



## ORIGINAL RESEARCH

# Prevalence of Unmet Rehabilitation Needs Among Canadians Living With Long-term Conditions or Disabilities During the First Wave of the COVID-19 Pandemic

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**Abstract**

**Objective:** We aimed to describe the prevalence of unmet rehabilitation needs among a sample of Canadians living with long-term conditions or disabilities during the first wave of the COVID-19 pandemic.

**Design:** Cross-sectional survey.

**Setting:** Individuals residing in Canada during the first wave of the COVID-19 pandemic.

**Participants:** Eligible participants were Canadians living with long-term conditions or disabilities, 15 years or older living in 1 of the 10 provinces or 3 territories (n=13,487).

**Interventions:** Not applicable.

**Main Outcome Measure:** We defined unmet rehabilitation needs as those who reported needing rehabilitation (ie, physiotherapy/massage therapy/chiropractic, speech, or occupational therapy, counseling services, support groups) but did not receive it because of the COVID-19 pandemic. We calculated the national, age, gender, and province/territory-specific prevalence and 95% confidence interval of unmet rehabilitation needs.

**Results:** During the first wave of the pandemic, the prevalence of unmet rehabilitation needs among Canadians with long-term conditions or disabilities was 49.3% (95% confidence interval [CI]; 48.3, 50.3]). The age-specific prevalence was higher among individuals 15-49 years old (55.6%; 95% CI [54.2, 57.1]) than those 50 years and older (46.0%; 95% CI [44.5, 47.4]). Females (53.7%; 95% CI [52.6, 54.9]) had higher unmet needs than males (44.1%; 95% CI [42.3, 45.9]). Unmet rehabilitation needs varied across provinces and territories.

**Conclusions:** In this sample, almost 50% of Canadians living with long-term conditions or disabilities had unmet rehabilitation needs during the first wave of the COVID-19 pandemic. This suggests that a significant gap between the needs for and delivery of rehabilitation care existed during the early phase of the pandemic.

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Despite a publicly funded health care system, unmet needs for health care and rehabilitation services are a significant concern in Canada.<sup>1,2</sup> In 2014, approximately 3.4 million Canadians 12 years and older reported unmet health care needs, with higher unmet needs among women and those aged 20–54 years.<sup>3</sup> Furthermore, individuals with health conditions, disabilities, and other marginalized groups face unique challenges with accessing rehabilitation care. In 2017, Statistics Canada reported that almost three-quarters of individuals with mobility disabilities reported unmet needs for physiotherapy, massage therapy, or chiropractic services.<sup>4</sup> More recently, in 2019, the Pan American Health Organization identified Canada as 1 of the top 10 countries in the Americas for unmet rehabilitation services (prevalence: 41,100 cases/100,000 population).<sup>5</sup> Although it is assumed that the COVID-19 pandemic worsened the need for rehabilitation services, the magnitude of this problem during the pandemic is unknown.

In Canada, the delivery of rehabilitation services varies greatly depending on the severity and type of health condition, affordability, and accessibility.<sup>6,7</sup> The COVID-19 pandemic posed many challenges for individuals who experienced health problems, inequities, or had limited access to rehabilitation services prior to the pandemic.<sup>8–10</sup> For these individuals, the COVID-19 pandemic likely exacerbated pre-existing health disparities, further widening the health gap.<sup>11,12</sup> Furthermore, individuals with worsening physical and psychological function due to the pandemic, have increased the need for rehabilitation services, calling for a prompt response from all sectors of the health care system.<sup>13</sup>

During the lockdown periods, access to rehabilitation services was disrupted globally, primarily affecting individuals with a range of chronic conditions and disabilities.<sup>14,15</sup> Such disruption increases the potential likelihood of further deterioration in health and functioning in individuals already suffering with chronic conditions and disabilities,<sup>16,17</sup> affecting their overall quality of life and wellbeing. In particular, the pandemic led to significant disruptions in the access and delivery of rehabilitation services provided by health care professionals such as physiotherapists, occupational therapists, chiropractors, as well as support group services, drop-in centers, or addiction services.<sup>18–22</sup> However, the actual extent of this disruption on rehabilitation services and the effect on health in Canadian populations during the initial months of the COVID-19 pandemic are unknown.

With emerging COVID-19 literature concentrating on overall health care needs, to our knowledge, no studies have yet investigated the unmet rehabilitation needs of individuals living with long-term conditions or disabilities in the Canadian population during the COVID-19 pandemic. Thus, our study adds to the understanding of the burden of unmet rehabilitation needs for individuals living with chronic conditions or disabilities during the initial months of a national health emergency. This new information would fill a knowledge gap necessary to inform the planning of rehabilitation services in future emergencies. Specifically, we investigated the unmet rehabilitation needs among Canadians with long-term conditions or disabilities during the first wave of the COVID-19 pandemic. We described the prevalence of unmet rehabilitation needs in a sample of individuals living with a long-term condition or disability by age, gender, and province/territory from June 23, 2020, to July 6, 2020, in the Canadian population.

#### List of abbreviations:

CI confidence interval

## Methods

### Study design

We analyzed data from the *Impacts of COVID-19 on Canadians Living with Long-Term Conditions and Disabilities*, a national cross-sectional survey conducted by Statistics Canada as part of a series of crowdsourcing cycles to collect self-reported information on Canadians living with a long-term condition or disability during the first wave of the COVID-19 pandemic.<sup>23</sup> The survey aimed to assess the challenges experienced by Canadians living with a long-term condition or disability during the pandemic and to measure the effect of the pandemic on their health, employment, household expenses, and access to health services.<sup>24</sup>

### Target population and study sample

Eligible and included participants were Canadians aged 15 years or older living in 1 of the 10 provinces or 3 territories during the first wave of the COVID-19 pandemic living with a long-term condition or disability.<sup>24</sup> Recruitment of participants occurred through a crowdsourcing method using open advertising and web-only collection. Crowdsourcing allows for timely and direct data collection during emergencies.<sup>24</sup> Open survey advertisement took place through social media, news channels, government agencies, private and public organizations, and associations.<sup>24</sup> Participation in the survey was voluntary and therefore non-probabilistic.

For the purpose of this survey, eligible Canadians included those who provided a valid postal code. To be included in the survey, eligible participants answered “yes” to 1 of 2 screening questions and answered at least 1 of the content areas within the survey.<sup>24</sup> The screening questions were “Do you have any difficulties or long-term conditions that have lasted or are expected to last for 6 or more months?”<sup>25(p13)</sup>, and “Do you identify as a person with a disability? A person with a disability is a person who has a long-term difficulty or condition that limits their daily activities inside or outside the home such as at school, work, or in the community in general”<sup>25(p13)</sup>. Participants who completed the survey were excluded if they did not report a long-term condition or identify as having a disability, were under the age of 15 years, or were not residing in Canada.<sup>24</sup>

### Data

Participants completed a self-administered online questionnaire through an anonymous portal on Statistics Canada’s website from June 23, 2020, to July 6, 2020.<sup>24</sup> We accessed the publicly available dataset (public-user microdata file) through the Ontario Data Documentation, Extraction Services and Infrastructure digital data repository.<sup>26</sup> The survey questionnaire included 9 sections, collecting data regarding employment, income, expenses, long-term conditions, health, education, indigenous identity, sociodemographic characteristics (ie, population groups participants belonged to), and demographics (ie, age, gender, household type, and geographic region).<sup>25</sup> For health, participants were asked to compare their general and mental health status at the time of the survey to before the COVID-19 pandemic. Five options varying from “much better now” to “much worse now” were available.<sup>25</sup>

## Unmet rehabilitation needs

We used the World Health Organization definition of rehabilitation to identify services that aim to improve physical, mental, or social functioning.<sup>27</sup> We measured unmet rehabilitation needs by using responses to the following question: “*Did you need any of the following therapies or services for a long-term condition, but did not receive it due to the COVID-19 pandemic?*”<sup>25(p15)</sup>. Participants who selected 1 of the following options: (1) physiotherapy/massage therapy/chiropractic treatments, (2) speech therapy, (3) occupational therapy, (4) counseling services from a psychologist/psychiatrist/psychotherapist/social worker, or (5) support group services, drop-in center or addiction services, telephone information or support lines were deemed to have had unmet rehabilitation needs.

## Statistical analysis

We described the characteristics of the sample across sociodemographic and health-related factors for the entire sample and stratified by those with and without unmet rehabilitation needs. We computed the national, age, gender, and province/territory-specific prevalence and 95% confidence interval (CI) of unmet rehabilitation needs among respondents living with a long-term condition or disability. In all prevalence calculations, the numerator included the number of participants with a long-term condition or disability reporting unmet rehabilitation needs and the denominator included the total number of respondents with a long-term condition or disability. As per Statistics Canada reporting guidelines, any estimates for which the numerator contained <10 respondents and/or the denominator contained <30 respondents were not published.<sup>24</sup> We also calculated the prevalence of unmet needs for each type of health service (ie, physiotherapy/massage therapy/chiropractic treatments; speech therapy; occupational therapy; counseling services from a psychologist/psychiatrist/psychotherapist/social worker; and support group services, drop-in center or addiction services, telephone information or support lines).

The age-specific prevalence was stratified into those 15–49 years and or ≥50 years old. Self-reported sex identity was stratified into male or female.<sup>25</sup> For province/territory-specific prevalence, we provide estimates for each of the 10 provinces and for the 3 territories combined.<sup>24</sup> Finally, we conducted stratified analysis for participants living with and without (1) a long-term condition or disability; (2) a long-term condition and disability; or (3) a long-term condition, but no disability. Less than 4% of participants did not answer specific questions in the survey.<sup>24</sup> Nevertheless, we included these participants in the denominators and computed conservative estimates of prevalence.

To account for the crowdsourcing sampling methodology, we applied standardized benchmarking factors provided by Statistics Canada to all prevalence calculations to control for participation bias related to geographic location (ie, province/territory), gender, and age.<sup>24</sup> We used the statistical software R<sup>31</sup> to perform all statistical analyses, and specific R packages tidyverse, dplyr, survey, and srvyr to account for the standardized benchmarking factors.<sup>28–31</sup>

## Ethics approval

The study was approved by Ontario Tech University Research Ethics Board (REB #: 15791 – 130103).

## Results

### Sample characteristics

Our sample included 13,487 valid questionnaires from eligible participants. Statistics Canada does not release the number of individuals who completed the questionnaire but were deemed ineligible. After the application of the standardized benchmarking factors, 53.8% of all participants with long-term conditions or disability were female, 52.3% were 50 years and older, 49.8% did not attend university, 13.5% were unemployed, while 40.9% were not in the labor force (table 1). Among participants, 27.9% experienced a decrease in overall household monthly income since the start of the pandemic. In our sample, 5.4% identified as visible minority and 2.5% as Indigenous. Most participants resided in Ontario (39.4%), followed by Quebec (19.3%) and British Columbia (14.6%). Of participants, 58.2% reported living with long-term conditions and disabilities, 39.4% reported a long-term condition but no disability, and 1.9% reported a disability but no long-term condition. The most commonly reported disabilities were related to mental health (47.4%), followed by physical health (37.3%), cognition (24.3%), seeing (14.3%), and hearing (6.3%). Overall, 38.1% reported that their general health was somewhat worse now compared with before the pandemic, while 41.5% reported their mental health as somewhat worse compared with before the pandemic. Furthermore, 45.9% of the sample reported 1 type of disability, 27.8% reported 2, 14.8% reported 3, 7% reported 4, and 2% reported to have all 5 types of disability.

### Characteristics of individuals with unmet rehabilitation needs

Among individuals with long-term conditions or disabilities who reported unmet rehabilitation needs, most were female (58.6%) and 14.4% were unemployed (table 1). Additionally, 66.3% reported having both a long-term condition and a disability, while 32.2% reported a long-term condition without a disability. Disability related to mental health (56.8%) was the most common followed by physical disability (43.4%). Overall, when asked to compare their general and mental health at the time of the survey, to prior to the COVID-19 pandemic, 43.1%, and 43.2%, respectively, reported that their health was somewhat worse compared with before the pandemic and only 6.7% and 5.6% reported somewhat improvement in their health.

### Prevalence of unmet rehabilitation needs

Overall, 49.3% (95% CI [48.3, 50.3]) of participants living with a long-term condition or disability reported unmet rehabilitation needs during the first wave of the pandemic (table 2). The prevalence was higher for individuals living with a long-term condition and a disability (56.2%; 95% CI [54.8, 57.5]) (table 3) than in those living with a long-term condition who did not identify as having a disability (40.2%; 95% CI [38.6, 41.8]) (table 4). Unmet rehabilitation needs related to physiotherapy/massage therapy/chiropractic were the most common (37.2%; 95% CI [36.2, 38.1]), followed by counseling services (18.1%; 95% CI [17.3, 18.8]), support groups/lines/addiction services (9.4%; 95% CI [8.8, 10.0]), occupational therapy (4.2%; 95% CI [3.8, 4.6]), and speech therapy (1.4%; 95% CI [1.2, 1.6]) (table 2). Regardless of disability type, the most commonly reported unmet needs were related to

**Table 1** Weighted sample characteristics of individuals living with a long-term condition or disability during the first wave of the COVID-19 pandemic in Canada\*

Characteristic	Overall Sample	Individuals With Unmet Rehabilitation Needs	Individuals Without Unmet Rehabilitation Needs
Total (n)	13,483	6650	6833
<b>Age (n, %)</b>			
15-49 years	5498 (40.8)	3059 (46.0)	2439 (35.7)
50 years and older	7058 (52.3)	3243 (48.8)	3815 (55.8)
<b>Gender (n, %)</b>			
Male	6195 (45.9)	2732 (41.1)	3463 (50.7)
Female	7250 (53.8)	3896 (58.6)	3354 (49.1)
<b>Provinces/territories (n, %)</b>			
Newfoundland and Labrador	216 (1.6)	109 (1.6)	107 (1.6)
Prince Edward Island	65 (0.5)	34 (0.5)	32 (0.5)
Nova Scotia	471 (3.5)	229 (3.4)	242 (3.5)
New Brunswick	350 (2.6)	143 (2.2)	206 (3.0)
Quebec	2604 (19.3)	1095 (16.5)	1509 (22.1)
Ontario	5315 (39.4)	2655 (39.9)	2660 (38.9)
Manitoba	525 (3.9)	279 (4.2)	246 (3.6)
Saskatchewan	442 (3.3)	235 (3.5)	207 (3.0)
Alberta	1486 (11.0)	825 (12.4)	661 (9.7)
British Columbia	1971 (14.6)	1025 (15.4)	947 (13.9)
Territories	38 (0.3)	22 (0.3)	16 (0.2)
<b>Household type (n, %)</b>			
Living alone	3080 (22.8)	1480 (22.3)	1600 (23.4)
Multiple person household, no children	7547 (56.0)	3608 (54.3)	3939 (57.6)
Multiple person household, with children or all under 18 years of age	2776 (20.6)	1513 (22.7)	1263 (18.5)
<b>Education (n, %)</b>			
Did not attend university	6717 (49.8)	3307 (49.7)	3411 (49.9)
Attended university	6717 (49.8)	3322 (49.9)	3395 (49.7)
<b>Visible minority (n, %)</b>			
Yes	733 (5.4)	388 (5.8)	345 (5.0)
No	12395 (91.9)	6068 (91.3)	6327 (92.6)
<b>Indigenous identity (n, %)</b>			
Yes	334 (2.5)	190 (2.9)	143 (2.1)
No	12918 (95.8)	6313 (94.9)	6605 (96.7)
<b>Labor force status - before March 2020 (n, %)</b>			
Employed	7263 (53.9)	3670 (55.2)	3592 (52.6)
Unemployed	513 (3.8)	279 (4.2)	234 (3.4)
Not in the labor force	5350 (39.7)	2519 (37.9)	2831 (41.4)
<b>Labor force status - current (n, %)</b>			
Employed	6010 (44.6)	3004 (45.2)	3006 (44.0)
Unemployed	1825 (13.5)	957 (14.4)	868 (12.7)
Not in the labor force	5509 (40.9)	2620 (39.4)	2890 (42.3)
<b>Changes in overall household monthly income since March 2020 (n, %)</b>			
Stayed about the same as before the COVID-19 pandemic	8000 (59.3)	3657 (55.0)	4344 (63.6)
Increased since before the COVID-19 pandemic	929 (6.9)	479 (7.2)	449 (6.6)
Decreased since before the COVID-19 pandemic	3759 (27.9)	2121 (31.9)	1638 (24.0)
<b>Disability status (n, %)</b>			
Long-term condition and identifies having a disability	7848 (58.2)	4410 (66.3)	3438 (50.3)
Long-term condition but no disability	5319 (39.4)	2139 (32.2)	3180 (46.5)
No long-term condition but identifies as having a disability	254 (1.9)	79 (1.2)	175 (2.6)
<b>Disability type (n, %)</b>			
Seeing difficulty	1932 (14.3)	994 (14.9)	938 (13.7)
No seeing difficulty	11,311 (83.9)	5528 (83.1)	5783 (84.6)
Hearing difficulty	853 (6.3)	362 (5.4)	491 (7.2)

(continued on next page)

**Table 1** (Continued)

Characteristic	Overall Sample	Individuals With Unmet Rehabilitation Needs	Individuals Without Unmet Rehabilitation Needs
No hearing difficulty	12,320 (91.4)	6121 (92.1)	6199 (90.7)
Physical difficulty	5035 (37.3)	2883 (43.4)	2152 (31.5)
No physical difficulty	8356 (62.0)	3726 (56.0)	4630 (67.8)
Cognitive difficulty	3281 (24.3)	2090 (31.4)	1191 (17.4)
No cognitive difficulty	10,081 (74.8)	4495 (67.6)	5586 (81.7)
Mental health-related difficulty	6397 (47.4)	3775 (56.8)	2622 (38.4)
No mental health-related difficulty	6978 (51.8)	2831 (42.6)	4146 (60.7)
<b>Perceived health since the start of COVID-19 pandemic (n, %)</b>			
Excellent	536 (4.0)	188 (2.8)	348 (5.1)
Very good	2081 (15.4)	788 (11.9)	1293 (18.9)
Good	4765 (35.3)	2103 (31.6)	2662 (39.0)
Fair	4268 (31.7)	2367 (35.6)	1901 (27.8)
Poor	1814 (13.5)	1193 (17.9)	620 (9.1)
<b>Perceived mental health since the start of COVID-19 pandemic (n, %)</b>			
Excellent	684 (5.1)	190 (2.9)	494 (7.2)
Very good	1717 (12.7)	620 (9.3)	1097 (16.0)
Good	3648 (27.1)	1544 (23.2)	2104 (30.8)
Fair	4692 (34.8)	2466 (37.1)	2226 (32.6)
Poor	2696 (20.0)	1804 (27.1)	892 (13.0)
<b>Health compared with before COVID-19 pandemic (n, %)</b>			
Much better now	200 (1.5)	89 (1.3)	111 (1.6)
Somewhat better now	877 (6.5)	446 (6.7)	430 (6.3)
About the same	5988 (44.4)	2312 (34.8)	3676 (53.8)
Somewhat worse now	5141 (38.1)	2866 (43.1)	2275 (33.3)
Much worse now	1250 (9.3)	920 (13.8)	330 (4.8)
<b>Mental health compared with before COVID-19 pandemic (n, %)</b>			
Much better now	201 (1.5)	90 (1.4)	112 (1.6)
Somewhat better now	739 (5.5)	374 (5.6)	365 (5.3)
About the same	4888 (36.3)	1896 (28.5)	2992 (43.8)
Somewhat worse now	5602 (41.5)	2874 (43.2)	2728 (39.9)
Much worse now	1960 (14.5)	1370 (20.6)	589 (8.6)

NOTE. Benchmarking factor applied to all estimates for standardization. Percentages may not add up to 100% because of missing values. Unmet rehabilitation needs included individuals who reported that they needed rehabilitation (ie, all services - physiotherapy/massage therapy/chiropractic treatment, speech therapy, occupational therapy, counseling services, or support groups) but did not receive it because of the COVID-19 pandemic.

\* Benchmarking factor applied to the original sample, which included 13,487 participants.

physiotherapy/massage therapy/chiropractic (table 5). This was followed by unmet needs related to counseling services, support groups/lines/addiction services, occupational therapy, and speech therapy.

### Age- and gender-specific prevalence of unmet rehabilitation needs

The prevalence was higher among individuals 15-49 years old, (55.6%; 95% CI [54.2, 57.1]) than among individuals 50 years and older, (46.0%; 95% CI [44.5, 47.4]) (table 2). The gender-specific prevalence of unmet rehabilitation needs was higher among females (53.7%; 95% CI [52.6, 54.9]) than males (44.1%; 95% CI [42.3, 45.9]) (table 2). Similarly, unmet rehabilitation needs related to physiotherapy/massage therapy/chiropractic, and those pertaining to counseling services, were more prevalent among females than in males. The prevalence of unmet needs related to speech therapy and occupational therapy was slightly higher in males than females, but the prevalence of unmet rehabilitation

needs related to support groups/lines/addiction services was similar for females and males.

### Province/territory-specific prevalence of unmet rehabilitation needs

The prevalence of unmet rehabilitation needs ranged from 41.0% (95% CI [34.8, 47.2]) in New Brunswick to 57.4% (95% CI [44.7, 70.1]) in the Territories (table 2). Unmet rehabilitation needs related to physiotherapy/massage therapy/chiropractic were most common in the Territories (53.1%; 95% CI [40.3, 65.8]) and the lowest in New Brunswick (28.3%; 95% CI [22.7, 34.0]). However, unmet rehabilitation needs related to speech therapy (3.4%; 95% CI [1.2, 5.6]) and occupational therapy (5.9%; 95% CI [3.2, 8.6]) were most common in Saskatchewan. Finally, unmet rehabilitation needs related to counseling services (22.1%; 95% CI [19.6, 24.7]) and support groups/lines/addiction services (11.6%; 95% CI [9.5, 13.7%]) were most prevalent in Alberta.

**Table 2** National, age, gender, and province/territory-specific prevalence (%) and 95% confidence interval of unmet rehabilitation needs among a sample of Canadians living with a long-term condition or disability during the first wave of COVID-19 pandemic (n=13,483)

Characteristic	Unmet Rehabilitation Needs (% , 95% CI)	Unmet Needs for Physiotherapy/Massage Therapy/Chiropractic (% , 95% CI)	Unmet Needs for Speech Therapy (% , 95% CI)	Unmet Needs for Occupational Therapy (% , 95% CI)	Unmet Needs for Counseling Services (% , 95% CI)	Unmet Needs for Support Group, Drop-in Center or Addiction Services (% , 95% CI)
<b>National</b>	49.3% (95% CI [48.3, 50.3])	37.2% (95% CI [36.2, 38.1])	1.4% (95% CI [1.2, 1.6])	4.2% (95% CI [3.8, 4.6])	18.1% (95% CI [17.3, 18.8])	9.4% (95% CI [8.8, 10.0])
<b>Age</b>						
15-49 years	55.6% (95% CI [54.2, 57.1])	39.1% (95% CI [37.7, 40.5])	2.1% (95% CI [1.6, 2.5])	5.6% (95% CI [4.9, 6.3])	26.4% (95% CI [25.1, 27.7])	12.1% (95% CI [11.2, 13.1])
50 years and older	46.0% (95% CI [44.5, 47.4])	37.0% (95% CI [35.6, 38.4])	1.0% (95% CI [0.7, 1.3])	3.1% (95% CI [2.6, 3.6])	12.4% (95% CI [11.4, 13.3])	7.8% (95% CI [7.1, 8.6])
<b>Gender</b>						
Male	44.1% (95% CI [42.3, 45.9])	30.9% (95% CI [29.3, 32.6])	1.5% (95% CI [1.0, 1.9])	4.5% (95% CI [3.8, 5.2])	17.3% (95% CI [16.0, 18.6])	9.4% (95% CI [8.4, 10.4])
Female	53.7% (95% CI [52.6, 54.9])	42.4% (95% CI [41.2, 43.5])	1.3% (95% CI [1.1, 1.6])	4.0% (95% CI [3.5, 4.4])	18.7% (95% CI [17.9, 19.6])	9.4% (95% CI [8.7, 10.0])
<b>Province/territories</b>						
Newfoundland and Labrador	50.4% (95% CI [41.1, 59.8])	34.4% (95% CI [25.7, 43.2])	—	—	21.5% (95% CI [13.6, 29.3])	5.0% (95% CI [1.3, 8.6])
Prince Edward Island	51.3% (95% CI [38.1, 64.4])	36.2% (95% CI [23.5, 48.9])	—	—	16.8% (95% CI [7.5, 26.1])	—
Nova Scotia	48.7% (95% CI [44.0, 53.3])	36.1% (95% CI [31.8, 40.5])	—	4.1% (95% CI [2.4, 5.8])	15.6% (95% CI [12.5, 18.7])	9.0% (95% CI [6.4, 11.6])
New Brunswick	41.0% (95% CI [34.8, 47.2])	28.3% (95% CI [22.7, 34.0])	—	3.5% (95% CI [1.6, 5.4])	15.9% (95% CI [11.9, 20.0])	7.8% (95% CI [4.5, 11.0])
Quebec	42.1% (95% CI [39.3, 44.9])	31.1% (95% CI [28.6, 33.7])	1.1% (95% CI [0.5, 1.6])	4.9% (95% CI [3.7, 6.1])	15.1% (95% CI [13.0, 17.1])	7.3% (95% CI [5.8, 8.8])
Ontario	49.9% (95% CI [48.4, 51.5])	37.4% (95% CI [36.0, 38.9])	1.2% (95% CI [0.9, 1.5])	3.8% (95% CI [3.2, 4.4])	18.3% (95% CI [17.2, 19.4])	9.9% (95% CI [9.0, 10.8])
Manitoba	53.1% (95% CI [48.6, 57.7])	40.5% (95% CI [36.1, 45.0])	—	4.2% (95% CI [2.5, 5.9])	17.2% (95% CI [14.0, 20.4])	10.6% (95% CI [7.8, 13.4])
Saskatchewan	53.1% (95% CI [47.2, 58.9])	36.5% (95% CI [31.1, 42.0])	3.4% (95% CI [1.2, 5.6])	5.9% (95% CI [3.2, 8.6])	19.6% (95% CI [15.0, 24.3])	9.5% (95% CI [6.1, 12.9])
Alberta	55.5% (95% CI [52.4, 58.7])	41.9% (95% CI [38.8, 45.0])	2.1% (95% CI [1.1, 3.1])	4.9% (95% CI [3.5, 6.3])	22.1% (95% CI [19.6, 24.7])	11.6% (95% CI [9.5, 13.7])
British Columbia	52.0% (95% CI [49.5, 54.4])	41.9% (95% CI [39.5, 44.3])	1.5% (95% CI [0.9, 2.1])	3.9% (95% CI [3.0, 4.8])	18.9% (95% CI [17.1, 20.8])	9.6% (95% CI [8.3, 11.0])
Territories	57.4% (95% CI [44.7, 70.1])	53.1% (95% CI [40.3, 65.8])	—	—	—	—

NOTE. Benchmarking factor applied to all estimates for standardization. Unmet rehabilitation needs included individuals who reported that they needed rehabilitation (ie, all services - physiotherapy/massage therapy/chiropractic treatment, speech therapy, occupational therapy, counseling services, or support groups) but did not receive it because of the COVID-19 pandemic.

— As per Statistics Canada guidelines, proportions of 0% or 100%, or numerator <10 and or denominator <30 were not reported.

**Table 3** National, age, gender, and province/territory-specific prevalence (%) and 95% confidence interval of unmet rehabilitation needs among a sample of Canadians living with a **long-term condition AND disability** during the first wave of COVID-19 pandemic (n=7848)

	Unmet Rehabilitation Needs (% , 95% CI)	Unmet Needs for Physiotherapy/Massage Therapy/Chiropractic (%, 95% CI)	Unmet Needs for Speech Therapy (%, 95% CI)	Unmet Needs for Occupational Therapy (%, 95% CI)	Unmet Needs for Counseling Services (%, 95% CI)	Unmet Needs for Support Group, Drop-in Center or Addiction Services (% , 95% CI)
<b>National</b>	56.2% (95% CI [54.8, 57.5])	39.9% (95% CI [38.7, 41.2])	1.9% (95% CI [1.5, 2.3])	6.3% (95% CI [5.6, 6.9])	23.2% (95% CI [22.1, 24.3])	13.7% (95% CI [12.8, 14.3])
<b>Age</b>						
15-49 years	62.2% (95% CI [60.3, 64.0])	41.1% (95% CI [39.3, 43.0])	2.7% (95% CI [2.1, 3.3])	8.0% (95% CI [7.0, 9.0])	32.0% (95% CI [30.2, 33.8])	17.4% (95% CI [15.9, 18.8])
50 years and older	52.8% (95% CI [50.9, 54.7])	40.6% (95% CI [38.7, 42.4])	1.5% (95% CI [1.0, 2.1])	4.7% (95% CI [3.9, 5.5])	16.7% (95% CI [15.3, 18.0])	11.3% (95% CI [10.1, 12.5])
<b>Gender</b>						
Male	51.8% (95% CI [49.4, 54.1])	33.4% (95% CI [31.2, 35.6])	2.0% (95% CI [1.4, 2.7])	6.8% (95% CI [5.6, 8.0])	22.7% (95% CI [20.7, 24.6])	14.5% (95% CI [12.9, 16.2])
Female	59.8% (95% CI [58.3, 61.3])	45.3% (95% CI [43.8, 46.8])	1.8% (95% CI [1.4, 2.2])	5.9% (95% CI [5.2, 6.5])	23.6% (95% CI [22.4, 24.9])	13.0% (95% CI [12.1, 14.0])
<b>Province/territories</b>						
Newfoundland and Labrador	54.2% (95% CI [41.9, 66.4])	34.9% (95% CI [23.1, 45.9])	—	—	25.9% (95% CI [15.0, 36.7])	—
Prince Edward Island	58.4% (95% CI [42.3, 74.5])	36.3% (95% CI [21.4, 51.3])	—	—	—	—
Nova Scotia	52.5% (95% CI [46.4, 58.6])	36.6% (95% CI [30.9, 42.3])	—	6.1% (95% CI [3.4, 8.7])	17.2% (95% CI [12.9, 21.5])	14.0% (95% CI [9.9, 18.1])
New Brunswick	42.5% (95% CI [34.7, 50.2])	26.1% (95% CI [19.5, 32.7])	—	5.5% (95% CI [2.6, 8.5])	19.3% (95% CI [13.8, 24.7])	9.8% (95% CI [5.5, 14.1])
Quebec	48.8% (95% CI [45.0, 52.6])	33.2% (95% CI [29.7, 36.7])	1.1% (95% CI [0.4, 1.8])	7.2% (95% CI [5.2, 9.2])	19.5% (95% CI [16.4, 22.5])	11.4% (95% CI [9.0, 13.8])
Ontario	57.6% (95% CI [55.6, 59.5])	40.7% (95% CI [38.8, 42.7])	1.7% (95% CI [1.2, 2.2])	5.8% (95% CI [4.9, 6.7])	24.6% (95% CI [22.9, 26.2])	14.5% (95% CI [13.1, 15.9])
Manitoba	57.6% (95% CI [51.7, 63.5])	41.9% (95% CI [36.1, 47.7])	—	5.1% (95% CI [2.8, 7.3])	20.1% (95% CI [15.7, 24.4])	13.1% (95% CI [9.2, 16.9])
Saskatchewan	59.7% (95% CI [52.0, 67.4])	38.4% (95% CI [31.0, 45.8])	—	8.0% (95% CI [3.9, 12.1])	23.8% (95% CI [17.0, 30.5])	13.8% (95% CI [8.4, 19.2])
Alberta	62.7% (95% CI [58.7, 66.7])	44.7% (95% CI [40.7, 48.8])	3.1% (95% CI [1.5, 4.7])	7.4% (95% CI [5.1, 9.6])	26.2% (95% CI [22.7, 29.7])	16.4% (95% CI [13.3, 19.6])
British Columbia Territories	59.7% (95% CI [56.5, 62.9])	46.6% (95% CI [43.5, 49.8])	2.5% (95% CI [1.5, 3.5])	6.2% (95% CI [4.7, 7.7])	24.6% (95% CI [21.9, 27.2])	14.3% (95% CI [12.1, 16.4])
	—	—	—	—	—	—

NOTE. Benchmarking factor applied to all estimates for standardization. Unmet rehabilitation needs included individuals who reported that they needed rehabilitation (ie, all services - physiotherapy/massage therapy/chiropractic treatment, speech therapy, occupational therapy, counseling services, or support groups) but did not receive it because of the COVID-19 pandemic.

— As per Statistics Canada guidelines, proportions of 0% or 100%, or numerator <10 and or denominator <30 were not reported.

**Table 4** National, age, gender, and province/territory-specific prevalence (%) and 95% confidence interval of unmet rehabilitation needs among a sample of Canadians living with a long-term condition and no disability during the first wave of COVID-19 pandemic (n=5319)

	Unmet Rehabilitation Needs (% , 95% CI)	Unmet Needs for Physiotherapy/Massage Therapy/Chiropractic (% , 95% CI)	Unmet Needs for Speech Therapy (% , 95% CI)	Unmet Needs for Occupational Therapy (% , 95% CI)	Unmet Needs for Counseling Services (% , 95% CI)	Unmet Needs for Support Group, Drop-in Center or Addiction Services (% , 95% CI)
<b>National</b>	40.2% (95% CI [38.6, 41.8])	33.7% (95% CI [32.2, 35.2])	0.6% (95% CI [0.3, 0.8])	1.2% (95% CI [0.8, 1.5])	11.3% (95% CI [10.3, 12.3])	3.4% (95% CI [2.9, 4.0])
<b>Age</b>						
15-49 years	46.4% (95% CI [44.1, 48.7])	36.5% (95% CI [34.3, 38.8])	1.1% (95% CI [0.6, 1.7])	1.6% (95% CI [1.0, 2.2])	18.3% (95% CI [16.5, 20.1])	4.0% (95% CI [3.1, 4.9])
50 years and older	37.6% (95% CI [35.4, 39.7])	32.9% (95% CI [30.8, 34.9])	—	1.0% (95% CI [0.5, 1.5])	6.9% (95% CI [5.8, 8.0])	3.4% (95% CI [2.6, 4.2])
<b>Gender</b>						
Male	34.0% (95% CI [31.3, 36.6])	27.9% (95% CI [25.4, 30.4])	0.5% (95% CI [0.1, 0.9])	1.2% (95% CI [0.6, 1.8])	10.6% (95% CI [8.9, 12.3])	2.5% (95% CI [1.7, 3.4])
Female	45.4% (95% CI [43.6, 47.3])	38.5% (95% CI [36.8, 40.3])	0.6% (95% CI [0.3, 0.9])	1.2% (95% CI [0.8, 1.6])	11.9% (95% CI [10.8, 13.1])	4.2% (95% CI [3.4, 4.9])
<b>Province/territories</b>						
Newfoundland and Labrador	44.0% (95% CI [30.0, 58.1])	34.4% (95% CI [20.8, 48.0])	—	—	13.8% (95% CI [4.1, 23.5])	—
Prince Edward Island	—	—	—	—	—	—
Nova Scotia	42.5% (95% CI [35.3, 49.6])	34.8% (95% CI [28.0, 41.5])	—	—	13.6% (95% CI [9.0, 18.2])	—
New Brunswick	37.3% (95% CI [26.7, 47.9])	31.7% (95% CI [21.3, 42.0])	—	—	10.0% (95% CI [4.1, 15.9])	—
Quebec	33.4% (95% CI [29.2, 37.7])	28.8% (95% CI [24.8, 32.9])	—	1.5% (95% CI [0.6, 2.5])	10.3% (95% CI [7.5, 13.0])	1.9% (95% CI [0.7, 3.0])
Ontario	40.0% (95% CI [37.6, 42.3])	33.4% (95% CI [31.2, 35.6])	—	0.9% (95% CI [0.4, 1.3])	9.7% (95% CI [8.4, 11.0])	3.6% (95% CI [2.8, 4.5])
Manitoba	46.9% (95% CI [39.6, 54.3])	38.7% (95% CI [31.5, 45.9])	—	—	13.9% (95% CI [8.9, 18.8])	7.3% (95% CI [3.1, 11.5])
Saskatchewan	45.9% (95% CI [37.1, 54.7])	34.8% (95% CI [26.7, 42.9])	—	—	15.0% (95% CI [8.8, 21.2])	—
Alberta	46.3% (95% CI [41.3, 51.3])	38.7% (95% CI [33.8, 43.5])	—	—	16.6% (95% CI [12.9, 20.4])	4.5% (95% CI [2.5, 6.6])
British Columbia	41.2% (95% CI [37.4, 45.0])	35.1% (95% CI [31.5, 38.7])	—	—	11.0% (95% CI [8.9, 13.2])	3.3% (95% CI [2.1, 4.5])
Territories	—	—	—	—	—	—

NOTE. Benchmarking factor applied to all estimates for standardization. Unmet rehabilitation needs included individuals who reported that they needed rehabilitation (ie, all services - physiotherapy/massage therapy/chiropractic treatment, speech therapy, occupational therapy, counseling services, or support groups) but did not receive it because of the COVID-19 pandemic.

— As per Statistics Canada guidelines, proportions of 0% or 100%, or numerator <10 and or denominator <30 were not reported.



**Table 5** Weighted unmet rehabilitation characteristics of individuals living with specific disability types during the first wave of the COVID-19 pandemic in Canada (n=13,483)

	Disability type*					
	Mental Health-Related Difficulty (n=6397)	Physical Difficulty (n=5035)	Cognitive Difficulty (n=3281)	Seeing Difficulty (n=1932)	Hearing Difficulty (n=853)	No Difficulties (n=254)
<b>Unmet rehabilitation needs (n, %)</b>	3775 (59.0)	2883 (57.3)	2090 (63.7)	994 (51.5)	362 (42.5)	79 (31.1)
<b>Unmet needs for physiotherapy/massage therapy/chiropractic (n, %)</b>	2554 (39.9)	2308 (45.8)	1395 (42.5)	741 (38.3)	277 (32.5)	65 (25.4)
<b>Unmet needs for speech therapy (n, %)</b>	107 (1.7)	93 (1.8)	104 (3.2)	37 (1.9)	12 (1.4)	—
<b>Unmet needs for occupational therapy (n, %)</b>	305 (4.8)	400 (7.9)	249 (7.6)	131 (6.8)	31 (3.7)	—
<b>Unmet needs for counseling services (n, %)</b>	2073 (32.4)	927 (18.4)	1042 (31.8)	423 (21.9)	132 (15.5)	13 (4.9)
<b>Unmet needs for support group, drop-in center or addiction services (n, %)</b>	866 (13.5)	641 (12.7)	655 (20.0)	216 (11.2)	87 (10.2)	—

NOTE. Benchmarking factor applied to all estimates for standardization. Disability type refers to difficulties or long-term conditions related to seeing, hearing, physical health, cognitive, or mental health, which have lasted or are expected to last for 6 months or more. “—” means, as per Statistics Canada guidelines, proportions of 0% or 100%, or numerator <10 and or denominator <30 were not reported.

\* Participants may have reported more than 1 specific type of disability; therefore, groups are not mutually exclusive.

## Discussion

We found that 49.3% of participants living with a long-term condition or disability reported unmet rehabilitation needs during the first wave of the COVID-19 pandemic. Moreover, these unmet rehabilitation needs varied across age, gender, and province/territory. Specifically, unmet needs were more prevalent among women than men, and for individuals between the ages of 15 and 49. In addition, the variation in early public health measures to the COVID-19 outbreak by provincial and territorial governments may have contributed to the level of access to and delivery of rehabilitation services made available to individuals.<sup>32,33</sup> Our results cannot be used to estimate the exact effects of the pandemic on unmet rehabilitation needs because we did not have pre-pandemic estimates of unmet needs in 2020. Rather, our findings provide an understanding of the burden of unmet rehabilitation needs during a period of health emergency in the Canadian population.

The reality that Canadians living with chronic conditions or disabilities have higher unmet rehabilitation needs than those without such conditions is longstanding.<sup>1,34,35</sup> For example in 1998-99, unmet rehabilitation needs were more common among those with disabilities (17.5%) than those without disabilities (5.2%). Among persons with disabilities, 22.2% reported unmet needs for a chiropractor, 20.3% for a social worker, 20.0% for a physiotherapist, 11.6% for a psychologist, and 5.1% related to occupational/speech therapy.<sup>1</sup> In addition, from 2001 to 2005, unmet needs in individuals with a physical health problem were most common in those with chronic conditions such as hypertension, diabetes, arthritis/rheumatism, or heart disease.<sup>36</sup> More recently in 2017, 72% of individuals with mobility disabilities reported unmet needs for physiotherapy, massage therapy, and chiropractic treatments.<sup>4</sup> Although we are unable to make a direct comparison with pre-pandemic unmet rehabilitation needs because of the differences in study population, sampling design and outcome measurement, our findings contribute to the larger issue highlighted by the Pan American Health Organization of the continued need for rehabilitation services in Canada.<sup>5</sup>

The reasons for the high burden of unmet needs in our sample is multifactorial and complex. We hypothesize that the public

health measures implemented by Canadian officials during the first wave of the COVID-19 pandemic led to significant barriers to accessing care in the Canadian population.<sup>37</sup> Moreover, lockdown periods, stay-at-home orders, and the closure of non-essential services,<sup>38</sup> likely reduced the availability of health professionals and rehabilitation clinics. Furthermore, during the initial months of the pandemic, delays in accessing rehabilitation care were likely due to the pivoting of health services to pandemic-related care. At the individual level, fear, worry, and anxiety of contracting COVID-19 may have prevented individuals from seeking rehabilitation care,<sup>39</sup> or scheduling appointments with health care providers who offered limited access to in-person services for provisions experiencing a harder time transitioning to a virtual platform (ie, manual therapy). Finally, the prioritization of care delivery to COVID-19 patients, older adults and those most vulnerable to illness, likely shifted the allocation of rehabilitation services. This may explain, for example, why we observed higher unmet rehabilitation needs among those aged 15-49 years. Our findings are consistent with previous pre-pandemic literature, which reported that unmet health care needs were higher among females and younger age groups.<sup>1,34</sup>

Our findings are also consistent with studies conducted in other countries suggesting that rehabilitation services were scarce, not accessible or considered non-essential.<sup>40</sup> In May 2020, the World Health Organization found that 63% of 155 surveyed countries reported disruptions of rehabilitation services.<sup>41</sup> Moreover, studies from Turkey, Iran, and Italy reported important unmet rehabilitation needs by children and adolescents with rare and inherited metabolic disorders,<sup>42</sup> pregnant women,<sup>43</sup> and individuals with hearing and visual disabilities.<sup>44</sup>

Our findings demonstrate that individuals with chronic conditions or disabilities experienced a concerning proportion of unmet rehabilitation needs. In addition, the unmet needs were higher among females needing physiotherapy, massage therapy, chiropractic, and counseling services. This finding has important policy implications and suggests that the needs of women should be prioritized in times of emergencies. As such, the pandemic has emphasized the continued need to address the intersectionality contributing toward the potential unequal distribution of health services experienced by women and girls.<sup>45-47</sup> Moreover, the

marginalization of certain groups such as Indigenous peoples,<sup>48</sup> migrants,<sup>49</sup> and those experiencing homelessness<sup>50</sup> can further add to the burden of unmet needs found in Canada.

Given that our findings provide a brief snapshot of the rehabilitation challenges faced by individuals with long-term conditions or disabilities during the early months of the COVID-19 pandemic, it is difficult to determine whether the reported unmet rehabilitation needs occurred solely because of the pandemic. It is important to recognize that the reasons for unmet needs are often multifactorial, and that barriers to receiving rehabilitation services may have existed for individuals within our sample prior to the pandemic itself. To understand the true effect of the COVID-19 pandemic on hindering the receipt of rehabilitation services, factors related to availability, affordability, and acceptability<sup>36</sup> need to be assessed within both a pre-pandemic and pandemic context. More research is needed to examine the reasons for unmet rehabilitation needs in Canadians with long-term conditions or disabilities, as well as potential facilitators and barriers to accessing care.

Recent studies suggest that telerehabilitation, home-based, and community-based rehabilitation can serve as alternative modes of delivery for those living with long-term conditions or disabilities.<sup>51-55</sup> Telerehabilitation can be a cost-effective home-based mode of delivery for patients who experience barriers in accessing care while encouraging self-management and empowerment.<sup>56-59</sup> The COVID-19 pandemic's unintended effects on the delivery of rehabilitation services<sup>60-62</sup> suggest that telerehabilitation has the potential to reduce the growing burden of rehabilitation needs worldwide. However, implementing telerehabilitation is challenging and further research is required to address issues related to privacy and confidentiality, motivation and program adherence, digital literacy, evidence-based delivery of services, and the need for in-person contact.<sup>55-57</sup>

### Study limitations

The main limitation of our study is the use of crowdsourcing to recruit participants. Although crowdsourcing is a cost-effective and efficient method to recruit participants in surveys,<sup>63,64</sup> its non-probabilistic design may lead to the sample not being representative of the target population. However, we aimed to reduce the effect of this potential bias by using the standardized benchmarking provided by Statistics Canada.<sup>24</sup> Furthermore, as stated by Statistics Canada: "...because of the non-probabilistic nature of crowdsourcing and the calculation of a standardized benchmarking factor, results should be limited to proportions only and data from the crowdsourcing should not be used to calculate totals"<sup>65(p5)</sup>. Additionally, the reliability and validity of the questions used to collect data are unknown and we cannot rule out the possibility of misclassification bias when reporting unmet rehabilitation needs. However, the study questionnaire was developed according to standard practices and wording by Statistics Canada and can be considered to have face validity.<sup>24</sup>

Our survey questionnaire was only available online through Statistics Canada's portal. Therefore, this may have reduced knowledge of the survey and accessibility among individuals with long-term conditions or disabilities who required alternative survey formats to participate. It is also possible that participants who reported unmet rehabilitation needs during the pandemic had unmet needs prior to the pandemic. Therefore, the exact contribution of the pandemic to unmet rehabilitation needs is unknown.

## Conclusions

Almost 50% of Canadians living with a long-term condition or disability in this sample had unmet rehabilitation needs during the first wave of the COVID-19 pandemic. Our study suggests that the variations in unmet needs by age, gender, and geographic location highlight the need to develop policies for the delivery of equitable, accessible, and affordable rehabilitation services to Canadians in times of emergencies. Our research suggests that the Canadian health care system may be ill-equipped to provide necessary rehabilitation services to those in need. Bridging the rehabilitation gap will require collaborative action from individuals with long-term conditions and disabilities, rehabilitation providers, and policy makers. Lessons learned from the COVID-19 pandemic urge for ongoing creative, alternative modes to deliver rehabilitation services to individuals with chronic conditions and disabilities.

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## Keywords

COVID-19 pandemic; Disabilities; Long-term conditions; Rehabilitation; Unmet needs

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