



‘Stickiness’ and ‘inflow’ as proxy measures of the relative attractiveness of various sub-sectors of nursing employment

Mohamad Alameddine*, Audrey Laporte, Andrea Baumann, Linda O’Brien-Pallas, Barbara Mildon, Raisa Deber

Postgraduate Medical Education Office, Faculty of Medicine, University of Toronto, Toronto, Ont., Canada

Abstract

Workplaces vary in their ability to recruit and retain workers. We introduce two new concepts which can be used as proxy measures of the relative attractiveness of a particular setting, where setting can be defined narrowly (e.g., a particular organization) or broadly (e.g., a sub-sector). “Stickiness” is defined as the transition probability that an employee stays in a given setting; “inflow” as the proportion of new employees. Using a longitudinal dataset of all nurses registered with the College of Nurses of Ontario, Canada 1993–2003, employment site was used to define consistent sectors and sub-sectors. Each nurse was assigned to one sector/sub-sector per year. Stickiness and inflow values were calculated for each sub-sector, and the trends across time were analyzed. Results show that despite shrinkage in the hospital sub-sectors, hospitals remained highly sticky. The expanding sub-sectors, in general, appear relatively unattractive to nurses; they couple medium/low stickiness with high inflow. Considerable variability across sub-sectors was evident. Stickiness and inflow were found to be useful as proxy measures of the relative attractiveness of the various sub-sectors of nursing employment over time. The concepts may be used for other workforces for which linked longitudinal data are available.

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Keywords: Turnover; Retention; Recruitment; Employment sectors–sub-sectors; Workplace attractiveness; Staff shortage; Canada; Nursing

Background

Workplaces differ in their ability to attract and retain workers. As The World Health Organization (WHO) has observed, achieving health goals requires an appropriately prepared health workforce

(World Health Organization (WHO), 2006). At present, many countries report shortages of health human resources, particularly physicians and nurses (Canadian Nurses Association, 2002; Canadian Nursing Advisory Committee, 2002; Grinspun, 2003; Heitlinger, 2003; O’Brien-Pallas, Alksnis, & Wang, 2003); Canada is no exception (Simoens, Villeneuve, & Hurst, 2005). At the same time, healthcare is shifting its emphasis from hospitals to home and community, including downsizing hospitals. The current nursing shortage is likely to escalate competition for the existing supply. Reliable information about the relative stability and

*Corresponding author. Tel.: +1 416 978 8421; fax: +1 416 978 7144.

E-mail addresses: m.alameddine@utoronto.ca (M. Alameddine), audrey.laporte@utoronto.ca (A. Laporte), baumanna@mcmaster.ca (A. Baumann), l.obrien.pallas@utoronto.ca (L. O’Brien-Pallas), barbara.mildon@utoronto.ca (B. Mildon), raisa.deber@utoronto.ca (R. Deber).

attractiveness of various workplaces is thus essential, particularly for nurses, who constitute the biggest workforce in hospitals and are increasingly being sought for jobs in the community (Ontario Association of Community Care Access Centres, 2000; The Home Care Sector Study Corporation, 2003).

Nurses may work in different settings, where setting can be defined narrowly (e.g., a particular job in a particular organization), or more broadly (e.g., particular sub-sectors, such as acute hospitals or public health units). If “a nurse is a nurse is a nurse,” then setting is irrelevant; nursing will look like a single market. However, nursing may instead be composed of a series of ‘sub-markets’ with relatively little movement across settings. Understanding health labor markets requires the ability to ascertain the relative attractiveness of particular work settings. Although researchers have provided a comprehensive overview of nursing demography and work environment issues, little is known about movement within or across employment sub-sectors.

Defining the attractiveness of a particular setting, however, can be problematic. One approach is to analyze the perceptions of individual workers directly (e.g., via surveys). A common proxy measure of attractiveness at the workplace level is the concept of turnover, which assumes dissatisfied workers leave. The literature suggests that determining the ‘right’ level of turnover is complex; excessively high levels may increase costs, decrease productivity, reduce staff morale, and impair patient outcomes (Gifford, Zammuto, Goodan, & Hill, 2002; Gray, Philips, & Normand, 1996; Hayes et al., 2006; Ingersoll, Olsan, Drew-Cates, DeViney, & Davies, 2002; Johnson & Buelow, 2003; Jones, 1990); excessively low levels forego cost savings and productivity gains from replacing older by younger workers, innovation and better person-to-job match (Hayes et al., 2006).

Nonetheless, operationalizing turnover has proven difficult. The lack of a consistent definition of turnover and the variability in record-keeping methods has considerably hampered attempts to compare and generalize across studies, sectors or sub-sectors of employment (Tai, Bame, & Robinson, 1998). Depending on the study, turnover has been defined as leavers versus stayers, quitters versus non-quitters, intention-to-quit versus intention-to-stay, new staff versus old staff and filled positions versus vacant positions (Hinshaw & Atwood, 1983; Tai et al., 1998). From a policy

analytic viewpoint, these definitions of turnover may also conflate the characteristics of a particular job, a particular workplace, a particular sub-sector, and the profession as a whole.

Accordingly, we have developed two new concepts—stickiness and inflow—which we tested for their utility as proxies for differentiating the attractiveness of various settings, where setting can be defined narrowly (e.g., a particular job in a particular organization) or broadly (e.g., nursing vs. competing employment). In this paper, we define setting in intermediate terms, as employment sub-sector, defined as the categorization employed by the College of Nurses of Ontario (College of Nurses of Ontario (CNO), 2006); see Appendix A.

Definitions

“Stickiness” and “Inflow”

The concept “Stickiness” is defined as the transition probability of a nurse working in a given setting in year “ t ” remaining in the same setting in year “ $t+1$ ”. In this paper, setting is defined as sector or sub-sector; hence, stickiness is not identical to turnover because a nurse moving from one employer to another within the same sub-sector would represent turnover for that employer but that nurse would still be “sticky” in that sub-sector. (If setting is defined more narrowly as the job or workplace, then stickiness will be a variant of turnover.) If one denotes the number of nurses working in setting y in year t as $N_{y,t}$ the number of nurses working in setting y in year $(t+1)$ as $N_{y,t+1}$ and the number of nurses working in setting y in both years t and $t+1$ as $N_{y,t \& t+1}$ then:

$$\text{Stickiness}_{t \text{ to } t+1} = [(N_{y,t \& t+1} / N_{y,t})] \times 100.$$

For example, if 1000 nurses worked in the “public health” sub-sector in 2000 and 700 of them remained in that sub-sector in 2001, then stickiness_{2000 to 2001} is

$$\frac{700}{1000} \times 100 = 70\%.$$

Stickiness can be affected by a number of factors including: (1) Reclassification (e.g., reclassifying an outpatient clinic from “hospital” to “community” without changing its activities or workforce could nonetheless ‘move’ a nurse across sectors); (2) contraction/expansion of particular settings; (3)

age structure (e.g. retirements); and (4) the relative attractiveness of that setting.

One could compute an adjusted stickiness to exclude ‘involuntary’ departure from a shrinking setting with fewer jobs available by using as the denominator the smaller of number employed in year “ t ”, or in year “ $t+1$ ”.

$$\text{Adjusted Stickiness}_{t \text{ to } t+1} = \frac{N_{y,t\&t+1}}{\min(N_{y,t}, N_{y,t+1})} \times 100.$$

For the data analyzed, shrinkage was not sufficient to greatly affect the stickiness data and we report only unadjusted stickiness.

We defined the concept “Inflow” as the percentage of nurses that are working in a particular setting in year “ t ”, who were *not* working in that setting in year “ $t-1$ ”, i.e., were fresh additions to that setting. Inflow is defined as

$$\text{Inflow}_t = [(N_{y,t} - N_{y,t\&t-1})/N_{y,t}] \times 100.$$

For example, if 1000 nurses worked in the “public health” sub-sector in 2001, of whom 800 had worked there in year 2000, then inflow_{2001} is

$$\frac{(1000 - 800)}{1000} \times 100 = 20\%.$$

Inflow, by definition, is higher in sub-sectors that are expanding and or those that have a high turnover rate. Inflow may result from new additions to the workforce (new graduates, immigration), but also from nurses returning to the workforce, and from those switching sub-sectors. Depending upon the available data and policy purposes, one could thus distinguish among types of inflow; we have not done so here.

Relationships can be postulated between stickiness, inflow, growth/shrinkage, and attractiveness. If stickiness is high, then a setting is attractive by definition since it successfully retained the majority of its workers. Conversely, if a setting is sufficiently unattractive, stickiness will be low (since workers will seek alternative employment), and inflow high, irrespective of the changes in the size of workforce in that setting (since the setting will have to recruit new workers). However, if a setting is attractive, stickiness and inflow will depend upon whether the workforce in that setting is shrinking or expanding. Shrinking settings, by definition, will have relatively low stickiness (since not all workers can retain employment, even if they wished to do so). Expanding settings, if attractive, can exhibit both high stickiness and high inflow.

As noted, one advantage of these concepts is that setting can be defined broadly or narrowly. A disadvantage is that these concepts cannot reflect unfilled vacancies, since these are not reflected in the longitudinal employment data.

To test whether these concepts can distinguish among settings, the study used a longitudinal dataset of all nurses registered with CNO, between 1993 and 2003. Ontario is a large industrial province with a population of 12,439,755; it contains 38.8% of Canada’s population ([Statistics Canada, 2004](#)). In 2003, it employed 35.1% of all Canadian nurses ([Canadian Institute of Health Information, 2005](#)). Using this unique dataset, we computed the stickiness and inflow values for each sub-sector of nursing employment for 1993 to 2003 in Ontario, Canada.

The database

Registration with the CNO is a prerequisite for Registered Nurses (RNs) and Registered Practical Nurses (RPNs) to practice nursing in Ontario. Upon registration, each nurse is provided with a unique registration number; afterwards, nurses are required to fill out and submit an annual membership renewal to CNO in order to be eligible to work. Nurses have an incentive to keep their registration active even if they are temporarily out of work to avoid the requirements involved in reinstating their registration. The form includes designation of the workplace sub-sector, which CNO aggregates into sectors.

Access to the anonymized CNO database was provided by the Nursing Health Services Research Unit at the University of Toronto. A sub-set of the data containing a specified set of variables for all nurses registered was created for each year. The research team then carefully checked the data for consistency (definition of sub-sectors across years, age and employment status).

In this paper, we define setting in terms of the sector/sub-sector, as defined in the CNO registration form ([Table 1](#)). For ease of presentation, the LTC sector is included with the Hospital sub-sectors in [Tables 2–4](#). Agency nursing, which the CNO recently classified as a community sub-sector, but which largely serves hospitals, is also presented with the hospital sub-sectors. The cleaned subsets for all years were then merged to create a longitudinal dataset of all nurses registered with the College of Nurses of Ontario, Canada 1993–2003.

Table 1
Definition of sectors and sub-sectors of nursing employment

Sector	Sub-sectors (see Appendix A for definitions)
Hospital sector	Acute, Psychiatric, Chronic/ Rehabilitation, Other Hospitals and Agency nursing
LTC sector	Includes Nursing homes, Homes for the aged and Retirement homes. This sector is not disaggregated into sub-sectors, because definitions have changed over time.
Community sector	Community Care Access Centres (CCAC), Public health, Homecare, Mental health, Community Health Centres (CHC), and Community agencies.
'Other'	Physician office, Education, Business, Government, Self-employed, Nursing station and Miscellaneous

Data analysis was performed in SAS-PC. We first ran a series of cross-tabs (using PROC-FREQ) to determine the distribution of nurses across sub-sectors of employment for each year. We then generated 1-year transition probabilities; i.e., stickiness and inflow values, for each sub-sector of nursing employment over the 1993–2003 period, and computed mean values by sub-sector. Because there is no agreement in the literature as to what constitutes high or low turnover, and recognizing that cut-offs are arbitrary, we calculated the 25th and 75th percentiles of the aggregate distributions of stickiness and inflow, and defined stickiness and inflow as “high” if this mean value exceeded the 75th percentile (81.9% for stickiness, 47.9% for inflow), “low” if their value was less than the 25th percentile (59.5% for stickiness, 19.1% for inflow), and “medium” otherwise. Clearly, other values could be used, and these designations should accordingly be considered illustrative rather than definitive.

Results

Size trends by sector and sub-sector of employment

As noted above, analyzing the relative attractiveness of a particular sub-sector requires controlling for whether the sub-sectors are shrinking or expanding. Table 2 displays the trends in the size of each sub-sector of nursing employment in Ontario between 1993 and 2003 and its expansion/contraction;

more detailed data by year by sub-sector is reported elsewhere (Alameddine et al., 2006).

Table 2 shows that the size of the nursing workforce decreased in all hospital sub-sectors, with the largest decrease in the chronic/rehabilitation and psychiatric hospitals. Overall, the hospital sector lost 9781 nurses (−13.3%). In contrast, the size of the nursing work force expanded in most community sub-sectors except for home care agencies (−20.3%). The overall size of the community sector increased by 9.4%. The ‘Other’ sector shows a mixed picture, with some of its sub-sectors contracting (Physician office, Business and Education), while others expanded (Miscellaneous, Self-employed and Nursing Stations). Overall, the ‘Other’ and LTC sectors expanded by 10.8%, with the former adding 1481 nurses and the latter adding 1331 nurses.

Stickiness and inflow trends by sub-sector of employment for the years 1993–2003

Tables 3 and 4 give stickiness and inflow values for the years 1993–2003. Recognizing that the total values computed for a particular sector can be dominated by large sub-sectors within that sector, within each sector of nursing employment we find heterogeneity; some sub-sectors appear more appealing to nurses and others less attractive. The stickiness trends for nurses in Ontario (Table 3) distinguish among various sub-sectors, appear consistent with stakeholder perceptions about the consequences of some important policy decisions taken in Ontario in the last decade, and may thus provide a valuable proxy for attractiveness. Strikingly, despite the hospital downsizing initiatives and multiple budget cuts that took place in the 1990s, acute hospitals maintained a consistently high stickiness (89.7), reinforcing suggestions that many nurses prefer hospital-based work (Happel, 1998, 2002). LTC facilities were also quite sticky (83.7), as was Public health (81.3). Psychiatric hospitals, although highly sticky (85.5), became less so after 2000, as inpatient facilities were converted to community mental health programs. The stickiness of almost all community sub-sectors decreased during that period, with particular impact on those delivering direct care (Homecare agencies from 86.1 in 1996 to 58.5 in 2001; Community mental health from 81.5 in 1997 to 40.4 in 2001; Community agencies from 72.7 in 1999 to 35.5 in 2001). This decrease coincides with the Ontario government’s adoption of a competitive bidding process for

Table 2
Number of nurses working by sector/sub-sectors (1993–2003)

<i>The hospital and LTC sectors</i>								
Year/sub-sector	LTC sector	Hospital sector						
		Acute	Psychiatric	Chronic/rehab	Other hospital	Agency nursing	Hospital total	
Start (1993)	12373	59501	4451	6664	1842	1249	73707	
End (2003)	13704	53207	3148	4674	1458	1439	63926	
# change Start–End	+1331	–6294	–1303	–1990	–384	+190	–9781	
% change Start–End	+10.8	–10.6	–29.3	–29.9	–20.8	+15.2	–13.3	
Status	Expand	Contract	Contract	Contract	Contract	Expand	Contract	
<i>The community sector</i>								
Year/sub-sector	CCAC	Public health	Home care	Mental health	CHC	Comm. agency	Total	
Start (1993, 1997 or 1999)	1668 (1999)	3705	6565	175 (1997)	791	470 (1999)	13366	
End (2003)	2570	3435	5230	1220	1239	931	14625	
# change Start–End	+902	–270	–1335	+1045	+448	+461	+1259	
% change Start–End	+54.08	–7.3	–20.3	+597.14	+56.6	+98.0	+9.4	
Status	Expand	Contract	Contract	Expand	Expand	Expand	Expand	
<i>The 'Other' sector</i>								
Year/sub-sector	Physician office	Education	Business	Government/ assoc.	Self-employed	Nursing station	Miscellaneous	Total
Start (1993)	3939	2792	1434	1224	672	147	3476	13712
End (2003)	3457	2271	988	1307	1139	229	5802	15193
# change Start–End	–482	–521	–446	+83	+467	+82	+2326	+1481
% change Start–End	–12.2	–18.7	–31.1	+6.8	+69.5	+55.8	+66.9	+10.8
Status	Contract	Contract	Contract	Expand	Expand	Expand	Expand	Expand

homecare contracts, which was intended to achieve efficiencies, and many claim placed downward pressure on the wages and working conditions of nurses in the community (Aronson, Denton, & Zeytinoglu, 2004; Baranek, Deber, & Williams, 2004; Caplan, 2005; O'Brien-Pallas et al., 2003; Registered Nurses Association of Ontario, 1999; Shapiro, 1997).

The stickiness trends for the 'Other' sub-sectors, a heterogeneous group, fluctuate. Stickiness was high in sub-sectors that offer nurses a relatively high job stability (e.g. Physician office and Educational institutions), and low in others (e.g. Nursing stations serving remote areas).

Inflow trends by sub-sector of employment for the years 1993–2003

Inflow (Table 4) reflects both the general growth/shrinkage of a sub-sector, as well as its attractive-

ness. Thus, expanding sub-sectors by definition show higher inflow levels (e.g. community mental health and community agencies); while relatively sticky sub-sectors have fewer openings to fill. Thus, as hospitals began to hire back nurses in 1999 following years of cuts, inflow increased in all hospital sub-sectors, but this was moderated by stickiness, such that there were lower inflow values in the high stickiness sub-sectors (Acute hospital = 9.7; Psychiatric hospitals = 12.3) than in presumably less-attractive sub-sectors (Agency nurses = 58.4). Sticky sub-sectors which did not grow (e.g., Public health) thus exhibit lower inflow (19.0). Within the 'Other' sector, the highest inflow levels were accordingly reported in the three sub-sectors with the lowest stickiness values (Nursing stations, Self-employed and Miscellaneous), and the lowest inflow levels in the stickier sub-sectors (Physician office, Education, Businesses).

Table 3
Stickiness by year by sector/sub-sector (1993–2003)

<i>The hospital and LTC sectors</i>							
Year/sub-sector	LTC Sector	Hospital sector					
		Acute	Psychiatric	Chronic/Rehab	Other	Agency nursing	
93–94	81.8	90.6	89.7	70.2	42.7	37.5	
94–95	82.1	89.3	88.2	64.3	56.1	23.0	
95–96	85.0	90.3	88.9	65.1	51.2	35.3	
96–97	89.6	91.8	91.3	84.1	78.4	65.9	
97–98	86.0	89.7	88.6	79.4	81.6	56.6	
98–99	83.3	89.5	85.0	77.7	75.3	49.8	
99–00	86.7	93.8	90.5	83.7	83.7	52.3	
00–01	81.3	91.0	85.6	70.1	76.2	45.4	
01–02	79.6	83.2	67.0	55.9	52.6	34.2	
02–03	82.0	87.7	73.4	68.2	51.6	35.1	
Mean	82.5	89.7	85.5	71.9	64.0	42.7	
<i>The community sector</i>							
Year/sub-sector	CCAC	Public health	Home care	Mental health	CHC	Community agency	
93–94	NA	76.8	72.6	NA	44.4	NA	
94–95	NA	76.4	73.7	NA	48.1	NA	
95–96	NA	61.5	76.7	NA	38.4	NA	
96–97	NA	86.2	86.1	NA	75.2	NA	
97–98	NA	87.1	79.5	81.5	78.3	NA	
98–99	NA	80.6	64.2	79.1	66.1	NA	
99–00	89.9	89.2	73.9	80.9	74.8	72.7	
00–01	87.3	87.9	70.7	76.8	72.7	58.9	
01–02	77.5	81.1	58.5	40.4	46.5	35.5	
02–03	80.9	85.0	64.7	46.8	49.5	37.3	
Mean	83.7	81.3	72.9	60.3	59.6	49.3	
<i>The 'Other' sector</i>							
Year/Sub-sector	Physician office	Education	Business	Government	Self-employed	Nursing station	Miscellaneous
93–94	80.8	67.6	75.1	51.7	43.1	45.4	38.1
94–95	78.3	67.7	71.8	55.2	38.4	31.9	45.7
95–96	80.4	75.1	73.3	65.7	49.7	50.4	43.5
96–97	87.1	80.6	85.3	76.3	73.4	78.7	71.9
97–98	84.0	82.5	83.3	83.1	70.4	77.2	66.3
98–99	79.8	78.9	77.5	75.9	66.5	56.1	65.4
99–00	84.4	87.9	85.8	87.7	76.8	68.2	63.0
00–01	80.1	80.5	80.1	79.1	68.1	63.0	66.5
01–02	72.6	70.4	40.4	54.5	45.7	41.3	44.6
02–03	73.7	68.1	47.1	58.3	51.4	47.5	45.7
Mean	80.2	75.3	73.8	69.2	60.0	57.8	55.2

Discussion: relative attractiveness by sub-sector of employment

Stickiness and inflow augment such concepts as turnover as proxies for attractiveness; they have the advantage of allowing a more nuanced comparison of settings, highlighting potential heterogeneity in

labor markets. In addition, they allow for the implications of expansion/contraction of settings. For example, although we postulate that settings with high stickiness can be judged attractive, in absolute terms, those with medium-low stickiness may reflect forced shrinkage. Thus, our administrative data suggests that expanding settings with

Table 4
Inflow by year by sector/ sub-sector (1993–2003)

<i>The hospital and LTC sectors</i>							
Year/sub-sector	LTC Sector	Hospital sector					
		Acute	Psychiatric	Chronic/rehab	Other	Agency nurse	
93–94	19.8	8.7	9.8	33.5	42.9	71.4	
94–95	21.3	9.1	11.3	34.3	56.4	60.8	
95–96	21.1	9.3	12.1	31.0	37.8	70.7	
96–97	15.8	5.9	7.6	13.8	14.5	41.2	
97–98	8.3	3.2	6.0	9.1	16.3	28.7	
98–99	18.0	9.1	11.5	21.8	22.8	54.5	
99–00	17.8	11.8	10.5	18.1	21.6	42.1	
00–01	17.0	12.4	13.4	21.9	25.3	50.9	
01–02	19.8	11.7	18.2	46.8	53.4	79.0	
02–03	23.5	16.1	26.7	30.3	46.7	64.6	
Mean	18.2	9.7	12.3	26.1	35.1	58.4	
<i>The community sector</i>							
Year/sub-sector	CCAC	Public health	Homecare	Mental health	CHC	Community agency	
93–94	NA	22.7	31.7	NA	53.0	NA	
94–95	NA	29.2	33.9	NA	54.0	NA	
95–96	NA	24.3	31.1	NA	55.8	NA	
96–97	NA	21.0	20.4	NA	34.6	NA	
97–98	NA	12.7	16.4	34.3	23.9	NA	
98–99	NA	12.1	28.1	54.9	36.6	NA	
99–00	34.2	16.3	23.9	39.2	34.8	52.1	
00–01	21.9	16.5	24.4	50.6	37.6	51.9	
01–02	24.0	18.8	28.2	68.3	56.7	69.1	
02–03	17.9	15.2	30.6	57.4	51.6	59.4	
Mean	24.2	19.0	26.5	55.0	44.2	58.8	
<i>The 'Other' Sector</i>							
Year/sub-sector	Physician office	Education	Business	Government	Self-employed	Nursing station	Miscellaneous
93–94	23.3	26.3	27.6	49.5	63.3	70.5	65.7
94–95	19.6	21.6	27.9	39.6	58.8	55.6	54.3
95–96	20.0	22.2	26.8	43.8	53.9	54.6	61.9
96–97	15.8	15.1	18.6	19.3	47.4	40.5	39.2
97–98	11.6	12.9	14.7	19.0	28.9	24.1	35.6
98–99	18.4	17.8	20.8	29.5	39.5	40.1	40.2
99–00	18.6	20.1	18.9	21.3	32.3	34.5	30.5
00–01	18.9	22.1	22.0	24.5	35.2	51.7	36.4
01–02	22.6	36.7	41.6	39.1	47.1	50.7	66.7
02–03	23.5	33.9	49.4	39.2	47.3	55.8	55.2
Mean	19.2	23.4	25.6	32.2	43.7	48.1	47.1

relatively low stickiness (e.g. nursing stations) are unattractive, since they failed to retain their workforce even while expanding. Although directly measuring attractiveness would require individual-level survey data, future research could validate these administrative-level proxies of attractiveness of settings against individual perceptions.

Where sub-sectors have relatively similar growth levels, we note an inverse relationship between stickiness and inflow values (Table 5), suggesting that less-attractive settings must recruit to compensate for the loss of experienced workers. Table 5 also reveals several cases where the expansion/contraction of a setting results in relatively higher/lower

Table 5
Ranking settings by mean stickiness and inflow (1993–2003)

Sub-sector/rank	Mean stickiness	Mean inflow
Acute	1	19
Psychiatric	2	18
CCAC	3	13
LTC	4	17
Public health	5	16
Physician office	6	15
Education	7	14
Business	8	11
Homecare agency	9	10
Chronic/rehab	10	12
Government/assoc.	11	9
Other hospitals	12	8
Community mental	13	3
Self-employed	14	7
CHC	15	6
Nursing station	16	4
Miscellaneous	17	5
Community agency	18	1
Agency nursing	19	2

inflow than would otherwise be found. For example, the transition matrixes showed that health system restructuring in Ontario led to new sub-sectors (CCAC, community mental health) which attracted their workers from established sub-sectors (home care, psychiatric hospitals), and was reflected in higher mean inflows.

Examining the size trends also enables comparison across settings with superficially similar attractiveness. For example, “Other hospitals” and CHCs have similar medium values for both stickiness (64.0 vs. 59.6) and inflow (35.1 vs. 44.2). However, the former sub-sector contracted by 20.8%, while the latter expanded by 56.6%. Thus, we would conclude that CHCs are relatively less attractive, having more difficulty retaining their workers even in an expanding environment. Although the CNO registration data does not allow us to determine why particular sub-sectors are more or less attractive, it does suggest a number of additional hypotheses for future research. In the Ontario data examined, the persistent differences in stickiness which we identified across sub-sectors, coupled with the fact that the less-attractive sub-sectors had higher inflow values and thus were the most likely to be hiring new graduates, suggests a pressing need to understand and address the factors responsible for the unattractiveness of particular nursing settings

and the implications, if any, for the long-term ability to retain new nurses in nursing.

This analysis suggests that the two new concepts, stickiness and inflow, are useful proxy measures of relative attractiveness. The concepts are fairly easy to calculate, and can be defined at various levels of setting, ranging from individual jobs to employment classifications. Although we applied these concepts to sectors/sub-sectors for Ontario nurses using the CNO registration database, similar analyses can be performed for other workforces for which linked longitudinal data are available.

Appendix A

Employment sub-sector definitions

Sub-sector definitions are based primarily on definitions provided in the College of Nurses of Ontario Instruction Guide for the 2006 Annual Membership Renewal (CNO, 2006). Because categorization for certain sub-sectors varied over time, we have merged sub-sectors as required. Note that CNO only began providing formal definitions of sub-sectors in 2004; for the 1993–2003 period of the study, nurses selected their sub-sector without such definitions. The naming and categorization of sub-sectors has varied slightly over time. For example, in 2004, CNO merged Agency nursing, Community agencies and Home care into one sub-sector currently named: Nursing/Staffing agency; it also deleted Nursing station as a separate sub-sector. The sectors/sub-sectors used in this study and their current definitions are as follows.

LTC sector

This sector was not divided into sub-sectors, because the definitions of its sub-sectors have changed over the time period analyzed. It includes: Long-Term Care Facility: “Facilities for people who are not able to live independently or in their own homes who require 24-h nursing services to be available to meet their personal care needs. (Long-term Care Centre, Nursing Home, Home for the Aged);” plus Retirement Home: “A residential complex that is occupied by persons who are primarily 65 years of age or older, for the purpose of receiving care services, whether or not receiving the services is the primary purpose of occupancy;” plus Other Long-Term Care Facility: “Long-term care facilities not listed in the above definitions.”

Hospital sector: sub-sectors

Acute: “A category of health care facility that is staffed and equipped to deliver care to patients in the acute phase of illness. Acute care hospitals are characterized by having medical, surgical, nursing and allied health professionals available at all times to provide rapid, intensive interventions. These hospitals commonly provide diagnostic services utilizing high technology. An acute care hospital may also provide other non-acute services such as rehabilitation or chronic care.”

Psychiatric: “A health care facility that specializes in treating persons with mental health and/or addiction problems. Psychiatric hospitals that are part of a larger organization and short-term treatment programs are included in this group.”

Chronic/Rehab: Includes both Complex Continuing Care Hospital: “A hospital that provides care to patients who are unstable and require 24-h nursing care for chronic or fluctuating serious illness;” and Rehabilitation Hospital: “A hospital that provides primarily the continuing assessment and treatment of patients whose condition is expected to improve significantly through the provision of physical medicine and other rehabilitative services. Complex continuing care/rehabilitation hospitals which are part of a larger organization are also included in this group.

Other hospital: “Any other hospital excluding teaching hospitals, community hospitals, addiction and mental health centres/psychiatric hospitals and complex continuing care/rehabilitation hospitals.”

Agency nurse: A nurse employed by a commercial agency that enters into contractual, fee for service arrangements to supply nurses to individuals requiring nursing care in private homes or patients in health services facilities/organizations.

Community sector: sub-sectors

Community Care Access Centre (CCAC): “An organization providing simplified service access to: visiting professional and personal support health services at home and in schools, long-term care placement, service planning and case management and information and referrals to other long-term care services, including volunteer-based community services.”

Public health: (Public Health Unit/Department.) “An official health agency established by a group of urban and/or rural municipalities to develop and

provide comprehensive community health care programs.”

Home care: An agency that contracts with CCACs to provide a range of nursing services to support client care in the community. Services are delivered primarily in patients’ homes.

Mental Health: “A community program that is not hospital bed based and which serves people with mental health and/or addiction problems.”

CHC: “A not-for-profit, community-governed organization that provides primary health care, health promotion and community development services, using multi-disciplinary teams of health providers.”

Community agency: A service-focused, community-based organization that employs nurses to provide nursing or support services usually to a defined population, e.g. Easter Seals, Cancer Society, Red Cross.

Other sector: sub-sectors

Physician office: (Physician’s Office/Family Practice Unit:) “A group or solo practice that provides episodic or continuing, comprehensive primary care.”

Education: Includes both Colleges/Universities: “Post secondary educational organizations offering nursing programs”, and Schools: “Elementary and secondary schools, public or private.”

Business: “A commercial or industrial enterprise involved in the production, manufacturing, processing or sales of goods and/or services. “

Government: (Government/Association/Regulatory/Union): “The provincial and federal government, the various associations involved in supporting professions and organizations and the bodies charged with regulating health professions recognized under the *Regulated Health Professions Act*.”

Self-employed: “An individual earning income directly from one’s own business or profession rather than from a specified salary or wages from an employer”

Nursing station: A field unit located in an isolated community. Within these stations, nurses and other support and primary health care staff are organized to carry out primary health care services including urgent, short-term in-patient and public/community health care. Access to urgent health needs is available on a 24 h basis.

Miscellaneous (‘Other’ others): “Employers not listed in other definitions.”

Acknowledgments

This study was funded by a CIHR grant, “Where do nurses work? Work setting and work choice”. Analysis was performed at the Nursing Health Services Research Unit (NHSRU), Faculty of Nursing, University of Toronto. Additional support was provided by the M-THAC (from medicare to home and community) Research Unit, University of Toronto. Special thanks to the staff of the NHSRU for their help and advice, especially, Brad Milburn, Sping Wang, and Elisabeth Peereboom, and to Carey Levinton for programming assistance.

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