DATA MATTERS

High-Cost Users of Ontario's Healthcare Services

Usagers qui coûtent cher aux services de santé en Ontario

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Abstract

Approximately 1.5% of Ontario's population, represented by the top 5% highest cost-incurring users of Ontario's hospital and home care services, account for 61% of hospital and home care costs. Similar studies from other jurisdictions also show that a relatively small number of people use a high proportion of health system resources. Understanding these high-cost users (HCUs) can inform local healthcare planners in their efforts to improve the quality of care and reduce burden on patients and the healthcare system. To facilitate this understanding, we created a profile of HCUs using demographic and clinical characteristics. The profile provides detailed information on HCUs by care type, geography, age, sex and top clinical conditions.

Résumé

Environ 1,5 % de la population ontarienne, qui correspond à 5 % des usagers qui génèrent le plus de coûts pour les services hospitaliers et les soins à domicile en Ontario, comptent pour 61 % des frais hospitaliers et de frais pour les soins à domicile. Des études semblables menées ailleurs montrent également qu'un nombre relativement petit de personnes utilisent une grande partie des ressources du système de santé. Une meilleure compréhension des usagers qui coûtent cher peut aider les planificateurs à améliorer la qualité des services et à réduire le fardeau sur les patients et sur le système de santé. Afin de faciliter cette compréhension, nous avons brossé un profil des usagers qui coûtent cher à l'aide de caractéristiques cliniques et démographiques. Ce profil donne des renseignements détaillés sur ces patients, en fonction du type de soins, de la géographie, de l'âge, du sexe et des principaux états cliniques.

Studies have shown that high-cost users (HCUs) of healthcare, i.e., patients who incur the highest healthcare costs, represent only a small proportion of the population but consume a large proportion of healthcare funding. In British Columbia, for example, 5% of users spent 30% of the provincial physician service funding (Reid et al. 2003). A study in Manitoba also showed that 5% of prescription drug users accounted for 41% of prescription expenditures (Kozyrskyj et al. 2005). In Manitoba, the highest 1% population accounted for 54% of hospital expenditures (Deber and Lam 2009). In the United States, 5% of the population accounted for 49% of total healthcare spending (Center for Healthcare Research and Transformation 2010). The resulting spotlight on HCUs prompted economists and policy makers to acknowledge the influence of HCUs on quality of care and cost-effectiveness of the healthcare system. Gawande's 2011 article in *The New Yorker* ("The Hot Spotters"), for example, garnered considerable attention from policy makers, arguing that a focus on a few areas or individuals will have significant impact on patient outcomes and system costs. A 2012 report by The Commonwealth Fund also emphasized the need to address HCUs as the first step to achieving "rapid improvements in the value of services provided."

Recognizing the importance of HCUs, the Ontario Ministry of Health and Long-Term Care used clinical and demographic patient information to profile HCUs of Ontario's hospital and home care healthcare services. This profile, as presented below, should inform the management of healthcare funding, support the development of policies and programs that provide better access, quality and value to Ontario patients, and motivate further research on HCUs.

Methodology

HCUs were defined as the top 5% cost-consuming users of hospital and home care services at the provincial level during the fiscal year 2009/10. Primary care and long-term care use were excluded. The patient count, total cost and cost per patient were measured for selected demographics, care types and clinical conditions, both for HCUs and for all users. Cost was calculated using the Ontario Cost Distribution Methodology as the product of the unit cost (of a care type within a specific hospital) and the case weight (of a case-mix group) (Ministry of Health and Long-Term Care 2011).

The demographic characteristics examined were geography (by Local Health Integration Network [LHIN] of service), age group (<1, 1–17, 18–45, 45–64, 65–79, 80+) and sex. The care types included Acute In-Patient Care, Acute Day Surgery, Emergency, In-Patient Mental Health, Rehabilitation, Complex Continuing Care and Home Care. The clinical care types studied were limited to In-Patient (by major clinical category), Day Surgery (by major ambulatory cluster) and Emergency (by major ambulatory cluster).

Data used for the analysis were extracted from ministry-accessible administrative databases specific to each care type: In-Patient from the Discharge Abstract Database, Day Surgery and Emergency from the National Ambulatory Care Reporting System, Mental Health from the Ontario Mental Health Reporting System, Chronic from the Continuing Care Reporting System, Rehabilitation from the National Rehabilitation Reporting System and Home Care from the Home Care Database. Records were screened out if they represented services not covered by the Ontario Health Insurance Plan (OHIP), hospital services not funded through Ontario's case-mix funding model, or services with zero resource intensity measures. Each patient's age, sex and LHIN of service was based on his/her most recent record.

Formal ethics review was not required because de-identified ministry administrative data were used.

Results

Tables 1 through 3 summarize the results of the analysis. Each table presents the patient count, total cost and average cost per patient both for HCUs and for all users (including HCUs) across specified characteristics. Table 1 also includes the standard deviations (SD) of average cost per patient. The tables enable comparison of measures between categories and between HCUs and all users.

Note that the patient count and cost per patient may not be consistent across tables because patients may have contributed to multiple categories for a given characteristic. Ninety-

one per cent of HCUs received care in multiple care types, and within In-Patient, Day Surgery and Emergency, 83% of HCUs received care for multiple clinical conditions.

TABLE 1. Distribution of patients and costs across demographic characteristics, 2009/10

	High-Cost Users			All Users		
Demographic	**# of Patients**	**Total Cost ($M)**	**Average Cost per Patient ($K) (SD)**	**# of Patients**	**Total Cost ($M)**	**Average Cost per Patient ($K) (SD)**
LHIN						
ESC	8,758	342	39.07 (37.76)	203,149	634	3.12 (11.20)
SW	18,822	820	43.56 (48.01)	371,313	1,318	3.55 (14.43)
WW	7,604	292	38.40 (39.46)	191,818	557	2.90 (10.92)
HNHB	23,400	1,025	43.82 (51.79)	435,571	1,670	3.83 (15.53)
CW	6,700	265	39.51 (42.64)	168,255	514	3.05 (11.54)
MH	10,507	403	38.40 (40.53)	279,322	762	2.73 (10.80)
TC	38,682	1,954	50.51 (62.69)	407,156	2,721	6.68 (24.14)
C	14,224	546	38.35 (44.63)	386,414	1,070	2.77 (11.26)
CE	16,157	689	42.64 (45.69)	412,740	1,237	3.00 (12.29)
SE	8,659	378	43.68 (49.53)	181,826	624	3.43 (14.27)
CH	20,039	940	46.89 (53.87)	372,130	1,465	3.94 (16.34)
NSM	5,940	278	46.80 (55.41)	152,616	470	3.08 (14.21)
NE	10,784	488	45.22 (52.49)	234,131	812	3.47 (14.73)
NW	4,805	221	46.07 (46.24)	105,180	362	3.44 (13.79)
Age Group						
<1	5,201	311	59.79 (77.79)	161,602	540	3.34 (17.43)
1–17	6,723	365	54.30 (76.95)	707,323	857	1.21 (9.24)
18–44	19,976	987	49.39 (65.52)	1,240,331	2,491	2.01 (10.47)
45–64	47,021	2,100	44.65 (53.11)	983,463	3,543	3.60 (15.03)
65–79	59,896	2,562	42.78 (47.01)	526,686	3,687	7.00 (20.63)
80+	56,264	2,316	41.17 (39.92)	282,216	3,096	10.97 (23.60)
Sex						
Female	98,259	4,189	42.63 (47.56)	2,088,726	7,390	3.54 (13.71)
Male	96,822	4.452	45.98 (54.92)	1,812,895	6,824	3.76 (16.35)
Provincial	**195,081**	**8,641**	**44.29 (51.37)**	**3,901,621**	**14,214**	**3.64 (14.99)**

ESC=Erie St. Clair; SW=South West; WW=Waterloo Wellington; HNHB=Hamilton Niagara Haldimand Brant; CW=Central West; MH=Mississauga Halton; TC=Toronto Central; C=Central; CE=Central East; SE=South East; CH=Champlain; NSM=North Simcoe Muskoka; NE=North East; NW=North West

Table 1 presents analyses by demographic characteristics and at the provincial level. Provincially, HCUs accounted for 61% of all costs and had an average cost per patient that was 12 times that of all users. Within each LHIN, the percentage of all users that were HCUs ranged from 3.7% in Central (C) to 9.5% in Toronto Central (TC), and the percentage of total costs attributed to HCUs ranged from 51.0% in C to 71.8% in TC. TC also incurred the highest total cost and average cost per patient, among both HCUs and all users.

The 65+ age group accounted for the largest proportion (60%) of HCUs and 56% of HCU costs. Furthermore, the percentage of total costs attributed to HCUs was disproportionately higher in the 65+ age group (72%). Among HCUs, while the number of patients and total cost increased with increasing age, the average cost per patient decreased with increasing age. Thus, the age group with the highest average cost per HCU was the <1 group ($59,795), but not for all users, for whom the cost per patient increased with age (after the <1 age group). The cost per patient was slightly – but with statistical significance – higher among males versus females. The percentage of total costs attributed to HCUs was also higher among males (65% versus 57%).

TABLE 2. Distribution of patients and costs across care types, 2009/10

	High-Cost Users			All Users		
Care Type	# of Patients	Total Cost ($M)	Average Cost per Patient ($K)	# of Patients	Total Cost ($M)	Average Cost per Patient ($K)
IP	170,035	5,365	31.55	819,971	8,096	9.87
DS	54,775	129	2.35	968,344	1,158	1.20
ER	158,667	233	1.47	2,926,568	1,319	0.45
MH	14,868	805	54.14	35,517	904	25.45
Rehab	23,239	465	20.01	25,536	477	18.68
CCC	16,852	824	48.92	18,265	833	45.61
HC	114,270	819	7.17	430,465	1,427	3.32

IP=In-Patient; DS=Day Surgery; ER=Emergency; MH=Mental Health; Rehab=Rehabilitation; CCC=Chronic Continuing Care; HC=Home Care

Table 2 presents results by care type. In-Patient, the most costly one, represented 62% of HCU costs and 57% of all costs. Mental Health was the care type with the highest cost per HCU ($54,140). Most of Mental Health, Rehabilitation and Chronic costs – 89%, 98% and 99%, respectively – were attributed to HCUs. By contrast, only 15% of Emergency and Day Surgery costs combined were attributed to HCUs, as the cost per patient for these care types was relatively small.

TABLE 3. Distribution of patients and costs across top five care-type specific clinical conditions, 2009/10

	High-Cost Users			All Users		
Condition	**# of Patients**	**Total Cost ($M)**	**Average Cost per Patient ($K)**	**# of Patients**	**Total Cost ($M)**	**Average Cost per Patient ($K)**
Acute In-Patient Care						
D&D circulatory system	46,039	1,060	23.03	102,802	1,379	13.42
D&D Respiratory System	25,743	613	23.83	63,532	808	12.72
D&D digestive system	27,708	556	20.08	89,260	834	9.35
Trauma inj pois & tox eff drug	23,454	476	20.29	56,682	643	11.35
D&D nervous system	18,276	458	25.05	36,777	566	15.40
All categories	**252,142**	**5,365**	**21.28**	**930,508**	**8,096**	**8.70**
Day Surgery						
D&D circulatory system	15,109	65	4.30	50,314	162	3.22
Mental diseases & disorders	9,013	11	1.18	70,504	76	1.07
Examination & other health factors	7,997	11	1.32	150,417	84	0.56
D&D digestive system	11,325	10	0.87	269,210	208	0.77
D&D of the kidney, GU, M&F repro	8,274	8	0.91	163,959	139	0.85
All categories	**67,839**	**129**	**1.90**	**1,069,137**	**1,158**	**1.08**
Emergency						
D&D circulatory system	43,038	39	0.92	302,578	153	0.51
D&D digestive system	38,418	33	0.86	447,351	192	0.43
D&D respiratory system	31,011	30	0.96	273,565	126	0.46
Oncological D&D	42,249	25	0.60	840,653	217	0.26
D&D nervous system	25,963	19	0.75	230,786	93	0.40
All categories	**334,388**	**233**	**0.70**	**4,167,398**	**1,319**	**0.32**

D&D=Diseases and Disorders

Table 3 presents the top five cost-incurring clinical conditions among HCUs for In-Patient, Day Surgery and Emergency. In total, there are 21 conditions in In-Patient, 19 in Day Surgery and 19 in Emergency. The top five conditions accounted for 59% of all HCU costs in In-Patient, 81% in Day Surgery and 63% in Emergency.

The table shows that all but one of the top five clinical conditions in In-Patient and Emergency were identical, though ranked differently. Furthermore, in all three care types, circulatory system conditions incurred the highest total HCU costs. Within Day Surgery, circulatory system conditions had a notably higher average cost per patient than any other condition, whether for HCUs or for all users.

Discussion

This HCU profile highlights the preponderant characteristics among HCUs. HCUs are most costly and prevalent in the TC LHIN, possibly because TC is host to hospitals that provide more specialized, costly acute services. Males are more costly than females, but neither age distribution nor frequency of care types was found to explain this observation. Seniors predictably accounted for the majority of HCU patients and costs, but the average cost per patient decreased with age; with age, the increase in patient count was greater than the increase in total costs, suggesting a higher frequency of less costly visits at older ages. Of the different clinical conditions, circulatory system conditions incurred the most costs in In-Patient, Day Surgery and Emergency. In In-Patient and Emergency, the high cost for circulatory system conditions was due to volume of patients, not due to the cost per patient. In Day Surgery, however, both cost per patient and volume of patients contributed to the high costs, illustrating that the cost and cost drivers associated with a condition vary by care type. In In-Patient, 92% of circulatory system condition costs were from patients aged 45+, 58% of these costs were from males, and 23% were from patients in TC, reconfirming the role of demographics in driving prevalence of conditions. Further investigations concerning the types of treatments used in each demographic may give added insights into the differences observed between demographic categories.

The profile of high-cost users in Ontario presented in this paper is an original contribution to the wide body of published literature on HCUs in other jurisdictions. It confirms previously published findings that a relatively small proportion of patients consume the majority of healthcare resources, but also looks at characteristics that are specific to Ontario.

Moving forward, this profile should guide the development of policies and programs supporting Ontario's Action Plan for Health Care (Government of Ontario 2012). Furthermore, efforts to manage HCUs should address their complex profile through integrated, multidisciplinary healthcare delivery. The focus of the delivery, moreover, should be on appropriate care as opposed to simply more frequent or more costly care, as Stukel and colleagues (2012) and The Commonwealth Fund (2012) have emphasized. This profile should also help in providing coordinated healthcare services to HCUs by all related care providers in each LHIN. Further research should build upon the profile presented, investigating, for example, how HCUs transition through the system and how different interventions contribute to high costs. Currently, we are looking at the histories of HCUs and the progression of chronic conditions to identify precursors and interventions that may help identify patients at risk of becoming HCUs. Proper interventions and proactive care for such high-risk patients may improve health outcomes and ease fiscal pressures on the healthcare system.

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