

A comparative cost-minimization analysis of providing paediatric palliative respite care before and after the opening of services at a paediatric hospice

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Abstract—A palliative care service provider may add or decrease overall operational costs to the healthcare system. This study assessed the costs of managing respite care for children with life-limiting illness at the Children's Hospital of Eastern Ontario for the 12-month period both before and after services at Roger's House (RH, a paediatric hospice) was made available. The opening and operation of RH for providing respite care resulted in a minimization of operational costs (n = 66 patients, mean decrease of \$4,251.95 per month per patient).

Paediatric palliative care is an essential and comprehensive model of care for children with life-threatening or progressive life-limiting conditions.¹ It is an evolving discipline that seeks to focus on enhancing the quality of life for the patient with the management of distressing symptoms and the provision of respite care throughout the illness.² Paediatric hospice palliative care is a continuum of services including respite, pain and symptom management, transition from hospital to home, end-of-life care, and bereavement support. All of the services in the continuum are important in supporting the child and family during the trajectory of the disease. Respite care has been established as an important caregiving resource and is meant to provide temporary relief from the daily caregiving demands of primary caregivers and their families.³ It is also a chance for the palliative program staff to continue ongoing evaluation of the child's current state of health as well as a time for the patient and family to receive support and education in relation to the patient's progressive illness.

The Children's Hospital of Eastern Ontario (CHEO) is a tertiary paediatric institution and the regional provider of paediatric care for Eastern Ontario, Western Quebec, and Nunavut. In an effort to improve palliative care offered by CHEO, in May of 2006 Roger's House (RH) opened as a freestanding home-like 8-bed paediatric residential hospice located on the

grounds adjacent to the hospital. RH provides paediatric palliative care services including respite care to those children and families who have been referred by the comprehensive CHEO Paediatric Palliative Care Outreach Program. This article presents the cost-minimization analysis of service utilization and costs for paediatric respite care before and after the opening of services at a hospice (RH).

METHODOLOGY

Study design

The team conducted a non-randomized, retrospective chart review evaluating the 12-month period before and after services at RH became available. The costs assigned, either in monetary value or in number of units, are based on available data on hospital/hospice length of stay, the number of emergency visits, and the number of outpatient visits.

Patient selection

All paediatric palliative patients followed by the Palliative Care Service with life-limiting illness who frequented RH at least once for respite care were included in the study.

Data collection

Hospital days, emergency department visits, and outpatient clinic visits were measured by the Eclipsys Corporation program Sunrise Acute Care, which integrates inpatient, emergency, and ambulatory care through a single, enterprise-wide electronic medical record. All hospice data were collected by reviewing the paper copies of the patients' medical records.

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Cost calculation

The study focused on the cost per patient day to CHEO. The cost per patient day was calculated as follows: the number of patient days per month before and after the first visit to RH was calculated for each patient. After-visit patient days include both CHEO and RH. Next, the monthly cost before and after the first visit to RH was calculated for each patient by multiplying the number of patient days per month by the corresponding daily cost (\$2,007 for CHEO and \$500 for RH). The difference between the before- and after-visit monthly costs were then calculated for each patient and, finally, the mean difference among all patients was calculated.

The cost of providing inpatient care at CHEO is fixed at \$2,007 per day based on 2007 costs. This is the interprovincial billing rate for inpatient day and includes the direct healthcare costs (such as nursing) as well as allocated overhead costs (including administration, personnel, building maintenance, equipment, and so on). The average cost per patient day at RH is approximately \$500. This figure was calculated by dividing the total annual 2007 budget by the total annual bed days (365 days × 8 beds at RH).

Assumptions

The same palliative care team provides quality care for respite patients seen at CHEO and RH. Acute medical care continued to be provided at CHEO as needed.

Statistical analysis

Analyses were conducted by using SPSS 16.0. Presented *p* values were two sided and were deemed significant if $\leq .05$. Normally distributed variables were summarized by using means and standard deviation. Non-normally distributed variables were summarized by using medians and interquartile ranges. The paired sample *t* test was used to compare the outcome variables before and after the first RH visit if the difference is normally distributed; otherwise, the paired non-parametric Wilcoxon signed rank test was used.

RESULTS

Patient demographics

A total of 66 patients received respite care during the study period of May 2005 to February 2009. Demographic data are displayed in Table 1. The mean age of children who received respite care was 9.6 (standard deviation = 6). In general, the study population was fairly equal in both male (43%) and female (57%) gender. The age of the study patients when referred to the Palliative Care Program was equally represented (Table 1).

Table 1. Descriptive characteristics of the participating respite patients

<i>Characteristic</i>	<i>Respite care users (n = 66) n (%)</i>
Mean age, yr (SD)	9.6 (6)
Male gender, n (%)	43 (65)
Diagnosis,* n (%)	
Neoplasms	3 (4.5)
Diseases of the nervous system	34 (51.5)
Congenital malformations, deformations, and chromosomal abnormalities	19 (28.8)
Endocrine, nutritional, and metabolic diseases	8 (12.1)
Injury, poisoning, and certain other consequences of external causes	2 (3.0)
Age at referral, n (%)	
<1 yr of age	10 (15)
1-4 yr of age	8 (12)
5-9 yr of age	7 (11)
10-14 yr of age	14 (21)
>15 yr of age	10 (15)
Info missing	17 (26)

*Based on WHO International Classification of Diseases (ICD-10).

Service utilization

The service utilization before and after the patients' first RH visits is summarized in Table 2. During the study period, there was a significant decrease in the monthly number of CHEO inpatient days and the monthly number of outpatient days after the patients' first RH visits, but the monthly number of Emergency Room (ER) visits was not affected (Fig 1).

Notably, the mean change in monthly CHEO inpatient days was -2.9 (95% Confidence Interval [CI], -4.5 to -1.3 , $p = .001$). The mean change in monthly CHEO outpatient days was -0.5 (95% CI -1.0 to -0.05 , $p = .029$). The mean change in monthly ER visits was -0.03 (95% CI, -0.09 to 0.02 , $p = .20$). The monthly total inpatient days (CHEO and RH combined) significantly increased (median 0.9, $p = .013$). Despite this increase in inpatient days, there was a mean decrease of \$4,252 in the monthly cost as inpatient (95% CI, \$953-\$7,551, $p = .012$). This can be attributed to the fact that RH provides patient services at a significantly lower cost.

DISCUSSION

Paediatric hospice palliative care is a continuum of services including respite, pain and symptom management, transition from hospital to home, end-of-life care, and bereavement support. All of the services in the continuum are important in supporting the child and family during the

Table 2. Total CHEO inpatient days, outpatient visits, and ER visits per month before and after the first RH visit and total RH inpatient days per month after the first visit

		Before 1st RH visit (n = 66)		After 1st RH visit (n = 66)	
		Median (min – max)	IQR	Median (min – max)	IQR
Outpatient clinic visits	CHEO	1.1 (0-11.4)	1.1	0.8 (0-6.3)	1.1
Emergency department visits	CHEO	0.08 (0-0.9)	0.24	0 (0-0.6)	0.17
Inpatient days	CHEO	0.7 (0-28.2)	3.8	0 (0-4.8)	0.7
	RH	—	—	2.4 (0.08-26.5)	2.8
	CHEO + RH	—	—	2.8 (0.08-26.5)	3.5

trajectory of the disease. Paediatric palliative care in a freestanding hospice is a relatively new service in health-care. It is important to understand whether these services increase or decrease the overall cost of care within the healthcare system.

Respite services offered by RH have proven to be beneficial from a cost-containment perspective as compared with continuous hospital stays or long-term institutional care. The cost differences observed for respite care patients before and after the hospice was made available are driven by the hospital's relatively higher overhead costs.

Previous studies have indicated that there is both a lack of availability and an underuse of palliative care services for children in North America.¹ This study suggests the ability of RH to provide comparable palliative services at a lower cost indicating that although there is increased utilization of the paediatric hospice, the end result is still economical. We show that the opening and operation of a paediatric hospice resulted in a minimization of overall care costs.

Typically, respite services are not provided in a hospital setting. However, there are times when physicians will admit patients on compassionate grounds for respite. The assumption made is that CHEO and RH provide comparable effectiveness in terms of respite care provided; therefore, economic cost is the only differentiating factor. As Robinson⁴ notes, in this situation (where outcomes are expected to be similar), the cost-minimization approach is appropriate and useful in identifying the least costly option. As previously stated, this assumes that the quality of care provided by each facility is comparable and that the quality of care will not be compromised by increasing the utilization of RH. It also assumes that the cost of running RH will not change with additional patients. Families desiring acute medical care continued to receive these services at CHEO.

Cost information obtained by this study may be used to guide management's decisions regarding the location of future paediatric palliative care centres. Generally speaking, because a hospice has a lower patient cost per day than a hospital, the cost-minimizing approach would be to use RH at its full capacity whenever possible. The long-

term cost savings model of hospices for respite care justifies the need to increase funding of hospices. In addition, hospital paediatric palliative care units are urged to examine the hospice model for opportunities for cost savings (ie, what are the differences in costs for administration, staffing, equipment, facilities, and so on) to capitalize on existing cost opportunities.

Limitations

Because the costs per inpatient day were calculated differently for each facility (CHEO based on an interprovincial rate agreement and RH based on average cost per patient day), the comparison is not ideal and savings may be over- or understated. Costs for care at home were not addressed but may be a useful addition to future studies.

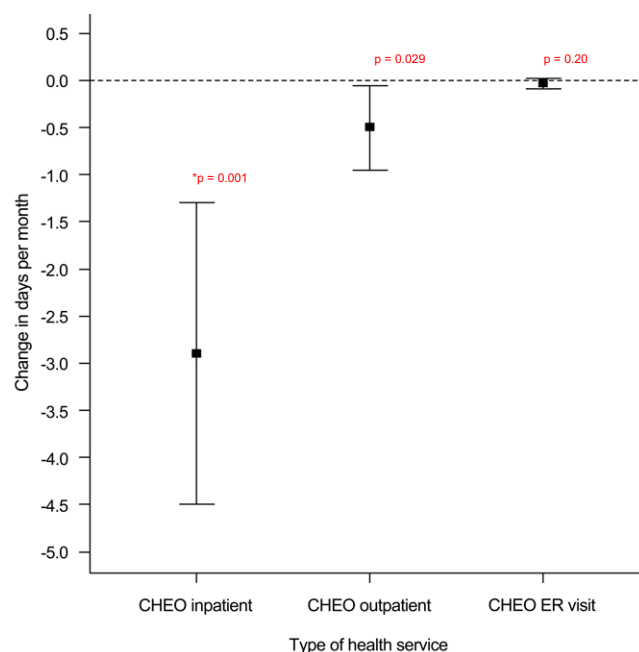


Figure 1. The change in mean inpatient days per month, outpatient days per month, and ER visit per month before and after the first RH visit (with 95% CIs). (Color version of figure is available online.)

CONCLUSION

The availability of the RH paediatric hospice has provided the means in which respite care services are provided to families of paediatric patients followed by the Palliative Care Program. This has proven to be a cost-minimization means that has significantly reduced respite care patients' use of inpatient services at our tertiary care paediatric institution.

An economic analysis of the impact of a new health service provides information to decision makers to better optimize the use of resources.

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