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Research

Primary care reform and funding equity for mental health disorders in Ontario: a retrospective observational population-based study

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Abstract

Background: Mental health disorders are associated with high morbidity and reduced life expectancy, and are largely managed in primary care. We sought to assess the equity of distribution of new alternative payment models and teams introduced under primary care reform in Ontario for patients with mental health disorders.

Methods: We conducted a retrospective observational study using population-level administrative data for insured Ontario adults (age ≥ 18 yr) to identify all primary care payments to physicians that were allocated to individual patients in 2002/03 and 2011/12. We identified patients with mental health disorders using validated algorithms, and modelled the relations between per capita primary care costs and mental health disorders over time, stratified by type of mental health or substance use disorder and type of primary care payment. In an adjusted model, we adjusted for age, sex, rurality, neighbourhood income quintile, immigrant status, comorbidity and primary care model. For comparative purposes, we also examined the distribution of primary care payments for people with diabetes mellitus.

Results: Total per capita primary care payments increased more slowly over the study period for patients with mental health disorders (62.0%) than for the general population (88.3%). Total payments for patients with substance use disorders increased by 142.7%, largely owing to urine drug testing in opioid substitution clinics. Adjusted total payments for those with versus without mental health disorders decreased by 10% between 2002/03 and 2011/12, driven by lower alternative payments. Similar decreases, also driven by lower alternative payments, were found for all mental health disorder subgroups except substance use and for diabetes.

Interpretation: Payment and team reforms were associated with inequitable resource allocation to people with mental health disorders. The findings suggest the need for monitoring reforms for their impact on high-needs populations and making appropriate adjustments.

Mental health and substance use disorders affect 33% of adults over their lifetime,[1] and account for about 23% of years lived with a disability[2] and a mortality gap of 13–20 years.[3] Primary care physicians are the health care professionals most frequently consulted by adults with mental health disorders,[4] but affected patients experience lower access and quality of primary care.[5–9]

Strong primary care systems are associated with greater health equity and lower mortality and cost.[10] An essential evidence-based attribute of effective primary care systems is equitable distribution of health care resources.[11,12] In Canada, medically necessary physician and hospital services are universally funded for permanent residents without any direct charges to patients. In 2000, following a period of declining policy support for primary care, Ontario increased investment and implemented broad voluntary reforms in the delivery and payment of primary care aimed at improving access, quality of care and physician retention.[13] Under the reforms, most physicians shifted from exclusive fee-for-service (FFS) remuneration to new models that incorporated blended capitation payments, patient enrolment, pay for performance and, in some cases, access to nonphysician health care professionals.

Previous work showed that fewer patients with mental health disorders than those without such disorders were enrolled in new payment models.[14–16] However, little is known about the equity of distribution of new primary care investments, which we hypothesized would flow inequitably for adults with mental health disorders. We aimed to assess the equity of distribution of new alternative payments introduced under primary care reform in Ontario. For

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comparative purposes, we also examined the distribution of primary care payments for people with diabetes mellitus.

Methods

Design, setting and participants

We conducted a retrospective observational study using population-level administrative data housed at ICES. Study participants included all adult (age ≥ 18 yr) Ontario residents eligible for universal health insurance and Ontario primary care physicians. Uninsured Ontario residents were excluded, as were physicians practising in Community Health Centres (representing 2%–3% of primary care provision[17]) owing to lack of payment data.

Data sources and linkages

The data sets used were the Registered Persons Database (a registry of all Ontario residents eligible for the Ontario Health Insurance Plan [OHIP]), the Corporate Provider Database (a registry of all providers and provider groups eligible to bill OHIP for their services) and the Client Agency Program Enrolment database (which lists all patients enrolled with a primary care physician within a primary care group). The data sets were linked by means of unique encoded identifiers.

Payment data sources, all from the Ontario Ministry of Health and Long-Term Care, were the OHIP database of FFS billings; the OHIP Architected Payments database of incentive, premium, bonus and capitation payments; the Generalized Alternative Payment Plan database of non-FFS payments to physicians who are part of alternative funding agreements; payments to academic health science centres; and a database of miscellaneous payments. The unique identifiers were used to link patients and payments, sometimes directly, sometimes via linkage between patients and physicians or groups. A detailed description of how payments to physicians and groups were allocated to patients is available in Appendix 1 (available at www.cmajopen.ca/content/8/2/E455/suppl/DC1).

Variable definition

Outcome

We decided a priori that any payment to a primary care physician or a primary care enrolment model group would be deemed a primary care payment. Primary care physicians were defined as those whose specialty was listed as general practitioner or family physician, plus any physician with a full-time affiliation with a primary care enrolment model (which included physician groups such as Family Health Groups, Comprehensive Care Models, Family Health Networks and Family Health Organizations, and multidisciplinary Family Health Teams).

We extended established patient-level costing methodology[18] to include payments specific to primary care reform. We included all payments for services provided to patients, plus payments to Family Health Teams for practice infrastructure and services of other health care professionals because these are important components of primary care reform. Only Ontario Ministry of Health and Long-Term Care payments were available and could be included. We allocated FFS payments to the patients for whom the service was provided. Block payments made to physicians or groups were divided among the patients assigned to the physician or group based on the type of payment and the relationship between the patient and the provider. A detailed description of the methodology used is available in Appendix 1.

Although some small pilot projects in 2002/03 used alternative funding models, payment data for these were unavailable, so all primary care payments in 2002/03 were FFS. We divided new primary care payments in 2011/12 (non-FFS payments, referred to collectively as alternative funding payments) into 4 categories: capitation, other physician payments (all noncapitation primary care payments to physicians), payments for interdisciplinary teams and other.

The study period was Apr. 1, 2002, to Mar. 31, 2012. We selected Mar. 31, 2012 as the study end date because interprofessional team payments were excluded from payment data sent to ICES after 2012.

Exposure

We identified people with mental health and substance use disorders using validated administrative case definitions (see Appendix 2, available at www.cmajopen.ca/content/8/2/E455/suppl/DC1, for a complete list of diagnostic codes).[19,20] We stratified mental health and substance use disorders into 3 diagnostic categories: psychotic, nonpsychotic and substance use disorders. We identified people with diabetes using a validated administrative case definition.[21]

Covariates

We derived age, sex, rurality and immigration status from the Registered Persons Database. We measured rurality using the postal code and the Rurality Index for Ontario, with categories of urban (score 0–9), suburban (score 10–39) and rural (score ≥ 40).[22] We derived neighbourhood income quintile using the postal code linked to census dissemination area.[23] We identified recent immigrants as people who received an Ontario health card for the first time within the previous 10 years (about 75% of this group would be expected to be recent immigrants, and the remainder would be expected to have migrated from other Canadian provinces[24]). We used the Johns Hopkins Adjusted Clinical Groups System Version 10 to capture comorbidity according to Aggregated Diagnostic Groups. We determined primary care model type, including FFS, enhanced FFS (Family Health Groups and Comprehensive Care Model) and blended capitation (Family Health Organizations and Family Health Networks), using the Client Agency Program Enrolment database tables.[13]

Statistical analysis

We compared the population characteristics of people with various conditions to the Ontario population. Then we estimated the unadjusted per capita primary care payments for

these groups in 2002/03 and 2011/12. Finally, we modelled the relation between per capita payments and the presence of a condition, controlling for prespecified covariates.

Before modelling, we found the distribution of per capita primary care payments to be highly skewed, which we addressed using a log-transformation. We then modelled the relation between the presence of a given condition and the log of per capita primary care payments, using ordinary least squares regression with log payments as the outcome, adjusting for prespecified covariates including age, sex, neighbourhood income quintile, rurality, immigration status, primary care payment model and comorbidity. We then exponentiated the modelling results to back transform them. The parameter estimate, when exponentiated, yielded an estimate of the ratio of the average per capita primary care payment for people with the condition compared to those without, controlling for the factors listed above. Exponentiating the least squares means plus half the mean square error produced adjusted cost estimates.[25]

The unit of analysis in all models was the patient. We ran separate models for each diagnostic category and for each type of payment comparing average per capita primary care payments for those with and without the disorder.

We measured the relative distribution of primary care investment as the ratio of average per capita primary care payments for people with a condition compared to those without the condition. We measured change in the distribution by comparing the ratios at the beginning (2002/03) and end (2011/12) of the study period. We then estimated the change in this distribution by calculating stratum-specific ratios of the total payment ratios from the end and beginning of the study period. If the relative distribution of funding had been consistent over the study period, this ratio would equal 1. A ratio greater than 1 indicates a relatively higher proportion of funding going to those with the condition over the study period, and a ratio less than 1 indicates a relatively smaller proportion of funding going to those with the condition. We subsequently examined the contribution of payments for urine drug testing for people who received opioid substitution therapy.

We carried out all analyses using SAS 9.4 (SAS Institute).

Sensitivity analysis

We conducted a sensitivity analysis to assess the impact of clustering by patient or physician.

Ethics approval

The study was approved by the Queen's University Health Sciences Research Ethics Board and the Sunnybrook Health Sciences Centre Research Ethics Board.

Results

We identified 1 645 324 Ontario adults in 2011/12 (16.6% of the adult population) with a mental health disorder, including 149 185 with psychotic disorders, 1 456 981 with nonpsychotic disorders, and 127 820 with substance use disorders (Table 1). People with a mental health disorder were more likely to be female, poor and nonimmigrant, to live in urban settings and to have 2 or more comorbid conditions. Similar patterns were seen for people with psychotic and nonpsychotic disorders. Those with substance use disorders were more likely to be young and male, and less likely to live in urban settings. We found similar patterns in 2002/03 except for a higher prevalence of any mental health disorder (20.0%) (data not shown).

Total per capita primary care payments increased by 88.3% over the study period (Table 2). Total primary care payments for any mental health disorder were higher than for the general population at baseline and study end. However, growth was slower for those with any mental health disorder (62.0%), psychotic disorders (45.3%) and nonpsychotic disorders (50.2%), whereas total primary care payments grew more rapidly for those with substance use disorders (142.7%). In 2011/12, 45.5% of primary care payments for the general population went to alternative funding payments, which was higher than the corresponding figure for any mental health disorder (28.0%) and each subcategory (psychotic disorders 25.8%, nonpsychotic disorders 31.5% and substance use disorders 11.3%).

Results were similar in the adjusted model (Table 3). Overall payments for people with any mental health disorder were 50% higher than for those without a mental health disorder in 2002/03, but by 2011/12 they were 35% higher, a 10% relative reduction. Overall payments were also reduced for psychotic disorders (by 8%) and nonpsychotic disorders (by 13%), but increased by 141% for substance use disorders. A similar relative payment reduction was seen for diabetes (6%). Total alternative funding payments were directed less or about equally to those with and without mental health disorders (ratios for specific conditions 0.82–1.05) and diabetes (ratio 1.17).

In the sensitivity analysis, although we found evidence of physician clustering, neither the point estimates nor the ratios changed significantly when we adjusted for clustering.

We examined the contribution of urine drug testing for people who received opioid substitution to the increased FFS payments for people with substance use disorders. The mean per person payment for urine drug testing increased from $0 in 2002/03 to $1140 for the 115 778 people who underwent testing in 2011/12, accounting for the majority of the increase in FFS payments.

Interpretation

We found that, during a period of substantial reform in primary care delivery and growth in primary care funding in Ontario, new investment flowed inequitably to the care of adults with mental health disorders. There was slower overall growth in primary care funding for those with mental health disorders than for the general population and relatively lower alternative funding payments than expected based on need. The exception was in payments for substance use disorders, where there was substantial overall growth in total payments, driven by large increases in FFS payments (led by the need

Table 1: Ontario adult population with mental health disorders and diabetes mellitus by sex, age, neighbourhood income quintile, rurality, immigrant status and comorbidity, 2011/12

Variable	No. (%) of people					
		Mental health disorder				
	Ontario population *n* = 9 931 509	Any mental health disorder *n* = 1 645 324	Psychotic disorder *n* = 149 185	Substance abuse disorder *n* = 127 820	Nonpsychotic disorder *n* = 1 456 981	Diabetes mellitus *n* = 1 180 698
Female sex	5 229 991 (52.7)	988 774 (60.1)	80 724 (54.1)	46 251 (36.2)	897 908 (61.6)	568 557 (48.2)
Age group, yr						
18–44	4 451 837 (44.8)	717 968 (43.6)	64 212 (43.0)	72 066 (56.4)	632 077 (43.4)	125 601 (10.6)
45–64	3 585 439 (36.1)	638 963 (38.8)	61 255 (41.1)	46 456 (36.3)	565 231 (38.8)	500 980 (42.4)
65–74	1 022 816 (10.3)	153 995 (9.4)	12 612 (8.5)	6327 (4.9)	138 704 (9.5)	284 634 (24.1)
≥ 75	871 417 (8.8)	134 398 (8.2)	11 106 (7.4)	2971 (2.3)	120 969 (8.3)	269 483 (22.8)
Neighbourhood income quintile						
1 (lowest)	1 834 914 (18.5)	345 361 (21.0)	42 112 (28.2)	37 575 (29.4)	297 483 (20.4)	255 837 (21.7)
2	1 946 061 (19.6)	327 731 (16.8)	31 552 (21.1)	27 553 (21.6)	288 809 (19.8)	252 641 (21.4)
3	1 987 891 (20.0)	319 330 (19.4)	26 457 (17.7)	22 915 (17.9)	284 615 (19.5)	238 997 (20.2)
4	2 099 737 (21.1)	330 406 (20.1)	25 321 (17.0)	20 932 (16.4)	296 010 (20.3)	230 452 (19.5)
5 (highest)	2 022 459 (20.4)	315 477 (19.2)	22 873 (15.3)	17 708 (13.9)	284 261 (19.5)	197 160 (16.7)
Missing	40 447 (0.4)	7019 (0.4)	870 (0.6)	1137 (0.9)	5803 (0.4)	5611 (0.5)
Rurality						
Urban	7 181 977 (72.3)	1 218 108 (74.0)	112 146 (75.2)	87 755 (68.7)	1 083 914 (74.4)	845 868 (71.6)
Suburban	1 932 660 (19.5)	307 792 (18.7)	27 001 (18.1)	26 948 (21.1)	269 913 (18.5)	229 100 (19.4)
Rural	741 770 (7.5)	108 584 (6.6)	9171 (6.1)	10 665 (8.3)	94 705 (6.5)	93 355 (7.9)
Missing	75 102 (0.8)	10 840 (0.7)	867 (0.6)	2452 (1.9)	8449 (0.6)	12 375 (1.0)
Immigrant	983 620 (9.9)	118 921 (7.2)	7530 (5.0)	5236 (4.1)	108 251 (7.4)	67 868 (5.7)
No. of Aggregated Diagnostic Groups*						
0	506 134 (5.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	13 599 (1.2)
1	4 404 093 (44.3)	388 269 (23.6)	32 076 (21.5)	34 574 (27.0)	328 149 (22.5)	352 370 (29.8)
2	4 031 097 (40.6)	867 655 (52.7)	72 350 (48.5)	61 558 (48.2)	775 665 (53.2)	572 592 (48.5)
3	990 185 (10.0)	389 400 (23.7)	44 759 (30.0)	31 688 (24.8)	353 167 (24.2)	242 137 (20.5)

*Comorbidity as determined with the Johns Hopkins Adjusted Clinical Groups.

for frequent urine drug testing for opioid substitution therapy) and smaller investment in alternative funding payments.

Our findings can be expected based on the voluntary nature and self-selection of physicians into new payment models and the nature of new incentives.[26] In blended capitation models, physicians receive a monthly payment for providing an essential basket of services for each enrolled patient, adjusted for age and sex but not case-mix. People with mental health disorders have complex health needs[27] and may be underserved in a structure with disincentives to enrol such patients. Previous work showed underrepresentation of people with mental health disorders in new models of primary care delivery[16] and fewer primary care visits related to mental health in capitation-based models.[28] Despite incentives to provide care to people with schizophrenia and bipolar disorder (up to $2000 annually to physicians caring for at least 10 patients with either diagnosis), there was a relative decrease in payments for mental health disorders (other than substance use) under primary care reform in Ontario.

The large increase in primary care payments for people with substance use disorder is appropriate given the opioid crisis.[29] Urine testing for opioid substitution represented a substantial proportion of primary care costs for people with substance use disorder. Relatively low alternative funding payments are also consistent with reform incentives. Physicians in new models are eligible for an access bonus when their team provides all primary care services. Patients receiving opioid substitution at addiction clinics require frequent visits and

Table 2: Unadjusted average per capita primary care payment costs by subgroup and type of cost, 2002/03 and 2011/12

Subgroup	Average per capita PCP, $								% change in average per capita PCP 2002/03 to 2011/12‡
		Funding model							
	Overall, 2002/03*	Fee-for-service	Physician capitation†	Physician other†	Interdisciplinary team†	Other†	Total (% of payments)	Overall, 2011/12	
Total Ontario population	173	178	98	28	16	7	148 (46)	326	88.3
Any mental health disorder	321	376	93	30	15	7	145 (28)	521	62.0
Psychotic disorder	420	453	94	32	21	11	157 (26)	610	45.3
Substance use disorder	460	992	66	30	21	10	126 (11)	1118	142.7
Nonpsychotic disorder	308	317	95	29	14	7	145 (32)	462	50.2
Diabetes mellitus	292	304	125	49	15	7	196 (39)	500	71.2

Note: PCP = primary care payment.
*Fee-for-service only.
†Alternative funding.
‡Differences are due to rounding.

Table 3: Adjusted per capita primary care payment costs by subgroup and type of cost, and ratio of estimated costs for population with and without the specified condition, 2002/03 and 2011/12

Subgroup	Adjusted per capita PCP estimate, $, and ratio of payment estimate for those with and without each condition*																Ratio of overall adjusted payment ratios 2011/12 and 2002/03
			Funding model, 2011/12														
	Overall, 2002/03†		Fee-for-service		Physician capitation‡		Physician other‡		Interdisciplinary team‡		Other‡		Total‡		Overall, 2011/12		
	Cost	Ratio	Cost	Ratio	Cost	Ratio	Cost	Ratio	Cost	Ratio	Cost	Ratio	Cost	Ratio	Cost	Ratio	
Any mental health disorder	301	1.50	387	1.45	130	0.95	82	1.08	93	0.98	73	1.16	364	0.99	677	1.35	0.90
Psychotic disorder	304	1.38	380	1.33	141	1.04	83	1.08	116	1.23	86	1.34	387	1.05	673	1.27	0.92
Substance abuse disorder	355.	1.62	790	2.82	124	0.92	73	0.94	106	1.13	81	1.27	305	0.82	1193	2.29	1.41
Nonpsychotic disorder	304	1.50	377	1.38	129	0.95	82	1.08	91	0.96	72	1.15	366	0.99	665	1.31	0.87
Diabetes mellitus	282	1.34	378	1.43	133	0.98	106	1.53	90	0.94	63	0.98	417	1.17	637	1.26	0.94

Note: PCP = primary care payment.
*Adjusted for age, sex, rurality, neighbourhood income quintile, immigrant status, comorbidity and primary care model.
†Fee-for-service only.
‡Alternative funding.

urine testing. The loss of the access bonus incentivizes physicians in new models to unenrol these patients and provide care on an FFS basis. The implications for quality of care are unknown, but people with substance use disorders have complex needs and are at elevated risk for chronic diseases,[30] mental health conditions[31–33] and failure to receive preventive health care such as cancer screening,[9] for which a medical home model may be more appropriate.

System-level barriers to primary care for people with mental health disorders are seen internationally. In the United States, payment systems frequently compartmentalize primary care and behavioural health delivery, resulting in fragmented and suboptimal care for both behavioural and medical health needs.[34] Despite lower uninsured status rates,[35] structural barriers maintain the siloed nature of care.[36–39] The UK quality-improvement incentive program has been associated with increased primary care consultation for people with serious mental illness,[4] but the impact on access for people with other mental health disorders is unknown. In Australia, the Better Access initiative resulted in more frequent visits for depression,

but concerns persist regarding access for people with schizophrenia and bipolar disorder.[40] Promising innovations such as medical homes,[41] coordinated care models,[42] co-location with social services[43] and emergency department navigators[44] will require appropriately aligned payment models.

Limitations

Although this study has strengths, including the population-based approach to primary care payments over time, it also has limitations. The validated algorithm for detection of mental health and substance use disorders has very good sensitivity and excellent specificity but may have failed to identify some affected people. We identified costs by extending an established patient-level cost allocation method[18] to include premiums and infrastructure payments specific to Ontario primary care. This approach has not been validated.

Alternative funding payments may appear in multiple databases and may be paid to individual physicians, teams or academic departments. We divided block payments allocated to groups evenly among all group members, because more detailed allocation data were unavailable. About 2% of all primary care payments could not be allocated for 1 of 3 reasons: the payment was made to a physician with no assigned patients, the payment was made for a service provided to a patient who could not be assigned to a physician, or the payment was made to a group for whom no affiliated physicians could be identified because the group was not in the Corporate Provider Database. Payments to the small number of physicians in older alternative payment models in 2002/03 were not tracked in electronic databases and could not be included. However, nearly all payments were allocated, and the approach was consistent over the study period. Complete payment data were available only until 2012; however, there have since been no major changes in primary care payment models.

Conclusion

New resources were inequitably allocated to people with mental health disorders during a period of major reform of primary care delivery and payment in Ontario. Future policy directions should address the need for case-mix adjustment and misaligned incentives, monitoring reforms for their impact on high-needs populations and making appropriate adjustments.

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Data sharing: The data set from this study is held securely in coded form at ICES. Although data-sharing agreements prohibit ICES from making the data set publicly available, access can be granted to those who meet prespecified criteria for confidential access, available at www.ices.on.ca/DAS. The full data set creation plan and underlying analytic code are available from the authors on request, with the understanding that the programs may rely on coding templates or macros that are unique to ICES and are therefore inaccessible or may require modification.

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