Attachment to primary care and team-based primary care

Retrospective cohort study of people who experienced imprisonment in Ontario

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Abstract

Objective To examine attachment to primary care and team-based primary care in the community for people who experienced imprisonment in Ontario, and to compare these attachment data with data for the general population.

Design Population-based retrospective cohort study.

Setting Ontario.

Participants All persons released from provincial prison in Ontario to the community in 2010 who were linked with provincial health administrative data, and an age- and sex-matched general population group.

Main outcome measures Primary care attachment and team-based primary care attachment in the 2 years before admission to provincial prison (baseline) and in the 2 years after release in 2010 (follow-up) for the prison release group, and for the corresponding periods for the general population group.

Results People in the prison release group (n = 48 861) were less likely to be attached to primary care compared with the age- and sex-matched general population group (n = 195 444), at 58.9% versus 84.1% at baseline ($P < .001$) and 63.0% versus 84.4% during follow-up ($P < .001$), respectively. The difference in attachment to team-based primary care was small in magnitude but statistically significant, at 14.4% versus 16.1% at baseline ($P < .001$) and 19.9% versus 21.6% during follow-up ($P < .001$), respectively.

Conclusion People who experience imprisonment have lower primary care attachment compared with the general population. Efforts should be made to understand barriers and to facilitate access to high-quality primary care for this population, including through initiatives to link people while in prison with primary care in the community.

Editor's key points

- People who experienced imprisonment in Ontario were significantly less likely to be attached to primary care compared with the general population group, both before imprisonment and after release to the community ($P < .001$).
- Rates of attachment to team-based care were similar in magnitude for the prison release group and the general population group. A higher proportion of the prison release group was attached to community health centres. For persons in the prison release group, primary care attachment and team-based primary care attachment increased between baseline (2-year period before admission) and follow-up (2-year period after release).
- After prison release, a substantial proportion of persons with a chronic condition had no primary care attachment; however, the proportion of persons attached to primary care and team-based primary care increased with increasing comorbidities.

Points de repère du rédacteur

- Il était significativement moins probable que les personnes ayant vécu une incarcération en Ontario soient attachées aux soins primaires par rapport à la population en général, à la fois avant leur emprisonnement et après leur libération dans la collectivité (p <,001).
- Les taux de rattachement aux soins en équipe étaient semblables en importance dans le groupe des personnes libérées de prison et dans celui de la population en général. Une plus grande proportion, dans le groupe libéré, était rattachée à des centres de santé communautaires. Dans le cas des personnes du groupe libéré de prison, le rattachement s'est accru entre la période repère (2 années avant l'incarcération) et la période du suivi (2 années suivant la libération).
- Après la libération de prison, une proportion considérable des personnes atteintes d'une maladie chronique n'étaient d'aucune façon rattachées aux soins primaires; par ailleurs, le taux des personnes rattachées aux soins primaires et aux équipes de soins primaires augmentait en fonction du nombre de comorbidités.

Rattachement aux soins primaires et aux soins primaires en équipe

Étude rétrospective de cohortes auprès de personnes ayant vécu une incarcération en Ontario

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Résumé

Objectif Examiner si les personnes ayant vécu une incarcération en Ontario étaient rattachées aux soins primaires et aux soins primaires en équipe dans la communauté, et comparer les données sur ce rattachement avec celles observées dans la population en général.

Type d'étude Étude rétrospective de cohortes dans la population.

Contexte Ontario.

Participants Toutes les personnes libérées d'une prison provinciale en Ontario retournant dans la communauté en 2010 qui faisaient l'objet de données administratives du système de santé provincial, et un groupe dans la population en général jumelé en fonction de l'âge et du genre.

Principaux paramètres à l'étude Le rattachement aux soins primaires et le rattachement aux soins primaires en équipe durant la période de 2 ans précédant l'incarcération dans une prison provinciale (période repère) et durant la période de 2 ans suivant la libération en 2010 (suivi) dans le groupe libéré de prison et, pour la période correspondante, dans le groupe représentant la population en général.

Résultats Les personnes dans le groupe libéré de prison (n = 48 861) étaient moins susceptibles d'être rattachées aux soins primaires que les personnes représentant la population en général (n = 195 444), jumelées selon l'âge et le genre, soit respectivement 58,9 contre 84,1 % durant la période repère (p <,001) et 63,0 contre 84,4 % durant la période de suivi (p <,001). La différence dans le rattachement à une équipe de soins primaires était faible en nombre, mais statistiquement significative, respectivement 14,4 contre 16,1 % pendant la période repère (p <,001) et 19,9 contre 21,6 % pendant la période de suivi (p <,001).

Conclusion Les personnes incarcérées sont moins souvent rattachées aux soins primaires par rapport à celles dans la population en général. Des efforts devraient être déployés pour mieux comprendre les obstacles au rattachement et faciliter l'accès à des soins primaires de grande qualité dans cette population, notamment ay moyen d'initiatives visant l'établissement de liens entre les personnes durant leur incarcération et les soins primaires dans la communauté.

Worldwide, more than 10.3 million people are in prison at any given time.[1] International data reveal that the health of this population is poor compared with the general population, with a disproportionate burden of mental illness, infectious disease, injury, chronic disease, and premature mortality.[2]

Long championed internationally as "essential health care,"[3] primary care has been shown to reduce morbidity and mortality at the population level.[4] Limited evidence suggests that while primary care use rates are high for people while in prison,[5-12] a substantial proportion of people who experience imprisonment do not access primary care in prison or in the community after prison release.[13-16]

Since 2000, Ontario has implemented primary care reform, consistent with national goals of increasing primary care access, improving chronic disease prevention and management, providing interdisciplinary team care, and supporting integration and coordination with other health services.[17] One component of this reform has been the expansion of team-based primary care models with integrated access to nonphysician health professionals including social workers, dietitians, and pharmacists.[18] Team-based care is regarded as an essential building block for high-quality primary care[19] and has been associated with improvements in primary care quality in Ontario[20-23] and in other jurisdictions.[24-29] However, attachment to team-based care varies in Ontario based on sociodemographic characteristics, with lower participation by people in neighbourhoods with low income, people in urban settings, and people who are recent immigrants.[21,23,30]

Access to health care is a modifiable determinant of health,[31,32] and access to high-quality primary care is an indicator of health equity. Focused initiatives could improve access to high-quality primary care for people who experience imprisonment—for example, programs to link people in prison with primary care after prison release.[33] With greater morbidity burden, this population might have greater need for and benefit from high-quality primary care, and especially from interdisciplinary and team-based care.

This study describes primary care attachment and team-based primary care attachment before and after imprisonment for people released from provincial prison in Ontario in 2010 compared with people in the age- and sex-matched general population group.

Methods

Design and setting

We conducted a retrospective cohort study of all persons released from provincial correctional facilities in Ontario in 2010 matched by age and sex with persons from the general population. Provincial correctional facilities in Canada hold persons who are imprisoned before sentencing, persons sentenced to less than 2 years in prison, persons sentenced to 2 years or longer before being transferred to a federal prison, and persons in temporary detention for other reasons.[34] We use the term *provincial prison* to represent all provincial correctional facilities, including jails and prisons.

In Ontario, provincial prisons are publicly funded and administered. For Ontario residents, hospitalizations and medically necessary physician services are paid for through the public health insurance system, including in provincial prison. In provincial prison, a nurse conducts an initial assessment of each person at the time of admission, then people see a physician routinely within weeks of admission, or sooner if medically indicated, and subsequently based on identified need for ongoing or episodic care by health care staff or through patient request. People who are released within a short period might not see a physician while in prison.

Selection of participants

The Ontario Ministry of Community Safety and Correctional Services (MCSCS) provided identifying data on all adults released from provincial prison in 2010, including name, date of birth, sex, self-reported race, Ontario Health Insurance Plan (OHIP) number, and dates of admission and release and reasons for release between 2005 and 2015. They transferred these data to ICES, an independent non-profit organization funded by the Ontario Ministry of Health and Long-Term Care, which houses health administrative data for Ontario residents.

We linked data on persons released from provincial prison with a unique encoded OHIP number (an ICES key number) in the Registered Persons Database (RPDB), which is a comprehensive database of all persons in Ontario who are eligible for OHIP coverage. To link data, we used the OHIP number when provided and valid, or else we used a validated deterministic or probabilistic linkage method using name and date of birth.[35] We excluded linkages that might be incorrect, including for persons whose date of birth or sex differed between the MCSCS data and the RPDB, if the same ICES key number matched to multiple persons, if MCSCS data showed that the person was in custody after the date that the person was shown to have died in the RPDB, or if the person had accessed health care after the date of death in the MCSCS data.

To identify persons released to the community in 2010—ie, the prison release group—we excluded persons who had a release period of 1 day or less in 2010 based on the assumption that such short releases represent mainly administrative status changes rather than a true release to the community and do not represent an opportunity to seek health services. We also excluded persons whose reason for release was listed as death, transfer to the federal correctional system, or related to immigration. We did not exclude persons on the basis of death or readmission to custody during the 2-year follow-up period.

For each person released from provincial prison to the community, we randomly selected 4 age- and sex-matched people in the RPDB from the full list of people who had the same age and sex and were registered for OHIP coverage on the date the person was released from prison. We used a ratio of 4:1 for matching to optimize statistical efficiency,[36] with no replacement (ie, each person could be selected as a control only once). In this cohort study, the prison release group represented the exposed group and the general population group represented the unexposed group.

Covariates

Sociodemographic information. We accessed data on neighbourhood income quintile and residence in rural areas or small towns for each person using the postal code at the time of prison admission. We used self-reported race from the MCSCS data; we maintained the category names provided by the MCSCS (eg, "Aboriginal" for Indigenous persons). No data on race were available for the general population.

Comorbidities. We examined the proportion of people with a diagnosis of the following chronic conditions at the time of their initial release in 2010 (or on the corresponding date for the general population group): diabetes, hypertension, chronic obstructive pulmonary disease, asthma, and HIV infection. We used previously validated methods applied to ambulatory care data (the OHIP database), emergency department data (National Ambulatory Care Reporting System), and hospital admissions data (Canadian Institute for Health Information Discharge Abstract Database and Ontario Mental Health Reporting System).[37-41] We applied definitions from the Ontario Mental Health and Addictions Scorecard and Evaluation Framework to identify persons with mood disorders, schizophrenia, substance-related disorders, and anxiety disorders at the time of initial release in 2010 (or on the corresponding date for the general population group), based on data in the OHIP database, National Ambulatory Care Reporting System, Discharge Abstract Database, and Ontario Mental Health Reporting System.[42] For each person, we used the Johns Hopkins Adjusted Clinical Groups System[43] to determine the past-year number of aggregated diagnosis groups (ADGs), which represent 32 diagnosis clusters that indicate the burden of morbidity.[44] We categorized number of ADGs into 3 groups: 0 to 4, 5 to 9, and 10 or greater.

Outcome

The 2 outcomes were primary care attachment and team-based primary care attachment. We accessed data in OHIP and the community health centre (CHC) database.

We examined primary care use within a 2-year period, based on methods used in previous studies[21,23] and because we would be more likely to identify health care use for people who access primary care infrequently by using a relatively long follow-up period. We classified primary care attachment hierarchically. We classified a person's primary care attachment as a CHC, which is a salary- and interdisciplinary team–based model, if they used a CHC during the period. If not, we classified a person's primary care attachment based on enrolment in 1 of the following primary care models: a family health team (FHT), which is an interdisciplinary team–based capitation model; a family health organization or family health network, which are blended capitation models; a family health group, which is a blended fee-for-service model; or another primary care model, including comprehensive care models, community health groups, community-sponsored agreements, group health centres, the Rural and Northern Physician Group Agreement, the Southeastern Ontario Academic Medical Organization, or St Joseph's Health Centre. If a person had not used a CHC and was not enrolled in a primary care model, we examined any physician OHIP billing of any of 26 primary care fee codes (as listed elsewhere[21] plus codes K130, K131, and K132, which are new codes for periodic health examinations), and we considered the person as attached to a model of care or fee-for-service based on the physician who billed the greatest value.

We considered a person as having primary care attachment if he or she had any use of any of these types of primary care during the 2-year period (yes or no). We considered a person as having team-based primary care model attachment if he or she had any use of a CHC, enrolment with a physician who was associated with an FHT, or if the physician who billed the highest total value of the 26 core primary care fees for the patient was associated with an FHT.

Analysis

For sociodemographic characteristics and comorbidities, we calculated the frequency for categorical variables or the median and interquartile range (IQR) for continuous variables. We used χ^2 tests or t tests to compare the prison release group and general population group across these variables.

For the prison release group and general population group, we defined the proportion of persons attached to primary care and attached to team-based primary care. We examined primary care attachment at baseline—the 2-year period before admission to provincial prison for the prison release group or the corresponding period for the general population group—and follow-up—the 2-year period subsequent to release from provincial prison for the prison release group or the corresponding period for the general population group. For the prison release group, we excluded any time in provincial prison to examine primary care access in the community.

We used χ^2 tests to compare any primary care attachment and type of primary care attachment, including

attachment to team-based care, between the prison release group and general population group during the baseline and follow-up periods. For the prison release group, we compared these 2 outcomes between the baseline and follow-up periods.

We examined the percentage of persons with primary care attachment and with team-based primary care attachment in the prison release group in the follow-up period for persons with specific chronic conditions and by number of ADGs. We looked at primary care attachment for people with known medical conditions in the prison release group only, as we were interested in identifying the need for primary care linkage in this group in particular.

The study was approved by the St Michael's Hospital Research Ethics Board and the Hamilton Integrated Research Ethics Board. We completed the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology)[45] and RECORD (Reporting of Studies Conducted Using Observational Routinely Collected Data) checklists.[46]

Results

Of 53 955 persons released from provincial prison in Ontario in 2010, we linked 52 546 (97.4%). Of these, 48 861 persons were released to the community, which we called the *prison release group*. We matched each person in the prison release group with 4 age- and sex-matched people, for a total of 195 444 people in the general population group.

Compared with the general population group, those in the prison release group were more often from neighbourhoods in a lower income quintile and from rural areas or small towns (**Table 1**). For the prison release group, the median time in provincial prison during the admission leading to the initial release in 2010 was 10 days (IQR 3 to 52), and the median total time in provincial prison since January 1, 2005, was 72 days (IQR 12 to 230). About half of the people in the prison release group were readmitted to provincial prison during the 2-year follow-up period (**Table 1**). Those in the prison release group had a significantly higher prevalence of all conditions examined, except hypertension, which was significantly lower ($P<.001$).

Table 2 and **Figure 1** show primary care attachment during the baseline and follow-up periods for both groups. At baseline, a larger proportion of persons in the general population were attached to primary care compared with those in the prison release group, with an absolute difference of 25.2% ($P<.001$). In the follow-up period, the difference between groups in primary care attachment remained statistically significantly different ($P<.001$), but the difference between groups was smaller, at 21.4%. In the baseline and follow-up periods, a higher proportion of persons in the general population were attached to team-based care ($P<.001$ for each period), but the absolute difference between groups was relatively small, at 1.7% in each period.

For the prison release group, the proportion of persons with primary care attachment increased from baseline to follow-up, from 58.9% to 63.0% ($P<.001$), and the proportion of persons attached to team-based care increased from 14.4% to 19.9% ($P<.001$).

Regarding the 2 models of team-based care, a higher proportion of people in the prison release group were attached to CHCs in both periods compared with the general population group, at 3.5% versus 0.8% at baseline ($P<.001$) and 5.0% versus 1.0% at follow-up ($P<.001$), respectively, whereas a lower proportion were attached to FHTs compared with the general population group, at 10.9% versus 15.3% ($P<.001$) at baseline and 14.9% versus 20.6% at follow-up ($P<.001$), respectively. The proportion of persons attached to each of the other types of primary care (ie, family health group, family health organization or family health network, other primary care models, or traditional fee-for-service) was significantly lower in both time periods for those in the prison release group compared with the general population group.

In the follow-up period, about three-quarters of people in the prison release group with specific chronic conditions were attached to primary care, with a range from 73.1% for people with asthma to 77.5% for people with mood disorders, and between one-fifth and one-third were attached to team-based care (**Table 3**). There was an apparent increase in the proportion of persons with primary care attachment and team-based care attachment with increasing comorbidities, as indicated by ADG score, with primary care attachment rates of 51.5% for people with 0 to 4 ADGs, 73.9% for people with 5 to 9 ADGs, and 79.7% for people with 10 or more ADGs, and team-based care model attachment rates of 16.7% for people with 0 to 4 ADGs, 22.8% for people with 5 to 9 ADGs, and 24.5% for people with 10 or more ADGs.

Discussion

In this population-based study, we found that people who experienced imprisonment in Ontario were significantly less likely to be attached to primary care compared with the general population group, both before imprisonment and after release to the community. Rates of attachment to team-based care were similar in magnitude for the prison release group and the general population group (although statistically significantly different); of note, a higher proportion of the prison release group was attached to CHCs. For persons in the prison release group, primary care attachment and team-based primary care attachment increased between baseline and follow-up. After prison release, a substantial proportion of persons with a chronic condition had no primary care attachment; however, the proportion of

Table 1. Characteristics of persons released from provincial prison in Ontario in 2010 and people in the age- and sex-matched general population group: *Percentages might not add to 100 owing to rounding.*

CHARACTERISTIC	PRISON RELEASE GROUP (N = 48 861)	GENERAL POPULATION GROUP (N = 195 444)	*P* VALUE*
Median (IQR) age, y	32 (24-43)	32 (24-43)	NA
Sex, %			NA
• Male	87.5	87.5	
• Female	12.5	12.5	
Self-reported race,† %			NA
• Missing	9.2	NA	
• White	58.8	NA	
• Black	11.4	NA	
• Aboriginal	10.1	NA	
• Other	10.4	NA	
Neighbourhood income quintile, %			< .001
• Missing	4.7	0.5	
• 1 (lowest)	37.1	20.0	
• 2	21.5	20.0	
• 3	15.8	20.0	
• 4	12.1	20.5	
• 5	8.8	19.0	
From a rural area or small town, %	13.0	10.6	< .001
Provincial prison experience			NA
• Median (IQR) time in prison from admission to 2010 release, d	10 (3-52)	NA	
• Median (IQR) time in prison in the 5 y before 2010 release, d	72 (12-230)	NA	
Readmission after 2010 release			NA
• Any within 2 y, %	50.8	NA	
• Median (IQR) time to readmission, d	195 (69-490)	NA	
Median (IQR) no. of ADGs	4 (2-7)	3 (1-5)	< .001
No. of ADGs, %			
• 0-4	51.9	69.8	< .001
• 5-9	35.6	26.5	
• ≥ 10	12.4	3.7	
Chronic disease prevalence,‡ %			
• Diabetes	4.8	4.1	< .001
• Hypertension	7.4	8.7	< .001
• COPD	4.5	2.0	< .001
• Asthma	16.4	13.8	< .001
HIV infection prevalence,‡ %	0.7	0.2	< .001
Mental disorder prevalence,‡ %			
• Mood disorders	6.8	0.8	< .001
• Schizophrenia	3.9	0.4	< .001
• Anxiety disorders	7.7	1.2	< .001
• Substance-related disorders	16.9	1.2	< .001

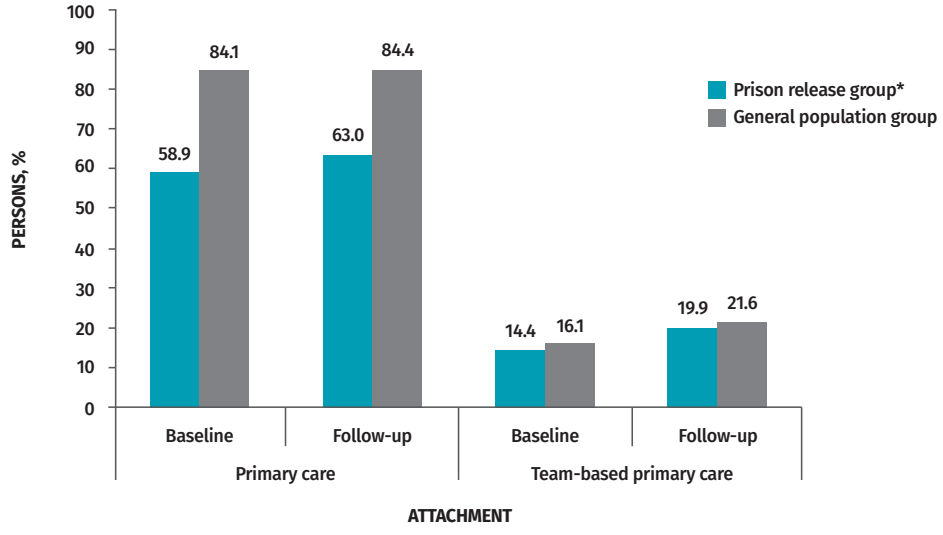
ADG—aggregated diagnosis group, COPD—chronic obstructive pulmonary disease, IQR—interquartile range, NA—not applicable or not available.
*For χ^2 or *t* tests.
†Data on race were not available for the general population group. We did not modify the category names provided by the Ontario Ministry of Community Safety and Correctional Services (eg, Aboriginal).
‡Diagnosis based on health administrative data.

Table 2. Primary care attachment by persons released from provincial prison in Ontario in 2010 (n = 48 861) and those in the age- and sex-matched general population group (n = 195 444): *We considered any use of primary care as primary care attachment. Percentages might not add to 100 owing to rounding.*

	BASELINE*			FOLLOW-UP*		
PRIMARY CARE TYPE	PRISON RELEASE GROUP, %	GENERAL POPULATION GROUP, %	*P* VALUE	PRISON RELEASE GROUP, %	GENERAL POPULATION GROUP, %	*P* VALUE
Primary care attachment	58.9	84.1	<.001	63.0	84.4	<.001
Team-based care models						
• Any	14.4	16.1	<.001	19.9	21.6	<.001
• CHC	3.5	0.8	<.001	5.0	1.0	<.001
• FHT	10.9	15.3	<.001	14.9	20.6	<.001
Non–team-based models						
• FHG	23.4	35.6	<.001	20.5	29.9	<.001
• FHO or FHN	11.1	18.5	<.001	13.2	21.9	<.001
Other primary care model	3.6	4.3	<.001	3.2	3.9	<.001
Traditional fee-for-service	6.4	9.6	<.001	6.3	7.1	<.001
No primary care attachment	41.1	15.9	<.001	37.0	15.6	<.001

CHC—community health centre, FHG—family health group, FHN—family health network, FHO—family health organization, FHT—family health team.
*For the prison release group, baseline is the 2 years before the day before admission to prison and follow-up is the 2 years after release from prison; the corresponding dates are used for the general population group. For the prison release group, baseline and follow-up periods exclude any time in provincial prison to focus on primary care access in the community.

Figure 1. Persons released from provincial prison in Ontario in 2010 (n = 48 861) and age- and sex-matched people in the general population (n = 195 444) with primary care attachment and team-based primary care attachment at baseline and follow-up: *We considered any use of primary care as primary care attachment. We considered 2 models for team-based primary care attachment: community health centres and family health teams.*



*For the prison release group, baseline is the 2 years before the day before admission to prison and follow-up is the 2 years after release from prison; the corresponding dates are used for the general population group. For the prison release group, baseline and follow-up periods exclude any time in provincial prison to focus on primary care access in the community.

Table 3. Persons released from provincial prison in Ontario in 2010 (n = 48 861) with primary care attachment and team-based primary care attachment during the follow-up period, by chronic medical condition and comorbidity index: *We considered any use of primary care as primary care attachment. Percentages in the CHC and FHT columns might not equal the total percentage in the "any" column owing to rounding.*

CHARACTERISTIC*	N	PRIMARY CARE ATTACHMENT, %	TEAM-BASED PRIMARY CARE ATTACHMENT, %		
			ANY	CHC	FHT
Chronic disease†					
• Diabetes	2341	76.1	24.8	7.6	17.1
• Hypertension	3629	76.3	22.6	5.1	17.5
• COPD	2178	77.1	27.8	8.6	19.1
• Asthma	8011	73.1	22.8	7.0	15.8
• HIV	330	76.1	33.0	13.3	19.7
Mental disorder†					
• Schizophrenia	1909	73.2	25.3	9.9	15.4
• Anxiety disorders	3757	74.8	28.3	8.4	20.0
• Mood disorders	3318	77.5	27.7	9.2	18.6
• Substance-related disorders	8270	73.3	26.9	10.1	16.8
No. of ADGs					
• 0-4	25 383	51.5	16.7	3.5	13.3
• 5-9	17 395	73.9	22.8	5.8	17.0
• ≥ 10	6083	79.7	24.5	9.2	15.3

ADG—aggregated diagnosis group, CHC—community health centre, COPD—chronic obstructive pulmonary disease, FHT—family health team.
*At the time of initial release in 2010.
†Diagnoses are from health administrative databases.

persons attached to primary care and team-based primary care increased with increasing comorbidities.

Our study findings are consistent with other evidence that people who experience imprisonment are less likely to access primary care, including direct evidence on the proportion of persons using primary care[13-16] and indirect evidence on high rates of emergency department use and hospitalization for ambulatory care–sensitive conditions.[47-49] Of note, most relevant studies were conducted in the United States, where the lack of universal health insurance might present a barrier to primary care access. With a system of universal public health insurance in place, health insurance should not be a barrier to primary care in Canada. Our study results are also consistent with data that show that some vulnerable groups have poor access to primary care and team-based care, including persons with low socioeconomic status, new immigrants, and people with mental illness.[21,50-53]

Using these administrative data, we were not able to determine the reasons for the relatively low proportions of persons in the prison release group with primary care attachment. Individual-, provider-, and system-level barriers might each contribute. Individual-level barriers might include a lack of knowledge regarding available primary care, a lack of identification required to access most primary care services (ie, an OHIP card),[13] logistical issues such as inconvenient hours of service,[13,54] or competing priorities that prevent people from attending to their health needs.[13,55-59] Provider- and system-level barriers might include services not meeting patients' needs,[13] discrimination against people who experience imprisonment,[60-63] the lack of routine programs to link people in prison with primary care in the community, and the lack of structures to support clinical work with this patient population. Specifically, physician payment through salary, as occurs in CHCs, might make it more feasible and desirable to accommodate complex patients, compared with physician compensation arrangements that do not account for complexity, such as those for physicians in FHTs.

Access to team-based care, including to health professionals such as social workers and physiotherapists, might be particularly important for people who experience imprisonment, given the high prevalence of comorbidities and social complexity. We note that consistent with their mandate of delivering services to persons who otherwise face barriers to health care services,[64] CHCs served a larger proportion of persons in the prison release group than in the general population group, including a high proportion of persons with comorbidities in the postrelease period. This contrasts with findings for FHTs, to which those in the prison release group had lower attachment.

Ongoing efforts to expand team-based care models in Ontario should explicitly include this population.

These data suggest the need for further research and policy and program changes to support access to high-quality primary care for people who experience imprisonment. Research is required to define barriers to primary care attachment and to team-based care attachment in particular, including qualitative work with people who experience imprisonment and with primary care providers and staff. Simultaneously, as programs and policies are developed to support primary care access, there should be explicit consideration of this vulnerable population with substantial health care needs.[54] The time in provincial prison offers a unique opportunity to link patients who want and need primary care with primary care.

Limitations

The definitions for mental illness have not been validated, and definitions of other comorbidities have not been validated in a prison population, which might have led to misclassification bias. We think it is unlikely that any such bias would negate the difference between exposure groups in the prevalence of most of these comorbidities. Data on health care use for First Nations are not captured in provincial health administrative data, and Indigenous persons are overrepresented in provincial prison in Ontario, which might have led to an underestimate of participation in primary care for those in the prison release group. This might have contributed to a nonconservative bias; however, given the proportion of Indigenous persons in the prison release group, this could only partly explain the large difference in primary care model participation between the prison release group and the general population group. We chose to exclude time in provincial prison during the baseline and follow-up periods for persons in the prison release group, given our focus on primary care attachment in the community. As we used the same 2-year period for matched persons in the prison release and general population groups, this might have led to a shorter follow-up time for some persons in the prison release group; however, as the length of any single admission and the cumulative time in provincial prison was short for most persons in the prison release group (**Table 1**), we think that, at most, this would explain a small amount of the between-group differences in primary care attachment and team-based care attachment. We included enrolment in primary care models as attachment to primary care, but some persons who were enrolled in a model might not have accessed care during the follow-up period. There is no evidence to suggest that this kind of misclassification would have been different by exposure group, in which case this bias would have led to a smaller between-group difference in attachment, which would be a conservative bias.

Conclusion

This population-based study demonstrates that a large proportion of people who experience imprisonment are not attached to any primary care. This represents an equity issue, and primary care offers an opportunity to improve morbidity and mortality in this population. Further work is required to define barriers to access to primary care and to support linkage of people who experience imprisonment to high-quality primary care.

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Acknowledgment

This study was funded by the Foundation for Advancing Family Medicine and the Physicians' Services Incorporated Foundation.

Contributors

All authors contributed to study design, assisted with data interpretation, revised the manuscript, and approved the final version. **Dr Kouyoumdjian** conceptualized the study. **Drs Kouyoumdjian** and **Kim** drafted the manuscript. **Ms Cheng, Ms Fung,** and **Dr Kouyoumdjian** conducted analyses.

Competing interests

None declared

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This article has been peer reviewed.
Cet article a fait l'objet d'une revision par des pairs.
Can Fam Physician 2019;65:e433-42