

# The Effects of Competition on Community-Based Nursing Wages

Les effets de la concurrence sur les salaires des  
infirmières en milieu communautaire



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## Abstract

In 1997, Ontario implemented a competitive bidding process for purchasing home care services, with the twin objectives of lowering costs and increasing service quality. The authors of this study performed regression analyses to ascertain the relationship between measures of competition, profit status of providers and nursing wages for community-based RNs and LPNs between 1995/1996 and 2000/2001. Using the Herfindahl-Hirschman Index as a measure of competition, we observed that only RN wages significantly increased as competition in home care increased. Furthermore, for-profit agencies paid significantly lower RN wages than their not-for-profit counterparts. By contrast, LPN wages declined over the sample period and did not differ markedly across provider types. The relative distribution of for-profit and not-for-profit agencies changed dramatically over the study period, with large increases in the number and volume of for-profit contracts. The results indicate that (a) greater competition in the home care sector resulted in upward pressure on RN wages independent of the profit status of the provider and (b) the increase appears to have been constrained by the increased presence of for-profit providers over the study period. The results highlight the role of profit status in provider behaviour, even in the context of publicly funded home care services. This finding has implications for both provider mix and the remuneration of nurses.

## Résumé

En 1997, l'Ontario mettait en place un système d'appel d'offres concurrentiel pour l'achat des services de soins à domicile, lequel visait le double objectif d'abaisser les coûts et d'augmenter la qualité des services. Les auteurs de la présente étude ont procédé à une analyse de régression afin de déterminer la relation entre les mesures de la concurrence, le type de fournisseurs (avec ou sans but lucratif) et les salaires des infirmières autorisées ainsi que des infirmières auxiliaires autorisées en milieu communautaire, entre 1995/1996 et 2000/2001. L'indice de Herfindahl-Hirschman comme mesure de la concurrence nous a permis d'observer que seuls les salaires des infirmières autorisées ont augmenté de façon appréciable avec l'accroissement de la concurrence pour les soins à domicile. De plus, les organismes à but lucratif ont offert aux infirmières autorisées des salaires notablement moindres en comparaison aux organismes sans but lucratif. Pour leur part, les salaires des infirmières auxiliaires autorisées ont diminué au cours de la période visée et ne présentent pas de différence appréciable selon le type de fournisseur. La distribution relative entre les organismes avec ou sans but lucratif s'est considérablement modifiée au cours de l'étude, notamment par une augmentation du nombre et du volume des contrats attribués aux organismes à but lucratif. Les résultats indiquent (a) qu'une concurrence accrue dans le secteur des soins à domicile exerce une pression à la hausse sur les salaires

des infirmières autorisées, et ce, indépendamment du type (avec ou sans but lucratif) de fournisseur, et que (b) l'augmentation semble freinée par la présence accrue de fournisseurs à but lucratif au cours de la période visée par l'étude. Les résultats font ressortir le rôle du statut (avec ou sans but lucratif) dans le comportement des fournisseurs, et ce, même dans le contexte des services à domiciles subventionnés par l'État. Ces conclusions ont des répercussions tant pour la composition des types de fournisseurs que pour la rémunération des infirmières.

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**S**IMILAR TO OTHER HEALTHCARE MARKETS, THE ONTARIO HOME CARE SECTOR has undergone reform in an effort to contain costs and improve the quality of care. In 1997, Ontario embraced competitive strategies in order to encourage the efficient provision of home care that influences both the price and quality of in-home services (Baker 2001). "Managed" competition in healthcare has been introduced in a number of countries as a mechanism to promote innovation, consumer choice, service flexibility, efficiency and responsiveness while ensuring accountability for public spending (Williams et al. 1999). The aim has been to capture features of competitive markets that result in efficient and innovative production by substituting private- for public-sector service delivery. The success of managed competition depends, however, on the extent to which agencies are willing to compete, the demand for service within the marketplace and the conditions of the competition (Baker 2001).

To date, most research on competition in healthcare has focused on the relationship between competition and quality of care (Sari 2003; Aizer et al. 2004; Doran et al. 2004; Propper et al. 2004). Aronson and colleagues (1996, 2004) have described the negative impacts of competition on the overall experiences and attitudes of home care workers. Doran and colleagues (2004) found that work satisfaction varied among provider agencies according to the amount of time allotted for care delivery, but not by the profit status of the home care agency. The effect of nursing wages on quality of care has been debated in the literature. Nelson and Folbre (2006) observed that higher salaries for nurses improved the quantity and quality of care. However, Heyes (2005) argued that highly skilled nurses may be willing to accept a lower wage. Finally, Stone and colleagues (2007) found no significant association between nursing wages and quality of care. Despite this lack of consensus, determining the effects of competition on wages is important given the potential implications for cost of care delivered.

Little research has been conducted on the effects of managed competition strategies on the wages of healthcare providers. The Registered Nurses Association of Ontario (1999), Ontario Community Support Association (2000) and VON Canada

(2001) have argued that any lower costs achieved in the management and delivery of home care services would come at the expense of depressed wages and destabilization of the labour market. There is also some evidence that managed competition has led to increased care provider turnover in the Ontario home care sector (Denton et al. 2006). Understanding the effects of increased competition on wages is, therefore, crucial. The purpose of this study was to assess the effects of managed competition within Ontario's home care system on the wages of community-based nurses.

## Background

Managed competition has been integrated into various healthcare markets throughout the world as part of overall cost containment strategies. It was implemented in the mid-1980s in the United States as part of large-scale reforms to improve the efficient operation of the healthcare sector (Enthoven 1993; Abelson et al. 2004). Countries across Europe, including the United Kingdom, Italy, the Netherlands and Sweden, have incorporated managed competition strategies within their respective health sectors. In the United Kingdom, managed competition was introduced in the early 1990s, initiated by the public and private healthcare providers employed by the National Health Service who would compete for general practitioner service contracts (Drummond et al. 1997; Propper et al. 2003). In Italy and Sweden, purchasers and providers of healthcare services were separated in the early 1990s in order to create internal markets (Bjuggren 1998; Freeman 1998; Cellini et al. 2000). In the Netherlands, healthcare reforms of the 1990s were strongly influenced by the managed competition model, in which competing health insurers acted as buyers of healthcare services for their members (Schut and Hassink 2002; van de Ven et al. 2004). In publicly insured systems such as these, managed competition was instituted in order to promote technical efficiency (i.e., producing the highest level of output from the available resources), while its purpose in the United States has largely been to reduce costs given existing output levels.

In Canada, Ontario is the only province to date that utilizes managed competition strategies within home care services. Prior to 1997, home care services were delivered either by direct in-house service providers or through contracts with home care provider agencies (Doran et al. 2004). Because the market was dominated by not-for-profit provider agencies, competition among providers was increased by allowing the entry of for-profit agencies. By the end of 1996, publicly funded home care services were coordinated by Community Care Access Centres (CCACs), autonomous government organizations created to serve as a single point of access for home care services. Forty-three CCACs were established to serve defined geographic areas and purchase services on behalf of the public with funding from the Ontario Ministry of Health and Long-Term Care (Williams et al. 1999). In January 2007, the CCACs underwent reorganization that reduced their number to 14, in order to align themselves better

with the geographic boundaries of the Local Health Integration Networks (LHINs) (OANHSS 2008). As part of the competitive process, CCACs issued requests for proposals (RFPs) for home care services and purchased services from competing for-profit and not-for-profit home care provider agencies (Harju and Woodward 2003).

Increased competition between the not-for-profit and for-profit agencies in the home care market was achieved through the introduction of the managed competition model and the creation of an internal market (Fuller 2001). The advantage of splitting the purchaser from the provider of service, as in this case, was based on the notion of efficiency gains associated with specialization (Enthoven 1993). Purchasers of service could concentrate on acquiring the best-quality care at the best price, while service providers could focus on providing low-cost, high-quality services (Williams et al. 1999). If these standards slipped, providers risked losing contracts, a consequence that would serve as an accountability mechanism.

Home care is delivered to people with an array of characteristics and needs, ranging from assistance with activities of daily living (e.g., toileting, bathing, dressing, transferring, continence, feeding) to complex nursing care (Williams et al. 1999). These programs also offer help and support to informal caregivers. In Ontario, home care programs offer a range of services, including community support, professional services, homemaking and personal support services (CHCA 1998). There is no charge for such services up to a specified maximum. Beyond this, individuals who wish to have more service must purchase it privately (Dumont-Lemasson et al. 1999).

## Data Sources

This study augmented data collected under the auspices of the Community Nursing Services Study (CNSS). The CNSS, established in 2000 by the Faculty of Nursing at the University of Toronto, examined Ontario's competitive home care model and analyzed its influence on nursing services. Questionnaires distributed to the executive directors and RFP coordinators at CCACs gathered information on the home care contracts held by provider agencies in 1995/1996 and 2000/2001. Contracts held in 1995/1996 represent the home care market prior to the implementation of the competitive model, while the contracts held in 2000/2001 correspond to the post-implementation period. Forty-two of the 43 CCACs participated (97.7% response rate). There were 162 home care contracts in 1995/1996 and 173 contracts in 2000/2001. Information was gathered on the profit status of each home care service provider, the nursing wage rate and the volume of service delivered under each contract.

## Methods

The analyses were separated into two parts, one for RNs and one for LPNs.

Multivariate ordinary least squares regression analysis was used to determine how a range of explanatory variables, including competition, affected community-based nursing wages.

## Dependent variables

The natural logarithms of the nursing wage for both RNs and LPNs were the two dependent variables used in this study. The wage that each RN or LPN was paid, associated with every nursing contract awarded by the CCACs, was determined from the study questionnaire. While both home care RNs and LPNs provide nursing services that help care recipients remain in their home during illness, there are inherent differences between the two types of nursing practices, and they are therefore analyzed separately. For instance, RNs generally have more post-secondary education and tend to earn more than their LPN counterparts. All wages were adjusted to 1995 dollars.

## Independent variables

### MEASURE OF COMPETITION

Competition was measured using the Herfindahl-Hirschman Index (HHI), which measures market concentration among firms in a defined catchment area. The HHI for each CCAC region was determined by summing the squares of the market shares of each of the  $N$  home care agencies, where  $S_i$  is the market share, in percentage terms, of the  $i$ th home care agency (Cesari 2000).

$$HHI = \sum_{i=1}^N S_i^2$$

Market share was based on the number of nursing hours provided by a particular home care agency. Squaring the market shares makes the HHI sensitive to firms with larger market shares (Baker and Blumenthal 1984). The HHI ranges from 0 to 1, where 1 represents a monopoly and 0 represents perfect competition (Laine 1995). Therefore, higher HHI values correspond to a less competitive market.

### CONTRACT CHARACTERISTICS

We included various characteristics, derived from the CNSS questionnaire, that are associated with home care nursing contracts and are thought to affect the wage rates for RNs and LPNs. A binary year variable (YEAR) was constructed with a base year of 1995 to account for changes in nursing wages due to the passage of time. According to the literature, for-profit (FP) firms typically pay lower wages to their staff compared to not-for-profit (NFP) firms (Ettner and Herman 2001; Rosenau and Linder 2003).

To investigate this premise in our data, we included a binary variable (STATUS) with NFP as the reference category. Home care nursing is delivered on both a per-visit and a shift basis. In several home care contracts, multiple nursing services were delivered that included either the typical nursing visit (i.e., lasting approximately one hour) or a nursing shift visit (i.e., services provided over several hours, for which the nurse is paid an hourly rate). Shift work tends to be compensated on an hourly basis, and may differ by type of work and level of nursing care required (Holmas 2002). Many of these shift workers are employed on a casual basis and tend to earn less than nurses who work full-time. A binary variable (SHIFT) was used in the analysis to account for whether a provider agency paid shift wages. No data were available about the proportion of workers paid on a shift basis.

#### CCAC CHARACTERISTICS

It is important to account for unobserved regional market characteristics, such as labour supply and population demographics, that might have an effect on nursing wage rates. Six regional binary variables (Central East [CE], East [E], South West [SW], Central West [CW], North [N] and Toronto [TOR]) were included to account for the location of the home care contract within Ontario. The most urban region, Toronto, was used as the base case for the analysis. Real median income (INCOME) and the unemployment rate (UE) were derived from the 1995 and 2001 Census Community profiles. They were collected based on the Ontario health districts, whose boundaries closely match the CCACs. Finally, we included a binary variable indicating whether the CCAC was dominated by NFP agencies (MAJNFP), to ascertain whether provider mix affected nursing wages.

The following equation was estimated for each nurse type:

$$\begin{aligned} \text{Log wage} &= \beta_0 + \beta_1 \text{HHI} + \beta_2 \text{YEAR} + \beta_3 \text{STATUS} + \beta_4 \text{SHIFT} + \beta_5 \text{CE} \\ &+ \beta_6 \text{E} + \beta_7 \text{SW} + \beta_8 \text{CW} + \beta_9 \text{N} + \beta_{10} \text{INCOME} + \beta_{11} \text{UE} + \\ &\beta_{12} \text{MAJNFP} + \epsilon_i \end{aligned}$$

All analyses were performed using the statistical package SAS System for Windows, Version 8 (SAS Institute 1999).

## Results

Table 1 presents the descriptive statistics concerning contract information for the study period. In 1995/1996, there were 40 home care nursing agencies with contracts. By 2000/2001, three years after the introduction of managed competition, there were 41 agencies. Although the total number of providers awarded contracts stayed roughly

the same over the study period, the number of for-profit agencies increased dramatically, from comprising 60% of successful bidders in 1995/1996 to 80% in 2000/2001. It appears that for-profit agencies had been awarded slightly more contracts as well, increasing their stake from 51% of all contracts in 1995/1996 to 58% in 2000/2001.

While the total volume of nursing services provided by both for-profit and not-for-profit agencies increased by more than 44% over the study period, the really dramatic change was the large increase in the volume of nursing service contracts delivered by for-profit provider agencies. It grew from 18% of total service volume in 1995/1996 to 45% in 2000/2001. However, not-for-profit agencies had consistently larger average service volumes per contract in both 1995/1996 and 2000/2001.

TABLE 1. Descriptive statistics for Ontario home care market before and after the implementation of managed competition

	Year	
	1995/1996	2000/2001
<b>Number of home care agencies</b>		
For-profit	40 24 (60%)	41 33 (80%)
<b>Number of nursing contracts</b>		
For-profit	162 83 (51%)	173 101 (58%)
<b>Total volume of service (hours of service)</b>		
For-profit	4,993,713 829,285 (18%)	7,179,563 3,239,671 (45%)
<b>Mean volume per contract</b>		
For-profit	11,439.5	33,398.7
Not-for-profit	53,966.5	56,824.2
<b>RN wage rate*</b>		
Mean FP	\$29.73	\$31.60
Mean NFP	\$33.70	\$34.43
<b>LPN wage rate*</b>		
Mean FP	\$26.48	\$24.01
Mean NFP	\$27.66	\$25.23
<b>Hefindahl-Hirschman Index</b>		
Mean	0.58	0.36
Standard deviation	0.18	0.17

\* All wages are in 1995 Canadian dollars.

We observed that NFP home care agencies consistently paid higher real (i.e., adjusted for inflation) wages to both their RNs and LPNs, in both study years, compared to for-profits. The mean wage for for-profit RNs increased from \$29.73 in 1995/1996 to \$31.60 in 2000/2001 (6% increase), while the mean not-for-profit RN wage rose from \$33.70 1995/1996 to \$34.43 in 2000/2001 (2% increase). Conversely, LPNs experienced a decline in their real wages. The mean for-profit LPN



wage decreased from \$26.48 in 1995/1996 to \$24.01 in 2000/2001 (9% decrease), and the mean not-for-profit LPN wage fell from \$27.66 in 1995/1996 to \$25.23 in 2000/2001 (9% decrease).

We observed an increase in measured competition as the HHI fell over the study period from 0.58 in 1995/1996 to 0.36 in 2000/01. This increase in competition was an intended effect of managed competition.

### Regression analysis

Results from the regression analysis for RN and LPN wages are reported in Tables 2 and 3, respectively.<sup>1</sup>

TABLE 2. Regression analysis of log RN wage (n=335)

	$\beta_1$	Standard error	t-statistic
Intercept	4.09**	0.26	15.40
HHI	-0.13**	0.04	-2.90
YEAR	0.08*	0.03	2.25
STATUS	-0.06**	0.01	-4.32
SHIFT	-0.15**	0.02	-7.32
Region			
CE	-0.02	0.03	-0.82
E	-0.05#	0.03	-1.81
SW	-0.04	0.03	-1.55
CW	-0.01	0.03	-0.47
N	0.04	0.03	1.06
INCOME	$-2.46 \times 10^{-5}$	0.00	-1.25
INCOME <sup>2</sup>	$3.09 \times 10^{-10}$	$3.79 \times 10^{-10}$	0.81
UNEMPLOYMENT	-0.15*	0.01	-1.97
MAJNFP	0.002	0.02	0.17
Adjusted R-square = 0.3128			
F-Value = 10.75, P-value < 0.0001			

\*\* Significant at the 1% level

\* Significant at the 5% level

# Significant at the 10% level

We observed that for RNs, competition was significantly associated with a change in wages. Specifically, a decrease in the HHI (i.e., increased competition) led to increased wages.<sup>2</sup> Of particular note is the significance of the STATUS binary variable, which indicated that wages paid by FP agencies were systematically lower (by

6.6%) than those paid by NFP agencies. As expected, the coefficient on the SHIFT variable showed that providers that paid some nurses on a shift basis paid wages that were 15% lower than providers who did not. Furthermore, RNs working in regions experiencing higher unemployment received lower wages (-1.5%). The positive coefficient on the YEAR binary variable represents the general trend in wages across periods but may also capture SHIFT and MAJNFP effects, which are not picked up by those variables. This is because the SHIFT variable, as we were able to define it from the data, captures only whether shift wages were paid at all, not the proportion of nurses who were paid a shift wage (which, of course, could change across periods). MAJNFP was also defined as a binary as opposed to a continuous variable. Since MAJNFP was not significant in the RN regression and the coefficient on YEAR is positive, this would suggest that the dominant effect captured by the YEAR variable is the upward trend in the RN wage.

TABLE 3. Regression analysis of log LPN gross wage (n=335)

	$\beta_i$	Standard error	t-statistic
Intercept	3.45**	0.51	6.75
HHI	-0.10	0.07	-1.39
YEAR	0.25**	0.06	4.33
STATUS	-0.01	0.02	-0.50
SHIFT	-0.30**	0.03	-10.66
Region			
CE	0.04	0.04	0.87
E	-0.01	0.04	-0.44
SW	-0.10*	0.04	-2.21
CW	0.02	0.04	0.48
N	0.15**	0.05	2.70
INCOME	$2.27 \times 10^{-5}$	$4.07 \times 10^{-5}$	0.56
INCOME ^ 2	$-6.61 \times 10^{-10}$	$8.25 \times 10^{-10}$	-0.80
UNEMPLOYMENT	-0.05**	0.01	-3.84
MAJNFP	0.09**	0.24	3.84
Adjusted R-square = 0.3914			
F-Value = 11.18, P-value < 0.0001			

\*\* Significant at the 1% level

\* Significant at the 5% level

In contrast to RNs, neither competition nor profit status of the provider was found to affect LPN wages. As with the RNs, providers who paid by shift paid signifi-

cantly lower wages (−30%) compared to providers who did not. Two regional variables showed significance, the South West and the Northern regions. Compared to nurses employed in Toronto, nurses who worked in the South West were paid 9.6% less and those in the North were paid 14.8% more. Not surprisingly, an increase in the unemployment rate was associated with a significantly lower LPN wage (−4.9%). The year coefficient likely remained positive in the LPN equation due to the presence of a general upward trend in wages that was countered in this data set by changes in the other explanatory variables.

CCACs containing a majority of NFP home care agencies paid LPN wages that were 9.2% higher than those not dominated by NFP providers. The model fit was quite good, with an adjusted R-square of 0.3128 and 0.3914 for the RN and LPN equations, respectively.

## Discussion

This study examined the association between market competition and nursing wage rates. The descriptive results revealed that the FP agencies achieved large increases in both the number of home care contracts and the volume of service compared to NFP home care agencies. This finding suggests that the former have been more successful under the managed competition regime compared to NFP agencies.

Increased competition (i.e., a decrease in the HHI) was associated with a significant increase in RN wages. This finding suggests that increased competition for the provision of home care nursing services may lead to increased competition for nurses, and thereby increase wages paid to nurses irrespective of the proprietary status of the home care provider agency (i.e., FP, NFP). Given the existing shortage of nurses, providers must attract nurses to work in home care in general, and to work for their organization in particular. So while FPs may have paid RNs less than NFPs, the wages paid to RNs by FPs increased more rapidly when compared to wages paid by NFPs (6% vs. 2%).

The observed decrease in the HHI (i.e., increased competition) over the study period indicates that the market became less concentrated, a situation that could result from either more home care provider agencies delivering nursing services or a more even distribution of service contracts. The data indicated that the number of agencies in Ontario remained relatively stable from 1995/1996 to 2000/2001, even though the distribution between FP and NFP agencies changed dramatically.

Part of the reason for the increased proportion of FPs in the market for home care nursing over the study period may be attributed to the fact that the majority of NFP agencies were unionized. Essentially, this means that nurses' wages are "locked in" for the duration of their collective bargaining agreement. Hence, reactions to changes in the competitive environment may have been delayed, depending on when the collective

bargaining agreements were up for renewal. However, FP agencies are typically non-unionized and may not have faced the same degree of constraint on wages and working conditions as the NFPs. Monitoring this trend in the future is important, because as the provider agencies become more accustomed to the competitive contracting process, the wage differential could narrow further, especially if NFPs begin to renegotiate less generous salary and benefits provisions with unionized nurses (Sutherland 2001).

It is interesting to note that in contrast to RN wages, LPN wages were characterized by a marked decline (in real terms) over the study period, independent of the degree of competition and provider profit status. Part of the reason for this may be that LPNs tend to be concentrated in the home and community care sectors, including the long-term care sector, and are typically paid lower wages than those employed by hospitals (CCACT 1999). Another possibility is that provider agencies could more readily substitute personal support workers for LPNs than for RNs. In other words, home care provider agencies must reckon with the fact that RNs have the possibility of obtaining higher-paying jobs in hospitals and are harder to replace – a situation that may differ for LPNs. Further investigation of this issue is warranted in future research.

The period under study was characterized by a significant shift in the site of care from institutional to the home and community sector. Increased government funding to support greater care provision in the community would have meant greater demand for nursing services. This may explain, in part, the rise in RN wages. Nevertheless, we observed that FPs paid lower wages and increased their market share. As a consequence, it is difficult to assess from our data whether the overall cost of home care service delivery fell as a result of managed competition. The findings seem to suggest that at least in the short run, managed competition restrained the increase in wages. What remains to be seen is whether FP entrants have merely adopted a loss-leader approach, in which the initial price they charge is low but then is increased once competitors have exited the market. In fact, concerns have recently been raised that this has occurred in relation to home-based rehabilitation services (Randall and Williams 2006).

## Limitations

There are limitations associated with our analysis. First, the effects of managed competition on nursing wages have implications for the quality of home care services, as suggested by Doran and colleagues (2004). Because this study did not use patient-level data, definitive conclusions cannot be drawn with regard to the direct impact that managed competition has had on the quality of patient care. Some research in Ontario has suggested that the introduction of managed competition in home care led to

increased turnover of home care workers (Denton et al. 2005). The loss of a consistent client–home care worker relationship due to increased turnover may indeed have negative effects on the quality of care (Aronson et al. 2004). Further, it has been suggested that FP agencies may be more likely to cut costs and lower service quality in order to secure contracts (Ettner and Herman 2001; Sutherland 2001), but the empirical evidence has been somewhat mixed (Doran et al. 2004).

The second limitation pertains to the absence of information regarding the number of providers who initially competed for contracts within each CCAC region, yet were unsuccessful in obtaining a service agreement. Our results therefore provide a lower-bound estimate for the degree of market competitiveness.

A third limitation was the cross-sectional nature of the analysis. Market concentration and CCAC payments to providers for nursing services were assessed cross-sectionally, such that areas with higher market concentration were compared to areas with lower concentration. Given longitudinal data, an interesting extension of the current study would be one that also examined the effects of changes in market concentration within the same CCAC over time.

## Conclusion

This study examined the relationship between market competition in the provision of home and community care services and the wages paid to nurses following the introduction of managed competition in the Ontario home care sector. The findings indicated that RN wages paid by FPs were lower but increased more rapidly compared to wages paid by NFP providers. By contrast, the fall in LPN wages raises the possibility that these workers were more prone to substitution by lower-paid personal support workers than were RNs.

The results highlight the fact that profit status has implications for provider behaviour, even in the context of publicly funded home care, in ways that affect the remuneration and labour market experience of nurses in that sector. Continued study in this field is therefore important for a better understanding of the impact that competition in home care has on community-based RNs and LPNs and, ultimately, on the quality of patient care.

## ACKNOWLEDGEMENTS

The authors thank four anonymous reviewers, as well as Dr. Brian Hutchison and Dr. Jan Barnsley, for helpful comments and suggestions. We acknowledge funding support from Dr. Coyte's CHSRF/CIHR Chair in Health Care Settings and Canadians and Dr. Doran's community nursing study funded by CHSRF and the Ontario Ministry of Health and Long-Term Care. All errors and omissions are the responsibility of the authors.

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#### NOTES

1. We also estimated the RN and LPN regressions separately for each year. Because no structural change occurred from one period to the next, we pooled the data for both years and report the results from those regressions.
2. There is the potential that while the degree of competition influences nursing wages, nursing wages may also influence the degree of competition in CCACs. We employed the Durbin-Wu-Hausman test in order to rule out the presence of endogeneity with respect to the HHI (Davidson and MacKinnon 1993).
3. To substantiate the decline in the HHI further, we calculated the coefficient of variation (CV) for volume of service per contract for both years. The CV declined by 47.13% from 1995/1996 to 2000/2001. This decline is consistent with the decreasing HHI in that the volume of service is likely more evenly distributed among the provider agencies.

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