

## A Neurological Integrated Care Pathway

Kathleen McCoy, Harriet Chan

### Abstract

**Objective:** To assess the feasibility of service integration for neurological care.

**Design:** Observation study

**Participants:** A total of 104 admissions for 92 neurological patients treated in a major region hospital and suitable for discharge home were eligible for participation.

**Intervention:** A neurological integrated care pathway (NICP) was trialed at a major regional hospital between July 2012 and June 2013. Objective data included patients, gender, age, diagnosis, length of hospital stay, referral dates, discharge dates, dates when patients were seen by the community neurological liaison nurse, and readmissions were collated for analyses.

**Outcome measures:** Targeted outcomes included the estimated service impact on the hospital in terms of reduced length of hospital stay and decreased readmissions and increased referral rate to community neurological support service, and quality of patient care.

**Results:** The trial saw an increase in efficiency and standard of care despite growth in patient numbers. The CNLN attended to 104 recorded referrals (more than 17 times the number of referrals in 2011), all within 7 days of their referral date (a 77.4% decrease compared to 2011 where patients were attended to up to 31 days). In addition, the average length of hospital stay had decreased significantly from 26 days in 2011 to 9 days (a 65.4% decrease) with a low rate of re-admission (approximately 11.5%).

**Conclusion:** The NICP improved service efficiency for both the hospital system and the community neurological support service, with high levels of patient satisfaction. In this case the NICP achieved best value from existing resources and provided a viable model of service delivery for chronic neurological conditions.

**Key words:** *integrated care pathway, community neurological support.*

### Introduction

About 9 years ago the World Health Organisation [WHO] pronounced that “neurological disorders will be one of the greatest threats to public health” (World Health Organization, 2006). Neurological conditions including mental disorders are diseases of the brain, spinal cord, peripheral nerves, and neuromuscular tissues (World Health Organization, 2014). There are more than 600 known neurological conditions (National Institute of Neurological Disorders & Stroke, 2014) of traumatic, primary or acquired nature, and their presentations may range from episodic, progressive or relapsing states. Neurological diseases affect all ages but are more common in people older than 45 years (MacDonald, Cockkerall, Saner & Shorvon, 2000). It is a fact that most neurological conditions pose a degree of disabling impairments, functional limitations and

chronic suffering on the individuals thus increased utility of hospital, health and care services. That is, a person living with a neurological condition often has numerous complex needs which tend to escalate over time and require continuous or periodic input from a wide range of health and support services (Freeman & Thompson, 2000; Boter, Rinkel, de Haan & HESTIA Study Group, 2004).

Though neurological care in Australia accounts for the second largest health expenditure (National Health Priority Action Council, 2006) service gaps exist. This is due to the increasing prevalence of neurological conditions and accumulation of needs and demand of the neurological community by large. In Western Australia (WA) a Neurocare program was developed in late 1990s as a measure to improve access to neurological support by people living within rural regions. The Neurocare program is led by community neurological nurses (CNNs) and funded by the Home and Community Care (HACC) Western Australia Department of Health. The CNN practice is supported by a postgraduate communi-

Questions or comments about this article should be directed to Kathleen McCoy, Executive Director, Neurological Council of Western Australia.  
ed@ncwa.com.au

Copyright©2015 ANNA

Diagnosis	Gender	Age (yr)	No.	LOS (days)	Readmission within 28 days of separation	Days taken to be seen by CNN
Parkinson's disease	M	61	1	28	0	35
Left stroke	F	64	1	32	0	30
Right stroke	M	53	1	21	0	31
Left stroke	M	67	1	24	0	29
Parkinson's disease	M	70	1	42	0	30
Herpes simplex right eye	F	68	1	14	0	32
<b>Mean</b>		<b>63</b>	<b>6</b>	<b>26</b>	<b>0</b>	<b>31</b>

**Table 1** (Above): Patient Profile of Referrals to the Neurocare Program in 2011

ty neurological nursing qualification, which emphasizes person-centre wellness principles from the International Classification of Functioning, Disability and Health framework (World Health Organisation, 2002). These CNNs have wide ranging local service knowledge and navigating skills that drive the best health outcomes for people living with a wide spectrum of neurological conditions. They guide, support and connect individuals to primary care, specialists, health care as well as many support and social services. They also provide education to the wider community and other health professionals and caregivers. More importantly this specialised nurse support service plays a vital role in managing health in all stages of a neurological disease, thus it has the potential to free up scarce health resources. The Neurocare program is gaining international standing and recognition; and evidence is mounting that many organizations are beginning to align their disease-specific service with this model of generic nurse-led neurological service. Similar programs of generic community neurology service have been cited in the literature (Jack, Kirton, O'Brien & Roe, 2009).

#### Nature and Significance of the Problem

In discussions with a WA Health Services senior executive (August, 2011), it was found that neurological patients account for at least one third (39%) of daily hospital bed usage. It was also noted there was an upward demand trend for neurological care which will continue to increase as the population grows and ages. In fact, in 2012 there were 31,804 hospital admissions due to primary nervous system diseases, and these admissions accounted for a total of 340,627 hospital bed-days (Government of WA, 2015).

Furthermore, current resources for neurological services in WA appear to be disproportion-

ately distributed. This has created an inequitable access issue between the metropolitan service hub and services within the rural regions. For example, only one neurologist visit occurs in the mid-west region on a quarterly basis and recently in the great southern region; and occasional telehealth consultations on demand from south-west region. It is common knowledge that this system-wide service access issue will continue to be a challenge over the next decade.

The Neurocare program is the preferred community generic neurological support service provider within major rural regions of Western Australia (Neurological Council of WA, 2015). The provision of evidence based neurological support has up till now been limited to non-hospital involvement, precluding the community neurological nurses from participating in the vital discharge planning and community care coordination for in-hospital patients with neurological conditions. A retrospective review of the south-west region Neurocare service revealed that only 6 referrals from the local regional hospital were received in 2011 (Table 1). Of the 6 patients referred, 4 were males aged between 53 and 70 years, and 2 were females aged 64 and 68 years; 2 males and 1 female had a stroke, 2 males had Parkinson's disease and 1 female had herpes simplex infected right eye; and the average length of hospital stays was 28 days (14 and 42 days). All 6 patients had their referrals initiated on the day of separation from the hospital to home; the average time taken by the community neurological nurse to make contact with these patients was 31 days; and there was no record of any re-hospitalisation within the first month of discharge home. From this review the Neurological Council of WA identified a gap as a key priority for improvement; this gap was the root cause for low referral rate and access delay to community specialised neuro-

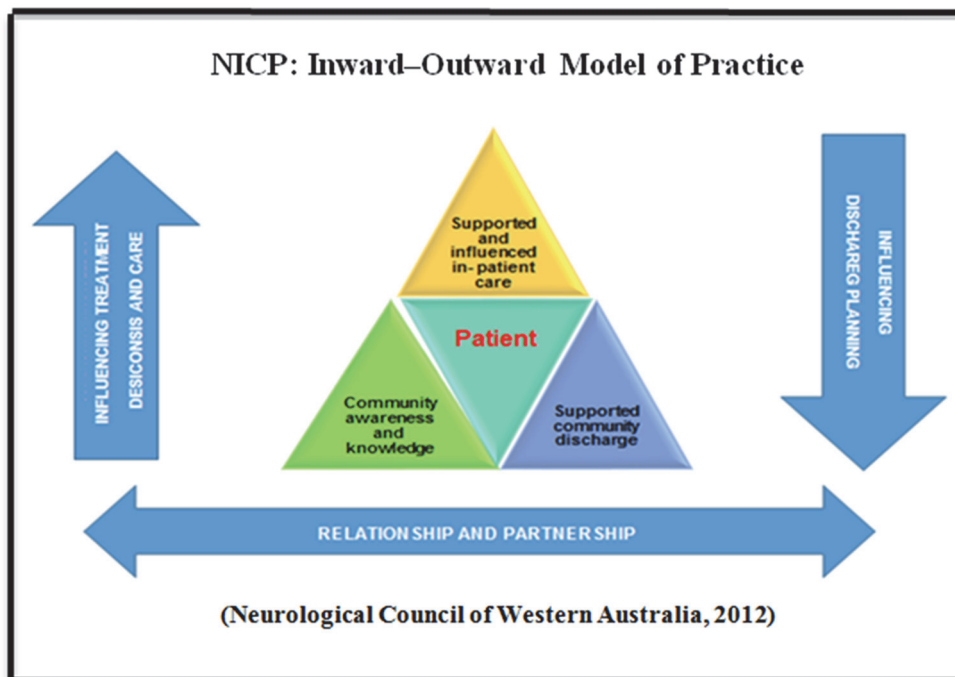


Figure 1 (Above): NICP: Inward–Outward Model of Practice

logical support, increased length of hospital stay and a stymied patient flow system. This gap was deemed to have significant impact on both the hospital system and the community support service delivery, and considered remediable through better utilisation of existing resources.

### Setting and Project Design

Both the local regional hospital and the Neurological Council of WA's Neurocare program served to provide hospital care and community neurological support, respectively in the south-west region of WA. In 2011 a unique opportunity arose for service re-design. The local regional hospital and the Neurological Council of WA had been successful in obtaining a grant from the WA Health's Clinical Integration and Innovation Grant of the Quality Incentive Program (QUIP) for a co-design project.

This project involved a new approach to service delivery, a neurological integrated care pathway (NICP), which is based on an inward-outward model of practice (Figure 1). This model integrated acute care and community support services so to create an 'express access to community neurological support' that would improve the discharge process. Operational procedures and documents were developed to formalise this practice change, all framed in the context of what was best for patient care.

A community neurological liaison nurse (CNLN) position was created and funded by the QUIP grant. The Neurological Council of WA developed the job specification form with selection criteria, and became the governance organization for this position. The successful applicant was a community neurological nurse in the Neurocare program who had the knowledge of locally based services and neurological nursing support expertise. The role of the CNLN had been recognized as a key success factor for the day-to-day partnering and care team processes as well as the overall project.

### Key Outcome Measures

The project's key outcomes included estimated service impact on the hospital system and the Neurocare program, and quality of patient care.

### Method

Adult neurological patients treated in the major regional hospital and suitable for discharge home were prospectively enrolled into the NICP between July 2012 and June 2013. Nurses were asked to record on each patient's NICP when a referral to the Neurocare program was initiated. The CNLN also recorded the dates on the NICP when she saw the patients. The CNLN served as the 'express referral system', this was made possible through her regular attendance and participation in the weekly multidisciplinary team meetings. The CNLN was responsible for collection

of the project data, which included patients, gender, age, diagnosis, length of hospital stay, referral dates, discharge dates, dates patients first seen by the CNLN, and readmissions. This dataset was analysed to ascertain the service impact on the hospital system and the Neurocare program, and quality of patient care including patient satisfaction ratings. Patient satisfaction was assessed by asking the patients or their carers to complete a survey form at 3 months after the initial referral date. All information was treated in a way that complied with ethical requirement of anonymity and confidentiality.

### Results and Outcomes

There were 104 admissions for 92 patients as shown in Table 2. Of the 92 patients 39 (42.4%, 33 males aged 45-65 years, 6 females aged 57-62 years) had Parkinson's disease, 23 (25%, 15 males aged 48-57 years, 8 females aged 63-69 years) had stroke syndromes, 15 (16.3%, 5 males aged 64-71 years, 10 females aged 62-72 years) had dementias, and the remaining 15 (16.3%, 6 males aged 46-62 years, 9 females aged 49-65 years) had various neurological diagnoses.

**Estimated service impact on the hospital system:** The average length of hospital stay for the cohort was 9 days and there were 12 patients readmitted during the pilot period, approximately 2 readmissions every 3 months. The average length of hospital stay had decreased significantly from 28 days in 2011 to 9 days currently (a 65.4% decrease) with a low rate of re-admission (approximately 11.5%). These results were of clinical importance in terms of efficient hospital bed use and patient flow impact.

**Estimated service impact on the Neurocare program:** The 104 referrals represented more than 17 times the number of referrals in 2011. The CNLN attended to all referrals within 7 days of their referral dates, this demonstrated a 77.4% decrease compared to 2011 where patients were attended to up to 31 days. These results showed a promising upward change in service throughput for the Neurocare program.

**Quality of patient care:** Quality of patient care referred to the deliberate engagement of patients and their family carers with education and advice relevant to actual and possible effects of their conditions including those self-management skills for living with the particular neurological condition by the CNLN, and the early linkage with the CNLN who would be

their primary neurological nurse in the community. Of the 104 referrals 99 were first seen in the hospital and only 5 were first seen one to two days after discharge home by the CNLN. The impact of this deliberate approach to care included high patient satisfaction ratings and low readmissions. Patient satisfaction ratings were obtained from the survey forms completed by 63 patients. As shown in table 3, the satisfaction ratings were extremely high. The low readmissions rate could be inferred as less morbidity and relatively good health for the cohort under the support of the Neurocare program.

### Conclusion and Discussion

Traditionally referrals to a community service agency occur by chance or are stimulated by crisis and the emergence of a particular problem (Freeman & Thompson, 2000; Boter et al., 2004). Indeed, the NICP with the inward-outward model is superior to that of the traditional referral system for it serves as a continuity thread for smooth transitioning of care between hospital and home. The inter-professional exchange between hospital and community services is in itself an invaluable resource of relationship development and service integration (Aspinal, Bernard, Spiers & Parker, 2014). This may include the transfer of understanding, knowledge, insights and skills in self-management, symptoms and lifestyle influencing factors that help in care decisions and problem solving. More importantly the patient journey home was fully supported and positively influenced through this service integration. The NICP with the inward-outward model has been proven to be a practical method of resource utilisation in health service provision, and that it can be easily reproducible and sustainable. This new model of service delivery may also offer a cost-saving opportunity in terms of reduced length of hospital stay, readmissions and hospital bed use as well as improved patient flow.

Whilst acknowledging that the project has ended in June 2013 the new practice continues to be used in its original frame. The continuing flow of referrals to the Neurocare program clearly demonstrates true consolidation of the practice change. In this case service integration has achieved the best value from existing resources and can be regarded as a viable model of service delivery for long term neurological conditions.

### Strength and limitations

The strengths of this observational study in-

cluded a large sample size in a major regional hospital, the inclusion of service impact of both hospital system and community support service and quality of patient care as outcomes. Future work needs to focus on maintaining long-term sustainability of this new model of practice. The limitations include the lack of a control group, and data collection by a person who was not blinded to the study.

### Conflicts of interest

None exist.

### Funding

This pilot study was supported by a grant obtained from the WA Health's Clinical Integration Quality Incentive Program.

### References

- Aspinal, F, Bernard, S, Spiers, G and Parker, G (2014) Outcomes assessment for people with long-term neurological conditions: a qualitative approach to developing and testing a checklist in integrated care. Southampton: NIH Research Unit
- Boter, H, Rinkel, G J, de Haan, R J and HESTIA Study Group (2004) 'Outreach nurse support after stroke: a descriptive study on patients' and carers' needs, and applied nursing interventions', *Clinical Rehabilitation*, Vol.18, No 2: 156-63
- Freeman, J A and Thompson, A J (2000) 'Community services in multiple sclerosis: still a matter of chance', *Journal of Neurology, Neurosurgery and Psychiatry*, Vol. 69, No 6: 728-32
- Government of Western Australia (2015) 'Epidemiology profile of neurological conditions in Western Australia 2015'; viewed 30 June 2015, [http://www.healthnetworks.health.wa.gov.au/docs/Epidemiology\\_Report\\_Final\\_2015.pdf](http://www.healthnetworks.health.wa.gov.au/docs/Epidemiology_Report_Final_2015.pdf)
- Jack, B, Kirton, J, O'Brien, M and Roe, B (2009) 'Evaluation of the generic neurology nurse service', Edge Hill University Faculty of Health, viewed 30 June 2015, [http://www.edgehill.ac.uk/eprc/files/2011/08/GenericNeurology\\_ExecReport.pdf](http://www.edgehill.ac.uk/eprc/files/2011/08/GenericNeurology_ExecReport.pdf)
- MacDonald BK, Cockkerall JW, Saner WAS and Shorvon SD (2000). 'The incidence and lifetime prevalence of neurological disorders in a prospective community-based study in the UK', *Brain*, Vol. 123, pp. 665-676. <http://brain.oxfordjournals.org/content/brain/123/4/665.full.pdf>
- National Health Priority Action Council (NHPAC) (2006) 'Australian Government Department of Health and Ageing National Chronic Disease Strategy', viewed 30 June 2015, [http://www.health.gov.au/internet/main/publishing.nsf/Content/66EC52273873D375CA257BF0001F3FED/\\$File/stratal3.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/66EC52273873D375CA257BF0001F3FED/$File/stratal3.pdf)
- National Institute of Neurological Disorders and Stroke (2014) 'Brain Basics: Know Your Brain'; viewed 30 June 2015, [http://www.ninds.nih.gov/disorders/brain\\_basics/know\\_your\\_brain.htm](http://www.ninds.nih.gov/disorders/brain_basics/know_your_brain.htm)
- Neurological Council of Western Australia (2015), 'Past to Present', viewed 30 June 2015, <http://www.ncwa.com.au/the-ncwa/past-to-present>
- World Health Organisation (2002) 'Towards a common language for Functioning, Disability and Health ICF', World Health Organisation, viewed 30 June 2015, <http://www.who.int/classifications/icf/training/icfbeginnersguide.pdf>
- World Health Organisation (2006) 'Neurological Disor

ders: Public Health Challenges'; viewed 30 June 2015, [http://www.who.int/mental\\_health/neurology/neurodiso/en/](http://www.who.int/mental_health/neurology/neurodiso/en/)

World Health Organisation (2014) 'Online Questions and Answers - What are neurological conditions'; viewed 30 June 2015, <http://www.who.int/features/qa/55/en/>