection, whilst the remaining 7 reported no association. The day during catheterisation that infection was most common was recorded and discussed but no literature agreed on the peak day of infection prevalence. There was no association detected with EVD duration time and ventriculitis in our study sample. Increased length of EVD duration was associated with a high CSF WCC and patients were more likely to be febrile. There was also a trend towards sepsis of any type the longer the EVD remained in place, although this could be associated with the complexities of the patient group that required longer EVD placement. Celik (2004) states that patients hospitalised in critical care units longer than 48 hours have a higher overall infection rate. Graves, et al., (2007) report that many healthcare associated infections are due to longer length of stays.

Four (13%) patients had their EVD's changed, one of whom met the criteria for ventriculitis. Lyke, et al., (2001) argue that EVD's should only be removed and changed if obstructed or infected. It was beyond the scope of this audit to determine the reasons for an EVD change.

There was no relationship between the use of antibiotic prophylaxis and ventriculitis within this study, with n=3 of the patients meeting the criteria for ventriculitis receiving antibiotics prophylactically and n=2 not. Bader, Littlejohns and Palmer, (1995) have advocated for the use of prophylactic antibiotics in reducing rates of ventriculitis in this population. However, the use of prophylactic antibiotics with EVD's is debated within the literature with several authors advocating against their use (Moon, et al., 2007; Alleyne, Hassan, and Zabramski, 2000). A study conducted by May, Fleming, Carpenter, Diaz, Guillamondegui, Deppen, Miller, Talbot, and Morris (2006) found that broad spectrum antibiotic use did not lower rates of ventriculitis in this population. Despite a lack of consensus within the literature, prophylactic antibiotics continue to be variably used locally with EVD insertion, at the discretion of medical teams and according to physician preference.

## Study Limitations

The primary limitation of this study was the small infection prevalence (n=5, 17%), which increases the difficulty in interpreting data, generalising results and drawing conclusions. Another limitation to this study is the retrospective nature of the data collected, which means that contextualising data can be problematic (Lamont, Brunero, Barclay, and Wijeratne 2011).

## Implications for Neuroscience Nursing / Future Directions

To our knowledge, there are currently no professional guidelines which guide practice when caring for patients with EVD's, and this should be addressed to support professional practice development. This has previously been noted by Korinek, Reina, Boch, Rivera, De Bels, and Puybasset, (2005), who reported that practices were inconsistent and lacked an evidence base.

The audit highlighted areas of service delivery that should be subject to review and evaluation against professional guidelines and contemporary literature (Lamont, et al., in press). The multidisciplinary neuroscience team in conjunction with the infectious diseases team at the study site is currently developing guidelines to standardise practice in EVD care. The audit highlighted areas of service delivery that warranted review and evaluation. These areas include inconsistent practices around the use of prophylactic use of antibiotics, unnecessary EVD changes, frequency of CSF sampling and a definition for infection which will be used to guide treatment.

## Conclusion

The current study indicated that use of antibiotic impregnated EVDs, appeared to have been associated with decreased rates of ventriculitis. However, auditing of EVD practices has supported quality improvement processes by indicating a number of areas with potential to make changes to improve patient outcomes. Future re-audit will indicate whether these practice development initiatives achieve this.

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# The Volunteer Feeding Program on the Neurosurgical Unit of Royal North Shore Hospital, Sydney.

*Michelle Kleiner, Riki Friedman*


## Abstract

Hospital malnutrition is an insidious problem that does not attract media attention. The lack of adequate feeding assistance at mealtimes is a known precipitator in the development of hospital malnutrition. It is common in the neurosurgical population due to sequela of their neurological diagnoses. Malnutrition increases infection risk, delays wound healing, reduces quality of life, prolongs hospital length of stay and increases healthcare costs.

A unique initiative known as the Volunteer Feeding Program, was developed for the Neurosurgical Unit at Royal North Shore Hospital (RNSH). Volunteers were recruited, educated and trained to assist with meal setup and feeding to optimise oral intake and subsequently improve nutritional status. On initial evaluation in 2007, adequate feeding assistance increased from 75% to 91% and patients consuming >3/4 of their meals increased from 55% to 76% with volunteers present. The follow-up annual evaluation in 2010 continued to show positive outcomes with a total of 1171 hours of volunteer assisted feeding and volunteers covering majority of meal services 7 days a week. The percentage of patients waiting >10-15 minutes for meal assistance reduced from 27% to 8% with volunteers engaged. Additionally, meal consumption improved from 27% to 67% of patients consuming >3/4 of their meals with volunteer assistance.


***Key Words**:* malnutrition, volunteer, assisted feeding, dysphagia.

## Background

Hospital malnutrition is a hidden and insidious problem and often does not grab media attention or the interest of health bureaucrats. Recent evidence shows that nutritional neglect and malnutrition are rife in public hospitals across NSW with many patients malnourished on admission to hospital or developing malnutrition whilst in hospital (Jeffries, Johnson & Ravens 2011). Malnutrition is prevalent in 35-63% of patients across hospitals Australia-wide (Middleton & Nazarenko 2001; Adams, Bowie, Simmance, Murray & Crowe 2008, Unosson 1991; Torje-sen, 2007). In addition, international data indicates 10-60% of all patients admitted to hospital are malnourished (Bavelaar, Otter, van Bodegraven, Thijs & van bokhorst de-van der Schueren 2009; Stratton, Green & Elia 2003). A patient's cause of death is rarely reported as malnutrition, despite the fact that this may well have been one of the main the precipitating factors.

*Questions or comments about this article should be directed to Michelle Kleiner, Senior Clinical Dietitian, RNSH at* mkleiner@nsccahs.health.nsw.gov.au



Malnutrition is known to cause a wide range of adverse consequences including dehydration, increased risk of infection, delayed wound healing, weakened respiratory system, reduced mobility, reduced quality of life, apathy and depression. As a result of the clinical consequences of malnutrition, the cost to the healthcare system is considerably increased due to prolonged hospital length of stay, bed block and increased rates of readmission (Stratton, Hakston, Longmore, Dixon, Price & Sproud 2004; Jordan, Snow, Hayes & Williams 2003: Adams et al 2008; Kyle, Genton & Pichard 2005).

Within the Area Health Service, a survey of 777 patients was conducted as part of the Nutrition Matters project which showed 51% of inpatients had some degree of malnutrition. The average length of stay for malnourished patients was almost double that of well-nourished patients. Key issues raised include the lack of assistance and encourage-ment provided to patients at mealtimes and the limited available nursing staff for the provision of assistance with oral intake (Mathews, Bartlett & Hall 2007).

Royal North Shore Hospital (RNSH) is a quaternary referral centre for neurosurgery capturing the most severe and complex neuro

-trauma cases throughout New South Wales with patients referred from Sydney Harbour to the Queensland border. The Neurosurgical Unit is a 25-bed ward including four high dependency beds. Patients on this unit are identified to have an increased risk of malnutrition as sequela of their neurological diagnoses. These diagnoses include stroke, traumatic brain injury, brain tumours and neurovascular disorders.

The human brain is only 2% of body weight, however it consumes 20% of total body oxygen and similar amounts of the total energy used by the body at rest, (Pierre, Magistretti, Pellerin & Martin 2000). Additionally, there is an increase in the body's energy requirements post brain injury due to the needs for tissue repair increasing malnutrition risk in this population (Whitehurst 2009; Pepe & Barba 1999; Seyfreid & Mukherjee 2005).

Current data reveals that the neurosurgical patient population has on average a longer length of stay compared with other hospitalised patients (Health Round Table, 2011). It has also been shown that oral intake and therefore nutritional status tends to worsen during hospital admission (Council of Europe, 2002; Holmes 2006; Kyle et al, 2005).

A high proportion of the neurosurgical population are at risk of malnutrition due to sequela of their neurological diagnoses. These include muscle weakness, incoordination, visual, cognitive, and behavioural disturbances (Holmes 2006) and dysphagia (Hansen, Engberg & Larsen 2008; Mackay, Morgan & Bernstein 1999; Takahata, Tsutsumi, baba, Nagata & Yoneekura 2011; Ward, Green & Morton 2007) which hinders their ability to eat. Furthermore, dysphagia can contribute to a more protracted hospitalisation (even death) due to aspiration pneumonia, dehydration, malnutrition or long term disability (Royal Melbourne Hospital, 2002; Mackay et al 1999, Mann, Hankey & Cameron 2000). Worsening nutritional status may exacerbate the degree of dysphagia, leading to a spiral of decline increasing the risk of morbidity and mortality (Veldee & Peth 1992).

A needs assessment including a survey and mealtime observation was conducted on the Neurosurgical Unit at RNSH which showed that 56% of patients required mealtime assistance and only 42% received this assistance. Nursing staff provided 70% of feeding assistance, visitors provided 20% of assistance and 10% received no assistance at all. It was also seen that approximately 40% of these patients had to wait more than 10-15 minutes for feeding assistance. Nutritionally, only 55% of patients consumed greater than three-quarters of their meal with 13% of patients eating nothing at this mealtime. Social isolation was also identified at mealtimes with many patients unable to have daily visitors due to the vast geographical region from which patients are referred.

The literature above and the results of the needs assessment recognised the need to address the lack of attention to the critical issue of malnutrition and the fundamental right of patients to receive adequate access and assistance with feeding (Whitehurst 2009). This was the driving force for initiating the Volunteer Feeding Program on the Neurosurgical Unit at Royal North Shore Hospital.

The use of volunteers to assist patients with meal set-up and/or assistance is a strategy in which hospitals can optimise oral intake at mealtimes and subsequently reduce malnutrition risk. There is also recognition of the potential for this innovation to reduce stress on nursing staff at 'peak' times, improve patient mealtime satisfaction and minimise patients' social isolation.

The program's outcomes reflect the Australian Council on Healthcare Standards (criteria 1.5.7) 'The organisation ensures that the nutritional needs of patients are met' and the Area Health Service Nutritional Care Policy standard 5 'Assistance to eat and drink' (The Australian Council on Healthcare Standards, 2010, Mathews et al 2007).

## Aim

To engage volunteers to assist with meal time feeding in order to optimise timely nutritional intake whilst maintaining safe feeding and swallowing practices on the Neurosurgical Unit at RNSH.

## Methods

Initially, a baseline study was conducted in late 2007 including a quantitative mealtime observation and a qualitative nursing survey. Information collected included data on proportion of patients requiring assistance, level of assistance required, persons providing assistance, length of waiting times for feeding assistance and the amount of the meal consumed.

A review of the literature identified the strengths, weaknesses and structures of other volunteer programs in nationally and internationally. The specific and specialist nature of the neurosurgical population was acknowledged and considered in the development of this unique patient-focussed initiative. Program design was based on best

available constructs and modified accordingly to achieve specific goals in maximising nutrition support.

A pilot proposal was submitted to the RNSH Executive outlining the priority of improving nutrition via the use of volunteers to assist with feeding, based on the quantitative baseline study results and literature review. Volunteers were to be recruited to assist with mealtime set-up and feeding of patients with nil known dysphagia, ideally allowing nurses to focus their specialised feeding skills where required. Volunteers were also thought to increase social support for patients in a climate where this is often limited. This initiative was unanimously accepted as a first of its kind at RNSH and according to the literature review the first of its kind in the neurosurgical population.

Close liaison and discussion through focus groups with relevant key stakeholders including the Clinical Nurse Educator, RNSH Volunteer Coordinator, Nurse Unit Manager, nurses, medical team and patients, was sought prior to planning and implementation of the pilot program.

The pilot design consisted of a 10-week trial at negligible cost with recruitment of one volunteer per day feeding morning tea, lunch and afternoon tea. All volunteers were educated by the Dietitian, Speech Pathologist and Clinical Nurse Educator prior to commencement of the program. Volunteer education and training incorporated the importance of adequate nutrition in the neurosurgical population, occupational health & safety concerns, safe feeding practices, signs of swallowing difficulty, mealtime procedures, standards for communication and documentation requirements. Consistent daily liaison and bedside monitoring with nursing staff and volunteers remained vital.

Inclusion criteria for patient selection encompassed patients requiring feeding set-up and/or assistance. Patients with known dysphagia, infection requiring isolation and/or those that were aggressive or combative were excluded due to associated risks.

Volunteer recruitment was completed by the RNSH Volunteer Coordinator via standard means of recruitment, however a focus on an interest in patient feeding was essential.

Resources developed included an organisational volunteer folder which comprised a volunteer sign on/off sheet, relevant staff contact details, educational materials, mandatory training timetables, feeding-assistance request forms, volunteer feedback/communication forms, food chart templates and the volunteer practical cue card (step-by-step guide to feeding and assistance). Volunteers were also provided with hospital security identification badges and embroidered volunteer aprons funded by donations.

The post pilot evaluation included a repeat of the baseline study to evaluate effects of volunteer presence on the Unit. A formal evaluation report and brief was compiled and forwarded to the hospital executive of RNSH. Following this, approval was granted for the Volunteer Feeding Program to continue as a permanent initiative on the Neurosurgical Unit.

Ongoing annual evaluation involves repeat quantitative studies, qualitative surveys to nursing and volunteers and collection of statistical data including volunteer hours and occasions of feeding assistance. Regular appreciation morning teas were commenced in the second year of this program and run quarterly for nursing and volunteers. This provides an opportunity for ongoing education, feedback and networking between volunteers and ward staff.

## Outcomes - Pilot Evaluation

According to the pilot evaluation study conducted in March 2008 it was found that the percentage of patients who failed to receive assistance reduced from 25% to 9%. This equates to one patient not receiving meal assistance as required. It was noted that this patient had just returned to the ward post-operatively and no meal tray was provided.

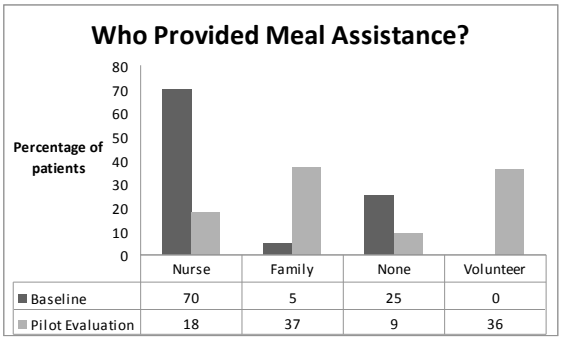


**Figure 1:** *Who provided meal assistance?*

Notably, pressures on nursing staff to assist patients with meals dramatically reduced during the 10-week trial. As per Figure 1, in the baseline study 70% of patients were assisted by nurses compared to only 18% in the pilot evaluation study. This allowed nurses to focus their specialised feeding skills with dysphagic patients. In the pilot evaluation study, volunteers were shown to provide 36% of the feeding assistance

with family assistance increasing from 5% to 37%.

A reduction in waiting periods for assistance with meals on the ward was also achieved, whereby 27% of patients had to wait more than 10-15 minutes for assistance in the pilot evaluation study, compared to 38% in the baseline study.

As per Figures 2 & 3, meal consumption was noted to improve substantially with 76% of patients consuming >3/4 of their meals on average in the pilot evaluation study compared

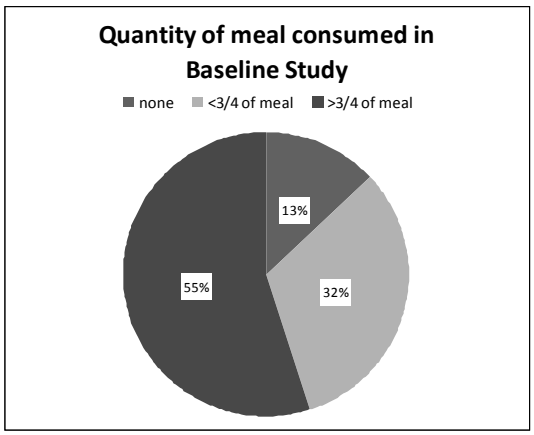


**Figure 2:** *Quantity of meal consumed in baseline study*

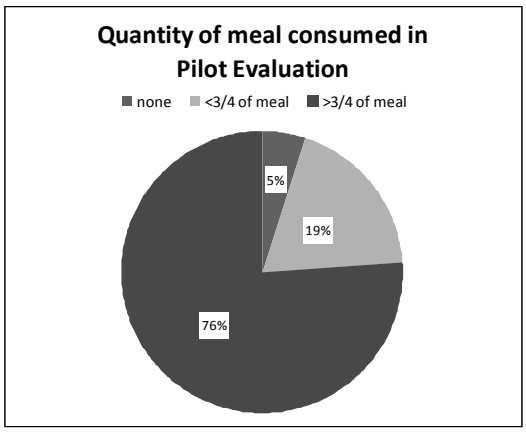


**Figure 3:** *Quantity of meal consumed in pilot evaluation study*

to 55% in the initial baseline study. It was also noted that the percentage of patients that ate none of their meal improved to 5% in the pilot evaluation study from 13% in the baseline study.

The Nursing Satisfaction Survey completed after the 10 week trial revealed that 43% of nurses surveyed reported 'less work' in feeding and assistance at meal times, 43% reported the 'same amount of work' and nil reported 'more work' during the pilot period. It was also found that 17% of nurses surveyed reported a reduction in 30 minutes per shift attributed to feeding and assistance at mealtimes. All nurses surveyed reported it was not difficult to identify patients suitable for feeding by volunteers and felt that the program was effective. Several additional comments were made by nursing staff including, '(The program) allows nurses to get on with their other duties such as meds (medications) and obs (observations) with the comfort of knowing their patients will be fed', 'Takes the pressure off at meal times', 'Still enables nurses to do jobs that would still need to be done on top of feeding patients' and 'When visitors see the volunteer or us help patients, they are more inclined to do so themselves with the person they are visiting'.

From the Volunteer Satisfaction Survey, 100% of the volunteers found the Dietitian & Speech Pathology education sessions useful. All of the volunteers reported feeling comfortable on the ward with two volunteers adding they felt 'very' comfortable on the ward. The volunteer folder was found to be useful by 66% of volunteers. All reported spending 60-90 minutes of the 4 hours on the ward feeding and assisting patients at meal times and on average volunteers reported the ability to feed or assist 3 or more patients each visit with this number dependant on patient requirements on that day.

## Evaluation - 2010

The 2010 evaluation was completed over 2 consecutive days measuring meal assistance and oral intake with and without volunteer presence on the ward.

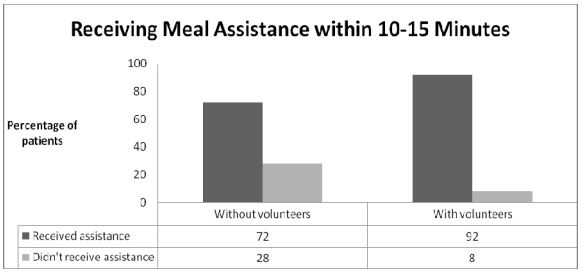


**Figure 4:** *Comparison of the percentage of patients that received meal assistance within 10-15 minutes without and with volunteers present.*

Figure 4 shows the improvement in timing of meal time assistance, with 92% of patients receiving timely meal assistance (within 10-15 minutes) with volunteers present compared to only 72% of patients without volunteers present on the ward.

Figures 5 & 6 compare the amount of the meal consumed without and with volunteer assistance respectively. In summary the percentage of patients consuming >¾ of their meal improved from 27% to 67%. The percentage of patients that ate nothing decreased from 27% to 8%.

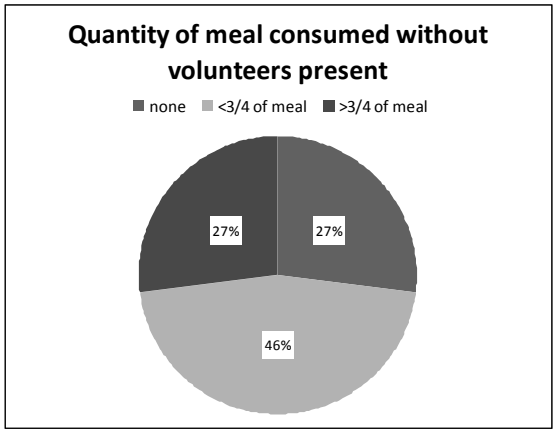


**Figure 5:** Quantity of meals consumed without volunteers present.

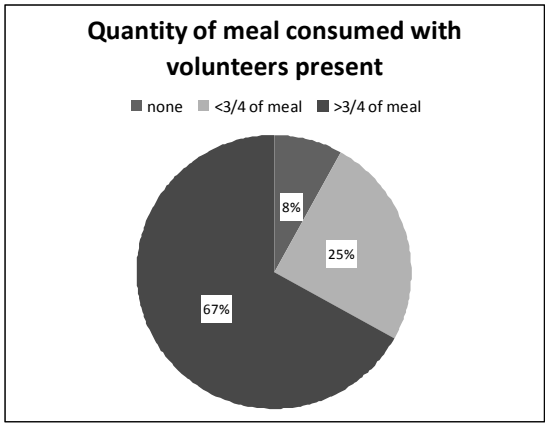


**Figure 6:** Quantity of meals consumed with volunteers present.

Statistics recorded from the 2010 evaluation showed that volunteers completed 1171 hours of service with an estimated 1450 occasions of feeding assistance.

As of July 2011, there were volunteers covering all meal services, 7 days a week with 27 volunteers having completed training.

## Conclusions

The Volunteer Feeding Program was approved by the hospital executive as a permanent program in 2008 based on the positive outcomes found and continues to be implemented on the Neurosurgical Unit. This project has been seen as a low-cost and practical method to assist in addressing the issues of malnutrition and lack of adequate feeding assistance in the public hospital system.

Sustainability has been maintained through ongoing support and communication by key stake-holders at the ward-level according to the program processes and at higher levels through open reporting and feedback.

Appreciation, recognition and support is offered to volunteers and nursing staff through quarterly morning teas conducted by Clinical Nurse Educator, Nurse Unit Manager, Dietitian and Speech Pathologist. This provides opportunity for volunteers to debrief and build social connections and receive further training and education.

Annual auditing is conducted to ensure positive outcomes are sustained.

Finally, this program is sustained with RNSH Executive support and endorsement inline with area-wide and national health standards (Mathews et al 2007, The Australian Council on Healthcare Standards, 2010).

The development and evaluation of this program has highlighted the essential right of the hospitalised patient to receive adequate assistance with meals ensuring optimal nutrition through a low-cost and practical process. The potential for transfer of this program has been recognised by RNSH and has been modified for implementation on the Aged Care, Orthopaedic and Neurology Wards.

The Program is a first in the neurosurgical population and has been recognised in media coverage and through invited presentations at multidisciplinary local and international conferences. Site visits have been sought from local, national and international healthcare workers with the view to run the program within their facilities. The volunteers were recognised by winning the RNSH-Ryde Carer Group Award in 2010.

## Acknowledgements

We acknowledge and value the dedication of our volunteers in their service to the neurosurgical patients. Nicki Pereira, Clinical Nurse Educator, has provided an integral and essential role in the ongoing success of this program along with Alicia Agius, Nurse Unit Manager, and the dedicated nursing staff of the Neurosurgical Unit.

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# A Review of Current Treatment Options for Glioblastoma Multiforme

*Linda Nichols*

## Abstract

Treatment options for most patients diagnosed with a Glioblastoma Multiforme consist of surgery, radiotherapy and chemotherapy. Despite recent advances treatments remains palliative and not curative. The life expectancy for patients is still dismal, and in this context, the objective should be towards improving not only quantity but also quality of life. The following paper is a critical review of the literature pertaining to the treatment of Glioblastoma Multiforme, focusing on the use of the two most available and utilised chemotherapy regimes. Specifically, the oral alkylating agent Temozolomide and surgically implanted polymer wafers impregnated with Carmustine (commonly known under the name of 'Gliadel').

***Key Words:*** Glioblastoma multiforme, Temozolomide, Gliadel, chemotherapy.

## Introduction

Glioblastoma Multiforme (GBM) or grade 4 astrocytoma is the most common and most aggressive brain tumour in adults (Schwartzbaum, Fisher, Aldape, & Wrensch, 2006). GBM's are composed of poorly differentiated astrocyte and histopathological features including marked cellular pleomorphism, endothelial proliferation and necrosis (Kaye, 2005; Mirimanoff, 2006). Surgery, radiotherapy and chemotherapy are the main treatment modalities for GBM. Surgery remains pivotal as a precursor to adjuvant treatments by reducing the mass effect of the tumour and also providing a tissue sample for histological diagnosis. Maximal surgical resection is associated with improved survival rates (Gauden, Hunn, Erasmus, Waites, Dubey & Gauden, 2009), although this is not always possible due to the infiltrative nature of GBM's and the need to balance the preservation of neurological function. Despite its characteristic resistance to radiation-induced apoptosis (Reardon & Wen, 2006), postoperative radiotherapy has been the standard treatment for GBM for more than three decades (Stupp, Hegi, Mason, van den Bent, Taphoorn, Janzer, Ludwin, Allgeier, Fisher, Belanger, Hau, Brandes, Gijten-beek, Marosi, Vecht, Mokhtari, Wesseling, Villa, Eisenhauer, Gorlia, Weller, Lacombe, Cairncross & Mirimanoff, 2009).

*Questions or comments about this article should be directed to Linda Nichols, Lecturer School of Nursing and Midwifery. University of Tasmania at* Linda.Nichols@utas.edu.au



Radiotherapy increases median survival from 3-4 months to 9-10 months (Hart, Grant, Garside, Rogers, Somerville & Stein, 2008).

The following paper is a critical review of the literature pertaining to the treatment of GBM, focusing on the use of the oral alkylating agent Temozolomide and Carmustine in the form of degradable polymer wafers (commonly known under the name of 'Gliadel').

The author reviewed the treatment of a brain malignancy in a 48-year-old female patient (Doreen) who presented to hospital following a witnessed tonic-clonic seizure. On presentation to the emergency department, Doreen was alert and orientated. A medical history obtained identified a three-week history of headaches and slurred speech. Reardon & Wen (2006) suggest that signs and symptoms of a GBM are variable in relation the tumour location, rate of growth and size. Common presenting symptoms include headaches, seizures, focal neurologic deficits, and changes in mental status. Taylor (2010) suggests that as well as age and functional status, patients that present with an acute onset of symptoms including seizures are more likely to have a better outcome and survival time, as subtle symptoms are often not investigated for extended periods of time allowing for tumour growth and infiltration (Gauden et al., 2009). Doreen's past medical history included a two-year period of hypercholesterolemia controlled with lipid-lowering medication. Married with two adult children, Doreen led an active life playing tennis twice a week. Initial investigation included blood biochemistry that was unremarkable and a computed tomography (CT) scan that identified a partially solid, partially cystic lesion in the left

temporal lobe with minimal mass effect and no midline shift. Magnetic resonance imaging supported that the lesion was a contrast enhancing solid and partially cystic mass. Anti-seizure treatment and oral glucocorticosteroid steroid treatment was commenced. Oral glucocorticosteroid treatment is vital in reducing cerebral oedema and when prescribed at initial presentation, patients often experience an initial marked improvement in neurological symptoms (Hart et al., 2008). Oral glucocorticosteroid management is continued in varying doses during treatment, and tapered as tolerated, to avoid the chronic side effects of steroid use. Doreen underwent surgery to allow for debulking of the tumour and histological diagnosis. The histology confirmed the diagnosis of a GBM. Post operatively Doreen was expressively and receptively dysphasic and required ongoing speech therapy assistance.

Fourteen days postoperatively Doreen began the Stupp protocol of concomitant chemotherapy (Temozolomide) and radiotherapy followed by adjunct chemotherapy (Stupp, Mason, van den Bent, Weller, Fisher, Taphoorn, Belanger, Brandes, Marosi, Bogdahn, Curschmann, Janzer, Ludwin, Gorlia, Allgeier, Lacombe, Cairncross, Eisenhauer & Mirimanoff, 2005). Despite the success of treatment regimes such as Temozolomide and Gliadel wafers, they are not curative and remain palliative, offering only improved overall survival and time to disease progression (Van Meir,Hadjipanayis, Norden, Hui-Kuo, Wen & Olson, 2010). Over the past few decades there has been significant research and ongoing clinical trials focusing on the treatment of patients diagnosed with GBM. However, data collected has been conflicting and the survival prognosis remains poor. The only statistical significant increase in survival that also reflected quality of life followed the seminal research by (Stupp et al., 2005); however, this has only translated to a median survival of 14.6 months from 12.1 months. Townsley (2011) thus supports that the focus of all treatment options should be to improve survival and maximise quality of life by focusing on symptomatic relief.

### Neurological Function and Quality of Life

The prognosis of a patient diagnosed with any brain malignancy is catastrophic as the primary control centre for the body is impacted (Lucas, 2010). The preservation of neurological function and timely and appropriate interventions to control symptoms is essential when exploring treatment options for GBM. Nieder, Adam, & Grosu (2006) assert that treatment must be balanced with the potential negative impact on the patient's quality of life. Quality of life and progression free time is important when given the poor prognosis and the catastrophic symptoms associated with GBM. Taylor (2010) suggests that patients often suffer a number of debilitating disabilities associated with GBM including fatigue, sleep disturbances, headaches, depression, cognitive impairment and anxiety. Salcman (2001) states that like Doreen, most people diagnosed with GBM are often in their most active and productive period of their life and there is a significant personal and social impact associated with the rapid cognitive deterioration.

## Temozolomide Treatment

Prior to the introduction of Temozolomide, there was no evidence that a chemotherapeutic agent could improve overall survival in GBM patients (Pelloski & Gilbert, 2007; Westphal, Hilt, Bortey, Delavault, Olivares, Warnke, Whittle, Jaaskelainen & Ram, 2003). The role of chemotherapy has long posed difficulties when treating GBM due to the malignancy location in the brain, the spread of malignant cells into brain parenchyma and the difficulty in disrupting the blood brain barrier. Further, the intrinsic resistance and limited response of GBM to chemotherapy place patients at risk of neurotoxicity and cerebral oedema (Chamberlain, 2006; Armstrong, 2009; Van Meir et al., 2010). The choice of treatment for most presenting patients including Doreen is Temozolomide, an orally administered alkylating agent, heralded due to its ability to cross the blood brain barrier, its good oral bioavailability and quality of life benefits (Chibbaro, Benvenuti, Caprio, Carnesecchi, Pulera, Faggionato, Serino, Galli, Andreucchetti, Buxton & Gagliardi, 2004). In 2004 a randomised phase III trial by the European Organisation for Research and Treatment of Cancer (EORTC) and National Cancer Institute of Canada Clinical Trials Group (NCIC) reported the benefits of concomitant and adjuvant temozolomide and radiotherapy for GBM (Stupp et al., 2005). The treatment regime consisted of 75 mg/m2 of temozolomide taken concomitantly to radiation therapy followed by an adjunct course of 200 mg/m2 five out of every 28 days for six months to one year. Despite the survival advantage being less than 2 months, this was a significant advance in the treatment of newly diagnosed GBM.

As a second-generation alkalising agent that undergoes spontaneous hydrolysis, Temozolomide does not require hepatic metabolism for activation (Corsa, Parisi, Raguso, Troiano, Perrone, Cossa, Munafo, Piombino, Spagnoletti, & Borgia 2006). Temozolomide is rapidly absorbed and works by inducing a block in the mitotic phase of the cell cycle (Oshige, Yamahara, Oishi, Li, Zhen, Numa, & Kawamoto, 2010). This block corresponds with

the most radiosensitive phase of the cell cycle thus increasing cell sensitivity to radiation whilst also inhibiting radiation induced cell invasion (Mirimanoff, 2006). Simultaneously administered agents such as Temozolomide are aimed at radio -sensitization and enhancing the benefit from radiation (Robins, Lassman, & Khuntia, 2009). Radiation-induced DNA double-strand breaks and cell death occurs when Temozolomide is administered concomitantly with radiotherapy and not sequentially (Stupp et al., 2009). DNA damage is rapidly repaired by MGMT ($O^6$-methylguanine–DNA methyltransferase) DNA repair enzyme (Van Meir et al., 2010). In a subgroup of patients the silencing of the MGMT gene promoter by methylation is associated with a significantly longer overall survival of 27% versus 11% at two years and 10% versus 2% at five years in patients who receive alkylating agents such as Temozolomide (Hegi, Diserens, Gorlia, Hamou, de Tribolet, Weller, Kros, Hainfellner, Mason, Mariani, Bromberg, Hau, Mirimanoff, Cairncross, Janzer,& Stupp, 2005; Stupp et al., 2009). It is thought that in this subgroup of patients, tumour cells are less able to repair the damage caused by Temozolomide.

Although Temozolomide is not the only alkylating agent that can cross the blood brain barrier, it increases radio-sensitivity offering improved outcomes. When administered concurrently and adjunct to radiotherapy Temozolomide is efficacious for many patients as a first line therapy for newly diagnosed GBM, demonstrating prolonged progression free survival and increased quality of life that includes improved neurological functioning and performance status (MacDonald, Kiebert, Prados, Yung, & Olsen, 2005; Stupp et al., 2009). Despite only extending the life expectancy of patients by a short period, Temozolomide's tolerability and ease of administration often allows patients to spend less time in hospital. In most patients like Doreen, Temozolomide is well tolerated and side effects are predictable and manageable with transient myelosuppression that is noncumulative (Friedman, Kerbey, & Calvert, 2000). Side effects also include gastrointestinal symptoms, fatigue and rash, while Bohan, (2007) suggests that approximately 10% of patients suffer extended periods of neutropenia, thrombocytopenia and anaemia requiring transfusions. In the context that treatment including Temozolomide is palliative and does not alter the disease course, it is important that side effects are predictable and manageable.

## Gliadel Wafer Treatment

The alternative treatment option discussed in this paper is Gliadel wafers, which consist of a degradable polymer wafer impregnated with Carmustine and placed along the walls of a tumour resection cavity. Carmustine or BCNU (bis-chloroethylnitrosourea) exerts its cytotoxicity mainly by alkylating DNA at the O6 position of guanine and by forming DNA interstrand cross-links (Jin, Cook, Cui, Chen, Keir, Di, Payne, Gregory, McLendon, Bigner & Yan, 2010). The development of Gliadel wafers was a novel alternative route of administration that circumvents the obstruction that is imposed by the impenetrable nature of the blood-brain barrier. Systemic administration of Carmustine is associated with severe toxicity including pulmonary fibrosis and myelosuppression and offers little to no improved outcome or quality of life for patients (Armstrong & Gilbert, 2002). The proposed advantage of Gliadel wafers is the potential to simplify management for patients reducing the prolonged 6-month course of systemic chemotherapy. Gliadel wafers were designed as a less toxic option. Implanted onto the tumour bed during surgery, they provide a controlled release of Carmustine over a period of two to three weeks (Hart et al., 2008). The theory is that there should be a reduction in toxicity, as Carmustine is directly applied to the tumour bed and in contact with any residual tumour cells. Due to the localized nature of the release, no pharmacokinetic measurements have been taken in humans (Ericksen, Fortin, Hou, & Shumpp, 2008). Reviews such as Chamberlain, (2006) maintain that Gliadel wafers are limited by high and heterogeneous drug concentrations that within a small volume of distribution may be sub therapeutic or toxic.

Despite extending tumour control and survival in selected cases, Gliadel implants have not become standard treatment for a number of reasons. There is an increase in complications such as; cerebral oedema requiring extended steroid use, hydrocephalus, meningitis, cerebritis, intracranial abscess and healing abnormalities, specifically poor dural repair resulting in cerebral spinal fluid leakage (Brock, Puchner, Lohmann, Schutze, Koll, ketter, Bachalla. Rainov, Kantelhardty, Rohde & Giese, 2010; Van Meir et al., 2010). Seizures and neurological deficits are also commonly associated with Gliadel implants. Brock et al. (2010) claim that adverse medical events associated with Gliadel wafers include thromboembolic events (thrombosis, pulmonary embolism) and toxicity, which poses a particular difficulty as implanted wafers require surgical intervention to remove in comparison to withholding or ceasing other chemotherapeutic agents.

Patients that receive Gliadel wafers may also be limited by other treatments that can be offered, as

there is a reluctance to combine Gliadel wafers, radiotherapy and Temozolomide, due to the risk of toxicity. Brock et al. (2010) purport that the toxicity risks of Gliadel wafers and concomitant radio-chemotherapy is significant and underestimated. However McGirt, Than, Weingart, Chaichana, Attenello, Olivi, Laterra, Kleinberg, Grossman, Brem & Quinones-Hinojosa, (2009) maintain that radio-chemotherapy can be safely administered following Gliadel treatment. Kleinberg, Weingart, Burger, Carson, Gossman, Li, Olivi, Wharam & Brem, (2004) also assert that Gliadel followed by radiotherapy is well tolerated, despite 19% of patients in their study developing adverse neurologic symptoms during radiotherapy requiring increased steroids and/or anticonvulsants. This opinion is still debated as Hickey & Armstrong (2009) assert that there has been no research that compares a systemic chemotherapy strategy with wafer treatment limiting the development of definitive guidelines for the combined use.

Temozolomide treatment does not commence until there has been a full macroscopic and microscopic diagnosis. Treatment with Gliadel wafers relies on diagnostic confirmation from a intra-operative frozen section (See & Gilbert, 2007). Whilst intra-operative frozen section diagnoses is a valuable tool that for the most part provides an accurate preliminary diagnosis (Welsh, Lindsey, Coulter, & Smith, 2010), there are a number of limitations that restrict the interpretation of GBM tissue samples. Whittle (2004) suggests that up to 30% of what are initially thought to be low grade gliomas are in fact grade III or grade IV tumours. Meyer, Keith-Rokosh, Reddy, Megyesi, & Hammond (2010) consider that errors in intra-operative frozen section diagnosis occur due to a combination of sampling, technical and interpretive sources. GBMs have a heterogeneous nature and the ultimate reliance on frozen section for diagnosis is problematic as a GMB often has multiple histological appearances. GBM's are composed of poorly differentiated astrocyte and histopathological cell features including necrotic, mutative, diverse and invasive features of dense cellularity (Mirimanoff, 2006; Reardon & Wen, 2006) that preclude complete surgical resection. Powell (2005) asserts that accurate diagnosis requires assessment of both the gross specimen and frozen sections correlated with clinical, radiologic, and histological data.

Gliadel wafers have not been proven to confer a significant increase in survival in comparison to placebos with the validity of phase III placebo controlled study of Gliadel wafers questioned by Robins et al (2009). Statistically significant results were claimed by Westphal, Ram, Riddle, Hilt & Bortey (2006) who reported a 2-year survival advantage for patients treated with Gliadel wafers and radiotherapy. However, this comparison was based on a placebo and not with Temozolomide or other chemotherapeutic agents. Trials suggest that the median survival following Gliadel implantation and radiotherapy is around 14 months with a 2.5 month improvement over placebo (Westphal et al., 2003). When the results of literature studies are limited to GBM, the trials undertaken to date fail to demonstrate a statistically significant improvement in survival.

## Future Directions

The combination of multiple and targeted therapies and pathways is a fast growing area of research (Li, Di, Mattox, Wu, & Adamson, 2010). It is most probable that treatment regimes will be personalised and targeted with the aid of patient genetic profiling. Understanding and identifying the molecular characteristics of GBM may be the true key to understanding the variability in patient survival and in turn identifying genetic subtypes which will respond more favourably to treatments (Garside, Pitt, Anderson, Rogers, Dyer, Mealing, Somerville, Price & Stein, 2007). New surgical techniques are also continuing to be developed and trialled including fluorescence-guided resection and neuro-endoscopic approaches (Van Meir et al., 2010). It is essential that nurses are aware of current advances in research, potential treatment options and on-going clinical trials (Graham & Clughesy, 2004). As this study has highlighted, a holistic approach is required to improve both the quality and quantity of life. Skilled nurses who understand the effects of chemotherapy on quality of life are required so that the side effects and cognitive decline of patients can be managed efficiently.

## Conclusion

GBM remains one of the most grave cancer diagnoses, with a guarded prognosis, where even in the most favourable situation most patients will succumb within two years of diagnosis. Temozolomide is well tolerated, has minimal side effects and benefits not only the quality (if only by a short time frame) but also the quantity of life for patients such as Doreen. Seven months following Doreen's initial diagnosis, a CT scan was undertaken following an increase in headaches that identified disease recurrence. She died eleven and a half months after her initial diagnosis. Despite recent advances in treatments, and improved outcomes achieved through multimodality therapy including the use of Gliadel wafers and more significantly Temozolomide, life expectancy is still dismal and has only been improved by a matter of months. In

this context, there is no place for a nihilistic attitude and the objective should be towards improving not only quantity but also quality of life.

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# 2011 Conference Abstracts

## Black or White or is it? Is ICU admission necessary after elective craniotomy?

*Kylie Wright, Liverpool Hospital, NSW.*

**Abstract:** Routine postoperative admission to an intensive care unit (ICU) is often considered a prerequisite in the management of patients after elective craniotomy, but may strain already limited resources and is of unproven benefit. This study investigated whether post-op admission to a regular neurosurgical ward is a safe alternative.

**Methods.** We retrospectively analysed 394 consecutive patients undergoing elective craniotomy over 54 months at a single institution. Recorded data included age, gender, indication for craniotomy, operation type, reason for ICU admission, Medical Emergency Team (MET) calls, in-hospital mortality and postoperative length of stay.

**Results.** 343 patients were admitted to the neurosurgical ward postoperatively, while there were 43 planned and 8 unplanned ICU admissions. The most common reasons for planned ICU admission were anticipated lengthy operation (42%) and anaesthetic risk (40%), causes for unplanned ICU admissions were mainly unexpected slow neurological recovery or large intra-operative blood loss. Out of 343 ward admissions, 10 (3%) required a MET call, of which only 3 occurred within the first 48 postoperative hours and did not lead to ICU admission. Overall mortality in the investigated cohort was 1%, with no fatalities in patients admitted to the neurosurgical ward postoperatively.

**Conclusion.** Ward admission of patients undergoing elective craniotomies with selective ICU admission appears safe; however, approximately 2% of patients might require direct postoperative unplanned ICU admission. Patients with anticipated long operation times, high blood loss & high anaesthetic risk should be selected for postoperative ICU admission, but further study is needed to determine preoperative factors aiding in identifying/managing these groups of patients.

**Objectives:**

- To explore if postoperative admission to a neurosurgical ward is a feasible/safe alternative approach in post-op management of patients after elective craniotomy.
- To analyse the safety/adverse events of routine ward admission after elective craniotomy
- To share/reflect on the results of the study, to contribute to the body of knowledge and to support other neurosurgical units to consider this model of care.

## Managing the complexities of the palliative care patient on the Neuroscience Unit.

*Alison Punch, Westmead Hospital, NSW.*

**Abstract:** End of life or palliative care can be challenging to the nurse working in the acute neuroscience unit when they are inexperienced and infrequently nurse dying patients. This presentation aims to explore what attributes palliative care nurses possess, the fundamentals of palliative care nursing practice, and how nurses working in the Neuroscience unit at Westmead Hospital feel about caring for palliative care patients. The presentation will identify factors that may affect nursing care – what is done well and what requires further education. It will also provide an example of a patient that may require end of life care in the neuroscience unit, and how that patient may differ from other end of life situations.

A patient who has had an intracerebral haemorrhage and requires end of life care has additional issues for the neuroscience nurse. For these patients and their families, the event is usually sudden, unexpected and charged with emotion.

Often it is uncertain when decisions about active treatment should cease and comfort care assumed. Therefore nurses' goals are also uncertain. The importance of Advanced Care Plans as an essential tool for end of life patients will be illustrated, as they inform family and staff about patients' wishes in regard to their care. This will allow the nurse to be better able to focus on the patient's and family's needs so as to provide personalised care.

**Objectives:**

- To stress the importance of quality care to nurses who infrequently care for dying patients and how that care will make a difference and leave a lasting impression on families.

## The evaluation of post discharge needs of people who have had a craniotomy to remove a primary benign brain tumour.

*Bernice Appiah, Westmead Private Hospital, NSW*

**Abstract:** The transition from hospital to home following surgical removal of a brain tumour is very critical, yet discharge information is usually general and poor. Lack of appropriate discharge information has been linked with return to healthcare facilities, sometimes, merely for reassurance. Inadequate information and support prior to discharge from hospital can leave patients feeling incompetent to continue their care. Appropriate discharge management in hospitals, particularly for people who have had brain tumour operations is very critical, as brain tumours have been associated with high levels of anxiety and uncertainty. To improve this process, healthcare professionals need to know about issues that former patients encountered post discharge. Hence, the aim of this study was to identify the post discharge needs of people who have had a craniotomy to remove a primary brain tumour in the hope of supporting the discharge management of future patients.

Nine women who had benign brain tumours were recruited from three private hospitals via convenience sampling. Semi-structured telephone interviews were conducted with each of these former patients three to seven weeks post discharge from hospital.

The findings of the research revealed that participants in this study had a variety of concerns, challenges and needs after discharge. The current discharge management of primary benign brain tumour patients appears adequate, however, several areas of improvement could be considered by the healthcare team. Recommendations for improvement have been made based on the major findings of this study.

**Objectives:**

- The aim of the study was to identify the needs and challenges (e.g. of a physical, social or emotional nature) if any, that primary brain tumour patients (PBT) encountered once discharged from hospital to home.
- By understanding the identified issues, the researcher hoped to recommend processes and information to improve the discharge management of future PBT patients.

## The future of decompressive craniectomy for traumatic brain injury.

*S Honeybul, K Ho, C Lind, G Gillett*

**Abstract:** The DECRA collaborators have recently published the results of a prospective randomised trial demonstrating that early bifrontal decompressive craniectomy for diffuse traumatic brain injury did not improve outcome and indeed suggested that the procedure may worsen outcome. There are however, some significant limitations that require consideration before these findings can influence clinical practice.

The study is comparing relatively transient intracranial hypertension in the standard care group with an aggressive surgical procedure that is not without significant morbidity. In addition, the patients in the surgical arm were more severely injured with a higher incidence of bilateral non-reactive pupils and worse initial radiological findings. After adjusting for injury severity there was no difference in outcome between the two groups. An alternative interpretation of the data would be that the procedure is in fact relatively safe and this in itself is an important finding. The question remains as the place of decompressive craniectomy as a life saving procedure when the intracranial pressure is rising progressively. A number of studies have demonstrated that whilst many of these patients achieve a good long term outcome many patients survive with severe disability. To what degree that outcome is acceptable to those individuals is difficult to determine and further work is required in this area before we consign decompressive craniectomy to the history books.

## "NOgIN" - A Nurse Co-ordinated Brain Tumour Support Group. A five year review.

*Emma Everingham, Westmead Private Hospital, NSW .*

**Abstract:** The diagnosis of a brain tumour can be devastating and the prognosis unpredictable. As health professionals, we can only imagine the turmoil our patients are experiencing, as they travel along the roller-coaster of specialist treatment. Advances in neurosurgery, radiation therapy, and concurrent chemotherapy for the management of brain tumours have seen improvements in survival rates. However, this management process, including the potential neurological deficits and psychosocial effects, continues to have an enormous impact on the patient's and their family members quality of life.

The Clinical Nurse Consultants for Neurosciences at both Westmead Hospital and Westmead Private Hospital identified a lack of ongoing support for patients diagnosed with a brain tumour and their carer. Existing cancer support groups did not cater specifically for the unique challenges associated with neurological conditions. In July 2006 the nurse co-ordinated brain tumour support group, "The Neuro Oncology Information Network", known as "NOgIN", was implemented for patients and their carers at the Westmead Hospitals.

Highlights from the past five years, including planning, creation of patient data bases, the first information session, to the new "Carer's Only Dinner" will be outlined. The formal implementation of the program design, newsletter, fundraising, promotional activities, and The NOgIN Nursing Scholarship, will be described.

The development process will be overviewed and attributed to the team approach between public and private hospital nurses, uniting, to improve the patients' quality of life. Other essential support from the neurosurgeons, allied health services, financial and administrative assistance, will be outlined. Evaluations obtained throughout the past five years will be presented, as they overwhelmingly demonstrate the decision to continue with the program, developing new initiatives as a direct result of formal evaluation data.

In conclusion, a thought provoking collection of statements from patients/carers will be summarised, providing an emotional motivation for neuroscience nurses to implement similar initiatives.

**Objectives:**

- To highlight the process of developing and designing a nurse co-ordinate Brain Tumour Support Group.
- To demonstrate the team approach between public and private hospital neuroscience nurses.

## Who needs the MCA anyway? Superficial Temporal Artery to Middle Cerebral Artery (STA-MCA) anastomosis.

*Jane Raftesath and Elaine McGloin, Royal Prince Alfred Hospital, NSW*

**Abstract:** Hickey defines STA-MCA anastomosis as "a micro-neurosurgical bypass procedure that is used to provide collateral circulation to the areas of the brain supplied by the middle cerebral artery. It involves the anastomosis of the superior temporal artery, a branch of the external carotid artery, to the middle cerebral artery. The result being improved collateral circulation to the brain." It is most commonly used in the treatment for moya-moya disease.

Recent improvements in pre-operative imaging, intra-operative techniques and post-operative management has refined the populations that benefit from these revascularisation procedures. It is now a frequent procedure at the Royal Prince Alfred Hospital averaging about 10 cases per year. It is not without complications though, cerebral haemorrhages being a common complication post-operatively.

Following this type of surgery, the patient is required to be in intensive care for a minimum five days. This allows for strict blood pressure parameters which can help limit the potential for post-operative haemorrhage while close neurological assessments are a key element in identifying complications early. This presentation will explore the specific nursing care these patients require and we will also look at a specific patient's journey of undergoing this specialised surgery at the Royal Prince Alfred Hospital which has resulted in the development of an ICU nursing care guideline.

The presentation will be in the form of a case study and also clinical guidelines that have been created.

**Objectives:**

- To explore the role of the neuroscience nurse in looking after STA-MCA patients .

## Coiling vs Clipping of intracranial Aneurysms - Current trends of management in Australia and around the world.

*Leon Lai, Macquarie University Hospital, NSW*

**Abstract:** Endovascular coiling has changed the practice of cerebrovascular surgery. In most neurosurgical centres in Australia, and indeed throughout the world, there has been an ongoing trend to consider endovascular procedures for the management of most intracranial aneurysms, regardless of rupture status. However, the large multi-centre studies, such as the International Study of Unruptured Intracranial Aneurysm (ISUIA II) and the International Subarachnoid Aneurysm Trial (ISAT) do not provide direct and robust evidence to support this changing paradigm of aneurysm management. Now almost 2 decades on since the introduction of endovascular therapy, the debate of coiling vs clipping is over.

**Objectives:** To discuss -

- When neurosurgeons choose to coil and when they choose to clip aneurysms
- What the ISUIA and ISAT mean to neurosurgeons
- Data on clinical outcomes (morbidity, mortality) and cognitive outcomes of coiling vs clipping of intracranial aneurysms.
- The changing trends of aneurysm treatment in Australia from 1998 to 2008 (of coiling vs clipping). What this mean for the new generation of cerebrovascular neurosurgeons in Australia.
- The changing trends of aneurysm treatment around the world, particularly in the United States, United Kingdom, Canada, Japan, and Asia.
- What is the future of aneurysm management?

## Vasospasm in the Neuroscience Patient is not all it's cracked up to be!

*Elizabeth O'Brien, Royal North Shore Hospital, NSW*

**Abstract:** Cerebral vasospasm is usually thought to be associated with subarachnoid haemorrhage and aneurysms. A rare diagnosis, reversible cerebral vasoconstriction/ vasospasm syndrome is precipitated by thunderclap or severe headache, and fluctuating neurological deficits, it commonly affects women of child bearing age. There is no evidence of aneurysm rupture or subarachnoid haemorrhage on CT scanning however an MRA may indicate vasospasm. Precipitating factors have been attributed to postpartum state, exposure to vasoactive substances and possibly in combination with binge drinking. Treatments are varied but include the use of calcium channel blockers. This case presentation will follow the journey of a 50 year old female presenting with stroke and the unfolding of therapies and treatments normally reserved for aneurysmal cases..

**Objectives:**

- To share a case study with colleagues that differs from the usual understanding of neurological processes.
- To explore and expand the understanding of a rare but treatable condition.

## Cerebral Abscess - Looking down the barrel of a gun.

*Diane Lear, Westmead Hospital, NSW*

**Abstract:** Cerebral abscess remains a serious central nervous system condition with a high incidence of morbidity and mortality despite advances in neurosurgical techniques, neuro imaging modalities and the introduction of widespread antibiotic therapy with good central nervous system penetrating ability.

The clinical presentation of a cerebral abscess is varied and will depend on the source and location of the abscess. Headaches, fever, a deterioration in level of consciousness and focal neurological signs progressing over a one to two week period are the most typical symptom complex. Seizures occur in approximately 30-50% of cases. As the infection progresses, the symptoms of a space occupying lesion and serious infection predominate and the patient may rapidly deteriorate. The purpose of this presentation is to highlight the epidemiology, causes, prognostic factors and current approach to the diagnosis and treatment of cerebral abscess.

This case study will also highlight the journey of a young man admitted to a tertiary referral hospital from rural New South Wales following a gun shot wound to the orbit. Following initial management, serial imaging indicated a thick ring enhancing evolving lesion with hypervascularity and mass effect. The patient subsequently developed a large cerebral abscess in the frontal lobe. Treatment options and the patient outcome will be discussed.

**Objectives:**

- Discuss the treatment modalities for a cerebral abscess

## Neuro-oncology nurse coordination: role development and evaluating clinical care outcomes.

*Karen M. Robinson, Liverpool Hospital, NSW*

**Abstract:** Neuro-oncology nurse care coordinators (NOCC) remain uncommon despite key recommendations supporting the significant need for this role. This project aimed to evaluate the recently introduced NOCC role by assessing (1) the support provided for primary brain tumour (PBT) patients/carers through their cancer journey and (2) any efficiency gains in clinical care delivery.

**Methods:** All new and existing South West Sydney PBT patients during March-December 2010 formed the NOCC caseload. PBT patients/ carers and health professionals (HP) were surveyed to ascertain views regarding NOCC function. NOCC KPIs included: time between referral to NOCC contact, number/complexity of care episodes using Macmillan level interventions [MLI] (1-least to 5-most complex) and psychosocial screening/referrals initiated.

**Results:** NOCC caseload (N=129) consisted of high grade glioma [HGG] (70%), low grade glioma [LGG] (14%) and benign [BBT] (16%). Of n=69 Patient and HP surveys, 54% and 86% responded; with majority (95%-98%) agreeing/ strongly agreeing that the NOCC was essential to patient care. Mean time from referral to initial NOCC contact was 3 days (range 0-26). MLIs (N=360) ranged from level 1-5; with level 2=58% (≤30 minutes) the most frequent. The distribution of MLIs for HGG, LGG and BBT was 77%, 12% and 11% respectively. Importantly, most MLIs (79%) with HGG patients involved carers. Needs assessment/psychosocial screening occurred in n=80 (80%) of newly diagnosed glioma patients within 5 days (range 0-21).

Pleasingly, 88% of HGG patients saw a social worker and psychology referrals doubled from 15% in 2006 to 31% in 2010-11.

**Conclusions:** These findings support the value of the NOCC role in PBT patient care outcomes, in particular timely, systematic psychosocial needs assessment and facilitation of relevant referrals/support for this complex patient and carer group. Such results help substantiate the case for more widespread NOCC role development and implementation.

*****Changed to Poster presentation*****

## An objective and consistent approach to neurological assessment – Development of an Adult Neurological Observation Chart and Education Package.

*Violeta Sutherland, Royal Prince Alfred and Concord Hospitals, NSW*

**Abstract:** The Agency for Clinical Innovation (ACI) is a board governed statutory body reporting directly to the New South Wales (NSW) Director General and NSW Minister for Health and Minister for Medical Research. In 2005 a multidisciplinary working group from the ACI Neurosurgery Network was established to develop a Neurological Observation Chart for the early identification of patients at risk of clinical deterioration in their level of consciousness.

The motivation behind the development of the neurological chart and education package was a desire to eliminate or greatly reduce the amount of variance in chart design and improve the clinical skills and knowledge of staff conducting neurological assessment. In preparation for developing the neurological chart the working group reviewed more than 12 different neurological observation charts and conducted a wide ranging literature review. A smaller working group was convened to develop the chart and create the comprehensive education package. At each Pilot Site facility the Neurosurgery Network Project Officer collaborated with Pilot Site Representatives (PSR) to facilitate the implementation of the Pilot Program. The efficacy of the chart is being audited and focus groups are being conducted at each of the pilot sites with favourable feedback and data reported for both the Neurological Observation Chart and Education Package. The next stage will be to work with NSW Health Forms Committee in the implementation of the chart and education package across NSW.

**Objectives:**

- To showcase an evidence based neurological assessment tool and education package.
- To outline the processes taken throughout the project.
- To share and reflect on the results of the project and to contribute to the neuroscience nursing body of knowledge.

## There's hardware in my Software - neurovista tge seizure advisory system for the management of medically intractable epilepsy.

*Naveeni Natkunarajah, Austin Health, Victoria*

**Abstract:** Refractory epilepsy can have a huge impact on a person's life. The World Health Organization (WHO) state "The social consequences of epilepsy are often more difficult to overcome than the seizures themselves." Although there is no cure for the condition, prescription medication, surgical intervention and medical devises can control and manage seizures in 80% of the population diagnosed with epilepsy. This presentation will describe a new technology that uses an invasive implantable seizure advisory system, embracing a potential for predicting and providing a warning of seizure onset in patients whose seizures are of a rapid onset. Neuro vista is a clinical stage medical devices company for management and treatment of intractable epilepsy. Neuro-Vista received approval in February 2011 for an Australian Clinical Study which is being conducted at three major hospitals in Melbourne Australia, Austin Health being one of these hospitals.

The Study aims to evaluate the safety and efficacy of the Neuro Vista Seizure Advisory System in patients diagnosed with medically refractory epilepsy. The system uses subdural electrodes that are inserted via craniotomy and placed over the lobe of the brain that has proven seizure activity on previous iEEG. The electrodes then connect to the Implantable Telemetry Unit (ITU) in order for data to be processed to the personal advisory device (PAD) much like a pager. The idea is that the PAD sounds at the sign of an ictal event then giving the patient the opportunity to stop what they are doing, make themselves safe to then have their seizure event, and ideally get back to their previous activity following their normal post-ictal state. The study has seen 12 patients implanted with inconclusive results to date, 3 of whom are part of the Austin Health, Complex Epilepsy Program (CEP).

**Objectives:**

- To describe a new technology in seizure advisory devices.

**Normal Pressure Hydrocephalus – Where Neurology Meets Neurosurgery.**

*David Tsui, Westmead Hospital, NSW*

**Abstract:** Normal pressure hydrocephalus (NPH) was first described in 1965 by Dr. Salomón Hakim Dow and Dr. Raymond Adams. It is thought to be a form of communicating hydrocephalus caused by reabsorption difficulties resulting in abnormal levels of cerebral spinal fluid (CSF). However the CSF pressure is not grossly elevated on routine lumbar puncture hence earning the name 'Normal Pressure Hydrocephalus'. The condition exhibits a triad of symptoms including gait disturbance, urinary incontinence and cognitive impairment. Despite the condition being described over 40 years ago, it is commonly misdiagnosed as Parkinson's Disease, Alzheimer's Disease or dementia because the symptoms manifest like these other diseases. Unfortunately, these symptoms are found commonly in many elderly people over 60-70 years of age so the condition is also believed to be under-diagnosed.

NPH is usually identified by a neurologist and referred to a neurosurgeon for the consideration of a shunt insertion. This is a condition where neurology and neurosurgery work in collaboration to manage this debilitating but treatable condition. The aim of this presentation is to publicize NPH to neuroscience nurses and enhance their understanding and knowledge of normal pressure hydrocephalus. The presentation will describe the pathophysiology of NPH, outline some of the 'red flags' that medical staff use to identify this condition and it will also describe and explain some of the symptomatology in detail. The presentation will conclude by identifying the role of neuroscience nurses in the context of this condition.

**Objectives:**

- Enhance the knowledge and understanding of Normal Pressure Hydrocephalus within neuroscience nurses.
- Increase awareness of NPH as it is a debilitating but curable condition. Improved awareness will enhance early detection and intervention.

**Myasthenia Gravis - Part two: the lived experience.**

*Trudy Keer Keer, Christchurch Hospital, NZ*

**Abstract:** This presentation outlines a qualitative study undertaken for the author's thesis. The aim was to explore and develop an understanding of the lived experience in people with myasthenia gravis.

Myasthenia gravis is a rare disease of the neuromuscular junction. Symptoms include fatigue and fluctuating muscle weakness. Without recognition and treatment myasthenia gravis can be life threatening.

Seven people were recruited and interviewed for this phenomenological study. Their transcripts provided rich data that produced clear themes during analysis. Living with the unknown, living with symptoms and living with change are the core concepts that will be presented.

The results of this unique study provide a deep insight into the lived experience of myasthenia gravis and are significant for neurosciences nurses caring for patients in hospital and community settings.

**Objectives:**

- Raise awareness and understanding of myasthenia gravis
- Highlight the considerations for neuroscience nurses in clinical practice
- Disseminate results of research that contributes to an existing body of knowledge
- Encourage and promote scholarly enquiry in this specialised field of nursing.

## "Shunts" Not so black and white.

*Leigh Arrowsmith, and Chris Tolar, Westmead Hospital, NSW.*

**Abstract:** Hydrocephalus is a condition where there is an excessive build up of Cerebral Spinal Fluid (CSF) within the ventricles of the brain. CSF normally flows from the upper ventricles to the lower ventricles where there are openings which allow the CSF to circulate around the brain, where it is absorbed. Hydrocephalus can be either communicating or non-communicating. Communicating hydrocephalus occurs when the flow of CSF is blocked after it exits the ventricles. Non-communicating hydro-cephalus occurs when the flow of CSF is blocked along one or more of the narrow passages connecting the ventricles by blood, a tumor or other mass. VP shunts are devices which are inserted surgically. They allow the excess CSF to be channeled into the abdomen where the fluid can be absorbed back into the blood. Shunts generally function well, however complications can occur. Blockage or obstruction are the most common faults within the system, however infection and over drainage can also oc-cur. These complications require immediate revision where the shunt can be reprogrammed or replaced.

This presentation will focus on the moral and ethical dilemmas involved in the case study of a 32 year old female (Mrs B) who presented to hospital with a suspected blocked shunt. Mrs B's history revealed that she was born with Hydro-cephalus and was treated with the insertion of a ventricular pleural (VP) Shunt. Mrs B had been a healthy and active woman, with no previous history of Shunt malfunction, she was married and was the mother and carer of two young children. Shortly after admission Mrs B was taken to theatre for a shunt revision. Post-operatively Mrs B had severely raised intracranial pressure (ICP) that lead to an ischemic brain injury with tentorial herniation. She was taken back to theatre and had the shunt removed and an external ventricular drain (EVD) inserted. After being in hospital for two months both in the High dependency and intensive care units, with no neurological improvement it was decided by the family and medical staff to keep Mrs B comfortable and supported until the time came for organ donation. The discussion will also examine the treatment decisions and the impact this had on her family and the staff working with Mrs B.

## There is no such thing as a mini stroke.

*Myra Drummond, South Western Sydney Local Health Network. NSW.*

**Abstract:** A Transient Ischemic Attack is often referred to in both medical and wider community setting as a mini stroke. A transient ischemic attack (TIA) is when a person has stroke like symptoms lasting less than 45 minutes . A TIA is often considered a warning sign that a stroke may happen in the future if something is not done to prevent it. A TIA is caused by a temporary disturbance of blood supply to an area of the brain. resulting in a sudden, brief decrease in brain function resulting in temporary neurologic deficit. A TIA is different from a stroke in that unlike a stroke, a TIA does not cause brain tissue to infarct and die. The symptoms of TIAs do not last as long as the symptoms of a stroke and TIAs also do not show changes to the brain tissue on CT or MRI scans. What TIA's do not reflect is the lurking danger behind the short term symptoms.

New studies are now posing the questions - is there a gene that predisposes us to TIA and Stroke? Should we be examining our hospital re-admission rates more closely? If a person has had a TIA can a stroke be prevented Should we be relying on the so called wonder tool ABCD2 score to determine admission priority after a TIA and why we should be teaching our patients and staff that there really is "no such thing as a mini stroke?"

**Objectives:**

- To highlight the importance of TIA diagnosis, management and review

**Brain Tumour survivorship: A Personal Perspective.**

*Heidi Good. Website developer. NSW.*

**Abstract:** In 2006, Heidi was diagnosed with a golf-ball sized brain tumour. The then 29 year old was initially advised she likely had a grade 2 Astrocytoma. An astrocytoma is a tumour that typically arises from star-shaped brain cells called astrocytes. Although it rarely spreads outside the brain, the cancer can grow rapidly within, and with this growth comes the threat of impeding general brain function.

With a 17 month old toddler and 2 week old baby, Heidi and her husband embarked on the journey that was surgery and the resulting diagnosis of a non-enhancing Grade 3 Anaplastic Astrocytoma.

After being advised of the worst and going through both chemotherapy and radiotherapy, Heidi now considers herself extremely lucky. 34 years old, no recurrence and now the mother of 3 children, Heidi talks about what it was like from the perspective of a patient, and how much the attitudes of others, both personally and professionally made to the times that followed.

**Disc Arthroplasty: An Overview.**

*Hayley Howard and Claire Aldis, Calvary health Care, Tasmania.*

**Abstract:** Degenerative disc disease affects a considerable number of people in society. Over the years surgeons have treated this condition with a variety of non-surgical and surgical methods. Traditionally the most common surgical procedure has been to fuse the spine. However another surgical approach, disc arthroplasty has also been used for a number of years with a high success rate, in those patients that fit the recommended criteria.

Disc Arthroplasy is a surgical procedure in which surgeons replace diseased spinal column discs with artificial devices in the lumbar and cervical spine. Disc Arthroplasty removes the diseased disc, restores disc height, reduces pain and damage to nearby discs and joints and preserves motion in the spine.

There are two main types of artificial discs used within Australia, the Charite` and ProDisc. The primary focus in this paper will be to discuss ProDisc Arthrolplasty. Our aim is to give a general overview of the history of disc arthroplasty, indications and contraindications of use, benefits of disc arthroplasty versus spinal fusion, post-operative complications, surgical approach, care and education of the patient receiving an artificial disc implantation pre and post procedure and a brief overview of a case study

**Objectives:**

- Our aim is to educate others nurses on the surgical procedure of disc arthroplasty.

## How the Minimally Invasive Spinal Surgery technique has revolutionised post operative nursing care.

*Michelle Marrington, Mater Private Hospital, Queensland.*

**Abstract:** There are many differences between the minimally invasive spinal surgery technique and the traditional open surgical approach. These differences have revolutionised the way nurses care for the spinal surgical patient.

Minimally invasive spinal surgery is a technique that has been used successfully around the world since the year 2000, but has only been seen in Australia in the last 3 years. There are only a select few specialist that can offer this revolutionary surgical approach.

The introduction of the minimally invasive technique has lead to dramatic changes in the nursing care of the spinal patient. Patients have the ability to be more independent from the moment they return to the ward and therefore the workload on the nursing staff is significantly reduced.

Minimally invasive spinal surgery has multiple benefits for both the patient and the organisation including significantly decreased length of surgical procedure time, decreased length of stay in hospital, decreased post operative pain, increased activity post surgery and faster return to normal activities of daily living.

This technique allows patients to go home on the same day of surgery for microdiscectomies and day one or two for laminectomies.

It is important that nursing staff have a sound understanding of the surgical procedure in order to care for and educate these patients from admission to discharge.

**Objectives:**

- To define the minimally invasive surgical technique
- To compare the differences between the minimally invasive technique and the traditional open technique
- To describe the pre and post operative nursing care of the minimally invasive spinal technique
- To review the benefits to patient and organisation following minimally invasive technique

## The use of cytotoxics in patients with neurological symptoms.

*Robert Parker and Paul Bolton, Mater Private Hospital, Queensland.*

**Abstract:** The use of cytotoxic medications are being used to treat some neurological conditions, eg MS. Recently on our ward we had a patient present with a Gnathostomiasis infestation. This presented with the symptomology of MS, but with Mabthera treatment showed great improvement.
It is our aim to explore the reasons behind the varying effectiveness of cytotoxic therapy in patients presenting with Neurological conditions, the diagnosis and treatment of our patient and the nursing roles and implications when caring for the neurological patient being treated with cytotoxic and immunomodifying therapy.

Some of the nursing implications include, not knowing how or why this treatment works. Even though most of the nurses on the ward have done the theory component of cytotoxic competency we do not have enough opportunities to complete the practical component. So what does this mean for the staff? What difference does it make to the care of and time management of the patient? What does it mean for the patient? How are the final outcomes different?

**Objectives:**

- What does this mean for the staff?
- What difference does it make to the care of and time management of the patient?
- What does it mean for the patient?
- How are the final outcomes different?

## 3D's of Workplace Culture: Bureaucratic Dominance, Medical Dominance & Nursing Disempowerment - Research insights that may resonate with neuroscience nurses.

*Dr Helen Pannowitz, Tracks Health Education and Management Services, Perth, WA.*

**Abstract:** The state of Australasian neuroscience nursing as a practice specialty is neither black nor white. Instead, it is fundamentally 'muddy'. This represents the author's view of the current and probable future status of neuroscience nursing. Undeniably, there are good advances occurring but in the main the future of neuroscience nursing as a robust nursing specialty, that is not 'other' dominated, is not clear.

The author's principal suggestion is that neuroscience nursing requires an approach that dramatically re-charts its current 'business as usual' incremental change process into a commitment to 'put all at risk' to achieve the seemingly 'impossible goal' of being the health profession's elite and a career of choice for aspiring, outstanding and successful people. The typical 'creep in/creep up' change process applied by nurses has resulted in predictable outcomes in the past and will, if continued, result in a future where neuroscience nursing is fully subsumed into other areas of nursing, or, more alarmingly, by other non-nursing skilled people.

The current perception of the 'muddiness' of neuroscience nursing's professional future and the power tensions that hospital practicing nurses experience can be viewed as a watershed opportunity for beneficial change in this area. Neuroscience nurses need to be 'breakthrough' thinkers where they embrace 'future state' change management approaches. Such approaches break the shackles of current constraints and behaviour to create strategies that achieve outcomes beyond the group's wildest aspirations.

The author draws upon her forty years experience as a neuroscience nurse and her management consultancy experience to underpin this passion for an outstanding future for the neuroscience nursing profession particularly and nursing in general. She reflects upon this experience and also incorporates key findings from her doctoral research project both of which reveal insights and understandings that have potential implications for Australasian neuroscience nurses. Her research revealed the following 3 D's of workplace culture gleaned from interview and observation of the research nurse participants: that nursing is dominated by bureaucratic managerialism, dominated by medical sovereignty and the current working environment is disempowering to nursing.

## From Black and White to full colour.

*Jennifer Blundell, University of Sydney, NSW.*

**Abstract:** The advent of computerised tomography in the late 1960s signaled major changes in investigation of the central nervous system. Prior to this patients had to undergo invasive, uncomfortable and often frightening procedures. These often resulted in unpleasant side effects and required careful nursing care following the procedure. This paper will discuss the development of neurological radiology over the last fifty years and the effect this has had on the patient experience and nursing care.

**Objectives:**
To illustrate the effect of technological advances in investigation of the central nervous system.
To discuss the result of technological advances in:

- improving the neuroscience patient experience
- reducing the time to diagnosis
- changing neuroscience nursing care.

# 2011 Conference Poster Abstracts

## Cerebral Cavernous Malformations and Epilepsy.

*Melissa Bartley & Catherine Hardman, Epilepsy Unit, Westmead Hospital, NSW.*

**Abstract:** Cerebral Cavernous Malformations (CCMs) are a type of vascular malformation of the brain. Estimated incidence ranges from 100-500 per 100 000 in the general population. Approximately 40-70% of CCMs are associated with seizure activity. Research into biology and genetics of CCM formation has identified a number of potential treatment pathways. Development of imaging technologies over the past 30 years has enabled more frequent diagnosis of these lesions, particularly using T2-weighted MRI. Haemorrhage and leakage of blood from the CCM causes deposits of haemosiderin around the CCM. These haemosiderin deposits create neuronal excitability, resulting in seizures. Management of CCM-related epilepsy includes both medical and surgical considerations.

**Objectives:**

- Incidence of CCMs & seizures
- CCM pathophysiology & seizures
- Diagnostics for CCMs, including MRI, PET + ictal SPECT
- Management of CCM-related epilepsy (medical, surgical)
- Expected outcomes for the person with CCM-related epilepsy

## Coordinating Neuro-Oncology Care a Primary Health Care Framework.

*Linda Nichols, Registered Nurse, Lecturer University of Tasmania.*

**Abstract:** In Australia there are more than 1400 primary brain tumours (PBT) diagnosed each year. Despite being one of the less common forms of cancer, PBT are one of the most aggressive and devastating cancers. PBT's pose a unique concern for health professionals, as they generally present with a rapid and poor prognosis associated with the development of functional and cognitive deficiencies which creates a profound psychosocial impact. Considering the majority of patients diagnosed with a high-grade brain tumour succumb within 14 months of diagnosis, the most important outcome of patient care is to insure that care is comprehensive and individually focused.

Nurses play a vital role in the outcome of patient care, providing constancy and continuity as patients and families attempt to negotiate their way through the multifaceted and complex treatment regimes. The management of PBT patients by specialist neuro-oncological nurses and cancer care coordinators has resulted in an increased focus on cancer care reform. Despite the aim of reforms to provide seamless patient journeys, there needs to be an increased emphasis on primary health care (PHC) as a strategy for achieving co-ordination of care.

This presentation reviews the incidence of PBTs in a regional centre in Australia and examines an innovative PHC framework that can be applied to the nursing care of people with PBTs. Improved nursing management of patients diagnosed with a PBT is explored through the five interconnecting principles of PHC (appropriate technology; multidisciplinary collaboration; accessibility; increased emphasis on health promotion; and public participation). Practical, scientifically sound and socially acceptable neuro-oncological nursing activities and roles are discussed during the presentation, drawing on National/International literature and models of care.

**Objectives:**

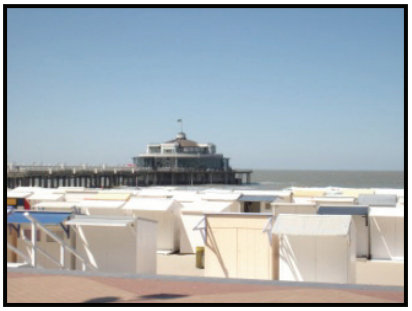
- Demonstrate how improved nursing management of PBT patients can be achieved through the five interconnecting principles of PHC.

# Conference Reports

## EUROPEAN ASSOCIATION OF NEUROSCIENCE NURSES CONGRESS May 4-7 2011

**Blankenberge, Belgium.**

***Submitted By Nicki Pereira***



The 9th Quadrennial EANN Congress took place in the seaside village of Blankenberge, Belgium. There were over 680 delegates, including 7 from Australia.The Royal North Shore Hospital (RNSH) delegates (Barr, Pereira, Kleiner and Evans) gave two oral and one poster presentation. Michelle Kleiner, Senior Clinical Dietitian was one of only two Allied Health professionals in attendance. Three RNSH delegates received funding to attend from the Agency for Clinical Innovation Neurosurgical Nursing and Allied Health Scholarship Fund.

The Belgian Association were well organised, wonderful hosts. They gave an excellent opening reception at The Pier (*above*) where we were able to sample Belgian produce.

Princess Astrid, Princess of Belgium (*left*) formally opened the Congress at the Floreal Congress Centre. Royal protocol came into play and a few were able to meet with HRH during the break.

**Above:** *HRH Princess Astrid*


This was followed by a brilliant Opening Plenary session by Chocolatier Dominique Persoone (*left*) and Neurologist Professor Paul Boon in which they asked "What does Belgian chocolate do to your brain?" Belgium's "best chocolatier" demonstrated the total experience of his art by stimulating our senses – visual, auditory, olfactory and finally gustatory, as Prof Paul Boon explained the brain's response using MRI imaging … whilst we did the tasting!

Dominique explained a dessert he had made for the Rolling Stones. He demonstrated it on stage - a contraption he invented to facilitate the inhaling of powdered stimulants up both nostrils. Thankfully chocolate, was Belgium and Dominique's drug of choice. In this case, his "chocolate shooter" catapults a finely ground dust of pure Dominican Republic cocoa cut with ginger and mint nose-ward to fill the brain with an explosion of phantom flavours.


**Above:** *Australian delegates: - Nicki Pereira, Brianna Beattie, Michelle Kleiner, Sharryn Byers, Jeanne Barr & Vicki Evans.*

There were 61 concurrent sessions as well as workshops and poster displays giving the delegate a wide choice of educational opportunities. It was amazing to see how well people presented when English was not their mother tongue. We met "foyer friends"- a term coined to represent those you encounter in the foyers of conferences. The take- home message is we are all striving in our own ways to achieve the same goals: to increase the profile of Neuroscience Nursing, to improve the education and lifelong learning of our members, to support each other, and most importantly to do the very best for our patients and their families by keeping abreast of latest techniques and innovations, and sharing ideas with our like-minded colleagues from overseas.



## Researchers Evaluate Red Wine Compound for Treating Concussions in Pro Boxers

*ScienceDaily (May 27, 2011)* UT Southwestern Medical Center researchers are engaging the help of professional boxers and trainers to study whether a component in red wine and grapes could help reduce the short and long-term effects of concussion.

Researchers plan to recruit professional boxers to take the neuroprotective compound resveratrol after a fight to see if it reduces damage to the brain after impact and helps restore subtle brain functions and connections via its antioxidant effects. If successful, researchers hope the results may be applicable not only to concussions in other sports, but also to everyday incidents such as falls, car accidents and other head injuries.

**What is Resveratrol?**

*Resveratrol* is a polyphenolic compound with anti-oxidant properties produced in plants (eg: grapes, blueberries, peanuts). They are naturally produced in these plants when under attack from pathogens (eg: fungus, bacteria) as a form of self -preservation. The pathogens that prompt their production also attack humans and because Resveratrol is not produced by the human body, their ingestion as a food supplement has been shown to be of benefit. So far, animal studies have not been purported in human studies. However, mice have shown to live longer when given Resveratrol. It is already being studied as an agent to lower blood sugar levels, for use against cancer, to protect cardiovascular health, and in stroke and Alzheimer's disease treatments. Researchers now think that Resveratrol holds a neuroprotective agent that could be of benefit for patients with concussion.

"We know from animal studies that if we give the drug immediately after or soon after a brain injury, it can dramatically and significantly reduce the damage you see long term," said Dr. Joshua Gatson, assistant professor of surgery in Burn/ Trauma/Critical Care and principal investigator for the study, University of Texas, Southwestern Medical Center. "There haven't been any completed human studies yet, so this (REPAIR trial) is really the first look at Resveratrol's effect on traumatic brain injury."

Currently, there is no drug therapy to protect the brain from consecutive concussions. As boxers can have several fights in a short period of time, the researchers decided to target pro boxers in the REPAIR trial. In this study, researchers are administering an oral dose of resveratrol once a day for seven days, within two hours of the match. Researchers will then use neuro-cognitive tests and MRI protocols to track subtle brain activity, inflammation, and restoration of cells and connections. The main goal of the study is to show that there is a decrease the cumulative effects of concussion.

The results of this study should prove well worthwhile.

Cheers, Vicki

# WFNN Update

**Vicki Evans, *WFNN Vice President.***

The WFNN Board Meeting was held in Blankenberge, Belgium (May 2011), where the Japanese Association, lead by JANN's President Mitsue Ishiyama, gave an excellent presentation covering all areas, including concerns following the devastating earthquake, tsunami and radiation issues, of earlier this year.

There were 22 Board members present whom unanimously voted that the 2013 Congress scheduled for Japan, should definitely go ahead. The Japanese are ready, willing and able to host this meeting. The venue will be the Nagaragawa Convention Centre, Gifu, Japan (September 13-17, 2013). This will coincide with JANN's 40th Anniversary meeting, a great reason to celebrate!

Their Congress website can be accessed directly at www.wfnn2013.jp or via the new WFNN website www.wfnn.org

It was also voted that work begin on introducing NeuroBlend™ to the wider global community. Originally under the umbrella of EANN, piloted in Europe and completed in 2008, it will now be partnered with WFNN to become a truly worldwide educational e-learning module. Over time, it is proposed that ANNA will become more involved in NeuroBlend™'s introduction in the South Pacific. More information can be found at the ANNA website www.anna.asn.au

*The World Federation of*
WFNN | Neuroscience Nurses

## Agnes Marshall Research Grant Award (AMRGA)

The Agnes Marshall Research Grant Award is named in honor of Agnes Marshall, founder of the World Federation of Neuroscience Nurses (WFNN).

The purpose of this award is to foster neuroscience nursing research and advance the scientific base of neuroscience nursing. The WFNN offers you the opportunity to submit an application for the Agnes Marshall Research Grant Award.

***Criteria:***

- The principle investigator must be a registered nurse and current member of the WFNN.
- Members of the WFNN Scientific Committee may not apply for, or benefit from, funding.
- The research project must be pertinent to neuroscience nursing.
- The application must be submitted prior to initiation of data collection.
- The principle investigator must sign an agreement with the WFNN.
- The principle investigator must assume responsibility for the conduct of the research.

***Amount of Research Grant:***

Total maximum amount of award: US$4,000.

***Procedure:***

- Application forms and instructions are available from the WFNN website: www.wfnn.org
- Applications are to be submitted to the Chair, WFNN Scientific Committee
- Applications are to be received no later than **February 13, 2013.**
- Award will be presented at the WFNN Congress - Gifu, Japan 2013.
- Completed research is to be presented at the WFNN Congress in 2017.

For further information, contact your WFNN representative through your WFNN Membership Association, or send an email to:

Vicki Evans, WFNN Scientific Committee Chair at vevans@nsccahs.health.nsw.gov.au

# Calendar of Events

2011
ANNA ANNUAL SCIENTIFIC MEETING
"Black & White", Or Is it? –
Neuroscience Nursing Practice.

Hyatt Regency. Perth, WA.
5 – 7 October, 2011

www.anna.asn.au

## 2011:

- **October 27 - 28, The 8th Annual Krembil Neuroscience Symposium.** The Old Mill Inn & Spa, Toronto, Canada. www.krembil.com or Rosalie.Magtoto@uhn.on.ca
- **November 3-5, Barrow Neurological Institute Brain Tumour Symposium.** Royal Palms Resort. Scottsdale, Arizona. USA. www.aann.org
- **November 18 - 20, British Association of Neuroscience Nurses Conference.** Sheffield, UK. www.bann.org.uk
- **November 23 - 25, Nurse Educators.** Hamilton, New Zealand. www.nursed.ac.nz

## 2012:

- **April 28 – May 1, American Association of Neuroscience Nurses Conference.** Washington State Convention & Trade Centre. Grand Hyatt. Seattle, WA. USA
  www.aann.org

## 2013:

- **American Association of Neuroscience Nurses Conference**
  Saturday, March 9 – Tuesday, March 12
  Charlotte Convention Centre
  Westin Charlotte
  Charlotte, NC.
  USA

  www.aann.org

- **World Federation of Neuroscience Nurses Congress**
  September 13 - 17. www.wfnn.org
  Nagaragawa Convention Centre.
  Gifu, Japan.

  www.wfnn2013.jp


## Introducing ... the 'new' WFNN website ~ www.wfnn.org

## 2015:

**European Association of Neuroscience Nurses Congress**

Belgrade, Serbia.

Dates: TBC

# Instructions for Authors

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