


# Use of Living Strategies among Adults Aging with HIV in Canada: Comparison by Age-Group Using Data from the HIV, Health and Rehabilitation Survey

Journal of the International  
Association of Providers of AIDS Care  
Volume 17: 1-16  
© The Author(s) 2018  
Reprints and permission:  
sagepub.com/journalsPermissions.nav  
DOI: 10.1177/2325958218774041  
journals.sagepub.com/home/jia  


Kelly Kathleen O'Brien, PhD<sup>1,2,3</sup>, Matthieu Dagenais, BSc<sup>2</sup>, Patricia Solomon, PhD<sup>4</sup>, Catherine Worthington, PhD<sup>5</sup>, Soo Chan Carusone, PhD<sup>6</sup>, Francisco Ibáñez-Carrasco, PhD<sup>7</sup>, Steven Hanna, PhD<sup>8</sup>, Jacqueline Gahagan, PhD<sup>9</sup>, Larry Baxter, BA<sup>10</sup>, Gregory Robinson, MD<sup>11</sup>, Patriic Gayle<sup>12</sup>, Dawn James, MOT<sup>13</sup>, and Tammy Yates, MPhil<sup>14</sup>; the HIV Health and Rehabilitation Survey (HHRs) Team

## Abstract

**Objective:** To examine the type and frequency of living strategies used by adults living with HIV. **Methods:** We conducted a cross-sectional web-based survey that included 51 living strategies: maintaining sense of control, attitudes and beliefs, blocking HIV out of the mind, and social interaction. We examined the frequency of use and compared the proportion of respondents who engaged in strategies across 3 age-groups (<40 years, 40-49 years, and ≥50 years). **Results:** Of the 935 participants, the majority were men (79%) and most (≥60%) engaged “most” or “all of the time” in healthy lifestyle strategies and maintained a positive outlook living with HIV. Compared to younger participants, a higher proportion of older adults (≥50 years) engaged “most” or “all the time” in strategies that involved maintaining control over health and adopting positive attitudes and outlook living with HIV. **Conclusions:** Findings can help to inform the role of self-management to enhance successful aging with HIV.

## Keywords

HIV/AIDS, aging, rehabilitation, coping, resiliency, self-management

<sup>1</sup> Department of Physical Therapy, University of Toronto, Toronto, Ontario, Canada

<sup>2</sup> Rehabilitation Sciences Institute (RSI), University of Toronto, Toronto, Ontario, Canada

<sup>3</sup> Institute of Health Policy, Management and Evaluation (IHPE), University of Toronto, Toronto, Ontario, Canada

<sup>4</sup> School of Rehabilitation Science, McMaster University, Hamilton, Ontario, Canada

<sup>5</sup> School of Public Health and Social Policy, University of Victoria, Victoria, British Columbia, Canada

<sup>6</sup> Casey House, Toronto, Ontario, Canada

<sup>7</sup> Centre for Urban Health Studies, Li Ka Shing Knowledge Institute, St Michael's Hospital, Toronto, Ontario, Canada

<sup>8</sup> Department of Health Research Methods, Evidence, and Impact, McMaster University, Hamilton, Ontario, Canada

<sup>9</sup> Faculty of Health, School of Health and Human Performance, Dalhousie University, Halifax, Nova Scotia, Canada

<sup>10</sup> Community Member, Halifax, Nova Scotia, Canada

<sup>11</sup> Community Member, Toronto, Ontario, Canada

<sup>12</sup> Gay Men's Health Collective (GMHC), London, United Kingdom

<sup>13</sup> Nine Circles Community Health Centre, Winnipeg, Manitoba, Canada

<sup>14</sup> Realize, formerly the Canadian Working Group on HIV and Rehabilitation, Toronto, Ontario, Canada

## Corresponding Author:

Kelly K. O'Brien, Department of Physical Therapy, University of Toronto (CWGHR), 500 University Avenue, Room 160, Toronto, Ontario, Canada M5G 1V7.  
Email: kelly.obrien@utoronto.ca



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 License (<http://www.creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access pages (<https://us.sagepub.com/en-us/nam/open-access-at-sage>).

## Introduction

With increased access to antiretroviral therapy (ART), HIV is transitioning into a chronic illness, whereby individuals on treatment are living to similar life expectancy of the general population.<sup>1</sup> Estimates from UNAIDS suggest that the prevalence of HIV among older adults aged  $\geq 50$  years has increased steadily since 1995 to an estimated 4.2 million worldwide and will continue to increase.<sup>2</sup> In Canada, the prevalence of older adults ( $\geq 50$  years) living with HIV is expected to increase, as individuals who were diagnosed at younger ages are now surviving into older age, as well as new diagnoses emerging among older adults.<sup>3</sup> Similar trends are seen in the United States, where in 2013, an estimated 26% of all people living with HIV were 55 years and older.<sup>4</sup>

As individuals age with HIV, they can experience a higher prevalence and earlier onset compared to the general population of multimorbidity including cardiovascular disease, mental health issues, bone and joint disorders, diabetes, renal failure and chronic lung disease.<sup>5–7</sup> Health-related sequelae associated with multimorbidity can result in increased frailty, functional decline, and disability—defined as the combination of multidimensional (physical, cognitive, mental, emotional, and social) health challenges living with HIV including uncertainty or worrying about future health.<sup>8–10</sup>

The *Episodic Disability Framework* was derived from the perspective of adults living with HIV to characterize the multidimensional and sometimes fluctuating nature of health challenges in people living with HIV. The Framework includes 3 main components: (1) *dimensions of disability* which include physical, cognitive, mental, and emotional symptoms and impairments, difficulties with day-to-day activities, challenges to social inclusion, and uncertainty or worrying about future health; (2) *contextual factors* that include extrinsic (social support and stigma) and intrinsic (living strategies and personal attributes) factors, which may interact with and influence disability; and (3) *triggers*, known as major or momentous life events that may trigger an episode of disability such as receiving a new health diagnosis, changing a medication regimen, or experiencing a health event.<sup>10,11</sup> The *Episodic Disability Framework* has been validated with a sample of adults living with HIV in Ontario and provides a novel approach for conceptualizing the multidimensional and episodic nature of disability experienced by adults living with HIV.<sup>12</sup> The *Framework* has been used to describe the physical, neurocognitive, and social participation challenges<sup>13,14</sup> as well as uncertainty<sup>15,16</sup> and the role for rehabilitation in the context of HIV.<sup>17,18</sup> This *Framework* is a foundation for this study.

Disability may differ among older versus younger adults with HIV.<sup>19</sup> Older adults living with HIV are at increased risk of frailty, possess higher rates of daily functional impairments and social participation restrictions, and are more likely to experience mental health challenges and social isolation compared to the general population.<sup>20,21</sup> Older adults with HIV may further face challenges with uncertainty surrounding financial insecurity, transitioning into retirement and changes in long-

term housing.<sup>15</sup> Hence, there is a need to better address the multidimensional and complex health-related consequences of HIV and multimorbidity across age groups and to identify ways to enhance successful aging with HIV.<sup>22</sup> However, access to formalized health and rehabilitation services may be limited to people living with HIV due to, for example, lack of awareness or financial barriers to government coverage for services.<sup>23</sup> Hence, many adults living with HIV are left to employ individual coping or living strategies to deal with their health-related challenges.

Coping, stress, and health are interrelated concepts. The way in which an individual experiences and assesses a stressful situation will determine how he or she goes about responding to it.<sup>24</sup> Living strategies is a newly emerging term that may be considered analogous to coping in the context of HIV. The concept of “living strategies” was derived from the perspective of people living with HIV as a component of the *Episodic Disability Framework*, defined as behaviors, attitudes, and beliefs adopted by people living with HIV to help deal with disability associated with HIV and multimorbidity.<sup>11</sup> The term “living strategies” is distinct from “coping” because it acknowledges strategies that can have both positive and negative influences on health. Examples of living strategies include seeking social interaction with others, maintaining a sense of control over life, blocking HIV out of the mind, and maintaining positive attitudes and beliefs living with HIV.<sup>11</sup> While most strategies have positive influences on health, isolating oneself from others and engaging in substance use to “block HIV out of the mind” are strategies that can have negative consequences on overall health and well-being.<sup>11</sup>

Despite the potential benefits of living strategies, the nature and extent to which people living with HIV utilize them and the extent to which strategy use differs across age groups for people living with HIV is unknown. Understanding how living strategies are used among older and younger adults with HIV can help to identify ways health-care providers can promote positive, timely, and age-appropriate self-management approaches for enhancing health.<sup>25,26</sup> Our aim was to examine the type and frequency of living strategies used by adults living with HIV and to examine living strategy use within our sample across 3 age groups (<40, 40–49, and  $\geq 50$  years).

## Methods

We conducted a cross-sectional, self-administered, web-based survey in adults (18 years of age or older) living with HIV in Canada. We used a community engagement approach to the survey design and implementation, and interpretation of the data involving a team of researchers, knowledge user organizations, people living with HIV, and representatives from community-based organizations, including *Realize*, a Canadian governmental organization dedicated to improving rehabilitation services for people living with HIV through research, education, policy, and practice.<sup>27</sup> This study was approved by Research Ethics Boards at the University of Toronto,

University of Victoria, McMaster University, and Dalhousie University.

The *HIV, Health, and Rehabilitation Survey* instrument was developed by our multidisciplinary team to assess disability and rehabilitation services use among people living with HIV. The survey instrument was composed of sections on disability, rehabilitation services use, comorbidities, living strategies, social support, stigma, and demographic and disease characteristics. It was developed, pretested, and piloted by researchers, knowledge users, and collaborators across Canada. We administered the survey using Lime Survey software.<sup>28</sup> In this article, we specifically focus on the sections and findings pertaining to living strategies and the demographic and disease characteristics of adults living with HIV.

### Survey Instrument

To our knowledge, no preexisting HIV-specific measure of living strategies is available in the literature. Hence, we developed items based on categories that pertained to living strategies in the *Episodic Disability Framework*, a conceptual framework validated in people living with HIV.<sup>12</sup> Fifty-one items spanned strategies related to seeking social interactions with others (10 items), maintaining a sense of control over life (lifestyle, re-establishing purpose in life, maintaining life balance, planning for and anticipating the future, and paying attention to the numbers, such as viral load; 26 items), attitudes and beliefs (outlook on life, faith, and spirituality; 8 items), and blocking HIV out of the mind (7 items). For each item, participants were asked how often they used a given living strategy in the past month ranging from 0 = "none of the time (eg, not at all)," 1 = "a little of the time (eg, few times a month)," 2 = "some of the time (eg, weekly)," 3 = "most of the time (eg, few times a week)," and 4 = "all of the time (eg, every day)." We asked in the form of 2 questions whether collectively the personal living strategies ( $n = 41$ ) and social interaction living strategies ( $n = 10$ ) helped reduce, minimize, or prevent day-to-day health challenges living with HIV ( $n = 10$ ).

### Participants and Recruitment

We recruited adults living with HIV (18 years of age or older) in Canada who were able to read and understand English. We used a modified Dillman Tailored Design Method<sup>29</sup> in collaboration with a total of 28 publicly funded community-based organizations and HIV clinics across Canada using a 4-step e-mail or e-blast approach that included an initial e-mail invitation with the link to the survey questionnaire and thank-you or follow-up reminder e-mails at 1, 4, and 5 weeks after the initial invitation. E-mails and e-blasts were sent by community organizations and clinics to a sampling frame composed of over 4800 known clients living with HIV. Recruitment was supplemented by electronic (e-mails, newsletters, websites, video) and on-site (posters, cards) strategies along with snowball sampling. Participants received a \$25 CAD electronic gift card as a token of appreciation for their participation.

### Analysis

We downloaded survey responses from Lime Survey software<sup>28</sup> into SAS 9.3 (IBM/SAS Institute) for analysis.<sup>30</sup> Mean imputation was performed for items with <5% missingness. We dichotomized living strategies into 2 categories of frequency: (1) none, a little, or some of the time and (2) most of the time or all of the time. We reported the frequency and percentage of respondents who engaged in each strategy most or all of the time. Using the *Episodic Disability Framework*,<sup>11</sup> we conceptualized 37 of the items as having positive influences on health, 8 having negative influences on health, and 6 potentially as having either a positive or negative influence on health dependent on the individual and context (Table 1).

We categorized age into 3 groups: <40 years of age, 40 to 49 years of age, and  $\geq 50$  years of age. The Public Health Agency of Canada defines older adults living with HIV as 50 years of age and older.<sup>31</sup> We chose the above 3 age categories as Emler et al reported benefits to interpretation when categorizing age because this takes into account the relationship of HIV and its impact across different age generations in the life course.<sup>32</sup>

We described the frequency of living strategy use and compared the proportion of participants who engaged in living strategies most (few times per week) or all the time (every day) versus none, a little, or some of the time across 3 age groups (<40 years, 40-49 years, and  $\geq 50$  years). We used pairwise  $\chi^2$  tests with Tukey-type adjusted  $P$  values for multiple comparisons to determine statistically significant differences between age groups.<sup>33</sup> Analyses were conducted using SAS statistical software.<sup>30</sup>

### Results

Of the 1850 people who accessed the survey, 1477 (80%) initiated and 1171 (79%) completed the survey. We removed 230 cases due to large amounts of missing responses, suspected multiple responses, and nonsensical responses, resulting in 941 complete and estimated valid responses. Each item in the living strategies section had less than 2% of responses missing. Of the 941 participants who completed the questionnaire, 935 (99%) answered the age item and were included in the analysis. The majority of participants were men (79%), with a median age of 48 years (interquartile range (IQR): 38-54 years) and median year of HIV diagnosis of 2000 (IQR: 1993-2007). Most (90%) respondents were taking antiretroviral medications and 65% reported an undetectable viral load. The majority were single (55%) and 38% were employed. Among the respondents, 26% were younger than 40 years, 30% were 40 to 49 years old, and 43% were 50 years or older (Table 2). Compared to younger participants, a greater proportion of older participants ( $\geq 50$  years) were living alone, living longer with their diagnosis, were taking ART, had some or completed university or postgraduate education, rated their health status as good, fair, or poor (opposed to excellent or very good), and fewer were working for pay.

**Table 1.** Living Strategy Items and Corresponding Intrinsic Contextual Factor Domain in the Episodic Disability Framework.<sup>a</sup>

Living Strategy Item	Living Strategy Conceptualized as Having Positive (+) or Negative (-) Influence on Health	Intrinsic Contextual Factor	Subcategory of Intrinsic Contextual Factor
<b>Maintaining sense of control over life (n = 26 items)</b>			
1) I make sure I get enough sleep	+	Maintaining sense of control over life	Lifestyle
2) I take a break or nap when I need to	+	Maintaining sense of control over life	Lifestyle
3) I make sure I eat healthy	+	Maintaining sense of control over life	Lifestyle
4) I brush my teeth and practice good dental care	+	Maintaining sense of control over life	Lifestyle
5) I exercise	+	Maintaining sense of control over life	Lifestyle
6) I take medications as discussed with my doctor	+	Maintaining sense of control over life	Lifestyle
7) I try to avoid people or things that stress me out	+	Maintaining sense of control over life	Lifestyle (related to social relationships)
8) I smoke cigarettes	-	Maintaining sense of control over life	Lifestyle
9) I focus on a hobby	+	Maintaining sense of control over life	Establishing purpose and focus in life
10) I focus on maintaining my health living with HIV	+	Maintaining sense of control over life	Establishing purpose and focus in life
11) I focus on things such as work and friends because HIV is not my main focus in life	+	Maintaining sense of control over life	Establishing purpose and focus in life
12) I make HIV the main focus of my life	+/-	Maintaining sense of control over life	Establishing purpose and focus in life
13) I make maintaining my health the main focus of my life	+/-	Maintaining sense of control over life	Establishing purpose and focus in life
14) I am involved in volunteerism, activism, and advocacy related to HIV	+	Maintaining sense of control over life	Establishing purpose and focus in life
15) I engage in activities of artistic expression (such as drawing, painting, dancing, singing, writing, etc)	+	Maintaining sense of control over life	Establishing purpose and focus in life
16) I try to manage my finances	+	Maintaining sense of control over life	Establishing purpose and focus in life
17) I maintain a good balance of activity in my life	+	Maintaining sense of control over life	Maintaining life balance
18) I try to stick to a daily structure or routine	+	Maintaining sense of control over life	Maintaining life balance
19) I prioritize and try not to overdo it when it comes to my daily activities	+	Maintaining sense of control over life	Maintaining life balance
20) I tend to overdo it by working or volunteering long hours	-	Maintaining sense of control over life	Maintaining life balance
21) I plan for and anticipate changes in my health	+	Maintaining sense of control over life	Planning for, anticipating future
22) I plan ahead at work or in my daily routine for possible fluctuations in my health	+	Maintaining sense of control over life	Planning for, anticipating future
23) I make to-do lists to help me keep on track with my daily routine	+	Maintaining sense of control over life	Planning for, anticipating future
24) I learn what I can about HIV so that I am informed about my illness	+	Maintaining sense of control over life	Planning for and anticipating future
25) I pay attention to the numbers (for example my viral load and CD4 counts) as a way to keep on top of my health	+	Maintaining sense of control over life	The numbers (CD4 count and viral load)
26) I use websites or applications to track my details (counts, medications, other conditions)	+	Maintaining sense of control over life	The Numbers (CD4 count and viral load)

(continued)

Table 1. (continued)

Living Strategy Item	Living Strategy Conceptualized as Having Positive (+) or Negative (-) Influence on Health	Intrinsic Contextual Factor	Subcategory of Intrinsic Contextual Factor
<b>Attitudes and beliefs (n = 8 items)</b>			
27) I consider myself healthy living with HIV	+	Attitudes and beliefs	Outlook on life
28) I accept and value who I am the good and the bad	+	Attitudes and beliefs	Outlook on life
29) I have a positive outlook on life and use hope and optimism to live with HIV	+	Attitudes and beliefs	Outlook on life
30) I accept that my health can fluctuate with good days and bad days living with HIV	+	Attitudes and beliefs	Outlook on life
31) I choose to believe I can survive and overcome any challenges living with HIV	+	Attitudes and beliefs	Outlook on life
32) I get upset if I don't get to everything I set out to do in a day	-	Attitudes and beliefs	Outlook on life
33) I feel hopeless living with HIV	-	Attitudes and beliefs	Outlook on life
34) I draw on faith and spirituality to deal with my challenges living with HIV	+	Attitudes and beliefs	Faith and spirituality
<b>Blocking HIV out of the mind (n = 7 items)</b>			
35) I ignore my HIV status	-	Blocking HIV out of the mind	-
36) I ignore my numbers (viral load and CD4 count)	-	Blocking HIV out of the mind	-
37) I drink alcohol as an escape to forget the challenges living with HIV	-	Blocking HIV out of the mind	-
38) I try to forget I'm living with HIV	+/-	Blocking HIV out of the mind	-
39) I use drugs recreationally to forget the challenges living with HIV	+/-	Blocking HIV out of the mind	-
40) I use sex as a way to forget the challenges of living with HIV	+/-	Blocking HIV out of the mind	-
41) I go shopping to forget the challenges living with HIV	+/-	Blocking HIV out of the mind	-
<b>Seeking social interaction with others (n = 10 items)</b>			
42) I spend time with my friends, partner, extended chosen or biological family, or pets	+	Seeking social interaction with others	-
43) I spend time with work (or volunteer) colleagues	+	Seeking social interaction with others	-
44) I spend time with people I know through religion or faith	+	Seeking social interaction with others	Faith and spirituality
45) I spend time at a community-based or AIDS service organization, either to volunteer or access their services	+	Seeking social interaction with others	-
46) I seek the company of others living with HIV (outside of organizations)	+	Seeking social interaction with others	-
47) I spend time interacting with others on the Internet (eg, Facebook, Twitter, Chat Rooms)	+	Seeking social interaction with others	-
48) I seek the company of others by attending dinner parties or going out to restaurants	+	Seeking social interaction with others	-
49) I access a support group (online, by telephone, or in person)	+	Seeking social interaction with others	-
50) I isolate myself from others	-	Seeking social interaction with others	-
51) I try to reduce or eliminate relationships or activities that I believe are harmful to me	+	Seeking social interaction with others	-

<sup>a</sup>(+) indicates positive living strategy; (-), negative living strategy; (+/-) strategy conceptualized as positive or negative depending on the context; - no additional subcategory of intrinsic factor. n = 935.

### Living Strategies across Age Groups

Table 3 displays the frequency of living strategies used most or all of the time by respondents across the age groups. Thirteen (25%) of the 51 living strategies were used by the majority of

respondents ( $\geq 50\%$ ) most or all of the time across 3 main positive living strategies associated with maintaining a sense of control, including (1) *healthy lifestyle strategies* which included getting enough sleep, eating healthy, brushing teeth

**Table 2.** Characteristics of Respondents by Age-Group.<sup>a</sup>

	Total Responses, N = 935	N of Group (%) or Median (IQR)	n = 247, <40 Years, n (%) or Median (IQR)	n = 283, 40-49 Years, n (%) or Median (IQR)	n = 405, ≥50, Years, n (%) or Median (IQR)	P Value
Gender	928		244	280	404	<.01
Man		737 (79.4)	172 (18.5)	218 (23.5)	347 (37.4)	
Woman		157 (17)	52 (5.6)	56 (6.0)	49 (5.3)	
Other <sup>b</sup>		34 (3.7)	20 (2.2)	6 (0.7)	8 (0.9)	
Median age in years (IQR)	935	48 (38-54)	33 (28-36)	45 (43-48)	55 (52-60)	<.01
Median year of diagnosis (IQR)	932	2000 (1993-2007)	2008 (2003-2011)	2000 (1994-2005)	1995 (1989-2003)	<.01
Currently taking antiretroviral therapy	931	846 (90.5)	244; 194 (20.8)	282; 261 (28.0)	405; 391 (42.0)	<.01
Undetectable viral load <sup>c</sup>	872	570 (65.4)	228; 105 (12.0)	265; 161 (18.5)	379; 304 (34.9)	<.01
Geographical region	933		246	283	404	.01
Atlantic region (NS, Nfld, NB, PEI)		46 (4.9)	12 (1.3)	10 (1.1)	24 (2.6)	
Quebec; Nunavut		57 (6.1)	14 (1.5)	17 (1.8)	26 (2.8)	
Ontario		669 (71.7)	185 (19.8)	215 (23.0)	269 (28.8)	
Prairies (Saskatchewan; Alberta, Manitoba)		25 (2.7)	10 (1.1)	8 (0.9)	7 (0.8)	
British Columbia		136 (14.6)	25 (2.7)	33 (3.5)	78 (8.4)	
Ethnocultural background	919					<.01
Caucasian white		624 (67.9)	134 (14.6)	172 (18.7)	318 (34.6)	
Black or African		76 (8.3)	32 (3.5)	27 (2.9)	17 (1.8)	
Indigenous		54 (5.9)	13 (1.4)	19 (2.1)	22 (2.4)	
Asian		25 (2.7)	14 (1.5)	7 (0.8)	4 (0.4)	
Latin American, Hispanic, or Latino		34 (3.7)	11 (1.2)	14 (1.5)	9 (1.0)	
Mediterranean		16 (1.7)	4 (0.4)	8 (0.9)	4 (0.4)	
Other <sup>d</sup>		59 (6.4)	18 (2.0)	25 (2.7)	16 (1.7)	
Prefer not to answer		31 (3.4)	15 (1.6)	8 (0.9)	8 (0.9)	
Sexual orientation	929		246	279	404	<.01
Gay		569 (61.2)	131 (14.1)	170 (18.3)	268 (28.8)	
Heterosexual/straight		226 (24.3)	64 (6.9)	68 (7.3)	94 (10.1)	
Bisexual		82 (8.8)	35 (3.7)	21 (2.3)	26 (2.8)	
Other <sup>e</sup>		52 (5.6)	16 (1.7)	20 (2.2)	16 (1.7)	
Employment status	920		240	282	398	<.01
Working for pay (FT or PT)		348 (37.8)	130 (14.1)	125 (13.6)	93 (10.1)	
Volunteering, student, or retired		152 (16.5)	27 (2.9)	18 (2.0)	107 (11.6)	
On disability income support		336 (36.5)	60 (6.5)	112 (12.2)	164 (17.8)	
Unemployed or other		84 (9.1)	23 (2.5)	27 (3.0)	34 (3.7)	
Education	920		240	281	399	<.01
No formal education or less than grade 9		38 (4.1)	13 (1.4)	8 (0.9)	17 (1.9)	
Some or completed high school		183 (19.9)	56 (6.1)	53 (5.8)	74 (8.0)	
Some or completed trade/technical training		88 (9.6)	21 (2.3)	30 (3.3)	37 (4.0)	
Some/completed college		271 (29.5)	73 (8.0)	96 (10.4)	102 (11.1)	
Some/completed university		237 (25.8)	65 (7.1)	64 (7.0)	108 (11.7)	
Marital status	930		245	280	405	<.01
Married/common law/relationship		275 (29.6)	67 (7.2)	78 (8.4)	139 (14.0)	

(continued)

**Table 2.** (continued)

	Total Responses, N = 935	N of Group (%) or Median (IQR)	n = 247, <40 Years, n (%) or Median (IQR)	n = 283, 40-49 Years, n (%) or Median (IQR)	n = 405, ≥50, Years, n (%) or Median (IQR)	P Value
Separated/divorced or widowed/don't know		142 (15.3)	22 (2.4)	38 (4.1)	82 (8.8)	
Single		513 (55.2)	156 (16.8)	164 (17.6)	193 (20.8)	
General health status	932		246	281	405	<.01
Excellent/very good		420 (45.1)	131 (14.1)	133 (14.3)	156 (16.7)	
Good		337 (36.2)	77 (8.3)	98 (10.5)	162 (17.4)	
Fair or poor		175 (18.8)	38 (4.1)	50 (5.4)	87 (9.3)	
Lives alone	838		227	244	367	<.01
		506 (60.4)	113 (13.5)	156 (18.6)	237 (28.3)	

Abbreviations: FT, full-time; IQR, interquartile range; NB, New Brunswick; Nfld, Newfoundland and Labrador; NS, Nova Scotia; PEI, Prince Edward Island; PT, part-time.

<sup>a</sup>N = 935. Undetectable viral load: proportion reflects undetectable status of entire sample regardless of antiretroviral medication use among those who were able to recall their most recent viral load. Characteristics are based on responses to self-reported questions on demographic and disease characteristics in the survey instrument.

<sup>b</sup>Other: transman to woman, transwoman to man, or 2-spirited.

<sup>c</sup>Undetectable viral load defined as respondents indicating their viral load was "undetectable" or any value fewer than 50 copies of HIV per mL of blood (<50 copies/mL).

<sup>d</sup>Other: Chinese, Filipino, Arab, Korean, Japanese, multiple backgrounds.

<sup>e</sup>Other: Queer, 2-spirit, questioning, asexual, trisexual.

and practicing good dental care, avoiding people or things that stress them out, and taking medications as discussed by their doctor; (2) *maintaining health as a focus and purpose in life* which included focusing on maintaining good health, focusing on work, friends, and activities, and managing finances; and (3) *adopting positive attitudes and beliefs* such as considering self-healthy living with HIV, accepting and valuing oneself, having a positive outlook on life, accepting that health can fluctuate, and choosing to believe one can survive and overcome any challenges living with HIV (Table 3). Among respondents who engaged in any of the first 41 living strategies and remaining 10 social interaction strategies, 40% and 65% felt they helped minimize or prevent the health challenges of living with HIV, respectively.

Proportions of respondents who engaged in living strategies "most (few times a week)" or "all the time (everyday)" differed across age groups for 29 (57%) of the 51 living strategies (Table 3). Of these strategies, a higher proportion of older adults (≥50 years) engaged most or all the time in the majority (20/29; 69%) of the strategies compared to the other age groups, all of which were perceived as having a positive influence on health (Table 3).

### Comparing Respondents ≥50 Years or Older with Those <40 years

Compared to respondents who were <40 years of age, a significantly higher proportion of respondents aged 50 and older took a break or nap when they needed to (49% versus 39%,  $P < .01$ ), tried to avoid people or things that stressed them out (56% versus 43%,  $P < .01$ ) [lifestyle], made maintaining health the main focus of their life (50% versus 39%,  $P < .01$ ) [maintaining focus], learned what they could to be informed about HIV

(44% versus 33%,  $P < .01$ ) [planning for and anticipating the future], chose to believe they could survive and overcome any challenges living with HIV (56% versus 44%,  $P = .01$ ) [positive outlook], and drew on faith and spirituality to face the challenges living with HIV (25% versus 15%,  $P = .01$ ) [faith and spirituality] most or all of the time (Table 3).

### Comparing Respondents ≥50 Years or Older with Those <50 Years

Compared to respondents <50 years of age, a significantly higher proportion of respondents aged 50 and older made sure they ate healthy (73% versus 62% [40-49 years] versus 56% [<40 years]), took medications as discussed with their doctor (96% versus 91% [40-49 years] versus 86% [<40 years]) [lifestyle], focused on maintaining their health living with HIV (64% versus 48% [40-49 years] versus 47% [<40 years]) [maintaining focus], planned ahead at work or in daily routine for possible changes in health such as good days and bad days (38% versus 28% [<40 years] versus 26% [40-49 years]) [planning for and anticipating the future], prioritized and tried not to overdo it when it came to their daily activities (49% versus 41% [40-49 years] versus 38% [<40 years]) [life balance], accepted and valued who they were the good and the bad (68% versus 56% [40-49 years] versus 50% [<40 years]), and had a positive outlook on life and used hope and optimism to live with HIV (63% versus 52% [40-49 years] versus 44% [<40 years]) [positive outlook] most or all the time (Table 3; all  $P < .01$ ).

Compared to respondents <40 years of age, a significantly higher proportion of respondents aged 40 to 49 years and even higher proportion of respondents aged 50 and older made sure they got enough sleep (67% [50 and older] versus 59% [40-49 years] versus 53% [<40 years]), brushed their teeth and

**Table 3.** Living Strategies Used Most (Few Times a Week) or All of the Time (Everyday) Across Age Groups of Respondents Living with HIV.<sup>a</sup>

In the Past Month, Engaged in the Following Strategies Most (Few Times a Week) or All of the Time (Everyday), n = 935	n (%)	<40 Years, n = 247 (26% of Sample), <sup>b</sup> (%)	40-49 Years, n = 283 (30% of Sample), <sup>b</sup> (%)	≥50 Years, n = 405 (43% of Sample), <sup>b</sup> (%)	$\chi^2$ P Value	Tukey Adjusted P Value <40 versus 40-49 Years	Tukey Adjusted P Value <40 versus ≥50 Years	Tukey Adjusted P Value 40-49 versus ≥50 Years
Living strategies: Maintaining sense of control								
Lifestyle								
1) I make sure I get enough sleep	566 (60%)	130 (53%) <sup>b,c</sup>	166 (59%) <sup>b,d</sup>	<b>270 (67%)<sup>c,d</sup></b>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>
2) I take a break or nap when I need to	414 (44%)	97 (39%) <sup>c</sup>	119 (42%)	<b>198 (49%)<sup>c</sup></b>	.04 <sup>e</sup>	.67	<.01 <sup>e</sup>	.17
3) I make sure I eat healthy	611 (65%)	139 (56%) <sup>c</sup>	177 (62%) <sup>d</sup>	<b>295 (73%)<sup>c,d</sup></b>	<.01 <sup>e</sup>	.17	<.01 <sup>e</sup>	<.01 <sup>e</sup>
4) I brush my teeth and practice good dental care	706 (76%)	160 (65%) <sup>b,c</sup>	208 (74%) <sup>b,d</sup>	<b>338 (84%)<sup>c,d</sup></b>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>
5) I exercise	348 (37%)	90 (36%)	93 (33%)	165 (41%)	.10	-	-	-
6) I take medications as discussed with my doctor (out of n = 915)	839 (92%)	199 (86%) <sup>c</sup>	256 (91%) <sup>d</sup>	<b>384 (96%)<sup>c,d</sup></b>	<.01 <sup>e</sup>	.17	<.01 <sup>e</sup>	<.01 <sup>e</sup>
7) I try to avoid people or things that stress me out	472 (50%)	107 (43%) <sup>c</sup>	140 (50%)	<b>225 (56%)<sup>c</sup></b>	.01 <sup>e</sup>	.17	<.01 <sup>e</sup>	.17
8) I smoke cigarettes (—)	284 (30%)	71 (29%)	88 (31%)	125 (31%)	.81	-	-	-
Maintaining focus/establishing purpose								
9) I focus on a hobby	257 (28%)	81 (33%)	69 (24%)	107 (26%)	.08	-	-	-
10) I focus on maintaining my health living with HIV	509 (54%)	115 (47%) <sup>c</sup>	137 (48%) <sup>d</sup>	<b>257 (64%)<sup>c,d</sup></b>	<.01 <sup>e</sup>	.83	<.01 <sup>e</sup>	<.01 <sup>e</sup>
11) I focus on things such as work, friends, and activities because HIV is not my main focus in life	492 (53%)	118 (48%)	152 (54%)	222 (55%)	.20	-	-	-
12) I make HIV the main focus of my life (+/—)	122 (13%)	<b>46 (19%)<sup>c</sup></b>	39 (14%) <sup>d</sup>	37 (9%) <sup>c,d</sup>	<.01 <sup>e</sup>	.33	<.01 <sup>e</sup>	<.01 <sup>e</sup>
13) I make maintaining my health the main focus of my life	418 (45%)	96 (39%) <sup>c</sup>	121 (43%)	<b>201 (50%)<sup>c</sup></b>	.02 <sup>e</sup>	.33	<.01 <sup>e</sup>	.17
14) I am involved in volunteerism, activism or advocacy related to HIV	192 (20%)	44 (18%)	56 (20%)	92 (23%)	.30	-	-	-
15) I engage in activities of artistic expression	181 (19%)	48 (19%)	53 (19%)	80 (20%)	.94	-	-	-
16) I try to manage my finances	527 (56%)	107 (43%) <sup>b,c</sup>	157 (56%) <sup>b,d</sup>	<b>263 (65%)<sup>c,d</sup></b>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>
Maintaining life balance								
17) I maintain a good balance or activity in my life	372 (40%)	96 (39%) <sup>b,c</sup>	92 (32%) <sup>b,d</sup>	<b>184 (45%)<sup>c,d</sup></b>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>
18) I try to stick to a daily structure or routine	434 (46%)	118 (48%)	116 (41%)	200 (49%)	.08	-	-	-
19) I prioritize and try not to “overdo it” when it comes to my daily activities	409 (44%)	93 (38%) <sup>c</sup>	116 (41%) <sup>d</sup>	<b>200 (49%)<sup>c,d</sup></b>	.01 <sup>e</sup>	.67	<.01 <sup>e</sup>	<.01 <sup>e</sup>
20) I tend to overdo it by working or volunteering long hours (—)	151 (16%)	43 (17%)	44 (16%)	64 (16%)	.82	-	-	-
Planning for and anticipating the future								
21) I plan for and anticipate possible changes in my health	345 (37%)	89 (36%)	86 (30%) <sup>d</sup>	<b>170 (42%)<sup>d</sup></b>	.01 <sup>e</sup>	.50	.40	.01 <sup>e</sup>
22) I plan ahead at work or in my daily routine for possible changes in my health such as good days and bad days	298 (32%)	70 (28%) <sup>c</sup>	75 (26%) <sup>d</sup>	<b>153 (38%)<sup>c,d</sup></b>	<.01 <sup>e</sup>	.83	<.01 <sup>e</sup>	<.01 <sup>e</sup>

(continued)



Table 3. (continued)

In the Past Month, Engaged in the Following Strategies Most (Few Times a Week) or All of the Time (Everyday), n = 935	n (%)	<40 Years, n = 247 (26% of Sample), <sup>b</sup> (%)	40-49 Years, n = 283 (30% of Sample), <sup>b</sup> (%)	≥50 Years, n = 405 (43% of Sample), <sup>b</sup> (%)	$\chi^2$ P Value	Tukey Adjusted P Value <40 versus 40-49 Years	Tukey Adjusted P Value <40 versus ≥50 Years	Tukey Adjusted P Value 40-49 versus ≥50 Years
23) I make "to-do" lists to help me keep on track with my daily routine	343 (37%)	85 (34%)	98 (35%)	160 (40%)	.29	-	-	-
24) I learn what I can about HIV so that I am informed about my illness	367 (39%)	81 (33%) <sup>c</sup>	110 (39%)	<b>176 (44%)<sup>c</sup></b>	.03 <sup>e</sup>	.33	<.01 <sup>e</sup>	.67
Paying attention to the numbers								
25) I pay attention to "the numbers" (viral load, CD4 count) as a way to keep on top of my health	382 (40%)	91 (37%)	120 (42%)	171 (42%)	.33	-	-	-
26) I use websites or applications to track my details	123 (13%)	<b>51 (21%)<sup>b,c</sup></b>	34 (12%) <sup>b</sup>	38 (9%) <sup>c</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	.50
Living strategies: Attitudes and beliefs								
Positive outlook								
27) I consider myself healthy living with HIV	562 (60%)	129 (52%) <sup>b,c</sup>	166 (59%) <sup>b,d</sup>	<b>267 (66%)<sup>c,d</sup></b>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>
28) I accept and value who I am; good and bad	559 (60%)	123 (50%) <sup>c</sup>	160 (56%) <sup>d</sup>	<b>276 (68%)<sup>c,d</sup></b>	<.01 <sup>e</sup>	.17	<.01 <sup>e</sup>	<.01 <sup>e</sup>
29) I have a positive outlook on life and use hope and optimism to live with HIV	512 (55%)	110 (44%) <sup>c</sup>	148 (52%) <sup>d</sup>	<b>254 (63%)<sup>c,d</sup></b>	<.01 <sup>e</sup>	.17	<.01 <sup>e</sup>	<.01 <sup>e</sup>
30) I accept that my health can fluctuate with "good days" and "bad days" living with HIV	566 (61%)	119 (48%) <sup>b,c</sup>	163 (58%) <sup>b,d</sup>	<b>284 (70%)<sup>c,d</sup></b>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>
31) I choose to believe I can survive and overcome any challenges living with HIV	468 (50%)	108 (44%) <sup>c</sup>	133 (47%)	<b>227 (56%)<sup>c</sup></b>	<.01 <sup>e</sup>	1.00	.01 <sup>e</sup>	.06
32) I get upset if I don't get to everything I set out to do in a day (-)	198 (21%)	61 (25%)	59 (21%)	78 (19%)	.25	-	-	-
33) I feel hopeless living with HIV (-)	152 (16%)	<b>53 (22%)<sup>c</sup></b>	46 (16%)	54 (13%) <sup>c</sup>	.02 <sup>e</sup>	.33	<.01 <sup>e</sup>	.50
Faith and spirituality								
34) I draw on faith and spirituality to deal with my challenges living with HIV	206 (22%)	38 (15%) <sup>c</sup>	68 (24%)	<b>100 (25%)<sup>c</sup></b>	.01 <sup>e</sup>	.04	.01 <sup>e</sup>	1.00
Living strategies: Blocking HIV out of the mind								
35) I ignore my HIV status (-)	134 (14%)	45 (18%)	35 (12%)	54 (13%)	.12	-	-	-
36) I ignore my 'numbers' (CD4 count and viral load) living with HIV (-)	137 (15%)	39 (16%)	43 (15%)	55 (14%)	.71	-	-	-
37) I drink alcohol as an escape to forget the challenges living with HIV (-)	102 (11%)	28 (11%)	27 (10%)	47 (12%)	.67	-	-	-
38) I try to forget I'm living with HIV (+/-)	261 (28%)	69 (28%)	79 (28%)	113 (28%)	1.00	-	-	-
39) I use drugs recreationally to forget the challenges living with HIV (+/-)	108 (12%)	34 (14%)	30 (11%)	44 (11%)	.44	-	-	-
40) I use sex as a way to forget the challenges of living with HIV (+/-)	61 (6%)	<b>30 (12%)<sup>c</sup></b>	24 (8%) <sup>d</sup>	7 (2%) <sup>c,d</sup>	<.01 <sup>e</sup>	.17	<.01 <sup>e</sup>	<.01 <sup>e</sup>

(continued)

Table 3. (continued)

In the Past Month, Engaged in the Following Strategies Most (Few Times a Week) or All of the Time (Everyday), n = 935	n (%)	<40 Years, n = 247 (26% of Sample), <sup>b</sup> (%)	40-49 Years, n = 283 (30% of Sample), <sup>b</sup> (%)	≥50 Years, n = 405 (43% of Sample), <sup>b</sup> (%)	$\chi^2$ P Value	Tukey Adjusted P Value <40 versus 40-49 Years	Tukey Adjusted P Value <40 versus ≥50 Years	Tukey Adjusted P Value 40-49 versus ≥50 Years
41) I go shopping to forget the challenges living with HIV (+/-)	80 (9%)	<b>39 (16%)<sup>b,c</sup></b>	20 (7%) <sup>c</sup>	21 (5%) <sup>c</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	.92
Living strategies: Social interaction <sup>f</sup>								
42) I spend time with my friends, partner, extended chosen or biological family, or pets (n = 914; not applicable: n = 21)	397 (43%)	108 (44%)	112 (40%)	177 (45%)	.48	-	-	-
43) I spend time with work (or volunteer) colleagues (n = 809; not applicable: n = 126)	178 (22%)	61 (27%)	52 (20%)	65 (20%)	.10	-	-	-
44) I spend time with people I know through religion or faith (n = 759; not applicable: n = 176)	72 (10%)	<b>30 (14%)<sup>b,c</sup></b>	16 (7%) <sup>b</sup>	26 (8%) <sup>b</sup>	.02 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	.67
45) I spend time at a community-based or AIDS service organization, either to volunteer or access their services (n = 891; not applicable: n = 44)	164 (18%)	42 (18%)	44 (16%)	78 (20%)	.44	-	-	-
46) I seek the company of others living with HIV (outside of organizations) (n = 900; not applicable: n = 35)	138 (15%)	45 (19%)	39 (14%)	54 (14%)	.22	-	-	-
47) I spend time interacting with others on the internet (eg, Facebook, Twitter, chat rooms) (n = 907; not applicable: n = 28)	287 (32%)	<b>103 (43%)<sup>b,c</sup></b>	82 (30%) <sup>b</sup>	102 (26%) <sup>c</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	.17
48) I seek the company of others by attending dinner parties or going out to restaurants (n = 906; not applicable: n = 29)	89 (10%)	<b>38 (16%)<sup>b,c</sup></b>	26 (10%) <sup>b</sup>	25 (6%) <sup>c</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	.17
49) I access a support group (either online, by telephone or in person) (n = 883; not applicable: n = 52)	83 (9%)	<b>37 (16%)<sup>b,c</sup></b>	21 (8%) <sup>b</sup>	25 (6%) <sup>c</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	<.01 <sup>e</sup>	.83
50) I isolate myself from others (n = 911; not applicable: n = 24) (-)	240 (26%)	62 (26%)	81 (29%)	97 (25%)	.40	-	-	-
51) I try to reduce or eliminate relationships or activities that I believe are harmful to me (n = 888; not applicable: n = 47)	373 (42%)	84 (36%)	115 (43%)	174 (45%)	.08	-	-	-

<sup>a</sup>(-) indicates strategies conceptualized by the *Episodic Disability Framework* that may have a negative influence on health (negative strategies); (+/-), either positive or negative influence on health. N = 936. Bolded indicates age groups with statistically significant highest proportion who engaged in a given strategy "most" or "all the time."

<sup>b</sup><40 years versus 40-49 years.

<sup>c</sup><40 years versus ≥50 years.

<sup>d</sup>40-49 years versus ≥50 years.

<sup>e</sup>P value (unadjusted and adjusted) <.05; column percentage used to compare differences among age groups. Percentages may not add to 100% due to rounding.

<sup>f</sup>Social interaction strategies was a separate section in the survey instrument whereby for each item there was a "not applicable" response option, hence the denominator changed for each item.

practiced good dental care (84% [50 and older] versus 74% [40-49 years] versus 65% [<40 years]) [lifestyle], managed their finances (65% [50 and older] versus 56% [40-49 years] versus 43% [<40 years]) [maintaining focus and control], considered themselves healthy living with HIV (66% [50 and older] versus 59% [40-49 years] versus 52% [<40 years]), and accepted that their health can fluctuate with good days and bad days living with HIV (70% [50 and older] versus 58% [40-49 years] versus 48% [<40 years]) [positive outlook] most or all of the time (Table 3; all  $P < .01$ ).

Compared to respondents aged 40 to 49 years, a significantly higher proportion of respondents aged 50 and older planned for and anticipated possible changes in their health (42% versus 30%;  $P = .01$ ) [planning for and anticipating the future] most or all of the time. Similarly, compared to this same age-group (40-49 years), a significantly higher proportion of respondents <40 years of age and even higher proportion of respondents 50 and older maintained a good balance of activity in their life (45% [50 and older] versus 39% [<40 years] versus 32% [40-49 years],  $P < .01$ ) [life balance] most or all of the time.

### Comparing Respondents $\geq 40$ Years to Those <40 Years

Compared to respondents  $\geq 40$  years, a significantly higher proportion of younger respondents (<40 years) used websites or applications to track their health details (21% versus 12% [40-49 years] versus 9% [50 and older]) [attention to numbers], spent time interacting with others on the Internet (43% versus 30% [40-49 years] versus 26% [50 and older]), sought the company of others (16% versus 10% [40-29 years] versus 6% [<40 years]), accessed a support group (online, by telephone, or in person; 16% versus 8% [40-49 years] versus 6% [50 and older]), and spent time with people they knew through religion or faith (14% versus 7% [40-49 years] versus 8% [50 and older]) [seeking social interaction] most or all the time (Table 3, all  $P < .01$ ).

### Differences for Living Strategies Perceived as Negatively Influencing Health

Of note, a higher proportion of younger respondents engaged in 9 of the living strategies, 4 of which were perceived as having potentially negative influences on health. Compared to respondents  $\geq 50$  years, a significantly higher proportion of younger respondents (<40 years) felt hopeless living with HIV (22% [<40 years] versus 3% [50 and older]) [negative outlook], and significantly higher proportion of younger respondents (<50 years) made HIV the main focus of their life (19% [<40 years] versus 14% [40-49 years] versus 9% [50 and older]) [focus in life], went shopping to forget the challenges living with HIV (16% [<40 years] versus 7% [40-49 years] versus 5% [50 and older]) and used sex as a way to forget the challenges of living with HIV (12% [<40 years] versus 8% [40-49 years] versus 2% [50 and older]) [blocking HIV out of the mind] most or all the time (Table 3, all  $P < .01$ ).

## Discussion

Canadian adults living with HIV in this study reported engaging in a variety of living strategies to deal with their health challenges. Of the 51 strategies, 13 (25%) were used frequently (most or all the time) by the majority of all respondents and ranged from 50% avoiding what they perceive as stressful events or people, and choosing one can overcome challenges with HIV, to 92% taking medications as prescribed by their physician. All of these strategies were most frequently used by those 50 years or older, and all were perceived to have positive influences on health.

### Living Strategies Analogous to Coping

Living strategies in our study may be considered analogous to concepts commonly described in the literature including coping (similar to positive outlook), mastery (maintaining sense of control), and social support (seeking social interaction), all of which are important for dealing with stressors and challenges living with HIV. Lazarus and Folkman described the interrelationship between stress, health, and coping, and the way in which a stressor might be experienced and evaluated by an individual will determine how he or she will go about responding to it.<sup>24</sup> For people living with HIV, positive refocusing, positive reappraisal, putting situations into perspective, and adjusting goals to be more realistic and attainable were associated with fewer symptoms of anxiety and depression.<sup>34</sup> Higher mastery scores were associated with having greater control in life and lower feelings of hopelessness, enabling individuals to mitigate mental health challenges and stressors living with HIV.<sup>35</sup> Rodkjaer and colleagues found that coping self-efficacy and the ability to positively disclose HIV status were associated with reduced depressive symptoms among adults living with HIV.<sup>36</sup> Finally, engaging in positive networks and social support, acquiring knowledge and understanding of HIV, selective disclosure of HIV status, and building confidence with employment were considered positive coping strategies for dealing with HIV-related stigma.<sup>37</sup> Our work offers a way to reframe traditional conceptualizations of coping to acknowledge positive and negative elements in any strategy on health and well-being. Despite the variations in terminology, a wealth of literature suggests the importance of considering multidimensional approaches to coping (and living) strategies for addressing mental and social health stressors for adults at any age with HIV.

### Older Respondents Employed Some Living Strategies More Often

Results from our study suggest that older adults more frequently engage than younger adults in *some* living strategies related to maintaining a sense of control and positive outlook on life. Authors of a qualitative study highlighted the importance of accessing support, helping oneself and others, adopting spirituality, and engaging in active meaning-based

strategies as ways to cope with HIV stressors, comorbidity, stigma, and financial insecurity among community-dwelling older adults living with HIV.<sup>38</sup> Similar strategies were documented among older adults for dealing with disability aging with HIV, such as keeping a positive attitude, maintaining sense of control, choosing social interactions, and focusing on other aspects of life beyond HIV status.<sup>15</sup> Drawing on faith and spirituality was documented as a frequent strategy among 25% of older adults in our sample. This approach was supported by Emlet and colleagues who demonstrated the role of spirituality among older adults aging with HIV, specifically to face the adversity that comes from long-term survivorship, to make connections with others, to harbor feelings of gratitude, and to learn new skills as one ages with HIV.<sup>39</sup>

A greater proportion of older adults living with HIV reported engaging most or all the time in *some* living strategies associated with maintaining sense of control and adopting positive attitudes and beliefs, whereas a greater proportion of younger participants (<40 years) reported frequently engaging in social interaction strategies online (eg, Facebook, Twitter, chat rooms) and reaching out to others, particularly involving the Internet. The Internet and particularly the use of dating sites are mechanisms for social networking among young gay men.<sup>40</sup> However, people living with HIV of all ages are using social networking sites more readily.<sup>41</sup> Differences in social interaction across age groups may reflect “social pruning,” a concept reported among older adults living with HIV that involves removing nonsupportive relationships, and those that might be stressful, highlighting the importance of quality of social relationships over quantity as adults age with HIV.<sup>42</sup> Nevertheless, online strategies may become increasingly important, as older adults are more likely to live alone and are at risk of social isolation compared to younger adults living with HIV <40 years of age.<sup>43</sup>

Older adults in our study were living with a greater number of concurrent health conditions compared to younger respondents, and they engaged in positive living strategies more frequently. Older adults diagnosed with HIV prior to the era of combination ART may be living with distinct challenges associated with chronic inflammation of HIV, long-term ARV medication use, and long-standing persistent sequelae from opportunistic infections and adverse effects from earlier medications (eg, peripheral neuropathy).<sup>22,44</sup> Further evidence from the Research on Older Adults with HIV (ROAH) study indicated that older adults living with HIV were living with a greater number of concurrent health challenges, depression, loneliness, and HIV-related stigma.<sup>45</sup> Older men and women have experienced the loss of friends and loved ones to HIV, resulting in their status as long-term survivors who have overcome adversity living in the pre-cART era. Someone living with HIV for 20 years or more may utilize living strategies more often compared to their younger counterparts because of having more experience with HIV.<sup>46</sup> Simply aging with HIV itself may be considered an accomplishment and predispose older adults and long-term survivors to adopt strategies such as optimism, self-esteem, and life satisfaction as a way to

positively influence health and well-being.<sup>47</sup> Results reflect the greater prevalence of multimorbidity, stigma, ageism, and loneliness documented among older adults with HIV, suggesting a potentially greater need, and greater ability, to acquire strategies to deal with adversity and overcome the long-standing, health-related challenges with HIV.<sup>48</sup> Nevertheless, we did not find that living strategies were correlated with length of time since diagnosis (data not shown), suggesting that reasons for the uptake of living strategies likely are multifactorial, dependent on a combination of personal and environmental factors. The effect of living strategies on health and disability outcomes for adults aging with HIV, while beyond the scope of this article, is an important phase of future research.

### *Living Strategies and Resiliency*

Some of the positive outlook living strategies utilized more frequently by older adults in our study, such as envisioning oneself as healthy with HIV, accepting and valuing oneself, having a positive outlook on life, accepting that health can fluctuate, and choosing to believe one can survive and overcome challenges with HIV, may be considered analogous to concepts of resilience, hardiness, mastery, or coping.<sup>49,50</sup> Resilience can be defined as adapting well and/or overcoming adversity, hardships or significant sources of stress, and the ability to “bounce back” from difficult experiences faced in life.<sup>51</sup> Resilience has been shown to mediate the relationship between life stress and physical, emotional, and functional well-being among older adults living with HIV.<sup>52</sup> Positive reframing, positive perceptions of social relationships, and cognitive health were associated with high resilience among adults with HIV.<sup>53</sup> Emlet and colleagues used qualitative approaches to profile strength and resilience and found the majority of adults 50 years and older expressed themes related to self-acceptance, optimism, relationships with others, self-management, and independence,<sup>54</sup> whereas Furlotte and Schwartz reported resilience as reducing the space HIV takes up in one’s life, lifestyle changes to accommodate living with HIV, and engaging in social support,<sup>55</sup> concepts similarly expressed by the older adults in our sample.

Resilience and mastery were shown to be associated with health-related quality of life, social support, and community engagement among a sample of older gay and bisexual men living with HIV.<sup>56</sup> Emlet and colleagues conducted a qualitative study in 58 older adults with HIV who recognized both positives and negatives of their life circumstances and developed resiliency by overcoming personal and illness adversity and establishing mastery related to health, stigma, and personal trauma, which can be facilitated by social support.<sup>57</sup> Hence, resilience, which appears related to positive outlook and hope and optimism in our study, is a trait that can be learned and developed by considering the determinants of resilience along with personal behaviors and the environment where people age with HIV.<sup>58</sup> Further considerations of the structural, social, and individual determinants of health are important to consider for

modeling resiliency with different aging sex- and gender-based populations.<sup>59</sup> Results suggest the role for interventions aimed at enhancing resilience using the above mentioned strategies as a way to potentially enhance quality of life for adults aging with HIV. Collectively, the living strategies exhibited by respondents in our sample may help to inform self-management interventions to help people living with HIV deal with and overcome the challenges of living with a chronic and episodic illness.<sup>60</sup>

We found only 1 negative strategy with significant differences between age groups. Of the 16% of respondents overall who reported feeling hopeless living with HIV most or all the time, this strategy was reported by a higher proportion of respondents <40 years (22%) compared to those 50 and older (3%). While evidence suggests that older adults may be more likely to experience mental health challenges, social isolation, and stigma compared to younger counterparts,<sup>61</sup> our results suggest strategies for emotional health coping remain critical for those of all ages with HIV.

Thirty percent of all the respondents reported smoking cigarettes most or all the time. Hence, while the majority of respondents engaged in positive strategies and avoided those with potentially negative health consequences, a role persists for health practitioners in addressing smoking cessation with people living with HIV.<sup>62</sup>

### Limitations

Our study is not without limitations. Respondents in this study represent a convenience sample largely recruited from community-based service organizations. The majority of the self-selected participants were gay men, Caucasian, living in urban centers in Ontario, Canada, and not employed; hence, results do not represent the general population of Canadians living with HIV. Because the majority were recruited from community-based service organizations, respondents may have had increased access to supportive services and social networks living with HIV. We did not conduct a gender-based analysis among the age groups. With only 17% of women in our sample, 5% of which were  $\geq 50$  years, our findings cannot be interpreted as representative of the estimated 22% of women living with HIV in Canada.<sup>31</sup> Further work is needed to examine the nature and extent of living strategy use specifically among women living with HIV. Future work may also explore frequency of living strategy use based on ethnocultural background, sexual orientation, and viral suppression. Second, given this is a newly emerging concept in the context of HIV, the living strategies component of the survey instrument was not a validated questionnaire. Nevertheless, the 51 items were derived from the *Episodic Disability Framework*, pilot tested by adults living with HIV, and determined to have face, content validity, and ease of usage with adults living with HIV. Furthermore, without a validated domain structure, we reported data based on the individual items and used the *Episodic Disability Framework* to inform our interpretation. Future research may include an exploratory factor analysis to establish a

domain structure and assess the measurement properties in order to establish a living strategies questionnaire for people living with HIV. Our classification of whether a strategy might positively or negatively influence health was based on the *Episodic Disability Framework* with known validity and reliability<sup>11,12</sup>; nevertheless, we recognize that strategies utilized by people living with HIV and their influence on health may differ depending on the individual and the context. Next, by classifying the oldest age-group  $\geq 50$  years, our analysis does not account for differences that may occur beyond those  $\geq 50$  years of age (96 participants were 60-69 years and 15 participants  $\geq 70$  years). Post hoc analyses (results not shown) suggest that older adults  $\geq 60$  years of age may be responsible for differences among older adults engaging most or all the time for some outcomes of lifestyle strategies (eating healthy, dental hygiene, and avoiding people or things that stress someone out), planning for and anticipating the future, prioritizing and not overdoing it, and maintaining a positive outlook. As a greater number of adults age with HIV, it will be increasingly important to further consider strategies used by adults  $\geq 60$  and  $\geq 70$  years of age for successful aging with HIV.<sup>63</sup> Our dichotomization of frequency of living strategy was done to help interpretation of findings. However, this may underestimate the variation in frequency of living strategy use within each group,<sup>64</sup> for example, exercising some of the time may have different clinical implications from exercising none of the time. Future property assessment may include consideration of frequency of living strategies use as a continuous variable. Qualitative inquiry may help to interpret what it means for older adults who engage in a given strategy more often than younger adults living with HIV. Finally, our analysis was exploratory in nature; while the majority of respondents reported that engaging the living strategies helped minimize or prevent health-related challenges living with HIV, intervention studies to determine effects of specific strategies on reducing disability and enhancing health for people living with HIV and strategies for increasing the use of beneficial living strategies warrant further study. Nevertheless, researchers and health-care professionals might consider these strategies as a mechanism in which to inform self-management interventions living with HIV.

### Conclusion

A greater proportion of older adults living with HIV in this study reported engaging most, or all the time, in living strategies associated with maintaining sense of control and adopting positive attitudes and beliefs, whereas a higher proportion of younger participants engaged in strategies for social interaction. Positive living strategies have a role in addressing disability experienced by adults with HIV. The frequency of engaging in negative strategies appeared similar by older and younger respondents living with HIV. Future research may consider how these strategies relate to resilience with HIV and the role of interventions for enhancing successful aging among adults living with HIV. Clinicians and community

organizations may examine ways of integrating living strategies when providing services to persons living with HIV across age groups.

### Authors' Note

The HIV Health and Rehabilitation Survey (HHRS) Team includes a team of researchers, knowledge users, and collaborators in Canada and the United Kingdom, many of whom are part of the Canada-International HIV and Rehabilitation Research Collaborative (CIHRRRC) (<http://cihrrc.hivandrehab.ca/>). *HHRS Team Researchers*: Kelly K. O'Brien (University of Toronto), Patricia Solomon (McMaster University), Francisco Ibáñez-Carrasco (Ontario HIV Treatment Network), Catherine Worthington (University of Victoria), Jacqueline Gahagan (Dalhousie University), Stephanie Nixon (University of Toronto), Steven Hanna (McMaster University), Brenda Merritt (Dalhousie University). *HHRS Team Knowledge Users*: Tammy Yates, Stephen Tattle, Elisse Zack (*Realize*, formerly the Canadian Working Group on HIV and Rehabilitation [CWGHR]), Will Chegwiddden (National Hospital for Neurology and Neurosurgery, University College Hospitals), Patriic Gayle (Gay Men's Health Collective (GMHC)), Three Flying Piglets), Larry Baxter (Community Member), Greg Robinson (Community Member), Tara Carnochan, Dawn James and Tammy Reimer (Nine Circles Community Health Centre), Rosalind Baltzer Turje and Patrick McDougall (Dr. Peter AIDS Foundation). *HHRS Team Collaborators*: Toronto PWA Foundation (Murray Jose-Boerbridge), Casey House (Soo Chan Carusone), Positive Living Society of British Columbia (Wayne Campbell and Adam Reibin), and AIDS Coalition of Nova Scotia (Liz Harrop-Archibald and Laura Toole).

### Acknowledgments

We thank the Knowledge Users, Collaborator Organizations and Recruitment Network involved in the study. We thank the HIV Health and Rehabilitation Survey (HHRS) study participants. Special thanks to the following for their collaboration and support of the HHRS Study: *Realize*, formerly the Canadian Working Group on HIV and Rehabilitation (CWGHR), Casey House (Toronto), Toronto People With AIDS Foundation (Toronto PWA), AIDS Committee of Durham Region, AIDS Niagara, HIV Care Program Windsor Regional Hospital, AIDS Committee of Toronto (ACT), Prisoners with HIV/AIDS Support Action Network (PASAN), Dr. Kovacs' Office-Maple Leaf Medical Centre (Toronto), The AIDS Network (Hamilton), AIDS Committee of Ottawa (Ottawa), Teresa Group (Toronto), HIV/AIDS Regional Services (Kingston), AIDS Committee of Windsor (Windsor), Dr. Peter AIDS Foundation (Vancouver), Positive Living Society of British Columbia (Vancouver), HIV Edmonton (Edmonton), Positive Women's Network (Vancouver), Pacific AIDS Network (Vancouver), Alberta Community Council on HIV (Edmonton), Nine Circles Community Health Centre (Winnipeg), AIDS Community Care Montreal (ACCM), Northern AIDS Connection Society, AIDS Committee of Newfoundland and Labrador, AIDS Saint John, and AIDS New Brunswick (Fredericton). The authors thank Ayesha Nayar and Nkem Iku (Research Coordinators, University of Toronto) for their role in the study.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) received following financial support for the research, authorship, and/or publication of this article: Kelly O'Brien is funded by a CIHR New Investigator Award. This study was funded by the Canadian Institutes of Health Research (CIHR), HIV/AIDS Research Initiative (FRN #120263).

### References

1. Deeks SG, Lewin SR, Havlir DV. The end of AIDS: HIV infection as a chronic disease. *Lancet*. 2013;382(9903):1525–1533.
2. Mahy M, Autenrieth CS, Stanecki K, Wynd S. Increasing trends in HIV prevalence among people aged 50 years and older: evidence from estimates and survey data. *AIDS*. 2014;28(suppl 4):S453–S459.
3. Public Health Agency of Canada. *HIV/AIDS Epi Updates. Chapter 1: National HIV Prevalence and Incidence Estimates for 2011*. 2014. [https://www.canada.ca/content/dam/phac-aspc/migration/phac-aspc/aids-sida/publication/epi/2010/pdf/EN\\_Chapter1\\_Web.pdf](https://www.canada.ca/content/dam/phac-aspc/migration/phac-aspc/aids-sida/publication/epi/2010/pdf/EN_Chapter1_Web.pdf). Accessed April 25, 2018.
4. Centers for Disease Control. HIV Among People Aged 50 and Over. 2017. <https://www.cdc.gov/hiv/group/age/olderamericans/index.html>. Accessed April 25, 2018.
5. Smit M, Brinkman K, Geerlings S, et al. Future challenges for clinical care of an ageing population infected with HIV: a modelling study. *Lancet Infect Dis*. 2015;15(7):810–818.
6. Guaraldi G, Orlando G, Zona S, et al. Premature age-related comorbidities among HIV-infected persons compared with the general population. *Clin Infect Dis*. 2011;53(11):1120–1126.
7. Onen NF, Overton ET, Seyfried W, et al. Aging and HIV infection: a comparison between older HIV-infected persons and the general population. *HIV Clin Trials*. 2010;11(2):100–109.
8. Guaraldi G, Silva AR, Stentarelli C. Multimorbidity and functional status assessment. *Curr Opin HIV AIDS*. 2014;9(4):386–397.
9. Brown TT, Guaraldi G. Multimorbidity and burden of disease. *Interdiscip Top Gerontol Geriatr*. 2017;42:59–73.
10. O'Brien KK, Bayoumi AM, Strike C, Young NL, Davis AM. Exploring disability from the perspective of adults living with HIV/AIDS: development of a conceptual framework. *Health Qual Life Outcomes*. 2008;6:76.
11. O'Brien KK, Davis AM, Strike C, Young NL, Bayoumi AM. Putting episodic disability into context: a qualitative study exploring factors that influence disability experienced by adults living with HIV/AIDS. *J Int AIDS Soc*. 2009;12(1):30.
12. O'Brien KK, Hanna S, Gardner S, et al. Validation of the Episodic Disability Framework with adults living with HIV. *Disabil Rehabil*. 2014;36(4):319–329.
13. Hopcroft L, Bester L, Clement D, et al. "My body's a 50 year-old but my brain is definitely an 85 year-old": exploring the experiences of men ageing with HIV-associated neurocognitive challenges. *J Int AIDS Soc*. 2013;16(1):18506.
14. Gallagher S, Biro S, Creamer E, et al. "It's a Hidden Issue": exploring the experiences of women with HIV-associated neurocognitive challenges using a disability framework. *Disabil Rehabil*. 2013;35(1):36–46.

15. Solomon P, O'Brien K, Wilkins S, Gervais N. Aging with HIV and disability: the role of uncertainty. *AIDS Care*. 2014;26(2):240–245.
16. Solomon P, O'Brien KK, Wilkins S, Gervais N. Aging with HIV: a model of disability. *J Int Assoc Provid AIDS Care*. 2014;13(6):519–525.
17. Brown D, Claffey A, Harding R. Evaluation of a physiotherapy-led group rehabilitation intervention for adults living with HIV: referrals, adherence and outcomes. *AIDS Care*. 2016;28(12):1495–1505.
18. Hanass-Hancock J, Nixon SA. The fields of HIV and disability: past, present and future. *J Int AIDS Soc*. 2009;2(1):3.
19. Erlandson KM, Schrack JA, Jankowski CM, Brown TT, Campbell TB. Functional impairment, disability, and frailty in adults aging with HIV-infection. *Curr HIV/AIDS Rep*. 2014;11(3):279–290.
20. Johs NA, Wu K, Tassiopoulos K, et al. Disability among middle-aged and older persons with HIV Infection. *Clin Infect Dis*. 2017;65(1):83–91.
21. Rueda S, Law S, Rourke SB. Psychosocial, mental health, and behavioral issues of aging with HIV. *Current opinion in HIV AIDS*. 2014;9(4):325–331.
22. Guaraldi G, Palella FJ Jr. Clinical implications of aging with HIV infection: perspectives and the future medical care agenda. *AIDS*. 2017;31(suppl 2):S129–S135.
23. Canadian Working Group on HIV and Rehabilitation, Wellesley Institute. *Equitable Access to Rehabilitation: Realizing Potential, Promising Practices, and Policy Directions*. 2012. <http://www.wellesleyinstitute.com/wp-content/uploads/2012/06/Equitable-Access-to-Rehabilitation-Discussion-Paper1.pdf>. Accessed April 25, 2018.
24. Lazarus RS, Folkman S. *Stress, Appraisal, and Coping*. New York, NY: Springer; 1984.
25. Lorig KR, Sobel DS, Ritter PL, Laurent D, Hobbs M. Effect of a self-management program on patients with chronic disease. *Eff Clin Pract*. 2001;4(6):256–162.
26. Webel AR, Lorig K, Laurent D, et al. *Living a Healthy Life with HIV*. 4th ed. Formerly *Living Well with HIV & AIDS*. Boulder, CO: Bull Publishing; 2016.
27. Realize (formerly the Canadian Working Group on HIV and Rehabilitation). *Strategic Plan*. 2017. <http://www.realizecanada.org/wp-content/uploads/CWGHR-Strategic-Plan-2014-2017.pdf>. Accessed February 11, 2018.
28. Carsten Schmitz. *LimeSurvey Software Package* [computer program]. Germany; 2010.
29. Dillman DA. *Mail and Internet Surveys: The Tailored Design Method—2007 Update with New Internet, Visual, and Mixed-Mode Guide*. Hoboken, NJ: John Wiley; 2011.
30. *SAS Computer Software 9.3* [computer program]; 2011. Toronto, Canada: SAS Institute.
31. Public Health Agency of Canada. *Summary: Estimates of HIV Incidence, Prevalence and Proportion Undiagnosed in Canada, 2014*. Canada: Surveillance and Epidemiology Division, Professional Guidelines and Public Health Practice Division, Centre for Communicable Disease and Infection Control, Public Health Agency of Canada; 2015. <https://www.canada.ca/content/dam/canada/health-canada/migration/healthy-canadians/publications/diseases-conditions-maladies-affections/hiv-aids-estimates-2014-vih-sida-estimations/alt/hiv-aids-estimates-2014-vih-sida-estimations-eng.pdf>. Accessed April 25, 2018.
32. Emlet CA, Brennan DJ, Brennenstuhl S, Rueda S, Hart TA, Rourke SB. The impact of HIV-related stigma on older and younger adults living with HIV disease: does age matter? *AIDS Care*. 2015;27(4):520–528.
33. Jin M. *Implementing Multiple Comparisons on Pearson Chi-square Test for an R×C Contingency Table in SAS®*. New York, NY: SAS Institute Inc; 2014.
34. Kraaij V, van der Veek SM, Garnefski N, Schroevers M, Witlox R, Maes S. Coping, goal adjustment, and psychological well-being in HIV-infected men who have sex with men. *AIDS Patient Care STDS*. 2008;22(5):395–402.
35. Gibson K, Rueda S, Rourke SB, et al. Mastery and coping moderate the negative effect of acute and chronic stressors on mental health-related quality of life in HIV. *AIDS Patient Care STDS*. 2011;25(6):371–381.
36. Rodkjaer L, Chesney MA, Lomborg K, Ostergaard L, Laursen T, Sodemann M. HIV-infected individuals with high coping self-efficacy are less likely to report depressive symptoms: a cross-sectional study from Denmark. *Int J Infect Dis*. 2014;22:67–72.
37. Kumar S, Mohanraj R, Rao D, Murray KR, Manhart LE. Positive coping strategies and HIV-related stigma in South India. *AIDS Patient Care STDS*. 2015;29(3):157–163.
38. DeGrezia MG, Scrandis D. Successful coping in urban, community-dwelling older adults with HIV. *J Assoc Nurses AIDS Care*. 2015;26(2):151–163.
39. Emlet CA, Harris L, Pierpaoli CM, Furlotte C. “The journey I have been through”: the role of religion and spirituality in aging well among HIV-positive older adults [published online March 6, 2017]. *Res Aging*. 2017.
40. Bolding G, Davis M, Sherr L, Hart G, Elford J. Use of gay Internet sites and views about online health promotion among men who have sex with men. *AIDS Care*. 2004;16(8):993–1001.
41. Horvath KJ, Danilenko GP, Williams ML, et al. Technology use and reasons to participate in social networking health websites among people living with HIV in the US. *AIDS Behav*. 2012;16(4):900–910.
42. Emlet CA, Harris L, Furlotte C, et al. When less is more: the pruning of social networks by HIV-positive older adults. Paper presented at: 25th Annual Canadian Conference on HIV/AIDS Research (CAHR Conference). May 12–15, 2016, Winnipeg, Canada.
43. Emlet CA. An examination of the social networks and social isolation in older and younger adults living with HIV/AIDS. *Health Soc Work*. 2006;31(4):299–308.
44. Guaraldi G, Prakash M, Moecklinghoff C, Stellbrink HJ. Morbidity in older HIV-infected patients: impact of long-term antiretroviral use. *AIDS Rev*. 2014;16(2):75–89.
45. Grov C, Golub SA, Parsons JT, Brennan M, Karpiak SE. Loneliness and HIV-related stigma explain depression among older HIV-positive adults. *AIDS Care*. 2010;22(5):630–639.
46. Moskowitz JT, Hult JR, Bussolari C, Acree M. What works in coping with HIV? A meta-analysis with implications for coping with serious illness. *Psychological Bulletin*. 2009;135(1):121–141.
47. Roger KS, Mignone J, Kirkland S. Social aspects of HIV/AIDS and aging: a thematic review. *Can J Aging*. 2013;32(3):298–306.

48. Emlet CA. "You're awfully old to have this disease": experiences of stigma and ageism in adults 50 years and older living with HIV/AIDS. *Gerontologist*. 2006;46(6):781–790.
49. De Santis JP, Florom-Smith A, Vermeesch A, Barroso S, DeLeon DA. Motivation, management, and mastery: a theory of resilience in the context of HIV infection. *J Am Psychiatr Nurses Assoc*. 2013;19(1):36–46.
50. Vance DE, Struzick TC, Masten J. Hardiness, successful aging, and HIV: implications for social work. *J Gerontol Soc Work*. 2008;51(3-4):260–283.
51. Zautra AJ, Hall JS, Murray KE, et al. Resilience: a new integrative approach to health and mental health research. *Health Psychology Review*. 2008;2(1):41–64.
52. Fang X, Vincent W, Calabrese SK, et al. Resilience, stress, and life quality in older adults living with HIV/AIDS. *Aging Ment Health*. 2015;19(11):1015–1021.
53. Fumaz CR, Ayestaran A, Perez-Alvarez N, et al. Resilience, ageing, and quality of life in long-term diagnosed HIV-infected patients. *AIDS Care*. 2015;27(11):1396–1403.
54. Emlet CA, Tozay S, Raveis VH. "I'm not going to die from the AIDS": resilience in aging with HIV disease. *Gerontologist*. 2011;51(1):101–111.
55. Furlotte C, Schwartz K. Mental health experiences of older adults living with HIV: uncertainty, stigma, and approaches to resilience. *Can J Aging*. 2017;36(2):125–140.
56. Emlet CA, Shiu C, Kim HJ, Fredriksen-Goldsen K. Bouncing back: resilience and mastery among HIV-positive older gay and bisexual men. *Gerontologist*. 2017;57(suppl 1):S40–S49.
57. Emlet CA, Harris L, Furlotte C, et al. 'I'm happy in my life now, I'm a positive person': approaches to successful ageing in older adults living with HIV in Ontario, Canada. *Aging Society*. 2017;37(10):2128–2151.
58. Southwick SM, Bonanno GA, Masten AS, Panter-Brick C, Yehuda R. Resilience definitions, theory, and challenges: interdisciplinary perspectives. *Eur J Psychotraumatol*. 2014;25338:5. <http://dx.doi.org/10.3402/ejpt.v5.25338>
59. Colpitts E, Gahagan J. The utility of resilience as a conceptual framework for understanding and measuring LGBTQ health. *Int J Equity Health*. 2016;15:60.
60. Bernardin KN, Toews DN, Restall GJ, Vuongphan L. Self-management interventions for people living with human immunodeficiency virus: a scoping review. *Can J Occup Ther*. 2013;80(5):314–327.
61. Cahill S, Valadez R. Growing older with HIV/AIDS: new public health challenges. *Am J Public Health*. 2013;103(3):e7–e15.
62. Moscou-Jackson G, Commodore-Mensah Y, Farley J, DiGiacomo M. Smoking-cessation interventions in people living with HIV infection: a systematic review. *J Assoc Nurses AIDS Care*. 2014;25(1):32–45.
63. High KP, Brennan-Ing M, Clifford DB, et al. HIV and aging: state of knowledge and areas of critical need for research. A report to the NIH Office of AIDS Research by the HIV and Aging Working Group. *J Acquir Immune Defic Syndr*. 2012;60(suppl 1):S1–S18.
64. Altman DG, Royston P. The cost of dichotomising continuous variables. *BMJ*. 2006;332(7549):1080.