

# National Post Hospital Care Project and Length of Hospitalization of Patients with Stroke 2010 - 2011



## Rede Nacional de Cuidados Continuados e Tempo de Internamento dos Doentes com Acidente Vascular Cerebral 2010-2011

Catarina CANHA<sup>1</sup>, Ana MASSANO<sup>2</sup>, Hélder ESPERTO<sup>1</sup>, Joana RATO<sup>1</sup>, Teresa FERREIRA<sup>3</sup>, Argemiro GERALDO<sup>2,3</sup>  
*Acta Med Port* 2013 Nov-Dec;26(6):683-688

### ABSTRACT

**Introduction:** The National Post Hospital Care Project was created to provide a continuity of care after hospitalization or to functionally dependent people. Currently there is a great difficulty in the integration of patients. The objective of this paper is to compare the impact of the referral to the Project *versus* being discharged home, in the length of stay of stroke patients between 2010 and 2011.

**Material and Methods:** Retrospective study of patients admitted to the Neurology Infirmery A and Stroke Unit of Coimbra's University Hospital, in 2010 and 2011. The cases analyzed were 1 209, featuring demographic data, length of stay, Rankin Score (mRS) and destination after discharge. The data was analyzed comparing the two years concerning the length of stay of stroke patients referred to the Project and those discharged home, given the their Rankin Score.

**Results:** In 2011, the number patients referred to the National Post Hospital Care Project was higher, 23.5% compared to 21.4%. The length of stay for the same Rankin Score of the patients referred to National Post Hospital Care Project, remained higher than those discharged home: for a Rankin Score of 1: 11, *versus* 26 days for the Project; Rankin Score 2: 13, *versus* 29 days for the project; Rankin Score 3: 13, *versus* 23 days for the Project; Rankin Score 4: 17, to 33 days for the Project, Rankin Score 5: 27, *versus* 39 days to the Project. After comparison between the length of stay of patient discharged of and those referred to the National Post Hospital Care Project, it was estimated that the referral represented an hospitalization excess of 1 718 days in 2010 and 1 198 days in 2011.

**Conclusion:** The National Post Hospital Care Project is unable to meet the actual needs although the waiting time has reduced, possibly due to the increased number of beds and the possibility of patients waiting at home.

**Keywords:** Patient Admission; Patient Discharge; Recovery of Function; Severity of Illness Index; Stroke.

### RESUMO

**Introdução:** A Rede Nacional de Cuidados Continuados Integrados surgiu para proporcionar a continuação de cuidados após internamento ou para pessoas funcionalmente dependentes. Actualmente há uma grande dificuldade na integração dos doentes no domicílio ou em estruturas de retaguarda. Pretende-se comparar o impacto da referenciação para a Rede Nacional de Cuidados Continuados Integrados *versus* alta para domicílio, no tempo de internamento dos doentes com Acidente Vascular Cerebral, entre 2010 e 2011.

**Material e Métodos:** Estudo retrospectivo envolvendo os doentes internados na Neurologia A e Unidade de Acidente Vascular Cerebral dos Hospitais da Universidade de Coimbra, naquele anos. Analisaram-se 1 209 processos, incluídos 819, caracterizados demograficamente, tempo de internamento, *Score* de Rankin modificado e destino pós-alta. Compararam-se os dados, relativamente ao tempo de internamento dos doentes com Acidente Vascular Cerebral, referenciados para a Rede Nacional de Cuidados Continuados Integrados e os com alta para domicílio, atendendo ao *Score* de Rankin final.

**Resultados:** Em 2011, aumentaram os doentes referenciados para a Rede Nacional de Cuidados Continuados Integrados, 23,5% comparativamente 21,4%. Em 2011 o tempo de internamento, para um mesmo *Score* de Rankin, da população referenciada manteve-se superior: para um Rankin de 1: 11 dias para domicílio, 26 dias para os doentes referenciados; para um Rankin de 2: 13 dias para domicílio, 29 dias para a rede; para Rankin de 3: 13 dias para domicílio, 23 dias para referenciados; para um Rankin de 4: 17 dias para domicílio, 33 dias para Rede; e para um Rankin de 5: 27 dias para domicílio, 39 dias para Rede. Comparando com os tempos de internamento da população com alta para domicílio, estima-se que tenha representado mais 1 718 dias de internamento, em 2010 e 1 198 dias, em 2011.

**Conclusão:** A Rede Nacional de Cuidados Continuados Integrados é incapaz de responder às necessidades actuais, embora o tempo de espera tenha reduzido, devido ao aumento do número de camas e da possibilidade dos doentes aguardarem vaga no domicílio.

**Palavras-chave:** Acidente Vascular Cerebral; Admissão do Doente; Alta do Doente; Índice de Gravidade de Doença; Recuperação de Função.

### INTRODUCTION

An increase in the average life expectancy of the Portuguese population has been accompanied by a decreased birth rate, leading to an ageing population, with a higher prevalence of chronic diseases that may be associated with acute exacerbations as well as an increased risk of *de novo* acute events. This reality justifies active attempts to allow increased life expectancy to be associated to life quality maintenance, thereby avoiding

hospital overloading with patients that not need this level of healthcare, training carers, participating in rehabilitation and prevention of loss of functionality.

Having this reality in mind, the *Rede Nacional de Cuidados Continuados Integrados (RNCCI)* was created in 2006, ruled by a law-decree n° 101/2006. DR 109 *Serie I-A2006-06-06*,<sup>1</sup> where post-hospital healthcare is defined as '... a range of healthcare sequential interventions and/

1. Serviço de Medicina Interna. Centro Hospitalar e Universitário de Coimbra. Coimbra. Portugal.

2. Serviço de Neurologia. Centro Hospitalar e Universitário de Coimbra. Coimbra. Portugal.

3. Equipa de Gestão de Altas. Centro Hospitalar e Universitário de Coimbra. Coimbra. Portugal.

Recebido: 02 de Fevereiro de 2013 - Aceite: 23 de Junho de 2013 | Copyright © Ordem dos Médicos 2013

Table 1 - RNCCI network – Medical Admission Units – Characteristics of the different typologies<sup>1,2</sup>

Typology	Objective / Characteristics
Convalescence	<ul style="list-style-type: none"> <li>- To promote rehabilitation and independence of patients;</li> <li>- To contribute for acute-care hospital management of discharges;</li> <li>- To avoid unnecessary stay in acute-care units;</li> <li>- To optimize the use of medium and long-term healthcare units.</li> </ul>
Medium-term care and Rehabilitation	<ul style="list-style-type: none"> <li>- To avoid unnecessary stays in acute-care units;</li> <li>- To contribute for acute-care hospital management of discharges;</li> <li>- To reduce unnecessary stay in convalescence and long-term healthcare units;</li> <li>- To promote rehabilitation and independence of patients</li> </ul>
Long-term care and Maintenance	<ul style="list-style-type: none"> <li>- To facilitate acute-care hospital management of discharges;</li> <li>- To promote autonomy and social need satisfaction of patients</li> </ul>
Palliative care	<ul style="list-style-type: none"> <li>- Follow-up, treatment and clinical supervision of patients in a complex clinical situation, incurable and progressive.</li> </ul>

or social support, based on a joint assessment, focused on global rehabilitation as a therapeutic and social support process, active and continuous, aiming to promote patient's autonomy, improving functionality in a dependence situation, through rehabilitation, readjustment and social and family rehabilitation'. This document also defines the specific objectives of the project focused in the improvement of life conditions and welfare of patients in a dependence situation, including family or carers support towards qualification and healthcare, encouraging their participation and co-responsibility.<sup>1</sup>

The RNCCI network includes: long-stay units, patient-care units (day-unit and autonomy promotion unit), hospital (discharge management and palliative care teams) and home-care teams (long-term care and community palliative care support teams).

Long-stay units comprise four types, designed with different objectives, involving different physical characteristics and of the involved multidisciplinary team, described in Table 1.

At first, the project of setting the required infrastructures for this objective followed three stages: the first one, between 2006 and 2008, was aimed to obtain coverage of 30% of the population; the second stage, between 2009 and 2012

covered 60% and a last stage, between 2012 and 2016, was aimed to cover 100%. This plan was subsequently updated, and it is estimated that RNCCI network will be in full operation in 2013.<sup>2</sup>

The main objective of the RNCCI network was the optimization of patient's healthcare after an acute event, or upon a chronic disease acute exacerbation event and the provision of comfort to terminal patients. This optimization also meant to ensure the flow of patients from acute-care hospitals, to enable the discharge management of patients that do not take advantage of this level of healthcare to units prepared to receive them or to the patient's household, once healthcare continuity is ensured, through support teams or training of informal carers. A better rehabilitation and reintegration is promoted, preventing complications of a unnecessarily long hospital stay.<sup>3</sup>

RNCCI network presents a continuous monitoring system in order to ensure healthcare quality, providing a public consultation annual report. This report involves an assessment of the different aspects of this structure: network implementation (number of available beds/typology, numbers from the Discharge Management Teams, Local Coordination Teams and Long-term Care Teams); referral (time of assessment of proposals by local

**Table 1** - RNCCI network – Medical Admission Units – Characteristics of the different typologies<sup>1,2</sup> (continuation).

Estimated time of stay	Healthcare
Up to 30 consecutive days per each hospital admission;	Permanent medical and nursing care; Diagnostic tests; Drug prescription and administration; Physiotherapy and psychosocial support; Hygiene, comfort and nutrition; Leisure and socialization.
Above 30 and below 90 consecutive days per each hospital admission;	Permanent medical and nursing care; Diagnostic tests; Drug prescription and administration; Psychosocial support; Hygiene, comfort and nutrition; Leisure and socialization.
Above 90 consecutive days;	Stimulation and maintenance activities; Daily nursing care and medical care; Drug prescription and administration; Psychosocial support and regular physical therapy; Physiotherapy and occupational therapy; Cultural entertainment; Hygiene, comfort and nutrition; Support in ADL.
	Permanent medical and nursing care; Diagnostic tests; Drug prescription and administration; Physiotherapy; Follow-up and psico-social and spiritual support; Hygiene, comfort and nutrition; Leisure and socialization.

coordination teams, time of identification of a vacancy by regional coordination team); characterization of referred patients (admission vs. exclusion criteria; patient waiting for a vacancy, cause of referral, demographic data); healthcare activity results (functional dependence at the time of hospital admission vs. time of discharge, pressure ulcers, falls, pain assessment, mortality) and training (family or carers and professional training).

The 2011 report shows that the number of contracted hospital beds in operation on 31st December 2011 increased 21% vs. 2010, representing 970 new places for admission, as the total number of patients referred to the network during 2011 was 30,103, with a 40.1% increase compared with the cumulative number of referred patients since the beginning of the RNCCI network, which comprised 105,257 referrals. Among patient referral proposals sent to the RNCCI network, 'ADL (Activities of Daily Living) dependence' was the main reason for referral - 90% (same as in 2010), followed by 'Patient/Carer training' - 61% (85% in 2010).<sup>4,5</sup>

Functionality and quality of the RNCCI network are assessed and monitored through annual reports, and as its implementation is almost completed; it is important to assess the response capacity to one of its major objectives: to

ensure patient's flow from acute-care hospitals, preventing long stays and their related complications. This study aimed to assess the impact of referral of patients to the RNCCI network on the times of acute hospital stay between 2010 and 2011. We analysed the discharge of patients with an admission diagnosis of stroke, a medical situation which potentially causes some level of ADL dependence, and is the most frequent cause for patient referral between 2010 and 2011. We analysed patients with similar pathological conditions and excluded variables that could bias the results and allowed for the merging patients according to the level of dependence.

We aimed to compare the times of stay of the patients referred to the admission unit vs. those who were discharged from hospital and continued treatment at home, between 2010 and 2011. We also assessed the relationship between the level of dependence and the need of referral to the RNCCI network.

## MATERIAL AND METHODS

A retrospective study of all the patients admitted to the Neurology Department – Stroke Unit – University Hospital of Coimbra (HUC), in 2010 and in 2011, was carried out. We analysed 1,209 clinical records, selected the patients

admitted with a stroke and assessed their demographic characteristics, time of stay, modified Rankin Score (mRS) and context upon discharge.

The Rankin score is used for the assessment of the level of dependence and is validated for patients with a stroke, ranging from 0 (asymptomatic) to 6 (death) (Table 2).

We compared the data of these two subsequent years, regarding the time of hospital stay of the patients referred to admission units of the RNCCI network vs. the patients discharged to continue their treatment at home.

## RESULTS

From the 1,209 records analysed, we selected 819 patients admitted with a diagnosis of stroke. During 2010, 379 patients with a stroke were admitted (228 men), the number of admissions increasing in 2011 to 440 patients. From one year to the next, the predominance of male gender and patients aged over 65 remained unchanged.

The patients referred in 2010 represented 21.4% ( $n = 81$ ) of all admitted patients with a stroke diagnosis (Table 3). In 2011, there was a slight increase of referred patients, representing 23.5% ( $n = 103$ ) of all admitted patients. We observed a higher need for referral with higher Rankin scores i.e. for patients with a higher dependence level. Of the referred patients, those with Rankin scores above 3 represented 67.9% ( $n = 55$ ) in 2010 and 83.5% ( $n = 86$ ) in 2011, respectively.

In both years, the group of patients with a higher need for referral had a Rankin score of 5 at the time of discharge and included 53.1% of the patients in 2010 ( $n = 26$ ), 67.2%

in 2011 ( $n = 41$ ).

While waiting for a vacancy through the RNCCI network 6 from a total of 81 referred patients died after having been referred in 2010. In 2011, 14 patients died in similar circumstances.

Patients were transferred, whenever possible, to Units closer to their area of residence (Table 4).

As regards the time of stay, we observed that a higher Rankin score was related to a longer hospital stay. In the group of patients that were discharged to continue their treatment at home, the average time of stay was higher in 2011, except for the patients with a mRS of 1 or 4. In the group of referred patients, the average time of stay decreased for almost all scores, except for a mRS of 1. When we compared the time of stay in the group of patients discharged to continue their treatment at home, the patients referred through the RNCCI network remained longer time in the hospital (Table 5).

## DISCUSSION

The *Rede Nacional de Cuidados Continuados Integrados* network was designed to ensure healthcare to patients with acute and chronic diseases. These increase with ageing population and are expected in this study as shown by the average age of our group of patients in 2010 and 2011 (69 and 70 – male and 72 and 74 – female, respectively).

There was an increase in the number of referred patients to the RNCCI network, namely to the medical admission units (81 patients in 2010 and 103 in 2011).

The relation between the need for referral and the mRS

Table 2 - Modified Rankin Score

Score	Description
0	No symptoms at all
1	No significant disability despite symptoms; able to carry out all usual duties and activities
2	Slight disability; unable to carry out all previous activities, but able to look after own affairs without assistance
3	Moderate disability; requiring some help, but able to walk without assistance
4	Moderately severe disability; unable to walk without assistance and unable to attend to own bodily needs without assistance
5	Severe disability; bedridden, incontinent and requiring constant nursing care and attention
6	Dead

Table 3 - Demographic characteristics of our group of patients

Year	2010 ( $n = 379$ )		2011 ( $n = 440$ )	
	Male	Female	Male	Female
Gender $n$ (%)	228 (60.2)	151 (39.8)	271 (61.6)	169 (38.4)
Average AGE Years (sd)	69 (13)	72 (16)	70 (12)	74 (13)

Table 4 - Distribution of the patients according to discharge context and Rankin Score

mRS	RNCCI		Home		Other Departments		Other Units		% patients per mRS	
	2010 % (n)	2011 % (n)	2010 % (n)	2011 % (n)	2010 % (n)	2011 % (n)	2010 % (n)	2011 % (n)	2010 % (n)	2011 % (n)
0	0 (0)	0 (0)	100 (37)	98.2 (55)	0	1.2 (1)	0	0	9.8 (37)	12.5 (55)
1	4.1 (3)	2.2 (2)	95.9 (70)	94.4 (85)	0	1.1 (1)	0	2.2 (2)	19.3 (73)	20.5 (90)
2	11.3 (8)	7.2 (5)	83.1 (59)	84.0 (58)	1.4 (1)	2.9 (2)	4.2 (3)	5.8 (4)	19.7 (71)	15.7 (69)
3	28.3 (15)	17.9 (10)	64.2 (34)	73.2 (41)	0	0 (0)	7.5 (4)	8.9 (5)	14.0 (53)	12.7 (56)
4	40.4 (23)	62.0 (31)	50.9 (29)	18.0 (9)	0	0	8.8 (5)	20 (10)	15.0 (57)	11.4 (50)
5	53.1 (26)	67.2 (41)	39,6 (15)	6.6 (4)	0	3.2 (2)	16.3 (8)	23.0 (14)	12.9 (49)	13.9 (61)
6	15.4 (6)	23.7 (14)	-	-	-	-	-	-	10.3 (39)	13.4 (59)
<b>Total</b>	<b>21.4 (81)</b>	<b>23.5 (103)</b>	<b>64.4 (244)</b>	<b>57.2 (252)</b>	<b>0.3 (1)</b>	<b>1.4 (6)</b>	<b>5.3 (20)</b>	<b>8.0 (35)</b>	<b>100 (379)</b>	<b>100 (440)</b>

mRS : modified Rankin Score; RNCCI: Rede Nacional de Cuidados Continuados network.

Tabela 5 - Average time of hospital stay, according to the modified Rankin Score (mRS).

mRS	Home		RNCCI network		Other Hospitals	
	2010 (days)	2011 (days)	2010 (days)	2011 (days)	2010 (days)	2011 (days)
0	8	11	-	-	-	-
1	11	11	15	26	-	4
2	10	13	42	29	9	13
3	10	13	33	23	15	9
4	26	17	39	33	38	17
5	24	27	55	39	16	15

shows, not unexpectantly, that a higher dependence level corresponds to a higher need for referral. This situation remained unchanged in both studied years, representing the patients with mRS above 3 – (67.9% of the patients referred in 2010;  $n = 55$ ) and 83.5% ( $n = 86$ ) of the patients referred in 2011). Families are still not prepared to deal with high levels of dependence, either because the clinical situation is established as an acute event with a harsh adjustment required or, not surprisingly, in an ageing population, the carers are themselves elderly, with already some level of dependence. In addition, younger family members are often actively working, without enough time to devote to these patients. Finally, even small necessary changes in family structure and organization, either in care availability or in room re-design, may require financial resources that most

families do not have.

When comparing 2010 and 2011, we observe an increase in hospital stay duration of the non-referred patients for almost all Rankin Scores, except for a mRS of 4. As regards the time of stay of referred patients, the opposite occurs, with a decrease in stay for almost all mRS, except for a mRS of 1. This fact certainly reflects improved referrals, an increase of available beds in the RNCCI network and an opportunity that emerged in 2011, for patients with hospital discharge, included in the RNCCI network, that were waiting at home for hospital admission.<sup>6</sup>

Despite the decrease of the average time of stay of referred patients, this time remained well above the average time of stay of the patients with discharge to continue their treatment at home, regardless the mRS. In 2011, for an mRS

of 2, the average time of stay of a patient with discharge to continue his treatment at home was less than half (11 days) the time of a patient referred to the RNCCI network (26 days).

Based on these results, the product of the number of referred patients by the time of stay related with the Rankin Score was compared with the equivalent time for the patients with discharge to continue their treatment at home. This shows that referral reflected an increase of 1,718 and 1,198 days of hospital stay in 2010 and 2011, respectively. These results are worrisome, as the RNCCI network implementation is almost finished and an increase of available beds is not expected after 2013. Furthermore, this average increase in the length of hospital stay, with respect to only 21.4% and 23.5% of patient referral, demonstrates a noticeable incapacity to respond to current needs.

This study presents some bias, as the mRS that we used was the score obtained at the time of discharge from hospital and not at the time of referral. In some situations, the mRS may have changed in this time gap. We included some patients with a mRS of 6 (dead patients) in the group of referred patients. These represent patients who died while waiting for a vacancy, often due to infectious complications but maintaining a major diagnosis of stroke.

## REFERENCES

1. Portugal. Decreto-Lei n.º 101/2006. DR 109 SÉRIE I-A de 2006-06-06.
2. Resolução do Conselho de Ministros n.º 37 2010. DR 94 SÉRIE I de 2010-05-14.
3. Rede Nacional para os Cuidados Continuados Integrados. Unidades de Internamento. [consultado 2012 Nov 15]. Disponível em: <http://www.mcci.min-saude.pt/mccci/Paginas/ARede.aspx>.
4. Rede Nacional para os Cuidados Continuados Integrados. Relatório de

## CONCLUSION

The *Rede Nacional de Cuidados Continuados Integrados* network implementation provides a solution to an increased need in our population. It must be highlighted that its major objective is the promotion of healthcare quality and its continuity upon discharge from hospital, as well as ensuring the flow of patients in acute-care hospitals. At this moment, although improved in comparison to 2010, the capacity of response is still clearly insufficient. As such, the necessity to re-design strategies is recommended such as: increasing the number of available beds in the RNCCI network and the training patient carers, as well as building a response system based in home-care support multidisciplinary teams, allowing for a better and more prompt patient rehabilitation within the family context.

## CONFLICTS OF INTEREST

The authors declare that there were no conflicts of interest in writing this manuscript.

## FINANTIAL SOURCES

There was no external financial source in the writing of this manuscript.

Previously presented at the *Congresso Português de Neurologia 2012 – O Sono e os Sonhos* (2012 Portuguese Congress of Neurology – Sleeping and Dreaming), November 2012, Lisbon.

5. monitorização do desenvolvimento e da actividade da Rede Nacional de Cuidados Continuados Integrados. Lisboa: RNCCI; 2011.
5. Rede Nacional para os Cuidados Continuados Integrados. Relatório de monitorização do desenvolvimento e da actividade da Rede Nacional de Cuidados Continuados Integrados. Lisboa: RNCCI; 2010.
6. Directiva Técnica nº1\_UMCCI\_2011\_da Unidade de Missão para os Cuidados Continuados.

Catarina CANHA, Ana MASSANO, Hélder ESPERTO, Joana RATO, Teresa FERREIRA, Argemiro GERALDO

# National Post Hospital Care Project and Length of Hospitalization of Patients with Stroke 2010 - 2011

Acta Med Port 2013;26:683-688

Publicado pela **Acta Médica Portuguesa**, a Revista Científica da Ordem dos Médicos

Av. Almirante Gago Coutinho, 151  
1749-084 Lisboa, Portugal.

Tel: +351 218 428 215

E-mail: [submissao@actamedicaportuguesa.com](mailto:submissao@actamedicaportuguesa.com)

[www.actamedicaportuguesa.com](http://www.actamedicaportuguesa.com)

ISSN:0870-399X | e-ISSN: 1646-0758



ACTA MÉDICA  
PORTUGUESA

