Medical assistance in dying (MAiD) was legalized throughout Canada in June 2016.1,2 Under Canadian law, MAiD is permissible for competent adults who have a serious and incurable illness, disease or disability; who are in an advanced state of irreversible decline in capability; whose illness, disease or disability or state of decline causes them enduring physical or psychologic suffering that is intolerable to them and that cannot be relieved under conditions that they consider acceptable; and whose natural death has become reasonably foreseeable, taking into account all of their medical circumstances, without a prognosis necessarily having been made as to the specific length of time that they have remaining. Medical assistance in dying may be self-administered or clinician-administered, and may be provided by a medical or nurse practitioner. By Oct. 31, 2018, 6749 Canadians had received MAiD,3 accounting for 1.1% of all deaths in 2018.3 However, this novel practice remains controversial. Concerns have been raised about whether patients might request MAiD solely because of poor access to palliative care, or because of social or economic vulnerabilities.4 Concerns have also been

ABSTRACT

BACKGROUND: Medical assistance in dying (MAiD) was legalized across Canada in June 2016. Some have expressed concern that patient requests for MAiD might be driven by poor access to palliative care and that social and economic vulnerability of patients may influence access to or receipt of MAiD. To examine these concerns, we describe Ontario’s early experience with MAiD and compare MAiD decedents with the general population of decedents in Ontario.

METHODS: We conducted a retrospective cohort study comparing all MAiD-related deaths with all deaths in Ontario, Canada, between June 7, 2016, and Oct. 31, 2018. Clinical and demographic characteristics were collected for all MAiD decedents and compared with those of all Ontario decedents when possible. We used logistic regression analyses to describe the association of demographic and clinical factors with receipt of MAiD.

RESULTS: A total of 2241 patients (50.2% women) were included in the MAiD cohort, and 186814 in the general Ontario decedent cohort. Recipients of MAiD reported both physical (99.5%) and psychologic suffering (96.4%) before the procedure. In 74.4% of cases, palliative care providers were involved in the patient’s care at the time of the MAiD request. The statutory 10-day reflection period was shortened for 26.6% of people. Compared with all Ontario decedents, MAiD recipients were younger (mean 74.4 v. 77.0 yr, standardized difference 0.18), more likely to be from a higher income quintile (24.9% v. 15.6%, standardized difference across quintiles 0.31); less likely to reside in an institution (6.3% v. 28.0%, standardized difference 0.6); more likely to be married (48.5% v. 40.6%) and less likely to be widowed (25.7% v. 35.8%, standardized difference 0.34); and more likely to have a cancer diagnosis (64.4% v. 27.6%, standardized difference 0.88 for diagnoses comparisons).

INTERPRETATION: Recipients of MAiD were younger, had higher income, were substantially less likely to reside in an institution and were more likely to be married than decedents from the general population, suggesting that MAiD is unlikely to be driven by social or economic vulnerability. Given the high prevalence of physical and psychologic suffering, despite involvement of palliative care providers in caring for patients who request MAiD, future studies should aim to improve our understanding and treatment of the specific types of suffering that lead to a MAiD request.
expressed about potential barriers to accessing MAiD due to geographic location, provider or institutional conscientious objection, or administrative delay. Using data collected by the Office of the Chief Coroner for Ontario (hereafter, the “Coroner’s Office”) and population-based health administrative data, we sought to describe Ontario’s early experience with MAiD, including the demographic and clinical characteristics of MAiD decedents in comparison with those of the general population of decedents in Ontario, to address the expressed concerns about MAiD.

Methods

Design
We conducted a retrospective cohort study involving all patients who received MAiD and all other decedents in Ontario, Canada, between June 7, 2016, and Oct. 31, 2018. We used data from the Coroner’s Office (MAiD decedent cohort) and population-based health administrative databases that include data on all Ontario residents (Ontario decedent cohort).

Setting
Ontario is the most populous of Canada’s 13 provinces and territories, comprising 14.5 million residents (39% of the Canadian population). It covers a large geographic area, with most Ontario residents (85%) living in urban settings in the Great Lakes area. The largest proportion of MAiD deaths in the country has occurred in Ontario.

MAiD decedent cohort
A detailed description of Canada’s MAiD legislation and the process of MAiD assessment and oversight in Ontario is available in Appendices 1 and 2, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.200016/-/DC1. All MAiD deaths between June 7, 2016, and Oct. 31, 2018, were included in the MAiD decedent cohort. All Ontario MAiD deaths must be reported to the Coroner’s Office, which serves as the provincial data custodian for the purpose of monitoring compliance with the federal MAiD legislation on behalf of the government of Ontario. A standardized reporting process for all MAiD deaths was established by the Coroner’s Office (Appendix 2) to collect data about each MAiD death from patient records and telephone communication with MAiD providers and the patients’ next of kin, including clinical and demographic information about the deceased, details about MAiD eligibility, information about the clinicians who assessed and provided MAiD, and any concerns raised by family members or the MAiD providers (e.g., perceived delays in access). Although Canadians do not require a specific prognosis to be eligible for MAiD — only that their natural death is reasonably foreseeable (Appendix 1) — prognostic estimates were generated from clinical notes recorded as open text for each MAiD case when possible. Prognostic estimates were categorized as less than 1 month, 1–6 months or more than 6 months. Quantitative estimates or ranges in the clinical notes were sorted into the appropriate category. When specific numbers were not provided in the clinical notes, “hours,” “days” or “weeks” were coded as less than 1 month, “months” as 1–6 months, and “months or years” as more than 6 months. Any unclear, discrepant data or clarifications were discussed and resolved by consensus between 2 authors with relevant clinical expertise (J.D. and R.H.).

Ontario decedent cohort
All Ontario population decedents (including those in the MAiD decedent cohort just described) between June 7, 2016, and Mar. 31, 2018, were identified using population-based routinely linked health administrative data sets on all Ontario residents. These data sets were linked using unique encoded identifiers and analyzed at ICES, a not-for-profit, provincially supported research institute (www.ices.on.ca; see Appendix 3, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.200016/-/DC1, for a list of databases included). Individuals who were enrolled in the provincial health insurance plan for less than 6 months were excluded to ensure the availability of demographic data to describe and characterize decedents. Patient and demographic characteristics included age, sex, income quintile and location of usual residence (based on decedents’ postal code at the time of death and Canadian census data), marital status, and location and cause of death; complete data on marital status and cause of death were available only between June 7, 2016, and Dec. 31, 2016 (n = 54 825).

Purpose
The primary purpose of this study was to describe the demographic and clinical characteristics of the MAiD decedent cohort compared with all Ontario decedents. Given the primary purpose, and in view of the concerns outlined in the introduction, the secondary purpose was to describe demographic and clinical characteristics of MAiD deaths associated with a shortened reflection period and difficulties accessing MAiD as reported by family members.

Statistical analysis
Descriptive statistics were used to characterize the decedent cohorts. We expressed continuous variables as means and standard deviations or medians and interquartile ranges, and categorical variables as frequencies and percentages. Comparisons between MAiD and Ontario decedent cohorts were evaluated using standardized differences, with a standardized difference of less than 0.1 indicating small differences. We examined between-group differences within the MAiD cohort using the Student t test, the Wilcoxon rank-sum test and the χ² test as appropriate. For the MAiD cohort, we also performed prespecified unadjusted logistic regression analyses to describe the association of different demographic and clinical factors with shortening of the usual 10-day reflection period and clinician- or family-reported difficulties in accessing MAiD. Missing data were included in counts and comparisons when possible. We also examined these relations using unadjusted modified Poisson regression analyses to estimate relative risks. All statistical analyses were performed using SAS Enterprise Guide version 7.12 (SAS Institute).
Ethics approval
This study was approved by the Health Sciences Research Ethics Board at the University of Toronto (protocol no. 35470).

Results
A total of 2241 patients were included in the MAiD cohort and 186 814 in the general Ontario decedent cohort (Table 1). The median age of MAiD recipients was 75 years (range 22–105), and 50.2% were women. Most patients had cancer (64.4%) as their diagnostic indication for MAiD, followed by neurodegenerative (11.9%), cardiovascular (8.5%) and respiratory disease (7.5%). Nearly half (48.5%) of MAiD recipients were married, 25.7% were widowed, and 16.6% were separated, divorced or single. Most patients (84.7%) resided in a private residence before receiving MAiD, and 6.3% resided in an institutional setting (long-term care or complex continuing care facility). Only 14.9% resided in a rural setting. Medical assistance in dying was performed predominantly in a private residence (45.0%) or acute care hospital (40.9%), with the remainder in residential care settings (e.g., long-term care). Compared with all Ontario decedents, MAiD recipients were younger (74.4 v. 77.0 yr, standardized difference 0.18); more likely to be from a higher income quintile (24.9% v. 15.6%, standardized difference across quintiles 0.31); less likely to reside in an institutional setting (6.3% v. 28.0%, standardized difference 0.6 for place of residence); more likely to be married (48.5% v. 40.6%) and less likely to be widowed (25.7% v. 35.8%, standardized difference 0.34 for marital status); and more likely to have a cancer diagnosis (64.4% v. 27.6%) and less likely to have cardiovascular disease (8.5% v. 27.8%) listed as the cause of death (standardized difference 0.88 for type of illness).

Patients receiving MAiD commonly reported both physical (99.5%) and psychologic (96.4%) suffering (Table 2). Only 1 patient received self-administered MAiD; the remainder were physician-administered. Palliative care providers were involved at any point in the care of 77.2% of patients, and at the time of the request for MAiD in 74.4%. Psychiatric consultations were performed in 6.2% of cases. In 4.3% of cases, the MAiD recipient had been found ineligible for MAiD on a previous request. In 36.3% of cases, the MAiD recipient had a pre-existing clinical professional relationship with the MAiD provider or one of the assessors. Prognostic estimate of remaining life was not recorded for 56.0% of MAiD recipients, but it was 6 months or less for 883 patients (89.5% of those with a recorded prognosis). Medical assistance in dying was performed by a physician in 94.4% of cases and by a nurse practitioner in 5.6% of cases.
Palliative care clinicians provided MAiD in 12.8% of cases and were either the provider or an assessor in 19.8% of cases (data not shown). English or French was the preferred language for 90.9% of MAiD recipients. A total of 156 (9.6%) had documented difficulties with communication (e.g., soft voice due to neurodegenerative disease).

The statutory 10-day reflection period was shortened in 26.6% of all cases (Table 3) and in 58.4% (229/392) of those with an estimated prognosis of less than 1 month. The reflection period was significantly more likely to be shortened for patients who were followed or assessed by a palliative care provider (odds ratio [OR] 1.53, 95% confidence interval [CI] 1.20–1.94), and less likely to be shortened for neurodegenerative disease (OR 0.28, 95% CI 0.19–0.42) or respiratory disease (OR 0.47, 95% CI 0.31–0.71) compared with cancer. The reflection period was also less likely to be shortened for individuals living in an institutional setting (OR 0.65, 95% CI 0.46–0.90), or when the estimated prognosis was 1–6 months (OR 0.12, 95% CI 0.09–0.16) or more than 6 months (OR 0.07, 95% CI 0.03–0.14) compared with a prognosis of less than 1 month.

In 6.6% of MAiD cases, a family member or MAiD provider raised concerns about difficulties accessing MAiD, such as delays in patient referrals to a willing MAiD assessor or provider, or lack of clarity on how to make a request for MAiD. Access concerns were more likely to be reported for noncancer diagnoses (hepatic disease [OR 12.95, 95% CI 3.41–49.13] or “other” [OR 2.06, 95% CI 1.17–3.62]), in cases where there had been a previous finding of ineligibility for MAiD (OR 3.32, 95% CI 1.91–5.79), or a documented communication difficulty (OR 2.23, 95% CI 1.26–3.93). Access concerns were less common when the MAiD provider or one of the assessors was previously known to the patient (OR 0.56, 95% CI 0.39–0.83) or if the prognosis was 1–6 months (OR 0.55, 95% CI 0.33–0.91) compared with less than 1 month. No specific demographic, geographic or economic characteristic was associated with shortening of the reflection period or concerns about access. The relative risks for each characteristic are provided in Appendix 4, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.200016/-/DC1.

### Interpretation

In this study comparing people who received MAiD in Ontario up to Oct. 31, 2018, with all decedents, we found that people who chose MAiD reported physical or psychologic suffering as the primary reason, despite engagement of palliative care in about three-quarters of patients, which suggests that for many patients the MAiD requests were not because of poor access to palliative care. Recipients of MAiD were younger, had higher income levels, were substantially less likely to reside in an institution and were more likely to be married than decedents from the general population, suggesting that MAiD requests are unlikely to be driven by social or economic vulnerability.

A previous population-based cohort study that compared the demographic characteristics of 1329 Swiss citizens undergoing MAiD with Swiss national census data over a 5-year period found that MAiD recipients were both more wealthy and highly educated, and less likely to be living in an institutional setting, than decedents overall.13 However, the Swiss context differs from that of Canada in that only self-administered MAiD is permitted (not physician-administered MAiD), and reporting of MAiD cases is not mandatory. Comprehensive data about MAiD recipients in the United States,14 Belgium15 and the Netherlands16 have been available for more than 2 decades. Recipients of MAiD in those jurisdictions had cancer slightly more often (~73%–77%) and cardiac and respiratory disease less often (3%–5%) than MAiD recipients in Ontario.27 To our knowledge, there is no publicly reported statistical comparison of socioeconomic differences between MAiD decedents and general decedents from these jurisdictions.

Requests for MAiD can be emotionally difficult for patients and family members, and administratively burdensome for clinicians who are helping their patients navigate the assessment process (Appendix 1). Any perceived delays can be upsetting for patients, families and clinicians alike. Reassuringly, only 6.6% of families reported difficulties with access to MAiD, and the frequency of these reports was not affected by socioeconomic or demographic factors, nor were they more common among patients who were assessed or followed by psychiatry or palliative care. Palliative care consultations are one means of ensuring that patients requesting MAiD are aware of the alternative ways to treat suffering, and psychiatric consultations can help to determine whether some patients are capable of making the

### Table 1 (part 2 of 2): Characteristics of all decedents in Ontario and decedents who received medical assistance in dying

| Characteristic      | No. (% of decedents)* | MAiD       | Standardized difference (Ontario v. MAiD) |
|---------------------|-----------------------|------------|------------------------------------------|
|                     | All Ontario | n = 186 814* | MAiD n = 2241* |                             |
| Type of illness§    | 0.88       |             |                          |                             |
| Cancer              | 15 129 (27.6) | 1444 (64.4) |                          |                             |
| Cardiovascular      | 15 249 (27.8) | 190 (8.5)   |                          |                             |
| Hepatic             | 680 (1.2)   | 9 (0.4)     |                          |                             |
| Neurodegenerative   | 6 346 (11.6) | 266 (11.9)  |                          |                             |
| Renal               | 1 118 (2.0)  | 23 (1.0)    |                          |                             |
| Respiratory         | 5 217 (9.5)  | 167 (7.5)   |                          |                             |
| Other               | 10 341 (18.9) | 142 (6.3)   |                          |                             |
| Missing             | 745 (1.4)   | 0           |                          |                             |

Note: MAiD = medical assistance in dying, SD = standard deviation.

†Metropolitan influenced zones are defined by the percentage of residents in the zone who commute to work in the core of a metropolitan area (www150.statcan.gc.ca/n1/pub/92–195-x/2011001/othe-autre/miz-zim/def-eng.htm).

‡For the MAiD cohort, the initial 611 patients were removed from the analysis of this variable because these data were not recorded.

§For the Ontario decedent cohort, complete data on marital status and cause of death were available only between June 7, 2016, and Dec. 31, 2016 (n = 54 825).
decision to have MAiD. Neither palliative care nor psychiatric consultation is mandatory in Canada for patients who request MAiD, and although some have argued for and against mandatory psychiatric assessments, the shortage of psychiatric specialists in some regions could make this requirement a substantial barrier to accessing MAiD.

The involvement of palliative care providers in the assessment and provision of MAiD in some patients who received MAiD is noteworthy. The World Health Organization’s definition of palliative care excludes MAiD, and the International Association for Hospice and Palliative Care has argued that palliative providers should not be involved in the practice of MAiD, and that “no country ... should consider the legalization of [MAiD] until it ensures universal access to palliative services and to appropriate medications.” Internationally, the relation between MAiD and palliative care providers ranges from synergistic and cooperative to conflicted and opposed. Some palliative care providers in Canada believe that MAiD is an important part of their clinical practice and have integrated MAiD with the provision of palliative care. Others have expressed concern that confusion between MAiD and palliative care might discourage the adoption of a palliative approach for those who could benefit. Our data do not support or refute either position, but as in other jurisdictions where MAiD is legal, we found that most MAiD recipients were followed by a palliative care clinician before death, whereas only a minority of Ontario residents are followed by palliative care clinicians before they die. This may allay fears that people are turning to MAiD because they cannot access palliative care. It may also suggest that people may be seeking MAiD to alleviate a type of suffering (e.g., existential distress) that may not be effectively treated by palliative care clinicians.

Another common concern about the legalization of MAiD is the potential for people who face social or economic vulnerabilities to be pressured into MAiD. However, our data indicate that people from traditionally vulnerable demographic groups (from an economic, linguistic, geographic or residential perspective) were far less likely to receive MAiD, consistent with findings from the US and Europe. Whether this reflects a lower desire for MAiD in these demographic groups, or a broader lack of access to end-of-life options for vulnerable

| Table 2: Characteristics of decedents who received medical assistance in dying |
| --- |
| **Characteristic** | **No. (%) of decedents** |
| **Type of suffering identified on assessment** | |
| Physical | 2230 (99.5) |
| Psychologic | 2161 (96.4) |
| **Prognostic estimate** | |
| Not recorded | 1254 (56.0) |
| < 1 month | 392 (17.5) |
| 1–6 months | 491 (21.9) |
| > 6 months | 104 (4.6) |
| **Preferred language** | |
| English or French | 1482 (90.9) |
| Other | 50 (3.1) |
| Unknown | 98 (6) |
| **Communication difficulties (e.g., soft voice, dysarthria)** | 156 (9.6) |
| **Profession of MAiD provider** | |
| Physician | 2116 (94.4) |
| Nurse practitioner | 125 (5.6) |
| **Specialty of MAiD provider** | |
| General practice (with no other specialty indicated) | 1104 (49.3) |
| Palliative care (including nurse practitioners) | 287 (12.8) |
| Anesthesiology | 285 (12.7) |
| Internal medicine and subspecialties | 180 (8.0) |
| Nurse practitioner (without further specialization) | 116 (5.2) |
| Medical or radiation oncology | 74 (3.3) |
| Emergency medicine | 66 (2.9) |
| Intensive care | 62 (2.8) |
| Surgical specialties/subspecialties | 42 (1.9) |
| Other | 25 (1.1) |
| **At the time of request, the patient was receiving palliative care from a physician or nurse practitioner** | 1667 (74.4) |
| **Patient followed or assessed by palliative care clinicians before death** | 1731 (77.2) |
| **Psychiatrist involvement in assessment of MAiD eligibility** | 140 (6.2) |
| **Patient previously known to MAiD provider/assessor** | 814 (36.3) |
| **Previous request for MAiD denied** | 2014 (89.9) |
| **10-day reflection period shortened** | 596 (26.6) |
| **Family or care team reported difficulties accessing MAiD** | 148 (6.6) |

Note: MAiD = medical assistance in dying.

*For the MAiD cohort, the initial 611 patients were removed from the analysis of this variable because these data were not recorded.
†In Canada, these fields have all been recognized as specialties or subspecialties by the Royal College of Physicians and Surgeons of Canada, but not all providers in these fields have completed an accredited specialty training program. Many providers in these fields have completed nonaccredited training, or have developed a focused practice based on many years of clinical experience.
| Characteristic                          | 10-day reflection period shortened; no. (% of decedents)* | Reported problems accessing MAID; no. (% of decedents)* |
|----------------------------------------|----------------------------------------------------------|--------------------------------------------------------|
| Age, yr, mean ± SD                     | 75.0 ± 12.9                                              | 74.5 ± 13.2                                             |
|                                        | 74.2 ± 13.2                                              | 74.4 ± 13.1                                             |
|                                        | 1.00 (1.00–1.01)                                         | 1.00 (0.99–1.01)                                        |
|                                        |                                                          |                                                        |
| Sex                                    |                                                          |                                                        |
| Female                                 | 284 (47.7)                                               | 73 (49.3)                                               |
|                                        | 840 (51.1)                                               | 1051 (50.2)                                             |
| Male                                   | 312 (52.3)                                               | 75 (50.7)                                               |
|                                        | 805 (48.9)                                               | 1042 (49.8)                                             |
|                                        | 1.15 (0.95–1.38)                                         | 1.04 (0.74–1.45)                                        |
|                                        |                                                          |                                                        |
| Income quintile                        |                                                          |                                                        |
| 1 (lowest)                            | 99 (16.6)                                                | 27 (18.2)                                               |
|                                        | 284 (17.3)                                               | 356 (17.0)                                              |
|                                        | Reference                                                | Reference                                              |
| 2                                      | 110 (18.5)                                               | 25 (16.9)                                               |
|                                        | 304 (18.5)                                               | 389 (18.6)                                              |
|                                        | 1.04 (0.76–1.42)                                         | 0.85 (0.48–1.49)                                        |
| 3                                      | 106 (17.8)                                               | 28 (18.9)                                               |
|                                        | 310 (18.8)                                               | 388 (18.5)                                              |
|                                        | 0.98 (0.71–1.35)                                         | 0.95 (0.55–1.65)                                        |
| 4                                      | 111 (18.6)                                               | 36 (24.3)                                               |
|                                        | 338 (20.5)                                               | 413 (19.7)                                              |
|                                        | 0.94 (0.69–1.29)                                         | 1.15 (0.68–1.93)                                        |
| 5 (highest)                           | 162 (27.2)                                               | 30 (20.3)                                               |
|                                        | 397 (24.1)                                               | 529 (25.3)                                              |
|                                        | 1.17 (0.87–1.57)                                         | 0.75 (0.44–1.28)                                        |
| Missing                                | 8 (1.3)                                                  | 2 (1.4)                                                 |
|                                        | 12 (0.7)                                                 | 18 (0.9)                                                |
| Rural                                  |                                                          |                                                        |
| No                                     | 506 (84.9)                                               | 122 (82.4)                                              |
|                                        | 1392 (84.6)                                              | 1776 (84.9)                                             |
|                                        | Reference                                                | Reference                                              |
| Yes                                    | 85 (14.3)                                                | 24 (16.2)                                               |
|                                        | 248 (15.1)                                               | 309 (14.8)                                              |
|                                        | 0.94 (0.72–1.23)                                         | 1.13 (0.72–1.78)                                        |
| Missing                                | 5 (0.8)                                                  | 2 (1.4)                                                 |
|                                        | 5 (0.3)                                                  | 8 (0.4)                                                 |
| Metropolitan influenced zone†          |                                                          |                                                        |
| Strong (more urban)                    | 214 (35.9)                                               | 59 (39.9)                                               |
|                                        | 609 (37.0)                                               | 764 (36.5)                                              |
|                                        | Reference                                                | Reference                                              |
| Moderate                               | 108 (18.1)                                               | 21 (14.2)                                               |
|                                        | 351 (21.3)                                               | 438 (20.9)                                              |
|                                        | 0.88 (0.67–1.14)                                         | 0.62 (0.37–1.04)                                        |
| Weak                                   | 181 (30.4)                                               | 49 (33.1)                                               |
|                                        | 457 (27.8)                                               | 589 (28.1)                                              |
|                                        | 1.13 (0.89–1.42)                                         | 1.08 (0.73–1.60)                                        |
| None (more rural)                     | 88 (14.8)                                                | 17 (11.5)                                               |
|                                        | 223 (13.6)                                               | 294 (14.0)                                              |
|                                        | 1.12 (0.84–1.50)                                         | 0.75 (0.43–1.31)                                        |
| Missing                                | 5 (0.8)                                                  | 2 (1.4)                                                 |
|                                        | 5 (0.3)                                                  | 8 (0.4)                                                 |
| Marital status‡                        |                                                          |                                                        |
| Single                                 | 27 (6.2)                                                 | 6 (6.8)                                                 |
|                                        | 90 (7.5)                                                 | 111 (7.2)                                               |
|                                        | 0.78 (0.50–1.24)                                         | 0.90 (0.37–2.15)                                        |
| Married                                | 219 (50.2)                                               | 45 (51.1)                                               |
|                                        | 572 (47.9)                                               | 746 (48.4)                                              |
|                                        | Reference                                                | Reference                                              |
| Divorced/separated                     | 35 (8.0)                                                 | 11 (12.5)                                               |
|                                        | 119 (10.0)                                               | 143 (9.3)                                               |
|                                        | 0.77 (0.51–1.16)                                         | 1.28 (0.64–2.53)                                        |
| Widowed                                | 110 (25.2)                                               | 20 (22.7)                                               |
|                                        | 309 (25.9)                                               | 399 (25.9)                                              |
|                                        | 0.93 (0.71–1.22)                                         | 0.83 (0.48–1.43)                                        |
| Unknown                                | 44 (10.1)                                                | 5 (5.7)                                                 |
|                                        | 101 (8.5)                                                | 140 (9.1)                                               |
|                                        | 1.13 (0.77–1.66)§                                       | 0.70 (0.29–1.66)§                                       |
| Missing                                | 1 (0.2)                                                  | 1 (1.1)                                                 |
|                                        | 3 (0.3)                                                  | 3 (0.2)                                                 |
| Place of residence‡                    |                                                          |                                                        |
| Private residence                      | 386 (88.5)                                               | 78 (88.6)                                               |
|                                        | 994 (83.2)                                               | 1302 (84.4)                                             |
|                                        | Reference                                                | Reference                                              |
| Institutional setting or assisted living facility | 50 (11.5)                                               | 10 (11.4)                                               |
|                                        | 199 (16.7)                                               | 239 (15.5)                                              |
|                                        | 0.65 (0.46–0.90)                                         | 0.70 (0.36–1.37)                                        |
| Type of illness                        |                                                          |                                                        |
| Cancer                                 | 449 (75.3)                                               | 84 (56.8)                                               |
|                                        | 995 (60.5)                                               | 1,360 (65.0)                                             |
|                                        | Reference                                                | Reference                                              |
| Cardiovascular                        | 48 (8.1)                                                 | 13 (8.8)                                                |
|                                        | 142 (8.6)                                                | 177 (8.5)                                               |
|                                        | 0.75 (0.53–1.06)                                         | 1.19 (0.65–2.18)                                        |
| Hepatic                                | -§                                                       | NA                                                      |
|                                        | -§                                                       | -§                                                      |
|                                        | 12.95 (3.41–49.13)                                       |                                                        |
| Neurodegenerative                      | 30 (5.0)                                                 | 24 (16.2)                                               |
|                                        | 236 (14.4)                                               | 242 (11.6)                                              |
|                                        | 0.28 (0.19–0.42)                                         | 1.61 (1.00–2.58)                                        |
| Renal                                  | -§                                                       | -§                                                      |
|                                        | -§                                                       | NA                                                      |
| Respiratory                            | 29 (4.9)                                                 | 7 (4.7)                                                 |
|                                        | 138 (8.4)                                                | 160 (7.6)                                               |
|                                        | 0.47 (0.31–0.71)                                         | 0.71 (0.32–1.56)                                        |
| Other                                  | 34 (5.7)                                                 | 16 (10.8)                                               |
|                                        | 108 (6.6)                                                | 126 (6.0)                                               |
|                                        | 0.70 (0.47–1.04)                                         | 2.06 (1.17–3.62)                                        |
Canadians in general, is not clear. We did not have data about physical or other disabilities, although only 6.3% of the MAiD cohort resided in an institution compared with 28.0% of Ontario decessents overall. Our data cannot exclude the possibility that people experienced pressure to receive MAiD, or that this led to MAiD in individual cases.

Limitations
The MAiD cohort consisted only of completed cases. Available data from other Canadian provinces suggest that as many as 20% of all patients who request MAiD die naturally before they receive it. It is plausible that such patients may have been more likely to have encountered difficulties accessing MAiD before their natural death, and so our data may not be an accurate representation of the overall patient experience. The new national reporting system in Canada monitors requests for MAiD, and future data analysis may provide better insight into access. Reporting of completed MAiD cases is mandatory throughout Canada. It is possible that some cases were not reported but, given the limited availability of the medications used to perform MAiD in Canada (e.g., intravenous propofol and neuromuscular blockers that are generally unavailable to health care providers outside of the hospital and MAiD process), delivering MAiD without record would be very unlikely. The

| Characteristic                                                                 | 10-day reflection period shortened; no. (%) of decedents* | Reported problems accessing MAiD; no. (%) of decedents* |
|-------------------------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------|
|                                                                               | Yes n = 596                                               | No n = 1645                                             |
|                                                                               | Unadjusted OR (95% CI)                                    |                                                         |
| Patient followed or assessed by palliative care at any point                  |                                                           |                                                         |
| No                                                                            | 105 (17.6)                                                | 405 (24.6)                                              |
| Yes                                                                           | 491 (82.4)                                                | 1240 (75.4)                                             |
|                                                                               | 1.53 (1.20–1.94)                                          |                                                         |
| Previous relationship with MAiD provider/assessor                             |                                                           |                                                         |
| No                                                                            | 391 (65.6)                                                | 1036 (63.0)                                             |
| Yes                                                                           | 205 (34.4)                                                | 609 (37.0)                                              |
|                                                                               | 0.89 (0.73–1.09)                                          |                                                         |
| Psychiatrist involvement in assessment of MAiD eligibility                    |                                                           |                                                         |
| No                                                                            | 565 (94.8)                                                | 1536 (93.4)                                             |
| Yes                                                                           | 205 (34.4)                                                | 609 (37.0)                                              |
|                                                                               | 0.77 (0.51–1.17)                                          |                                                         |
| Prognostic estimate                                                           |                                                           |                                                         |
| Not recorded                                                                  | 288 (48.3)                                                | 966 (58.7)                                              |
|                                                                               | –¶                                                       | –¶                                                      |
| < 1 month                                                                     | 229 (38.4)                                                | 163 (9.9)                                               |
|                                                                               | 0.12 (0.09–0.16)                                          |                                                         |
| 1–6 months                                                                    | 70 (11.7)                                                 | 421 (25.6)                                              |
|                                                                               | 0.07 (0.03–0.14)                                          |                                                         |
| > 6 months                                                                    | 9 (1.5)                                                   | 95 (5.8)                                                |
| Previous request for MAiD denied                                             |                                                           |                                                         |
| No                                                                            | 546 (91.6)                                                | 1468 (89.2)                                             |
| Yes                                                                           | 19 (3.2)                                                  | 78 (4.7)                                                |
|                                                                               | 0.66 (0.39–1.09)                                          |                                                         |
| Unknown                                                                       | 31 (5.2)                                                  | 99 (6.0)                                                |
|                                                                               | 0.74 (0.50–1.11)                                          |                                                         |
| Communication difficulties (e.g., soft voice, dysarthria)†                    |                                                           |                                                         |
| No                                                                            | 402 (92.2)                                                | 1072 (89.8)                                             |
| Yes                                                                           | 34 (7.8)                                                  | 122 (10.2)                                              |
|                                                                               | 0.40 (0.98–2.00)                                          |                                                         |
| Family or care team reported difficulties accessing MAiD                      |                                                           |                                                         |
| No                                                                            | 547 (91.8)                                                | 1546 (94.0)                                             |
| Yes                                                                           | 49 (8.2)                                                  | 99 (6.0)                                                |

Note: CI = confidence interval, MAiD = medical assistance in dying, NA = not available, OR = odds ratio, SD = standard deviation.

*Unless stated otherwise.
†Metropolitan influenced zones are defined by the percentage of residents in the zone who commute to work in the core of a metropolitan area (www150.statcan.gc.ca/n1/pub/92-195-x/2011001/other-autre/miz-zim/def-eng.htm).
‡The initial 611 patients were removed from the analysis of this variable because these data were not recorded.
§Missing and unknown categories combined for odds ratio calculation.
¶Numbers censored owing to small cell size (< 5).
practice of MAiD may vary across the country and our findings may not be generalizable; however, we have no reason to believe that the main findings of this study (related to equity and the involvement of palliative care) would be meaningfully different in other parts of Canada.

A number of important patient characteristics were not routinely recorded — for instance, religion, ethnicity or education — which would have provided additional information about the early cohort of MAiD recipients in Ontario. Difficulties with access were reported by a third party (family, friends or clinicians) post-mortem; these reports may not have represented patients’ experiences accurately. Finally, the general Ontario decedent cohort included the patients who died from MAiD; however, MAiD patients made up only about 1% of the cohort.

**Conclusion**

The practice of MAiD in Ontario is most common among elderly, community-residing patients with cancer, neurodegenerative disease or end-stage organ failure who are in the final months of life. Our findings that Ontario residents who received MAiD were frequently already followed by palliative care providers suggests that MAiD requests are unlikely to be the consequence of inadequate access to palliative care in Ontario. Recipients of MAiD in Ontario were younger, wealthier, more likely to be married and substantially less likely to live in an institution than the general population of decedents, suggesting that MAiD is unlikely to be driven by social or economic vulnerability.

The data presented here do not address the moral question of whether any amount of suffering can justify the hastening of death. However, the growing trend toward legalization and use of MAiD in many parts of the world should prompt the health care and research community to improve our understanding and treatment of the type of distress that leads to a MAiD request. Furthermore, jurisdictions considering legalization of MAiD might find data from countries like Canada (that have taken this step more recently) useful in informing their decisions about legalization of and necessary safeguards for MAiD.

**References**

1. An Act to amend the Criminal Code and to make related amendments to other Acts (medical assistance in dying) (S.C. 2016, c. 3).
2. Bill 52: an act respecting end-of-life care. Québec: National Assembly of Quebec; 2013.
3. Fourth interim report on medical assistance in dying in Canada. Ottawa: Health Canada; 2019. Available: www.canada.ca/en/health-canada/services/publications/health-system-services/medical-assistance-dying-interim-report-april-2019.html (accessed 2019 July 20).
4. Key messages: palliative care and medical assistance in dying (MAiD), May 2019. Surrey (BC): Canadian Society of Palliative Care Physicians; 2019. Available: www.cspcp.ca/wp-content/uploads/2019/05/CSPCP-Key-Messages-PC-and-MAiD-May-2019-FINAL.pdf (accessed 2019 July 20).
5. Downie J. Carter v. Canada: What’s next for physicians? CMAJ 2015;187:481-2.
6. Wright AC, Shaw JC. The spectrum of end of life care: an argument for access to medical assistance in dying for vulnerable populations. Med Health Care Philos 2019;22:211-9.
7. Table 17-10-0009-01: Population estimates, quarterly. Ottawa: Statistics Canada; modified 2019 Jan. 28. Available: www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000901 (accessed 2019 Oct. 10).
8. About Ontario [main page]. Available: www.ontario.ca/page/about-ontario (accessed 2019 Oct. 19).
9. Bill 84: Medical Assistance in Dying Statute Law Amendment Act. Toronto: Ontario Hospital Association; 2016.
10. Process overview and checklist: reporting a MAiD death to the Office of the Chief Coroner of Ontario. Toronto: Ministry of Health and Long-Term Care.
11. Austin PC. Using the standardized difference to compare the prevalence of a binary variable between two groups in observational research. Commun Stat Simul Comput 2009;38:1228-34.
12. Zou G. A modified Poisson regression approach to prospective studies with binary data. Am J Epidemiol 2004;159:702-6.
13. Steck N, Junker C, Maessen M, et al.; Swiss National Cohort. Suicide assisted by right-to-die associations: a population based cohort study. Int J Epidemiol 2014;43:614-22.
14. Oregon death with dignity act: annual reports. Portland (OR): Death and Dignity. Available: www.deathwithdignity.org/oregon-death-with-dignity-act-anual-reports (accessed 2018 May 5).
15. Chambaere K, Vander Stichele R, Mortier F, et al. Recent trends in euthanasia and other end-of-life practices in Belgium. N Engl J Med 2015;372:1179-81.
16. van der Heide A, van Delden JJM, Onwuteaka-Philipse BD. End-of-life decisions in the Netherlands over 25 years. N Engl J Med 2017;377:492-4. 
17. Emanuel EJ, Onwuteaka-Philipse BD, Urwin JW, et al. Attitudes and practices of euthanasia and physician-assisted suicide in the United States, Canada, and Europe. JAMA 2016;316:79-90.
18. McCormack R, Price A. Psychiatric review should be mandatory for patients requesting assisted suicide. Gen Hosp Psychiatry 2014;36:7-9.
19. Ganzini L. Psychiatric evaluations for individuals requesting assisted death in Washington and Oregon should not be mandatory. Gen Hosp Psychiatry 2014;36:10-2.
20. WHO definition of palliative Care. Geneva: World Health Organization; 2013. Available: www.who.int/cancer/palliative/definition/en (accessed 2019 July 20).
21. De Lima L, Wooldruff R, Pettus K, et al. International association for hospice and palliative care position statement: euthanasia and physician-assisted suicide. J Palliat Med 2017;20:8-14.
22. Gerson SM, Koksvik GH, Richards N, et al. The relationship of palliative care with assisted dying where assisted dying is lawful: a systematic scoping review of the literature. J Pain Symptom Manage 2019 Dec. 24 [Epub ahead of print]. doi:10.1016/j.jpainsymman.2019.12.361.
23. Buchman S. Why I decided to provide assisted dying: it is truly patient centred care. BMJ 2019;364:k1422.
24. Wales J, Isenberg W, Wegier P, et al. Providing medical assistance in dying within a home palliative care program in Toronto, Canada: an observational study of the first year of experience. J Pain Palliat Care Med 2018;21:1573-9.
25. Brinkman-Stoppelenburg A, Onwuteaka-Philipse BD, van der Heide A. Involvement of supportive care professionals in patient care in the last month of life. Support Care Cancer 2015;23:2899-906.
26. Brown CR, Hsu AT, Kendall C, et al. How are physicians delivering palliative care? A population-based retrospective cohort study describing the mix of generalist and specialist palliative care models in the last year of life. Palliat Med 2018;32:1334-43.
27. Boston P, Bruce A, Schreiber R. Existential suffering in the palliative care setting: an integrated literature review. J Pain Symptom Manage 2011;41:604-18.
28. Loggers ET, Starks H, Shannon-Dudley M, et al. Implementing a death with dignity program at a comprehensive cancer center. N Engl J Med 2013;368:1417-24.
29. Battin MP, van der Heide A, Ganzini L, et al. Legal physician-assisted dying in Oregon and the Netherlands: evidence concerning the impact on patients in “vulnerable” groups. J Med Ethics 2007;33:591-7.
Competing interests: James Downar is currently employed by Bruyère Continuing Care, a Catholic faith–based health care facility; he is a former unpaid member of the Clinicians Advisory Council of Dying with Dignity Canada, a group that advocated for legalization of medical assistance in dying (MAiD) in Canada; and he previously received consultation fees for curriculum development for a MAiD course offered by Joule, Inc. The work presented here does not represent the views of Bruyère Continuing Care, Dying with Dignity Canada, or Joule, Inc. Jennifer Gibson was co-chair of the Provincial–Territorial Expert Advisory Group on Physician-Assisted Dying (2015), which was commissioned by provincial and territorial governments to develop recommendations for the implementation of MAiD in Canada; she was also chair of the Advance Requests Working Group of the Council of Canadian Academies Expert Panel on Medical Assistance in Dying. No other competing interests were declared.

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Data sharing: Requests for data sharing from the MAiD data set may be directed to the corresponding author by email, but are subject to the terms of the data sharing agreement with the Office of the Chief Coroner of Ontario. The data set for the Ontario cohort of this study is held securely in coded form at ICES. Although data sharing agreements prohibit ICES from making the data set publicly available, access may be granted to those who meet prespecified criteria for confidential access, available at www.ices.on.ca/DAS.

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